The Determinants of Switching Insurers When Search Costs are Low: The Internet Automobile
Insurance Market in Korea

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August, 2006

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Introduction

The ability to retain customers in the face of competition is an important determinant of profitability for insurers, since customer acquisition costs are a significant component of insurer expenses. Simply put, it is less expensive to keep existing customers than it is to attract new ones. The long-term survival of firms requires that they be able to identify, attract and retain profitable customers. One study indicates that a five percent increase in customer retention can increase a service firm's profits by 100 percent over the long term (Reichheld and Sasser, 1990). This may be particularly important for a product like automobile insurance, where consumers may not perceive many differences among product offerings.

One way insurers might increase retention is to create or exploit switching costs in the market. Switching costs are distinct from search costs in that search costs must be borne ex ante to find price and quality distributions for heterogeneous products, or price information alone for commodity products (Klemperer, 1987, 1995; Bakos, 1997). Once a search is completed, consumers then choose the optimal price and quantity to maximize utility. However, once a consumer chooses a particular provider, the consumer may experience costs associated with switching to a new provider that would not be incurred if the consumer stayed with the current provider. These costs are referred to as switching costs.

Klemperer (1995) identifies several types of switching costs that are relevant for the insurance market. Transaction costs are incurred at the start of a new relationship. In insurance, submitting an initial application for insurance can be quite costly in terms of information gathering and submission. Learning costs reflect the effort expended to learn about using the new

product, even though the new product might be functionally similar to the previous one. Psychological costs include such intangibles as brand or personal loyalty. Artificial costs are imposed by firms as a method to retain customers. Artificial switching costs in an insurance market include experience rating plans that reward consumers for good claims history over a period of time with the insurer. In addition, consumers might have a "status quo" bias (Samuelson and Zeckhauser, 1988), or might have made the purchase decision as an act of friendship with an insurer representative (Schlesinger and von der Schulenburg, 1994). Switching costs may also include the costs to search for a new provider once a relationship has been established. If search costs are sufficiently high, a consumer might choose not to undertake a new search, and thus have higher costs of switching than otherwise. Conversely, when search costs are reduced switching should increase (See, for example, NERA, 2003; Chen and Hitt, 2002; Brynjolfsson and Smith, 2000; Bishop et al, 2006).

Empirical studies on the decision to switch insurers are relatively few. Several survey based studies have supported the notion that there are switching costs in the market for automobile insurance. For example, in a survey of 675 agencies, Cummins and Weisbart (1977) report that, on average 49.2 percent of those who shopped bought from the lowest price carrier but 47.5 percent did not. Further, the majority reported that the most important factor when shopping for insurance was the insurer rather than the price. Cummins et al (1974) reports that 44 percent of consumers would require a price reduction of at least twenty percent to switch insurers, while in a more recent study, Guiliani et al, (2004) report that a price increase of at least fifteen percent on average is required to induce European auto insurance customers to switch. Similarly, a 2001 survey of U.S. auto insurance consumers by J.D. Powers and Associates reports that only 30 percent of those who shop for insurance online are price driven, and that 40

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percent would not switch insurers for any reason. Of those that would switch, 30 percent would

require a premium savings of at least $300.0. Bishop et al, (2006) found that price was the

principal reason that auto insurance consumers started shopping, but that only 21 percent in

Germany, eight percent in Italy, and 35 percent in the U.K. actually switched insurers.

Statistics on customer retention rates also support the notion that there may be significant

switching costs in this market, as switching insurers appears to be rather low. Cummins and

Weisbart (1977) report the automobile insurance retention rates are approximately 92 percent on

average. Guiliani et al report an 82 percent retention rate for European auto insurers. The

retention rate for State Farm, the largest U.S. auto insurer, is approximately 91 percent

(Cavanaugh, 2005).

More rigorous empirical studies also support the notion that factors other than price are

important in deciding whether to switch insurers. In a study of Canadian automobile consumers,

Dahlby and West (1986) find substantial movement from very high to very low priced firms

with little movement between, and suggest that consumers switch only for substantial price

savings. Schlesinger and von der Schulenburg, (1993) conduct a rigorous empirical investigation

of consumer switching in the German automobile insurance market. Using survey data from a

sample of 2004 consumers, they find that approximately 30 percent of all consumers switched

insurers during the period, but that consumer informedness about prices and quality plays a key

role in the switching decision, with more informed consumers more likely to switch.

