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## **The Development of the Irish Private Health Insurance Market and Evidence of Selection Effects Therein**

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# **The Development of the Irish Private Health Insurance Market and Evidence of Selection Effects Therein\***

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## **Abstract**

This paper tracks the development of the Irish private health insurance market, both in terms of its legislative background and the development of competition. Literature on adverse selection and risk selection is then reviewed. Data from two surveys of consumers are then analysed to determine whether evidence exists of adverse selection or risk selection in the Irish private health insurance market. Both of these issues are relevant in the context of the debate over risk equalisation in the market in Ireland.

**Keywords:** Private health insurance, adverse selection, risk selection

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## **1. Introduction**

The Irish private health insurance system is based on voluntary – rather than mandatory – take-up, alongside universal entitlement to use the public healthcare system. Government policy in relation to the market includes the operation of community rating, open enrolment and lifetime cover. When the market was deregulated, these measures were given legislative status, and provision was made for a risk equalisation scheme. Critics of the Irish system suggest it is heavily regulated and favours the former State monopoly.

Much debate has taken place in relation to the need for risk equalisation, particularly in the context of the small number of insurers operating in the market. However, this debate has been largely based on qualitative, rather than quantitative, arguments. The research outlined in this paper attempts to add a quantitative dimension to this debate.

This paper reviews the development of the Irish private health insurance market and the literature on the potential threats caused by adverse selection on the part of consumers and risk selection on the part of insurers. An empirical examination is conducted to ascertain whether adverse selection and/or risk selection are evident in the Irish market. If no such threat exists then the need for risk equalisation might be mitigated. However the presence of one or both of these factors in the market may indicate the need for risk equalisation. Conclusions are drawn and directions for future research indicated.

## **2. The Irish Private Health Insurance Market**

### *2.1 Legislative Background*

The private health insurance market in Ireland was established with the passing of the Voluntary Health Insurance Act, 1957, which established the Voluntary Health Insurance Board (VHI). The aim was to provide the option of voluntary health insurance for the 15% of the population who, based on earnings, were not eligible for public hospital services at that time. Gradually, entitlement to access the public healthcare service increased, with the result that all residents of Ireland are now entitled to access to public hospital accommodation and treatment by public hospital consultants, subject to some nominal charges for those without medical cards. Despite this, the proportion of the population covered by private health insurance has far exceeded the 15% originally intended and currently stands at just over 50% (Source: HIA, 2007).

In 1992, the European Third Non-Life Insurance Directive<sup>1</sup> was passed, requiring all EU Member States to facilitate the entry of non-life insurers based in other Member States. This directive was reflected in the Health Insurance Act, 1994 (the 1994 Act) in Ireland. Among other provisions, this Act defined community rating, which VHI had been

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<sup>1</sup> Council Directive 92/49/EEC of 18 June 1992

operating on a *de facto* basis. A number of related regulations were introduced in 1996, including those relating to open enrolment, lifetime cover and minimum benefits.

Community rating in Irish legislation specifies that insurers may not vary premiums or benefits based on age, gender, current or prospective state of health or any other risk factor. The variant of community rating currently operating in Ireland is single rate community rating, whereby all insured persons, irrespective of the age at which they enter the market, are charged the same premium for a given plan. The introduction of lifetime community rating, whereby premium loadings are applied the older a person is when they first take out private health insurance, is anticipated<sup>2</sup>.

Open enrolment mandates that any applicant for private health insurance must be accepted<sup>3</sup>. Lifetime cover specifies that insurers may not refuse to renew coverage, unless in exceptional circumstances<sup>4</sup>. The three concepts of community rating, open enrolment and lifetime cover have become the ‘pillars’ on which the Irish private health insurance system is founded, and enjoy broad, cross-party support in the Oireachtas. In addition, the Minimum Benefit Regulations (S.I. No. 83 of 1996) specified minimum levels of cover, which must be provided by any eligible plan, for hospital bed charges and a large number of prescribed procedures undertaken by consultants – the idea being to ensure that enrolees would not under-insure due to information asymmetries.

The 1994 Act also provided for regulations to be drafted introducing risk equalisation (known in other markets as risk adjustment or, as in the Australian market, reinsurance). This is a system which aims to “equitably neutralise differences in insurers’ costs that arise due to variations in the health status of their members.” (HIA, 2007: 11) This aim is achieved by means of transfers of money from insurers with relatively low-risk membership profiles to a risk equalisation fund, from which money is received by insurers with relatively high-risk membership profiles.

Such regulations were introduced in 1996, but were later revoked in 1999, without transfers having been made, pending a review of the health insurance market in Ireland. The then government commissioned a report on risk equalisation, which was submitted in 1998 (Advisory Group, 1998) and formed one of the inputs into the White Paper on Private Health Insurance, published in 1999 (Department of Health and Children, 1999).

Following the publication of the 1999 White Paper, the Health Insurance (Amendment) Act, 2001 was enacted. Among other provisions, this Act allowed for the Minister for Health and Children to introduce regulations specifying a new risk equalisation scheme. These were later introduced in 2003 (S.I. No. 261 of 2003). It also made provisions for

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<sup>2</sup> A similar move was effected in Australia in 2000.

<sup>3</sup> The original 1996 regulations (S.I. No. 81 of 1996) specified that this applied only to those aged under-65 when first applying for health insurance, but this stipulation was removed in revised regulations in 2005 (S.I. No. 332 of 2005).

<sup>4</sup> According to the regulations (S.I. No. 82 of 1996), the circumstances allowed for are where an insurer ceases to carry on health insurance business in the State or where an insured person has committed fraud that caused, or could have caused, financial loss to an insurer.

the establishment of The Health Insurance Authority (HIA), an independent statutory body to regulate the private health insurance market in Ireland.

## 2.2 *Competition in the Irish Market*

From 1957, VHI was effectively the only private health insurer in the Irish market. A number of small, mostly vocational-based schemes existed when VHI was established, and a number of others have since been established, but these operate on a restricted basis, with restrictions primarily based on employment with a particular organisation. Having had a 40-year head-start, VHI first faced competition in the ‘unrestricted’ market in 1997, when BUPA Ireland (BUPA) launched its first plans. BUPA withdrew from the market in early 2007 and its operations were taken over by Quinn Healthcare. A third insurer, VIVAS Health (VIVAS), entered the market in October 2004. In 2005, VHI had a 76% share of the market, BUPA had a 17.5% market share, and VIVAS 0.5%, with the restricted membership undertakings accounting for the remaining 6% (HIA, 2005).

VHI’s competitors have claimed that VHI benefits from an unfair advantage arising from its statutory status. In particular, VHI is not required to hold a minimum level of reserves, although it has been accumulating reserves in recent years in anticipation of a change in its corporate status. VHI argues that its statutory status confers it with additional requirements, to which its competitors are not subject. Specifically, VHI must seek Ministerial approval if it wishes to increase premiums or launch new products.

