

## Adverse Selection in Private Health Insurance

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### Purpose

In a recent study of the Australian private health insurance (PHI) market, Carrington, Coelli et al. (2011) argued PHI was "...arguably too expensive and over recent years, the average increase in PHI premiums was consistently greater than the national consumer price index". This year alone, PHI premiums in Australia have increased since April 2016 by an average of 5.6% (inflation from June 2015 until September 2016 is currently running at just 1.3%).

Health insurance companies argue that the major causes for these significant and ongoing premium increases are twofold. First, the current and forecast increases in benefit outlays, which are largely associated with an ageing membership profile. Second, the increasing risk of the pool of risk-insured such that insurers set premiums based on the expected claims of subscribers, especially to cover the potentially higher risk (and costs) of less healthy consumers.

This paper examines the latter issue of adverse selection in Australian PHI based on recent survey data, particularly in relation to whether high-risk consumers with ageing, long-term health conditions, and other significant health-risk factors are more likely to subscribe to PHI.

### Literature Review

In health insurance market, adverse selection relates to the fact that unhealthy people who need health care are more likely to take out health insurance than healthy people do. Adverse selection is a particular concern (Buchmueller 2008) in Australia because in mixed private-public health insurance market, the regulation of PHI premiums is under a community-rating rule. This means that everyone pays the same premium for the same product regardless of risk factors such as age, health status or other characteristics that likely predict future expenditures.

A number of studies investigating risk selection in the Australian PHI market have found mixed results. The first group identifying adverse selection in PHI includes Butler (2002) and Barrett and Conlon (2003). For instance, Butler (2002) used data from the Australian Bureau of Statistics (ABS) and concluded "...the changing age composition of the insured pool since September 2000, resulting in an increasing average age of those insured, suggests the possible reappearance of an adverse selection dynamic. Thus the 'trick' delivered by lifetime community ratings may not be maintained in the longer term".

Alternatively, the second group of studies identifies favorable selection into PHI, including Banks, Jorm et al. (2009), Leach, Butterworth et al. (2012) and Buchmueller, Fiebig et al. (2013). For example, Buchmueller, Fiebig et al. (2013) also used data from the ABS in 2004-2005 and claimed their findings evidence a "...negative correlation between health risk and insurance coverage, in which insured adults for hospital care have lower hospital utilization and in better self-reported health compared to uninsured adults".

Overall, there are limited studies on risk selection in Australia PHI. In light of the results from existing studies and in the context of population ageing and chronic disease in Australia, we examine the PHI market and offer some general insights regarding risk selection of the insured pool, focusing initially on customers with long-term health conditions and health-risk characteristics.

### Method

We employ logistic regression with possession of private health insurance as the dependent variable. All independent variables in the model follow previous studies, broadly classified into the two groups: a first group of variables provides information on demographic and socioeconomic factors, including sex, income, education, marital status, state of residence, and geographic disadvantage; a second group of variables relates to long-term health conditions and health-risk factors.

The long-term health conditions in our include asthma, cancer, cardiovascular conditions, arthritis, osteoporosis, diabetes, kidney disease, mental and behavioral conditions. The health-risk factors consist of tobacco smoking, alcohol consumption, body mass index, insufficient physical activity, high blood pressure, and the level of distress. A variable indicating whether the person has government health concession card (Health Care Card) is also included (automatically issued for Australian residents on Newstart Allowance, Sickness Allowance, Youth Allowance as a job seeker, Partner Allowance, Parenting Payment, Widow Allowance, Special Benefit, Carer Payment, Mobility Allowance if not receiving a Disability Support Pension, Carer Allowance or Farm Household Allowance).

The survey data are from the ABS's 4324.0.55.001 Microdata: National Health Survey (NHS), 2014-15, Expanded Confidentialized Unit Record File (CURF) Data. A number of previous studies of PHI using the NHS, see Barrett and Conlon (2003), Savage and Wright (2003), Doiron, Jones et al. (2008), Buchmueller, Fiebig et al. (2013). The survey covers the residents of some 15,000 private dwellings, consisting of nearly 19,000 people.

Similar to Buchmueller, Fiebig et al. (2013), we remove those observations for persons less than 25 years old because it is not appropriate to include children or dependents as independent observations in the model. We also remove observations with missing values for private health insurance cover status. The remaining sample comprises 10,323 individual observations.

### Findings

Table 1 provides descriptive statistics for the sample proportion by insurance cover regarding long-term health conditions and health-risk factors.