In the current paper, we analyze the decision to switch insurers for a group of automobile

insurance consumers shopping through an Internet insurance aggregator in Korea[1]. The

conventional wisdom is that Internet competition will increase efficiency and lower prices across

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[1] The aggregator acts as an agent and represents all ten of the licensed automobile insurers in the market. All
applicants get price quotes from all licensed insurers, and insurers compete on price and coverage terms and
conditions.

all product markets by reducing both transaction and search costs (Bakos, 1997; Lal and Sarvary, 1999)[2]. The aggregator site reduces search costs by providing information about specific insurer quality, general information about insurance contracts and coverages, and price quotes from all participating insurers based on one application. The site also reduces transaction costs by accepting premium payments online so that the applicant is insured once the premium is paid. We use data collected at this site to study insurance prices and switching behavior in this market. Out study is a bit different from prior studies in that all of the consumers are searching for an insurer, and all have more complete information about the price and quality choices in the market.

Our research adds to the literature in several important ways. First, this is the only study that we know of to examine automobile insurance purchasing decisions in an Internet environment, and one of the few empirical studies that examine Korean insurance markets. Following the thread that the Internet leads to reduced search and transaction costs as noted above, we investigate whether there is more customer switching than might be expected in a traditional market. The answer has implications for insurer marketing practices and for insurer profitability if Internet shopping makes it easier to switch suppliers, resulting in lower customer retention rates than conventional distribution channels. This is especially the case if insurers offer initial prices less than the break-even price to attract new clients and then capture rents from existing clients in the longer term (Darcy and Doherty, 1990; Klemperer, 1995). Greater switching might lead to higher prices than in traditional channels if insurers can not recapture the

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[2] Brown and Goolsbee (2002) examine the introduction of Internet quoting sites for term life insurance and find significant premium reductions following increased use of the Internet. Other studies have also found significant cost savings associated with electronic markets. For example, Brynjolfsson and Smith (2000) find that prices for books and CDs online are 9 - 15% lower than those at conventional retailers. Zettelmeyer (2000) notes that many Internet-only suppliers have lower prices than their more traditional retail competitors.

costs of customer acquisition, even though these costs should be lower on the Internet than through personal sales channels (Garven, 2002)

Second, we investigate whether the decision to switch insurers is driven by price alone, or whether other factors influence the decision to switch. Predicting the factors that drive customer behavior will become more important as price competition increases. We model the probability of switching insurers based on consumer demographics, risk types, and insurer prices to determine which characteristics are linked to a greater propensity to change insurers. If there are systematic differences in the population that switches and the population that does not, insures may exploit these to induce profitable potential switchers to stay, and may also forego inducements that might otherwise be offered to those who are not likely to switch in any case, thus resulting in lower costs, and / or improved insurer profitability.

Finally, automobile insurance is important in its own right. The global non-life insurance market accounted for approximately 3.25 percent of global GDP in 2005, with premium revenue of $1.425 trillion (SwissRE, 2006). The largest component of this market is automobile insurance, with market share differing significantly across countries. If Internet markets generate "excessive" switching that increases prices, the welfare implications may be serious.

Below we discuss the Korean automobile insurance market in Section 2. Our data is detailed in Section 3 and the empirical results are discussed in Section 4. We find significantly higher switching in this market compared to more traditional markets, with over 53 percent of consumers changing insurers in our sample. Section 5 concludes with a discussion of the implications of our findings.

2. The Korean Automobile Insurance Market

Automobile insurance is compulsory in Korea. All drivers must purchase bodily injury liability insurance at specific limits, and must also purchase property damage liability insurance. However, consumers have a choice in the limits carried. Consumers can also choose to carry uninsured motorists coverage, collision coverage, and medical expense limits, similar to those offered in U.S. markets. Drivers have a choice about the level of deductibles to carry for collision coverage.

Korea's insurance market is relatively well developed, with gross non-life insurance premium volume of $19.99 B in 2003 (OECD, 2005). Korean ranks number five in insurance as a proportion of GDP for OECD member nations. Automobile insurance accounts for approximately 65 percent of the property-casualty segment of the market, with premium volume of $5.53 B (KNIA, 2005). The average expenditure on insurance per registered vehicle was $376.00 for 2004[3]. This compares to $821.00 for the U.S. market for 2003, the latest year for which data is available.