BUPA Ireland was a tied agent of BUPA Insurance, part of the British United Provident Association, which is regulated by the Financial Services Authority in the UK. It was therefore not required to make returns to the Financial Regulator in Ireland<sup>5</sup>. Quinn Direct Insurance Limited (trading as Quinn Healthcare) and VIVAS Insurance Limited (trading as VIVAS Health) are regulated as non-life companies by the Financial Regulator. Until BUPA’s exit, the three main health insurers in the Irish market were each subject to a different prudential regulatory regime, although all health insurers are treated equally under the Health Insurance Acts and regulated equally by the HIA.

It is also clear that, despite the presence of competition in the Irish market since 1997, the majority of consumers have stayed with VHI. Research commissioned by the HIA suggests that the rate of switching remains low. Surveys of consumers show that, by the end of 2002, only 6% of consumers had switched health insurer (HIA, 2003) and by 2005 – eight years after the introduction of competition – this number had increased only slightly, to 10% (HIA, 2005), which remains relatively low<sup>6</sup>.

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<sup>5</sup> Except as a multi-agency intermediary, in which capacity it was regulated by the Financial Regulator.

<sup>6</sup> By comparison, Buchmueller & Feldstein (1996) found that 3-6% of enrollees in plans that were effectively free to University of California employees switched plans between 1993 and 1994 (i.e. a single switching opportunity), despite the fact that no cost savings were to be made. The authors also noted that this was consistent with “normal” switching rates for other large health benefit programs with multiple options. It could be argued that there is less choice in the Irish market, due to the low number of insurers, but given that the Buchmueller & Feldstein findings relate to switching when no cost savings were to be

This research also suggests that VHI has a larger proportion of older, higher-risk members<sup>7</sup> than BUPA (the number of VIVAS members found in the 2005 sample is too small to draw any conclusions about age profile). This is partly due to the fact that consumers taking out health insurance for the first time tend to be younger than the average of the insured population (the 2005 survey shows that the median age at which consumers take out health insurance is 28 compared with 43 for the insured population as a whole, while the means are 30 and 44 respectively) and partly due to the fact that those who switch insurer tend to be younger than average (the 2005 survey suggests that switchers had a median age of 39 – mean 39 – when they switched, compared with a median age at the time of the survey of 42 for non-switchers – mean 44).

The findings of the HIA that the market equalisation percentage (which can be thought of as a measure of the transfers that would take place under risk equalisation expressed as a percentage of the claims made in the market subject to risk equalisation) lay between 3.5% and 5.1% in the six-month periods between Jul-Dec 2003 and Jul-Dec 2005 also suggests that a significant difference in risk profile exists.

### **3. Review of the Literature**

Much of the literature in the area of competition in the provision of health insurance highlights two issues which are not present in all markets, but may be present in the health insurance market. These are risk selection and adverse selection. Briefly, risk selection involves insurers trying to select favourable risks to reduce their cost base and thereby maximise profits, while adverse selection involves consumers selecting more or less comprehensive coverage based on their own health status, which may accentuate cost differentials between more and less comprehensive cover.

#### *3.1 Risk Selection*

In insurance markets, there exist individuals who represent relatively low risks to insurers and individuals who represent relatively high risks to insurers. In the case of health insurance, these are relatively healthy and less healthy individuals, respectively.

The expected value of claims for medical expenses would be lower for a healthy individual than for a relatively unhealthy individual. Although a large number of factors will affect the likelihood of claiming for medical expenses, one of the key determinants is age. Studies have shown that average health expenditure rises with age<sup>8</sup>. Therefore, age

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made, this would suggest that price, a major basis of competition, was not a deciding factor in this rate of switching.

<sup>7</sup> Although age is only one determinant of risk posed to a health insurer, it is widely used as a proxy for risk.

<sup>8</sup> For example, Berk & Monheit (1992) show that in 1987, the top 1% of the US population, ranked by medical expenditure, accounted for 30% of expenditure, and that almost half of these were aged over-65. In Ireland, CSO figures show that 11.2% of the population in 2001 was aged 65+, but ESRI (2006) shows that age bracket accounted for 26.0% of total hospital discharges and 44.8% of total bed-days that year.

is a readily available indicator of expected medical expenses and thus of the risk that an individual would represent to a health insurer. However, Newhouse (1994, 1996) suggests that age and gender, while inexpensive to collect, only explain a small proportion of the variance in health costs, with prior utilisation being the main predictor. This point was also noted by Van de Ven et al (1994). Nicholson et al (2004) find that even a simple risk adjustment mechanism based on age and gender would not prevent the risk selection experienced by HMOs compared with non-HMOs, because the selection is based on other factors that are more difficult to observe, such as health status and preference for medical care.

As the payment of claims for medical expenses represents the majority of a health insurer's costs, this means insurers have a strong incentive to select lower-risk consumers, if possible, in order to maximise profits. This is particularly true in a community rated market, but may also hold true in a risk rated market, where insurers are free to charge premiums based on expected claims. In such markets, the factors that insurers may take into account and their relative accuracy in predicting future health expenditures will determine the degree to which risk selection is feasible. However, since there is no perfect predictor of future health spending, an incentive will likely remain for risk selection.

Although community rating is often accompanied by open enrolment, whereby insurers are obliged to accept all applicants, irrespective of risk, there are subtle ways in which insurers may still attempt to risk select. These would include marketing and plan design<sup>9</sup>. For example, additional benefits designed around sports injuries or maternity benefits would, *ceteris paribus*, appeal more to younger consumers, while benefits for heart conditions or cancer would, *ceteris paribus*, appeal more to older consumers. Thomson & Mossialos (2007) also note that product differentiation could restrict competition if consumers find it difficult to compare price and quality across a wide range of products.

In a report by the York Health Economics Consortium (YHEC), commissioned by the HIA in 2003, the authors note that, even though open enrolment means that risk selection is technically illegal, there remain a number of ways in which insurers could attempt to cream-skim healthier lives. These include “targeted marketing, ... structuring insurance plans to appeal most to the healthiest... and offering lower premiums in return for using service providers who follow strict protocols or other utilisation management techniques.” (YHEC, 2003: 50-51) They further note that, while price competition on the basis of efficiency, quality and innovation is desirable, price competition on the basis of a lower risk profile (achieved deliberately or accidentally) is socially undesirable. This latter point is echoed by a number of other authors, such as McCarthy et al (1995), Mossialos & Thomson (2002a), Newhouse (1982, 1998) and Shewry et al (1996). It should be noted that it may be possible for insurers to attract favourable risks without actively targeting lower-risk consumers, although the net result is the same.

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<sup>9</sup> A number of authors have noted this possibility, including Field (1985), Kifmann (2002), Mossialos & Thomson (2002a, 2002b), Newhouse (1994), Shewry et al (1996) and Thomson & Mossialos (2007)

A number of authors have suggested that incentives for insurers to risk select mean that a fully competitive market for health insurance is not possible. For example, Arrow (1963) notes “The equalization [of premiums between those with a low propensity to illness and those with a high propensity], of course, could not in fact be carried through if the market were genuinely competitive. Under those circumstances, insurance plans could arise which charged lower premiums to preferred risks and draw them off, leaving the plan which does not discriminate among risks with only an adverse selection of them.” (Arrow, 1963: 964).