3. Data and Methodology

We have 1563 observations of personal automobile insurance purchases at an online insurance aggregator serving the Korean automobile insurance market in the second quarter of 2003. The observations are for those consumers that are currently insured with a specific insurer (Insurer A), or were insured with Insurer A in the prior period. Thus our sample includes consumers that renewed coverage with Insurer A (did not switch), or switched to or from Insurer A for our period. Insurer A is one of the larger insurers in the market. We have information only on shoppers who completed the insurance purchase. Those who left the site before completion

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[3] This is based on 14,677,407 total registered vehicles in 2004 as reported by KNIA, assuming that all are insured. The exchange rate used is 952 won per dollar, reported as of July 24, 2006.

are not included in this analysis. The site collects data on the applicant's gender, age, driving history, zip code, market value of car, prior insurance provider, and vehicle type. The applicant selects coverage limits and endorsements, and these are also included in the data set. The site owner also provided us with information about the highest and lowest quoted prices for each applicant, as well as the name of the previous insurer and the applicant's choice of insurer for the upcoming period.

We do not have information about the complete distribution of prices from all insurers for each applicant, nor do we have data on the price paid for insurance in the prior period. Because of these data limitations, we can not explicitly measure switching costs. However, we can investigate the factors that influence switching, and we can measure the importance of price in the decision to switch insurers.

3.1 Explanatory variables

The dependent variable in our analysis is a zero - one indicator set equal to one if the driver switched insurers from the prior period, and zero if the driver did not switch. We are first interested in examining the impact of price on the decision to switch insurers. We have two possible measures of price. The website records the actual prices paid by consumers once the risk classification and policy selection variables are known. However, use of actual prices paid results in an endogeneity condition between price paid and whether the consumer switched insurers or not. An alternate measure of insurance prices that is not subject to this problem is the distribution of offering prices for each consumer. This measure is constructed by taking the average of the highest and lowest offering price. Of course, this is related to the customer risk type and policy offering choices, but is not determined simultaneously with the decision to switch.

H1: The probability of switching insurers is higher as insurance prices increase.

To control for the effects of customer risk and policy selection, we also include several additional variables. Insurance prices depend on the type of car driven. In this market, cars are classified by the size of the engine rather than car model. We construct an ordinal variable that ranges from zero to three for car type that corresponds to actual rating classes, where zero represents the smallest car, and three the largest. Only passenger cars are included in the sample. We also include the depreciated value of the car to control for difference in rating plans for newer versus older cars. Because this variable is highly skewed, we use the natural logarithm transformation in our analysis. Insurance rating for liability coverage is also affected by whether the car has airbags or not. The cars in our sample may have zero, one, or two airbags, with risk declining with the number of airbags. We include an indicator variable to control for whether the insured vehicle has at least one airbag[4].

Gender and driver age also play a role in insurance rating, and might also be important determinants of the decision to switch insurers. It is well known that, at least in the U.S., male drivers tend to have more frequent and more serious accidents than female drivers, and that this holds for all age groups. Across age groups, accident frequency is higher for drivers under twenty-five years old, and then begins to increase again for drivers over age seventy (III, 2005). Therefore, we would expect insurance prices, and thus the incentive to switch insurers, to be higher for males than for females, and for the youngest and oldest drivers in the sample[5].

Older drivers, however, may be less likely to switch providers even if premium savings are significant. There is a substantial body of evidence that finds that the elderly are relatively more risk

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[4] Note that we also tested an ordinal variable ranging from zero to two for the number of airbags, but this variable did not perform better than the 0-1 dummy, did not qualitatively change any other results, and is not as straightforward to interpret. Therefore, we do not report results using that variable.

[5] It seems reasonable that there may be differences in the characteristics of our sample by age and gender classes. However, we analyzed several interaction terms to test for these and found no significant interaction effects.

averse. For example, Haleck and Eisenhauer (2001) find greater relative risk aversion among the elderly for both pure and speculative risks while Riley and Chow (1992) find that risk aversion increases significantly after age 65. Research has also suggested that older customers exhibit greater brand loyalty than younger ones. This might be due to greater psychological costs of switching, or to differences in wealth that lead to greater differences in switching costs and loyalty (See, for example, Bell, et al 2005; Mitttal and Kamakura, 2001). This literature also suggests that males exhibit less brand loyalty overall than do females[6]. To capture these factors, we include an indicator variable set equal to one for female and zero for male consumers. We also include six indicator variables that capture differences across age categories in the regression models below[7]. The average age of the consumers in our sample is 40.56, ranging between 20 and 73 year old. Our age groups are for consumers less than thirty years old, those between thirty and thirty-five, thirty-five and forty, forty and forty-five, and those over fifty years old. Table 1 shows the distribution of the sample across age and gender classes.

H2: Older drivers are less likely to switch insurers than are younger drivers.

H3: Female drivers are less likely to switch insurers than are male drivers.

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[6] There is some evidence that there are age and gender related difference in Internet usage that might diminish or increase the incentives to switch. There are a number of studies that show that Internet usage is higher among males than females, and that this differs across countries. For example, in the U.S., 66% of women and 68% of men use the Internet regularly (Fox, 2004). Yang and Lester (2005) find that approximately 50% of Internet users are men in the U.S., but this increases to 62% for Japan, and 80% for China. In Korea, approximately 63% of men and 51% of women used the Internet in 2001 (MCIE, 2003). There is similar evidence that shows consistent difference in Internet usage across age groups, with use declining with age. For our study, we find that just 18% of shoppers for automobile insurance on the website were women, lower participation than might be expected. However, we find that 21% of the sample is over age 45, while approximately 26% of the population over the legal driving age is over 45 years old.

[7] A continuous variable for age was also initially included in the models but was not significantly related to switching for any of the relations we examined.

Of course, consumers must also make policy selections to match their needs and budget constraints. As mentioned above, both bodily injury and property damage liability are required coverages in Korea. Our sample includes only those consumers who purchase unlimited bodily injury coverage. If this option is chosen, at fault drivers are shielded from criminal liability for automobile accidents. Our original sample included only eight drivers who chose a lower bodily injury liability limit, so these were dropped from the sample. Our property-damage liability insurance variable is a continuous variable that ranges from 20,000 to 100,000. Drivers must also decide whether to carry uninsured motorist coverage, but if this coverage is selected, the limit is the same for all drivers. Therefore, we include a dummy variable set equal to one if the insured chooses uninsured motorist coverage, and zero otherwise. For collision coverage insureds must choose deductibles from a menu of $0.00, $50.00, $100.00, $200.00, $300.00 and $500.00. We constructed a dummy variable set equal to one for those who chose a deductible greater than $200.00, and zero otherwise. There is also a dummy variable that is set equal to one to control for those insured's who chose not to carry physical damage coverage at all. If physical damage coverage is chosen, the dummy variable is equal to zero. Therefore, a higher value for this variable indicates no physical damage coverage.

Insurers also apply credit and surcharge points for customer tenure and accident experience. Credit is applied as a ten percent discount from the base premium rate for each accident free year for the first five accident free years, and then the rate falls to five percent per accident-free year for the sixth and seventh years. There is no further reduction for accident experience after seven years. Thus, the maximum credit for good driving is a sixty percent discount from the base rate, or forty percent of the base premium payable. In our analysis, premium credit is represented by the proportion of base rate paid for accident experience, so that

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a higher value for credit is associated with a higher base rate (lower premium credit), and thus higher driver risk.

Insurers also apply a penalty for losses incurred in the previous three years. This premium surcharge ranges from one percent to forty percent applied to the base premium. A higher surcharge is associated with higher risk. For our sample, 13.5 percent of drivers were assessed a claims surcharge in our period, with the average surcharge equal to 14.7 percent for those assessed. For the whole sample, the average surcharge is equal to 1.99 percentage points. To control for recent accident experience, we also include the driver surcharge points in the analysis that follows[8]. We expect that there is a greater incentive to switch insurers as surcharges and premium credits increase, since there may be a greater financial benefit to switching for higher risk insureds.

H4: Higher risk drivers are more likely to switch insurers than are lower risk drivers.

Finally, we include a series of zip code indicator variables to control for location of the insured vehicle, since insurers might have underwriting guidelines that seek to increase or limit business in some areas. Note that zip codes are not permitted to be used as a rating factor in Korea, so do not affect insurance prices directly.