Enthoven (1993) states the issue more bluntly: “A free market does not and cannot work in health insurance and health care. If not corrected by a careful design, this market is plagued by problems of free riders, biased risk selection, segmentation, and other sources of market failure.” (Enthoven, 1993: 44). Feldman & Dowd (2000) note, “There appears to be a growing consensus that risk segmentation is undesirable, that “risk adjusted” payments to health plans are necessary either to forestall risk segmentation or to offset its effects, and even that competitive approaches to allocating health care resources may not be viable without such adjustments.” (Feldman & Dowd, 2000: 499).

Regarding the reasons for the competitive incentives for risk selection, Rogal & Gauthier (1998) note that plans gain more by competing on the basis of risk selection than by competing on the basis of cost efficiency and quality. Dunn (1998) notes that a common reason for the implementation of four risk adjustment schemes in the US was the reduction or removal of incentives to risk select. Van de Ven (1990) also notes that one of the reasons reforms were carried out in the Dutch health insurance system was the incentive for insurers to risk select rather than improve health care efficiency. Mossialos & Thomson (2002b) suggest that insurers in the EU tend to compete on the basis of risk selection.

In quantitative terms, Nicholson et al (2004) find that those who switched from non-HMOs to HMOs used 11% fewer medical services in the year prior to switching than those who didn't switch from non-HMOs, and that those switchers maintained relatively low use once enrolled in the HMO. Meanwhile, those who switched from HMOs into non-HMOs used 18% more medical services in the year prior to switching than those who didn't switch from HMOs. The authors estimate that the effect of these people switching is to reduce HMOs aggregate medical expenditure by 2% per annum.

Newhouse (1998) discusses the importance of risk adjustment and suggests that the need for risk adjustment stems from community rating, which gives insurers incentives to risk select. Pauly (1984) argues that, under the circumstances outlined by Newhouse (1982), the problem is not cream-skimming but rather adverse selection. He also argues that cream-skimming will only occur because of regulation (in the form of community rating)<sup>10</sup>. In this regard, he suggests that efficiency may only be achieved by sacrificing equity, although he questions whether the notion of high-risk individuals paying more for insurance than low-risk individuals is inequitable. In an earlier paper (Pauly, 1970), he

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<sup>10</sup> Hartedny (1994) also argues that community rating and guaranteed issue distort the market for health insurance and can contribute to making insurance less affordable for younger people.



suggests that community rating leads to a welfare loss relative to experience rating. Mossialos & Thomson (2002a) also note the argument that both risk selection and adverse selection are more likely to occur under regulatory regimes that restrict insurers' freedom to set premiums on the basis of the risk an insured person represents. Maynard & Dixon (2002) also note that community rating may induce adverse selection and that, in the absence of appropriate regulation, market segmentation, cream skinning and the exclusion of vulnerable groups could undermine social objectives.

McCarthy et al (1995) note the interaction between risk selection and adverse selection, suggesting that risk selection can be used by insurers as a defence against adverse selection by consumers, which could threaten their financial solvency. Meanwhile, Shewry et al (1996) note, in the context of The Health Insurance Plan of California, that "individual choice is likely to exacerbate any nonrandom risk segmentation that is occurring." (Shewry et al, 1996: 172).

### 3.2 *Adverse Selection*

While risk selection entails insurers trying to enrol preferred risks and avoid higher-risk individuals, adverse selection refers to the situation whereby higher-risk consumers prefer more comprehensive insurance cover, and are willing to pay more for it, while lower-risk consumers prefer less expensive, less comprehensive cover. This can widen cost differentials between the two types of plans.

Adverse selection arises from the fact that there is an information asymmetry between insurers and consumers, with the latter having greater knowledge about their health status than the former<sup>11</sup>. In many markets, health checks are not required before a health insurance contract is issued. This leaves insurers with only broad indicators of the health status of actual or potential enrolees, the main ones being age and gender. This allows insurers to place enrolees in broad categories of risk status, but in community rated markets this may not always be reflected in the premiums that an insurer can charge.

Rothschild & Stiglitz (1976) note that, in the presence of imperfect information, a competitive equilibrium may not exist, and even if it does, it may have unusual properties. The authors show that, in order for equilibrium to occur, high-risk and low-risk consumers must purchase separate insurance contracts. Equilibrium may not exist if the costs to low-risk individuals of pooling with high-risk individuals are low or if the costs of separating are high. Furthermore, even if equilibrium does exist, the negative externality imposed by high-risk individuals on low-risk individuals means such equilibrium may not be Pareto efficient.

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<sup>11</sup> In a seminal paper on information asymmetry and its effects on the market mechanism, Akerlof (1970) shows how information asymmetry can reduce the size and quality of markets or, in extreme cases, cause market collapse. He then shows how these principles can be applied in the market for health insurance, where, as the price rises, the average health status of the insured population decreases. In the extreme case, he notes, this could lead to no insurance being sold at all.

Altman et al (1998) introduce the concept of adverse retention alongside adverse selection. Adverse retention is the tendency for people who do not switch plans to magnify cost differentials between plans, especially as costs are non-linear with age. One of the factors that the authors suggest will affect the extent of adverse retention is the length of time for which the plans have been offered. The last factor suggests that if people do not switch plans to any great extent then adverse retention will drive up the costs of older plans relative to newer ones<sup>12</sup>. This suggestion may be relevant in the Irish case, given that VHI was in the market for 40 years before their first competitor

A number of empirical studies, such as Altman et al (1998), Cutler & Zeckhauser (1997) and Cutler & Reber (1998), show how adverse selection can lead to a 'death spiral', where more comprehensive plans had to be withdrawn after consumers were given a choice between them and less comprehensive plans, or after changes in the way these plans were subsidised. Adverse selection has also been found in other markets, such as Australia and Switzerland – see Barrett & Conlon (2001) and Gardiol et al (2005).

Buchmueller (2006) notes two examples of health insurance reforms which resulted in overall reductions in health insurance costs to the University of California and Harvard, but at the expense of adverse selection death spirals for the more expensive plans. He also cites research that suggests a greater degree of price-sensitivity on the part of younger consumers than older consumers, which contributes to adverse selection against plans favoured by the latter group. He also suggests that community rating contributed to the death spirals experienced in both institutions.

Ellis (1985), using data from a large US employer, finds that demographic factors explain some of the choice between HMO and non-HMO plans, and within non-HMO plans. However, prior expenditure patterns significantly improve the explanation of non-HMO plan choice, as well as future expenditure. In particular, expenditure on categories of treatment that are better predictors of future expenditure in those categories (e.g. prescription drugs) are better predictors of health plan choice than expenditure on categories that are not as highly serially correlated (such as inpatient care).

Not all empirical studies find evidence of adverse selection, however. Buchmueller & DiNardo (2002), Newhouse (1984) and Thomasson (2002) find mixed evidence of adverse selection effects and the causation of death spirals. A number of simulations of insurance markets however, including Browne (1992), Feldman & Dowd (1982) and Marquis (1992), found that adverse selection will manifest itself in markets with low-risk and high-risk consumers.

Ginsburg (1985) argues that biased selection goes together with rational choice, and that, as insured persons gain a greater understanding of their options, adverse selection is likely to increase over time. However, Pauly (1985) notes that adverse selection would

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<sup>12</sup> Newhouse (1994) also takes up this point, noting that new insurers tend to appeal more to people who don't already have insurance or those more likely to switch, both categories of which would tend to be relatively healthy. Price & Mays (1985) also note that one possible factor that could give rise to adverse selection is if one plan is older and thus has an older mix of enrollees.

not be a problem if community rating and easy switching between policies can be avoided. He questions whether adverse selection really leads to any inefficiency in the market, and suggests that inefficiency, in the form of low-risk consumers under-insuring, actually arises from the information asymmetry between insurers and consumers.

#### **4. Adverse Selection and Risk Selection in the Irish Context**

##### *4.1 Statistical Analysis*

An initial review of the data on risk profiles in Ireland, using the consumer surveys commissioned by the HIA and published in 2003 and 2005, provides some interesting results. The first survey consisted of a nationally representative sample of 1,001 consumers, of whom 47% were covered by private health insurance. The second involved an initial, nationally representative, sample of 1,002 consumers, of whom 52% were covered, as well as a booster sample of consumers who had switched insurer. The results presented in this paper include this booster sample.

The HIA produces comparisons of plans across insurers, in order to assist consumers in making more informed decisions about which plan to purchase. Using these comparisons, it is possible to broadly equate plans with similar levels of cover. It should be noted that there are some differences in cover between similar plans, but broad comparisons can be made in terms of hospital accommodation in particular. This would be one of the most important factors by which plans are differentiated, as all hospital plans offered by a given insurer would provide similar cover for consultants with whom that insurer has contracted and as all insurers contract with a sizeable majority of consultants. The three insurers also cover broadly similar numbers of hospitals.

Table 1 shows a comparison of BUPA, VHI and VIVAS plans that were offered at the time of one or both of the HIA surveys, ranked by the highest level of hospital accommodation that would be fully covered under the plan<sup>13</sup>.

If adverse selection were present in the market, it would be expected that plans which provide a lower level of cover, in terms of hospital accommodation, would attract a higher proportion of low-risk consumers, while plans providing more comprehensive cover (e.g. private rooms, access to the high-tech hospitals, etc.) would attract a higher proportion of high-risk consumers, who would be more likely to be hospitalised, or may have a higher probability of requiring treatment in one of the high-tech hospitals.

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<sup>13</sup> Higher levels of hospital cover would be partially, but not fully, covered.

**Table 1 – Comparison of Health Insurance Plans by Hospital Accommodation Provided**

<b>Cover Level</b>	<b>Hospital Accommodation</b>	<b>BUPA Plan</b>	<b>VHI Plan</b>	<b>VIVAS Plan</b>
1	Semi-private room in a public hospital	Essential	Plan A/A Option	Me, I and We Plans Level 1
2	Private room in a public hospital		<i>First Plan, Family Plan</i>	
3	Private room in a public hospital or semi-private room in a private hospital (excluding high-tech hospitals <sup>14</sup> )	Essential Plus (with/without excess)	Plan B/B Option/B Excess, <i>First Plan Plus, Family Plan Plus, Company Plan, Company Plan Plus</i>	Me, I and We Plans Level 2, Teachers Plan, Nurses Plan
4	Private room in a public hospital or private room in a private hospital (excluding high-tech hospitals)	<i>Health Manager Starter</i> <sup>15</sup> , <i>Health Manager</i>	Plan C/C Option, <i>Forward Plan</i>	I and We Plans Level 3, Teachers Plan Plus, Nurses Plan Plus
5	As Level 4 or semi-private room in a high-tech hospital		Plan D/D Option	I and We Plans Level 4
6	As Level 4 or private room in a high-tech hospital	Essential Gold <sup>16</sup> , <i>Health Manager Gold</i>	Plan E/E Option	I and We Plans Level 5

*Note: Plans in italics contain significant cover for ancillary (non-hospital) services*

Table 2 shows a comparison of plans in terms of the average age of respondents to the 2003 survey who said they were covered by that plan. Also included is a comparison of the claims experience of respondents on the plans. The number of respondents covered by each plan is also included. In some cases a small number of respondents were covered by particular plans, so care should be taken in interpreting the findings for these plans.

<sup>14</sup> The Blackrock Clinic and Mater Private hospitals in Dublin are considered high-tech hospitals, as they specialise in acute care of heart and cancer conditions. The Galway Clinic is considered a high-tech hospital for certain plans but not all plans.

<sup>15</sup> A limited number of private hospitals are covered by this plan.

<sup>16</sup> Essential Gold was closed to new subscribers in 2004. However, respondents were found in both surveys who had this plan.

Broadly speaking, the average age of respondents with more comprehensive plans was higher than that of respondents with plans providing less comprehensive cover. This suggests that younger consumers are more likely to take out less comprehensive plans than older consumers. This would be consistent with adverse selection on the part of consumers. Furthermore, there is some evidence that the likelihood of claiming is higher among consumers who are covered by more comprehensive plans.

**Table 2 – Average Age and Claims Experience by Plan, 2003**

Plan	Cover Level	Average Age	% of respondents on plan who had made a claim	Average no. of claims per claimant on the plan	No. of respondents on the plan
Essential	1	34	25.0%	2.50	8
Essential Plus	3	38	48.6%	2.75	35
Essential Gold	6	47	0.0%	0.00	1
Don't know which BUPA plan	N/A	40	19.0%	2.50	21
Plan A/A Option	1	44	66.7%	3.33	21
Plan B/B Option	3	43	60.9%	3.98	276
Plan C/C Option	4	45	59.1%	4.00	22
Plan D/D Option	5	58	100.0%	6.20	11
Plan E/E Option	6	51	80.0%	4.50	5
Plan P, Other VHI, Don't know which VHI Plan	N/A	35	29.4%	2.87	51
Other Insurers	N/A	42	48.0%	5.33	25
Overall		42	54.6%	3.91	476

It also appears that the average number of claims made per claimant is higher on the more comprehensive plans than on the less comprehensive ones. However, when the number of claims per year insured is examined, there is no clear trend evident, suggesting that at least part of the reason why those on more comprehensive plans have claimed more often is the fact that they have been insured for longer. The differential claims frequency between less and more comprehensive plans might indicate moral hazard rather than adverse selection, although it is unlikely that significant numbers of people would increase utilisation solely on the basis of better accommodation in hospital, which might not be forthcoming in any case, depending on room availability.

A comparison of broadly similar plans between BUPA and VHI suggests that there may also be a certain degree of risk selection in the market. Consumers on VHI plans tend to have a higher average age than those on comparable BUPA plans. Furthermore, the proportion of respondents on the VHI plans who made claims is higher than that for the comparable BUPA plans, as is the average number of claims made per claimant, although again this is less clear when the number of claims per year is examined.

It would appear from the evidence above that risk selection may be present in the market, with BUPA having a more favourable risk profile than VHI. However, it should be noted that average age is not necessarily an accurate measure of the average risk posed by subscribers to different plans; rather the distribution of members by age would be more accurate. The results from the 2005 data are presented in Table 3 and show similar trends, although less pronounced in the case of risk selection by age. The results for the VIVAS respondents are excluded from this table, as there was only one respondent found in each of three different VIVAS plans.