3.2 Methodology

We undertake two types of analysis here. First, since we are interested in the relationship between insurance prices, demographic and risk characteristics, and switching behavior, we examine patterns of switching in the sample as a whole and in subsets of the sample to determine whether there are differences in the propensity to switch. This is accomplished by using t-tests to compare differences in the means of selected explanatory variables across different sub-groups

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[8] One might expect that driving experience points would be strongly correlated with driver age, but we find that this is not the case for our sample. The average age for surcharged drivers is 42.24 years, compared with 40.56 for the sample as a whole.

of the sample. We first examine differences in the characteristics of those that switched insurers compared to those that did not, and then compare differences across subsets. We investigate differences by gender, risk class as measured by surcharge and credit points, and also look at differences in switching among those that bought insurance from the highest priced offeror and those that bought from the lowest price offeror[9].

We then use logistic regression to estimate the joint effects of our independent variables of the propensity to switch insurers. We test whether the probability of switching is higher as insurance price increases, holding all other factors in the model constant.

The model takes the following form:

$y = 1$ if switch $= 1$,

$y = 0$ otherwise,

then

$P = P(y_i = 1) = e^{(a + B'X_i)} / 1 + e^{(a + B'X_i)}$

and

Logit $P = (P / 1 - P) = a + B_1O_1 + B_2R_2 + B_3D_3 + B_iZ_i + u_i$

where

O = average offering prices

R = vector of risk charges

D = vector of demographic characteristics

Z = vector of controls

and u_i is the error term.

The model is estimated using maximum likelihood methods. We estimate three models. The first uses only the offering price and demographic variables without controls for policy selection, car type or risk charges. The second model includes all variables except the offering

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[9] We also examined differences by age by constructing an indicator variable equal to one for those under age 30, and zero for those over age 50. However, we found no difference in the propensity to switch between these two sub-groups, so we do not report the results for these tests.

price variable, and the third model includes all of the independent variables. Estimating these

three models allows us greater insight into the relations between price and switching behavior, as

well as the role of risk charges, demographics, and policy choices in the decision to switch. This

also allows a test of the robustness of our main results to various specifications of the model. The

standard tests were conducted for pairwise correlation, multicollinearity, and endogeneity of our

price variable, and we find no significant econometric problems in the estimation[10].

4. Empirical Results

We first discuss the results of our t-tests comparing the characteristics of the group that

switched insurers to the group that did not for our sample. Note that this analysis includes the

actual prices paid by insureds in the sample, to facilitate a comparison between actual and offer

prices across groups. Table 2 shows the means and standard deviations of the variables of

interest for our sample, with the group that switched insurers in column two, and the group that

did not switch in column three. T-statistics are shown in column four of the table[11]. Over 53

percent of the sample switched insurers in the period studied, a figure much higher than that

found in other studies, supporting the idea that switching costs are indeed lower in the Internet

market as hypothesized above. Of course, this might also be an artifact of the insurer under study

here. Further investigation revealed that, of the sub-group of 835 consumers that switched

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[10] Specifically, the Pearson correlation coefficients for our variables are all under 70%, so we should not have a problem with co linearity. The highest correlation coefficient, at 70%, is between our offer price variable and premium credit. The model was re-estimated omitting the credit variable with no qualitative change in the results. Also, the Pearson correlation between the premium credit and surcharge variables is just 28%. As a test of the joint collinearity of the variables in the model, we examine the variance inflation factors from the regression analysis. None exceeded 2, so joint multicollinearity is not a problem in the model. Finally, a Hausman test was conducted to test for endogeneity of our offer price variable. The test statistic was not significant at the 10% level, so we can not reject the hypothesis of no endogeneity.
[11] Note that we use a continuous variable for age here since it is more meaningful in this context than using a series of categorical variables. Also, we do not report results for this analysis for car type, zip code or airbag use to save space as these are control variables only, not subject to applicant selection, and not highly important in rating. This allows us to focus on the more meaningful variables.

insurers, 656 switched from Insurer A, and 179 switched to Insurer A. We analyzed differences

across these groups and found no significant differences on any important dimensions. Thus, our

results should generalize to other Internet auto insurers in this market[12].

The results of Table 2 indicate significant differences in means for all measures except

age for those that switched versus those that did not. Contrary to expectation, though, this test

finds that females are more likely to switch insurers than are males, and this is statistically

significant at the ten percent level. For the group that switched insurers, both average offer prices

and actual prices paid are statistically significantly higher than those of the non-switching group.

This is the case even though limits of insurance purchased are significantly lower for those that

switched. Property damage liability limits average \$32,443 for the switchers, versus \$34,744 for

the non-switchers, a difference that is statistically significant at the five percent level. Further,

switchers are less likely to carry physical damage coverage for their vehicles, and less likely to

carry uninsured motorist coverage, both of which reduce overall insurance prices. These

differences are statistically significant at the five percent level as well. However, switchers have

more expensive cars on average, and a smaller proportion of them carry higher deductibles for

physical damage coverage. These factors will work to increase premiums, all else equal.

There are quite significant differences in the risk charges for these groups. The group that

switched insurers is assessed statistically significantly higher accident surcharges than the non-

switchers. The average surcharge for the switching group is 2.4 percent, while is it 1.58 percent

for the non-switchers. This difference is significant at better than the one percent level. Further,

the credit reduction for the switching group is lower than that for the non-switching group, again

indicating a higher risk class. On average, those that switched paid almost seventy percent of the

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[12] Of course, the results may not generalize to more traditional auto insurance markets, since the demographics of the sample here are quite different from the population as a whole, as noted in Table 1.

base price, while those that did not paid approximately 58.66 percent, a difference that is statistically significant at the one percent level. This provides some support for Hypothesis 4 above that associates greater consumer risk with a greater propoensity to switch insurers.

Interestingly, those that did not switch paid actual prices higher than their mean offer price, while those that did switch paid prices lower than their mean offer price. This might imply that the non-switching group is not as price sensitive as the group that switched, or that switching costs are higher for this group.

Table 3 presents the results of the analysis of differences in switching by gender. The results indicate several important differences between males and females in the sample. First, the age of females in our sample is significantly lower than that of males. Second, while there is no statistically significant difference in car value, deductible choice, or the purchase of physical damage or uninsured motorist coverage between males and females, female drivers purchase significantly lower limits of property damage liability insurance, but pay higher prices overall, and face higher offering prices than males in the sample. Males on average purchase property damage liability limits of $33,380, while female limits average $30,000, and this is statistically significant at the ten percent level. The average offering price for males in the sample is $390.91, while it is $458.60 for females, a difference that is statistically significant at better than the one percent level. The factor that seems to be driving this is that females get less credit for experience and tenure than do males. On average, females paid almost 72.5 percent of the base rate, while males paid 60 percent. This difference is highly significant. However, there is no statistically significant difference in accident surcharges between these groups. Therefore, we conclude that females must have less insured tenure than males, and thus pay higher rates.

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Similar to the findings in Table 2, males are less likely to switch, and also pay prices that are higher than the average offering price, while females pay prices lower than their average offering price and are more likely to switch. Thus, although we do find that females are more likely to switch, counter to our hypothesis, this might be due to difference in insurance prices driven by risk factors, rather than to gender differences alone.

Table 4 presents the results of the t-tests for the sub-group of the population that was assessed a premium surcharge for accident experience in the previous three years. This represents 13.56 percent of the sample, or 211 insureds. This analysis provides greater insight into the relation between switching and risk type since we can expect drivers in this group to pay higher premiums on average, and thus we might expect to see little difference in premiums among the members of this group.

The results in Table 4 support this. Although both offer prices and prices paid are higher for those that switched in this group, neither difference is statistically significant. We do find significantly lower property damage liability limits for the group that switched than for non-switchers among those that were assessed a premium surcharge, but no other significant difference in insurance coverage choices. However, even among this group, there are differences in risk type that seem to affect the decision to switch. The results for our credit variable indicate that the group that switched paid 87.55 percent of the base premium, while those that did not paid 69.47 percent of the base premium, a difference that is statistically significant at the one percent level. This again provides some support for Hypothesis 4 that switching is related to risk type. Further, the rate of switching is highest among this group; 65.56 percent switched insurers from the prior period, compared to 53.42 percent for the sample as a whole.

Finally, we note that most consumers in our sample purchased coverage at a price near the midpoint of the offer distribution. Only a small proportion, just over four percent (64 insureds), purchased from the lowest priced insurer. This supports the notion that the decision to switch is affected by factors other than price for at least some consumers, but that a portion of the market is price driven. We also observed that a larger portion of the sample, just over seven percent (111 insureds) purchased from the insurer with the highest offer price. This indicates either a reluctance to switch from a current high priced insurer for this group and thus high switching costs, or a switch to the high priced insurer because of factors such as policy terms and conditions, reputation, or other factors that we are unable to control for. Table 5 shows the results of the comparison of means between these two groups. The results for those that chose the highest priced insurer are shown in column two, and the results for those that chose the lowest priced insurer are shown in column three.