**Table 3 – Average Age and Claims Experience by Plan, 2005**

Plan	Cover Level	Average Age	% of respondents on plan who had made a claim	Average no. of claims per claimant on the plan	No. of respondents on the plan
Essential	1	40	42.9%	2.83	15
Essential Plus	3	44	55.9%	3.14	59
Essential Gold	6	49	60.0%	4.00	5
Health Manager Starter	4	38	57.1%	2.75	7
Health Manager	4	41	66.7%	1.60	9
Health Manager Gold	6	45	100.0%	1.50	2
Don't know which BUPA plan	N/A	42	33.3%	2.17	19
Plan A/A Option	1	44	63.3%	4.33	30
Plan B/B Option/B Excess	3	46	70.8%	3.79	260
Plan C/C Option	4	50	70.4%	5.85	28
Plan D/D Option	5	51	88.9%	2.83	19
Plan E/E Option	6	46	100.0%	3.00	6
Plan P, Other VHI, Don't know which VHI plan	N/A	38	59.3%	4.21	66
Other Insurers	N/A	40	65.6%	6.56	33
Overall		44	65.8%	3.86	561

## 4.2 *Econometric Results*

### 4.2.1 Adverse Selection

Having examined the data, as discussed above, the next step was to model the data econometrically to ascertain whether the same trends were evident. In order to test for adverse selection, it was decided to use the level of cover as the dependent variable, with

plans ranked by reference to the level of hospital accommodation provided, since this is one of the main differentiating factors between plans (see Section 4.1). Table 1 above shows the ranking on this basis. Given the qualitative and ordered nature of the dependent variable, it was decided to use an ordered logit model<sup>17</sup>.

Two main measures of the risk posed by an insured person to an insurer are an age/gender combination and some measure of utilisation. For each data set, therefore, these risk variables were grouped together. The age/gender variables were the age of the insured person (AGE), a dummy variable (DUMMALE) set to 1 if they were male and 0 if they were female, and an interaction variable (AGEMALE), which is the product of the person's age and the gender dummy. The measures of utilisation available from the data are a dummy for whether any claims had been made on the respondent's policy, either for themselves or another named person (DUMCLAIMED), and the number of claims made (NUMCLAIMS). The length of time covered under the policy (YEARSCOVERED) was also included to account for the possibility that the number of claims made, and the likelihood of claiming, would increase with length of time covered.

It is possible that, as income rises, people can better afford more comprehensive cover, which could have an impact on their choice. In addition to the risk variables therefore, it was decided to include variables to try to account for income. Again, the choice of these variables was restricted by the data set, as income level was not explicitly measured. However, level of education achieved (EDUCATIONLEVEL) and social class (SOCIALCLASS) were used as proxy variables for income. It could be reasonably expected that, *ceteris paribus*, a more educated person (reflected in a higher value for EDUCATIONLEVEL) would command a higher income than a less educated person, while a person in the higher social classes, such as AB (reflected in a lower value for SOCIALCLASS) would also have a higher income than someone in a lower social class. However, social classes F50+ and F50- (farmers with large and small land holdings, respectively) might contain a broader range of income than the other social classes.

Finally, a number of other, miscellaneous variables were added to the regressions. A dummy for whether the respondent had a medical card (DUMMEDICALCARD) was included to test whether the possession of such a card, and therefore the entitlement to free access to the public healthcare system, would lead the card holder to opt for a lower level of cover. An alternative explanation for a negative coefficient on this variable would be that many medical card holders qualify for such cards on the basis of having a low income and therefore may choose a lower level of cover on the basis of affordability (although anyone over the age of 70 also qualifies, irrespective of income).

Two variables were included to test for the significance of life-stage in the decision on the level of cover to opt for. The first was a dummy variable for being married (DUMMARRIED), set to 1 if the person was married or living as married and 0 if they were single or widowed/divorced/separated. The second was the number of children on the plan (CHILDRENONPLAN). If these variables are significant and have positive

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<sup>17</sup> For an accessible discussion of ordered logit models, see DeMaris (1995) and Maddala (1983). For a review of models involving selection, particularly related to health insurance, see Maddala (1985).

coefficients, it might indicate that those with a spouse/partner or those with children tend to opt for higher cover than single people with no dependents. Again, this behaviour would be consistent with adverse selection, as those with dependents would bear higher risk if they became ill than those without, while the number of children on a plan would also increase the risk that such a policy unit would represent to an insurer, due to the increased likelihood of a claim being made on that policy.

Another variable included was an indicator of the price sensitivity of the consumer (PREMIUMDISCONT). Respondents to the HIA surveys who had health insurance were asked whether they would discontinue their cover if premiums were to rise on an annual basis by 10%, 20%, 30% and so on in increments of 10 percentage points, up to 100%. This variable reflects the level of premium increases that would be required for the respondent to discontinue cover. A positive coefficient on this variable could indicate that more price-sensitive consumers tend to opt for lower levels of cover, while less price sensitive consumers opt for more comprehensive cover.

In the 2005 survey, respondents were asked whether they had various other types of health-related insurance products (cash plan, critical illness policy, permanent health insurance or any other health-related insurance product). A dummy variable (DUMANYOTHERINS) was included in the regression using the 2005 data, set to 1 if a respondent had any of these types of insurance and 0 if they had none. Those who have such other products in addition to private health insurance might be considered more risk-averse. Therefore, a positive coefficient on this variable would indicate that more risk-averse individuals tend to opt for higher levels of cover, possibly because they may have information about their own state of health that would indicate a higher risk to insurers.

For each data set (2003 and 2005), three regressions were run. The first included the age/gender and utilisation variables only. The second added the income proxy variables, while the third also included the 'other' or miscellaneous variables described above.

Table 4 shows the results of the ordered logit regression using the data from the 2003 consumer survey. The fact that age is significant and has a positive coefficient suggests that younger people tend to take out less generous cover, while older people tend to take out more comprehensive cover, which is consistent with the presence of adverse selection. However, the gender variable and the age/gender interaction variable are both insignificant, indicating that there is no gender effect evident in the choice of cover level. In terms of the utilisation variables, both the dummy variable indicating whether a claim was made on the respondent's policy and the number of claims made were insignificant in all three regressions using the 2003 data, as was the length of time covered, indicating that there is no evident pattern of cover selection based on claims history.

When the income proxy variables were added to the regression, the results did not change significantly. Age remained the only significant variable and there was no meaningful change in the pseudo-R<sup>2</sup>. However, when the 'other' variables were added in, they did have an effect on the results. Age remained significant and retained its positive coefficient, but the pseudo-R<sup>2</sup> increased from less than 0.03 to almost 0.045.



The negative sign on the medical card dummy suggests that those with medical cards are less likely to take out the most comprehensive level of cover and more likely to take out the most basic level of cover, which is consistent with *a priori* expectations. The life-stage variables were both insignificant. The price sensitivity variable (PREMIUMDISCONT) was excluded from the regression, as when it was included it was highly insignificant, reduced the number of included observations by 47 and reduced the significance of a number of other variables in the regression and the pseudo-R<sup>2</sup>.