The results shed some interesting light on the factors that influence insurer switching. First, of the 111 consumers that chose the highest priced insurer, 16 of them switched there, and 95 renewed their coverage with the highest priced insurer. Of the group that chose the lowest priced insurer, 100 percent of them switched to that insurer. There were no renewals from the prior period among this group. This indicates significantly higher brand loyalty (higher switching costs) for those that chose the highest priced insurer.

There is no significant difference in age between these groups, but we do find that females are more likely to have chosen the lowest priced insurer than are males. Again, though, this might be due to the inter-relationship between female insureds and higher prices overall. Those that chose the highest priced insurer faced lower average offer prices, but paid actual prices higher than the average offer price as compared to lowest premium buyers. The average

offered premium for the highest priced buyers is $264.79, much lower than the average for lowest price buyers at $419.72. This is a difference of over 58 percent, and is statistically significant at better than the one percent level. Actual prices paid are also statistically significantly different at the one percent level but the relative difference in prices paid is smaller, with paid premiums equal to $278.81 for highest price buyers, and $383.81 for lowest price buyers, a difference of just 34 percent.

The lowest premium buyers are higher risk on average, with significantly higher surcharges and credits and narrower coverage, with fewer buying uninsured motorist or physical damage coverage. Each of these differences is statistically significant at the one percent level. Overall, these results indicate that there is less financial incentive for those that purchase from the highest priced buyer to switch. Further, these consumers are more desirable from an insurer's view, since their risk is lower and insurance coverage is broader. However, even though they could pay lower prices, few of the consumers in this group switched in our period, again supporting the idea that there are factors other than price that influence consumer switching in this market.

4.1 Logistic Regression Results

The above tests are suggestive, but can not control for the joint effect of the independent variables on the probability of switching insurers. Table 6 reports the results of three logistic regression models, where the dependent variable is equal to one if the consumer switched insurers from the prior period, and zero otherwise. Note that these models include indicator variables for different age groups as mentioned above, and car type and airbag use, as well as zip code indicators to control for different geographic regions. Model 1 includes age, gender, region,

and offer price variables only, Model 2 adds customer risk, car specification, and insurance policy choice variable, but omits offer prices, and Model 3 includes all independent variables.

The results for Model 1 are shown in the first column. Estimated coefficients and standard errors are shown. The model is statistically significant, with a likelihood ratio statistic of 48.55, and correctly predicts switching for 60.3 percent of the sample. We find strong support for Hypothesis 1 in this model. Switching is positively associated with insurance prices once other factors are controlled for. The estimated coefficient for our price variable is positive and statistically significant at better than the one percent level, as expected.

The results indicate that the probability of switching insurers is negatively associated with age for those between age 30 and 35, and over 45 years old. The estimated coefficients for these variables are statistically significant at the five percent level for those between ages 30 and 35, and those over 50 years old, and at ten percent for those between 40 and 45 years old. This provides mixed support for Hypothesis 2, that switching should be less likely for older consumers. Older consumers are indeed less likely to switch, but so are consumers between age 30 and 35. Moreover, we do not find that youngest consumers are more likely to switch once insurance price is accounted for.

Our regression models do not support Hypothesis 3 at all. We find no significant relation between gender and the probability of switching insurers for any model estimated. This might be due to the fact that females and males face different price distributions in this market as compared to other consumer goods markets that have been studied, and that price motives overwhelm gender differences. Alternately, it might be that the population of females that shop for automobile insurance on the Internet differs in important ways from the general population. One other possibility is that females might not be doing their own shopping in this market. If

males and females differ in their comfort with Internet shopping as some suggest, then perhaps some portion of females in this market rely on others to make the online insurance purchase. However, we can not control for those factors here.

Model 2 adds the remaining independent variables and omits average price. The results for age and gender are consistent with those of Model 1. In addition, we find that the estimated coefficients for our premium surcharge and credit variables are strongly related to the probability of switching and are of the expected sign. Consumers that are assessed higher surcharges and credits are more likely to switch insurers for our sample after controlling for insurance policy choices, supporting Hypothesis 4. The insurance policy choice variables indicate that switching is positively related to having more narrow coverage. The estimated coefficients for property damage liability limits and uninsured motorist coverage are negative, while the estimated coefficient for the physical damage dummy is positive, indicating that those with no physical damage coverage are more likely to switch insurers. All are statistically significant at better than the one percent level.