**Table 4 – Results from Ordered Logit Model with 2003 Data Using Level of Cover as Dependent Variable**

Variable	Age/Gender and Utilisation Only	Plus Income Proxy	Plus Income Proxy and Other Variables
AGE	0.033843 (0.015520)*	0.040020 (0.017089)*	0.037228 (0.017911)*
DUMMALE	0.482342 (0.945231)	0.524796 (0.937878)	0.542693 (0.921881)
AGEMALE	-0.004378 (0.022227)	-0.005798 (0.022023)	-0.004756 (0.021914)
DUMCLAIMED	0.066600 (0.337783)	0.109845 (0.331664)	-0.015721 (0.347901)
NUMCLAIMS	0.036129 (0.046402)	0.036626 (0.044436)	0.045642 (0.043153)
YEARSCOVERED	-0.005464 (0.017115)	-0.007550 (0.017113)	-0.005448 (0.016720)
EDUCATIONLEVEL		0.121986 (0.128790)	0.142765 (0.126375)
SOCIALCLASS		-0.017106 (0.096425)	0.029780 (0.091377)
DUMMEDICALCARD			-1.031148 (0.608068)**
DUMMARRIED			0.618275 (0.380433)
CHILDRENONPLAN			-0.133065 (0.103918)
PREMIUMDISCONT			Not Used
LR Index (Pseudo-R <sup>2</sup> )	0.026014	0.028604	0.044845
Included Observations	348	348	348

\* = Significant at 5% level; \*\* = Significant at 10% level

Note: Standard errors reported in parentheses are the QML (Huber/White) standard errors

One of the reasons that those who are less likely to claim tend to take out less generous insurance coverage is to save money. However, since the premium is heavily dependent on the level of cover (the simple correlation coefficient between level of cover and

premium is 0.86), adding this into the above regression would have been deterministic. It was therefore excluded on this basis.

The relatively low level of explanatory power of the model could reflect the fact that coverage for hospital treatment does not vary significantly between insurers or plans, the main differentiating factor instead being the level of cover for hospital accommodation<sup>18</sup>. This would be consistent with Ellis's (1985) finding that minimising differences across plans of features that cause self-selection can reduce such self-selection. In both consumer surveys, approximately three-quarters of insured respondents said that hospital treatment was the most valued element of their cover, with hospital accommodation a distant second (11% of respondents to both surveys cited this as the most important element)<sup>19</sup>. Therefore, to a large extent, choice of plan is not made on the basis of cover for treatment, but rather for the 'hotel' aspects of plans (i.e. the type of room), which may be less likely to induce adverse selection. This is also consistent with Ginsburg's (1985) suggestion that limiting the benefit structures of competing plans will limit adverse selection, since the benefit structures of plans available in the Irish market do not differ significantly in terms of the level of cover for hospital treatment, as mentioned earlier.

The results of similar regressions for the 2005 survey data can be seen in Table 5. When using this data set, plans with significant ancillary (non-hospital) cover were excluded from the regressions, in order to ensure that this factor did not mask any adverse selection effects that may be present<sup>20</sup>. It should be noted however, that this means there were no plans at cover level 2 included in the regressions.

These results are somewhat different from those using the 2003 data. In these regressions, age is insignificant, while the number of years covered is significant and positive. This suggests that, although age is not a determining factor in the choice of cover level, length of time insured is. The simple correlation coefficient between these two variables is 0.53. The coefficients on the gender dummy and the age/gender interaction variable are insignificant for the most part, although the interaction variable is significant at the 10% level in the regression including age/gender, utilisation and income proxy variables. The coefficient on the dummy variable for having claimed is insignificant in all three regressions, while the coefficient on the number of claims is significant but negative in the last of the three regressions. This suggests that those who made more claims are less likely to take out the most comprehensive cover and more likely to take out the most basic cover, which is contrary to *a priori* expectations.

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<sup>18</sup> Explanatory power for this type of regression also tends to be lower than for many OLS regression, due to the discrete nature of the dependent variable.

<sup>19</sup> Similar issues were found in research carried out by the Economic and Social Research Institute, and reported in Harmon & Nolan (2001) and Nolan & Wiley (2000). This showed that the two most important factors leading Irish consumers to purchase private health insurance were fear of large medical bills and being sure of getting into hospital quickly when treatment is needed, with 88.5% and 86.4% of respondents, respectively, citing these as very important. By comparison, only 27.8% cited being able to have a private or semi-private room in hospital as being very important.

<sup>20</sup> No respondents were found in the 2003 survey who were on plans with significant ancillary cover.

Of the two income proxy variables, social class is insignificant in both versions of the regression in which it is included, while education level is significant and positive in both, which would be consistent with the hypothesis that those who can afford more comprehensive cover are more likely to take it out. Of the 'other' variables, only the price sensitivity variable is significant, and its positive coefficient suggests that more price sensitive consumers opt for less comprehensive cover, while less price sensitive consumers (perhaps because they are better able to afford cover or because they are knowingly higher-risk consumers) tend to take out more comprehensive cover. This would be consistent with *a priori* expectations.

**Table 5 – Results from Ordered Logit Model with 2005 Data Using Level of Cover as Dependent Variable**

Variable	Age/Gender and Utilisation Only	Plus Income Proxy	Plus Income Proxy and Other Variables
AGE	-0.009032 (0.011195)	0.003484 (0.010976)	0.016258 (0.015293)
DUMMALE	-1.194911 (0.830935)	-1.388522 (0.858106)	-1.146637 (0.947942)
AGEMALE	0.027048 (0.018209)	0.030300 (0.018410)**	0.023235 (0.020717)
DUMCLAIMED	0.421304 (0.324159)	0.338574 (0.327309)	0.264767 (0.360892)
NUMCLAIMS	-0.062656 (0.052751)	-0.052844 (0.049879)	-0.095809 (0.046891)*
YEARSCOVERED	0.041128 (0.008602)*	0.035137 (0.009027)*	0.029714 (0.011615)*
EDUCATIONLEVEL		0.401855 (0.106652)*	0.367751 (0.115841)*
SOCIALCLASS		-0.012163 (0.109863)	-0.090092 (0.116403)
DUMMEDICALCARD			-0.568029 (0.564514)
DUMMARRIED			-0.099803 (0.342495)
CHILDRENONPLAN			0.210008 (0.141837)
PREMIUMDISCONT			0.013292 (0.005235)*
DUMANYOTHERINS			0.428871 (0.283050)
LR Index (Pseudo-R <sup>2</sup> )	0.039240	0.064082	0.082429
Included Observations	345	345	309

\* = Significant at 5% level; \*\* = Significant at 10% level

Note: Standard errors reported in parentheses are the QML (Huber/White) standard errors

Again, premium is excluded from the model due to the deterministic nature of the relationship between premium and the level of cover provided. Also, the explanatory power of the regression is again relatively low, suggesting that other factors, not captured in the explanatory variables available here, heavily influence the decision on what level of cover to opt for. However, the inclusion of the 'other' variables does increase the predictive power of the regression somewhat.

#### 4.2.2 Risk Selection

Binary logit models were used to test for risk selection, using the dummy variable for being insured with VHI as the dependent variable. The level of cover was restricted to level 3, which is the level of hospital cover provided by the most popular plans, such as BUPA's Essential Plus schemes (with and without excess) and VHI's Plan B schemes (including Plan B Option and Plan B Excess). By restricting the level of cover to this level, adverse selection effects are removed from the analysis, so any significant difference in the age or claims profiles of insurers could be interpreted as signalling the presence of risk selection. Similar regressions for the most basic and the most comprehensive levels of cover (levels 1 and 6, respectively) were not reliable as there were too few observations.