Model 3 presents the results including offer prices and all of the other independent variables. This model increases the proportion correctly classified from 60.3 percent in Model 1 to 65.8 percent, a 9.1 percent improvement. Again, the results are broadly consistent across models. Importantly, average offer price is positively associated with the probability of switching, with the estimated coefficient statistically significant at the one percent level after controlling for other factors. The signs and significance levels of the remaining variables are unchanged from Model 2, with the exceptions of car value, which is now positively associated with switching probability at the five percent level, and car type, which is of the same sign but no longer significant once offering price is controlled for.

These regression results combined with the means tests above provide strong support for the hypotheses that switching is positively related to insurance prices, and to risk type controlling for insurance prices. However, we find mixed support for the hypothesis that older consumers are less likely to switch insurers, and find that females are in fact more likely to switch than males, contrary to Hypothesis 3. But, this gender difference becomes insignificant once price and other factors are controlled for in our regression model.

5. Conclusion

This study has investigated switching behavior among a group of consumers shopping for automobile insurance in an Internet market in Korea. The results confirm that, consistent with search theory, switching is higher in this market than in traditional insurance markets that have been studied. As the Internet evolves and a greater share of insurance is sold through this channel, increased switching by consumers could lead to a loss of profits for insurers. This could happen if the more profitable consumers are more likely to switch, and / or if insurers are not able to set prices so that they recover initial acquisition costs more quickly than they are able to do in the offline market.

Although our evidence indicates that higher price is linked to a greater probability of switching, we do find some segments of the market that choose higher priced insurers, and we also find that many consumers (47 percent) do not switch insurers in pursuit of lower prices. This is consistent with the existence of switching cost even in this market where search costs are low and switching is relatively easy from a transaction perspective.

We found that very few consumers in this market bought insurance from the lowest priced insurer, but all of those that did switched to the lowest priced insurer. If the lowest priced

insurer raises prices for this group next period, it is likely that a high proportion of consumers will switch to a lower priced insurer if one exists. If the current insurer is setting prices to cover the relatively higher risk associated with this group, the insurer may have to adjust prices upward to recover acquisition costs in the shorter term in anticipation of greater switching. Our evidence shows that this group paid higher prices than the group that did not switch at all on average, and paid significantly higher prices than the group that bought from the highest priced insurer. Those that bought from the highest priced insurer were the least likely to switch insurers, with just over 14 percent switching, but this group paid much lower prices on average than any other group analyzed in this study. This may indicate that insurers are following such a pricing strategy.

On average, those that did switch insurers were offered, and paid, higher prices for coverage after controlling for policy choices and customer risk factors. This is not consistent with the idea that insurers will compete to build market share by offering lower prices to new customers and extracting rents from longer term customers (Klemperer, 1995). We find instead that those who do not switch are offered lower prices for broader insurance coverage than those that do switch.

Our evidence provides weak support for the hypothesis that age may affect the propensity to switch providers, holding other factors constant. We do find that older consumers are less likely to switch, and thus may have higher switching costs, but we also find that younger customers are less likely to switch. We find no support for the hypothesis that females are less likely to switch providers, contrary to prior studies in consumer goods markets. However, as noted above this might be due to the confounding effect of price in this market, where female consumers are relatively more risky than are males, and thus face higher insurance prices.

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Understanding how consumers respond to insurance choices is important for policymaking and for insurer strategy. Our research identifies some significant factors that are linked to insurer switching. However, there are several important dimensions in the decision to switch that our data do not allow us to control for. For example, the analysis above implicitly assumes that there are no differences in insurer quality that are not impounded in price. However, if consumers change insurers in response to quality differences, we can not capture that here. Also, we do not attempt to measure switching costs directly, but if there are differences in switching costs across insurers as well as consumers, we would expect to see lower switching rates for insurers with higher switching costs. Finally, it would be useful to be able to follow individuals across time to determine how switching is related to past prices and how it might be related to expectations of future prices, but that is beyond the scope of this analysis.

Despite these constraints, our analysis leads to a better understanding of consumer behavior in automobile insurance markets, and also in electronic markets for financial services. Because the fundamental features of both the Korean automobile insurance market and the Internet market studied here are similar to those in other developed markets, our results should apply generally.

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