Again, the regressions contained variables related to socio-demographic indicators and the insured's characteristics. As with the adverse selection models, three regressions were run for each data set – the first using age/gender and utilisation variables only, the second adding in income proxy variables and the third adding the 'other' variables. It should be noted that, in the risk selection regressions, another age variable, AGESQUARED, was included, to take account of the non-linearity that was discovered in the age-related propensity to take out insurance with VHI versus BUPA<sup>21</sup>. The income proxy variables were included to take account of the fact that VHI premiums are higher than BUPA premiums for plans providing similar levels of cover. (This is confirmed by the fact that, if premium was included in the risk selection regressions using the 2003 data set, it was a perfect predictor of the choice of insurer, while using the 2005 data set premium was a significant predictor of this choice, albeit not perfect as Plan B Excess – which was not offered in 2003 – was cheaper than Essential Plus without an excess.)

The results of the model using the 2003 data can be seen in Table 6. The results indicate that age is a significant indicator of the likelihood of being a member of VHI, but the significance of Age<sup>2</sup> as well as Age suggests that the relationship is non-linear. The combined effect of Age and Age<sup>2</sup> is that younger people are less likely to be with VHI, while older people are more likely to be with the insurer. However, the number of claims, when included alongside the number of years covered, is insignificant, although being covered for a greater number of years increases the likelihood of being insured with

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<sup>21</sup> When AGESQUARED was included in the adverse selection regressions, it was found to be insignificant, suggesting that there was not a non-linear effect of age on the choice of cover level, and it was therefore omitted from the adverse selection regressions on this basis. Furthermore, AGEUCUBED was added in to the risk selection regressions and found to be insignificant, so that variable was omitted on the basis that it appears to be a quadratic relationship between age and choice of insurer.

VHI. The simple correlation coefficient between number of claims and number of years covered is 0.38, which would suggest that it is not multicollinearity which is causing the insignificance of the former. The explanatory power of the regression indicates that other factors have a large impact on VHI membership, but that the regression does have more explanatory power than those for adverse selection.

**Table 6 – Results from Binary Logit Model with 2003 Data Using the Dummy for Membership of VHI as Dependent Variable and Restricting Observations to Those with Cover Level = 3**

Variable	Age/Gender and Utilisation Only	Plus Income Proxy	Plus Income Proxy and Other Variables
CONSTANT	6.803912 (2.470593)*	8.432390 (2.373525)*	8.087252 (2.991323)*
AGE	-0.332617 (0.118459)*	-0.365736 (0.112689)*	-0.355776 (0.148377)*
AGESQUARED	0.004024 (0.001320)*	0.004274 (0.001267)*	0.004077 (0.001628)*
DUMMALE	0.937113 (1.486372)	1.070990 (1.519455)	1.756130 (1.690095)
AGEMALE	-0.007495 (0.037927)	-0.009993 (0.038160)	-0.020856 (0.040704)
DUMCLAIMED	0.235316 (0.517698)	0.204527 (0.527475)	0.392086 (0.607422)
NUMCLAIMS	-0.005179 (0.134865)	-0.012179 (0.135018)	-0.004824 (0.178899)
YEARSCOVERED	0.104888 (0.040960)*	0.112917 (0.041896)*	0.119249 (0.047145)*
EDUCATIONLEVEL		-0.243546 (0.183645)	-0.304946 (0.211030)
SOCIALCLASS		-0.031134 (0.151530)	-0.036811 (0.160072)
DUMMARRIED			-0.050294 (0.630846)
CHILDRENONPLAN			-0.024396 (0.184009)
PREMIUMDISCONT			0.009266 (0.014157)
McFadden R <sup>2</sup>	0.134561	0.143706	0.164497
Included Observations	290	290	250

\* = Significant at 5% level; \*\* = Significant at 10% level

Note: Standard errors reported in parentheses are the QML (Huber/White) standard errors

The addition of the income proxy variables and the ‘other’ variables show that all of these are insignificant. It is not entirely surprising that the income proxy variables are insignificant however, as the difference in premium between the standard level plans of BUPA and VHI would not likely be sufficient to render affordability a major issue for a

large number of people. The results do suggest that, based on the data from the 2003 survey, VHI's standard plans had a less favourable age profile, although not necessarily a worse claims profile, than comparable plans offered by BUPA.

**Table 7 – Results from Binary Logit Model with 2005 Data Using the Dummy for Membership of VHI as Dependent Variable and Restricting Observations to Those with Cover Level = 3**

Variable	Age/Gender and Utilisation Only	Plus Income Proxy	Plus Income Proxy and Other Variables
CONSTANT	5.401491 (1.851940)*	7.363297 (2.158127)*	7.230462 (2.291054)*
AGE	-0.233057 (0.087998)*	-0.272189 (0.095280)*	-0.190993 (0.105070)**
AGESQUARED	0.002530 (0.000948)*	0.002811 (0.001015)*	0.001673 (0.001098)
DUMMALE	1.444910 (1.261829)	1.579168 (1.296941)	0.888470 (1.325318)
AGEMALE	-0.028578 (0.027575)	-0.029564 (0.028275)	-0.012911 (0.028901)
DUMCLAIMED	0.205748 (0.539897)	0.359139 (0.515686)	0.695993 (0.519424)
NUMCLAIMS	0.080232 (0.141067)	0.053868 (0.124619)	0.059833 (0.125660)
YEARSCOVERED	0.038783 (0.022188)**	0.044504 (0.022382)*	0.039292 (0.024682)
EDUCATIONLEVEL		-0.327576 (0.139695)*	-0.392033 (0.148845)*
SOCIALCLASS		-0.007370 (0.131337)	-0.025784 (0.132084)
DUMMARRIED			-0.349543 (0.458997)
CHILDRENONPLAN			-0.347543 (0.159829)*
PREMIUMDISCONT			0.008937 (0.006187)
DUMANYOTHERINS			-0.006815 (0.376090)
McFadden R <sup>2</sup>	0.057121	0.078060	0.105954
Included Observations	265	265	239

\* = Significant at 5% level; \*\* = Significant at 10% level

Note: Standard errors reported in parentheses are the QML (Huber/White) standard errors

Table 7 shows the results from similar models run using the 2005 data. As the number of VIVAS members in the sample was so small, it was decided to exclude those respondents

from the regressions. This also allows for more direct comparisons between the results of the two data sets, vis-à-vis any selection effects between BUPA and VHI.

Respondents who had plans which provide significant ancillary cover were also excluded, as this may affect the choice of plan/insurer but the numbers were so low (only four respondents at this level of cover) that the dummy variable for significant ancillary cover proved insignificant when included as an explanatory variable.

The same variables appear in these regressions, although the significance of Age, Age<sup>2</sup> and the number of years covered are all reduced slightly, compared with the regressions using the 2003 data, with the last of these being insignificant in the regression including the 'other' variables. The correlation coefficient between number of claims and number of years covered using this data set is 0.27, again suggesting that multicollinearity is not the culprit in rendering the former insignificant. Again, the results suggest that VHI had a less favourable age profile on its standard plans than BUPA had on its corresponding plans, although not necessarily a less favourable claims profile. The explanatory power of the regressions using the 2005 data is lower than of that using the 2003 data, indicating that other factors account for more of the likelihood of being a VHI member.

The inclusion of the income proxy variables shows that the more educated a person, the less likely they are to be with VHI. If the affordability issue were to come into play, then it would be expected that this variable would have a positive, rather than a negative coefficient. The inclusion of the 'other' variables reduces the significance of Age and makes Age<sup>2</sup> and the number of years covered insignificant, while the number of children on the plan is the only one of the 'other' variables that is significant. The negative coefficient on this variable indicates that those with more children are more likely to have chosen a BUPA plan. Adding premium or the dummy variable for being a switcher significantly improved the explanatory power of the regression but these are somewhat deterministic, and their inclusion in the model is not warranted by theory.

It could be argued, however, that the effect being seen in these regressions is not risk selection, but rather adverse retention, as outlined by Altman et al (1998), or even a combination of both effects. In particular, an argument could be made that BUPA would not have had a chance to attract a similar membership profile as VHI due to the fact that it was not in the market for the same length of time. The counter-argument to this would be that any VHI member could have switched to BUPA, although as discussed earlier, switching is not common in the Irish market. Nevertheless, to try to account for this possibility, the risk selection regressions were re-estimated, restricting the sample to those who had been covered for a maximum of six years for the 2003 survey (since the sampling was carried out in late 2002) and eight years for the 2005 survey, in other words to those who had taken out their policies since BUPA entered the market.

As the sample sizes were more restricted in both cases, the three-regression analysis used above was not as effective, and therefore the results presented in Table 8 represent the best models that were found using the restricted sample. These results show similar patterns to the full sample above, in terms of age. Both Age and Age<sup>2</sup> are significant

using the 2003 data, while Age is significant using the 2005 figures, although Age<sup>2</sup> is significant at the 10% level. The only other variable that is significant using the 2003 data is education level, and the negative sign on this indicates that people with a higher educational attainment were less likely to be with VHI. This suggests that those people who choose VHI do not do so because of being better able to afford the higher premiums charged by that insurer. The significance in the 2005 regression of the dummy variable for having claimed suggests that those who took out cover with VHI after BUPA entered the market were more likely to have claimed than those who took out cover with BUPA. The significance of the dummy for males indicates that they are more likely to be with VHI. Again, the level of education is negatively related to the likelihood of being with VHI and is significant at the 10% level, suggesting that ability to afford higher premiums does not induce people to join VHI.

**Table 8 – Results from Binary Logit Model with 2003 and 2005 Data Using the Dummy for Membership of VHI as Dependent Variable and Restricting Observations to Those with Cover Level = 3 and who Were Covered Since BUPA Entered the Market**

Variable	2003 Data	2005 Data
CONSTANT	14.60051 (4.405324)*	12.83974 (3.543604)*
AGE	-0.545397 (0.189091)*	-0.443509 (0.165534)*
AGESQUARED	0.005637 (0.002079)*	0.003270 (0.001801)**
DUMMALE	1.875661 (1.765058)	1.821864 (0.808021)*
AGEMALE	-0.014536 (0.042803)	
DUMCLAIMED	0.464181 (0.857388)	2.103362 (0.832100)*
NUMCLAIMS	-0.038434 (0.304699)	
EDUCATIONLEVEL	-0.800110 (0.314189)*	-0.550010 (0.281062)**
McFadden R <sup>2</sup>	0.169378	0.311899
Included Observations	81	67

\* = Significant at 5% level; \*\* = Significant at 10% level

Note: Standard errors reported in parentheses are the QML (Huber/White) standard errors

In addition to re-estimating the risk selection regressions using only those who had been covered since BUPA entered the market, regressions were also run to test whether switchers had different characteristics from non-switchers. The models using the 2003 data showed a non-linear age effect, with older people being less likely to switch, although the regressions were insignificant. This was probably due to the low number of switchers (28) included in the equations. However, using the 2005 sample, which included a higher number of switchers, the same age effect was evident, but the regressions were significant. However, the explanatory power of the regressions was relatively low, the highest McFadden R<sup>2</sup> being 0.08.

This suggests that the effects seen in Tables 6 and 7 are not just indicative of adverse retention, but that risk selection is also evident. Looking only at those who were first covered by private health insurance when a choice of insurer was available in the market, BUPA still appears to have a more advantageous risk profile than VHI. Furthermore,



those who switched (mostly from VHI to BUPA) tended to be younger, therefore adding to the more favourable risk profile that BUPA attracted after entering the Irish market.

## **5. Summary and Conclusions**

The Irish private health insurance market consists, primarily, of three competitors, BUPA (now Quinn Healthcare), VHI and VIVAS. Features of the Irish market include community rating, open enrolment and lifetime cover, along with a mandated minimum level of cover that must be provided. The fact that the largest insurer had a monopoly for 40 years before the introduction of competition is also unusual, if not unique.

The majority of products in the market are structured in a similar fashion, catering primarily for hospital treatment, which is what consumers value most highly. The main differentiating factor between plans is the level of hospital accommodation provided. This lends itself to examination of adverse selection and risk selection effects. Analysis of data from two consumer surveys indicates the presence of both effects.

In both cases, it is primarily age that provides the evidence for selection effects, while claims experience does not show as distinct a pattern. This could be due to the fact that having claimed and the number of claims made are not the most accurate indicators of utilisation, as they do not take account of the intensity of claims. The results suggest that older consumers are more likely to choose more comprehensive plans and more likely to be with VHI than with BUPA. The latter finding is also consistent with the notion of adverse retention, put forward by Altman et al (1998) and the suggestion by Price & Mays (1985) that older plans may have an older mix of consumers. The fact that VHI had a 40-year head-start over BUPA, combined with the relatively low levels of switching between insurers and the fact that switchers tend to be younger, appears to be contributing to the relatively unfavourable nature of VHI's membership age profile.

Much of the literature concerning both risk selection and adverse selection suggests that risk adjustment is either necessary or a possible solution to these problems. Evidence of both types of selection in the Irish market might indicate that risk equalisation is in fact warranted in the Irish context. Much of the criticism of risk equalisation in the Irish context has been on the basis that it is anti-competitive. However, this is contrary to the findings of a number of papers, which suggest that risk adjustment would actually improve competition, as it would force insurers to compete on the basis of price, service or efficiency, rather than risk profile. The findings of this research may have implications for the debate over risk equalisation in Ireland.

While an examination of the relative merits of risk equalisation in the Irish context is beyond the scope of the current paper, it is an area for ongoing research, of which this study will form a part. Another area for further research is whether, or to what extent, community rating is the cause of market distortion, although the fact that community rating has broad cross-party support would make any dilution of this highly unlikely. However, the introduction of lifetime community rating might have some impact on

adverse selection, albeit more likely in the long-run than in the short-run. It is possible that staggered entry of insurers into a community rated health insurance market with open enrolment will inherently lead to differential risk profiles, in which case some form of risk adjustment may be inevitable, and this is another, related, area of ongoing research.

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