**Table 1.** Descriptive statistics

| Variable   | PHI (%) | No PHI (%) |
|--|---------|------------|
| <i>Age</i>   |         |            |
| 25-30 years (8.24%*)                                   | 4.79    | 6.04       |
| 30-44 years (29.89%)                                   | 18.52   | 12.71      |
| 45-64 years (36.50%)                                   | 22.84   | 13.90      |
| 65+ years (25.37%)                                     | 11.99   | 9.20       |
| <i>Long-term health conditions</i>                     |         |            |
| Have long-term health conditions (62.14%)              | 35.85   | 26.28      |
| No long-term health conditions (37.86%)                | 22.29   | 15.58      |
| <i>Tobacco smoking</i>                                 |         |            |
| Current smoking (16.21%)                               | 5.72    | 10.08      |
| No current smoking (83.79%)                            | 52.43   | 31.78      |
| <i>Physical activity</i>                               |         |            |
| Age group less than 64 years                           |         |            |
| Met 2014 physical activity guideline (10.27%)          | 7.64    | 3.37       |
| Did not met 2014 physical activity guideline (64.37%)  | 38.51   | 29.29      |
| Age group 65+ years                                    |         |            |
| Met 2014 physical activity guideline (4.17%)           | 2.06    | 1.37       |
| Did not meet 2014 physical activity guideline (21.20%) | 9.93    | 7.83       |
| <i>Alcohol consumption</i>                             |         |            |
| Exceeded guidelines (17.41%)                           | 11.02   | 6.86       |
| Did not exceed guideline (40.46%)                      | 26.31   | 14.11      |
| Never consumed alcohol (10.83%)                        | 5.05    | 6.00       |
| <i>Body mass index</i>                                 |         |            |
| Overweight/obese (66.44%)                              | 38.34   | 28.33      |

| Variable                                   | PHI (%) | No PHI (%) |
|--|---------|------------|
| No overweight or obese (33.56%)            | 19.81   | 13.53      |
| <i>High blood pressure</i>                 |         |            |
| Have high blood pressure (40.23%)          | 20.77   | 16.69      |
| Does not have high blood pressure (59.77%) | 37.37   | 25.17      |
| <i>Distress level</i>                      |         |            |
| Low level (68.36%)                         | 42.82   | 26.07      |
| Moderate level (18.97%)                    | 10.58   | 8.53       |
| High level (8.02%)                         | 3.25    | 4.26       |
| Very high level (4%)                       | 1.15    | 2.57       |

Table 1 reveals that in the insured pool, middle age and older customers very much outnumber younger customers. Moreover, there are more people with long-term health conditions than without. On the other hand, the number of insured people with health-risk factors such as overweight/obese and alcohol consumption is greater than insured people without. The opposite finding is found for people with high blood pressure, tobacco smoking, a very high distress level, and insufficient physical activity. Table 2 presents insurance cover status versus self-assessed health respondents showing that healthy customers (82.69%) outnumber unhealthy customers (17.31%) in the insured pool.

**Table 2.** Self-assessed health and insurance coverage

|            | Excellent<br>(18.74%) | Very good<br>(35.14%) | Good<br>(28.81%) | Fair<br>(11.74%) | Poor (5.57%) |
|------------|-----------------------|-----------------------|------------------|------------------|--------------|
| PHI (%)    | 12.49                 | 22.99                 | 16.18            | 4.92             | 1.57         |
| No PHI (%) | 6.46                  | 13.00                 | 12.96            | 6.04             | 3.40         |

Table 3 reports the results from the logistic regression with estimated coefficients, standard errors, and p-values for long-term health conditions and health-risk factors along with age (other socioeconomic and demographic factors included in model, but results not shown). The p-value corresponding to the Hosmer and Lemeshow Goodness-of-Fit Test is greater than 0.05 suggesting the models fit the data well at the .05 level.

**Table 3.** Model Estimates

| Parameter                  | Estimate  | Standard error | Pr>ChiSq |
|----------------------------|-----------|----------------|----------|
| <i>Age</i>                 |           |                |          |
| 30-44                      | 0.4853**  | 0.0832         | <.0001   |
| 45-64                      | 0.9642**  | 0.0885         | <.0001   |
| 65+                        | 1.8761**  | 0.1158         | <.0001   |
| Current smoking            | -0.7668** | 0.0667         | <.0001   |
| <i>Alcohol consumption</i> |           |                |          |
| Exceeded guidelines        | 0.6707**  | 0.0917         | <.0001   |

|                                       |           |        |        |
|---------------------------------------|-----------|--------|--------|
| Consumed but did not exceed guideline | 0.6201**  | 0.0781 | <.0001 |
| Overweight/obese                      | -0.0459   | 0.0511 | 0.3688 |
| High blood pressure                   | -0.1092*  | 0.0549 | 0.0466 |
| Distress level                        |           |        |        |
| Low distress level                    | 0.0515    | 0.0588 | 0.3809 |
| High distress level                   | -0.1051   | 0.0984 | 0.2855 |
| Very high distress level              | -0.2774*  | 0.1373 | 0.0433 |
| Insufficient physical activity        | -0.2144** | 0.0681 | 0.0016 |
| Long-term health conditions           |           |        |        |
| Asthma                                | -0.2201*  | 0.0871 | 0.0115 |
| Cancer                                | 0.5634**  | 0.2147 | 0.0087 |
| Cardiovascular conditions             | 0.0801    | 0.0680 | 0.2389 |
| Arthritis                             | -0.0938   | 0.0796 | 0.2387 |
| Osteoporosis                          | -0.1573   | 0.1332 | 0.2378 |
| Diabetes                              | 0.0894    | 0.1185 | 0.4508 |
| Kidney disease                        | -0.1129   | 0.2578 | 0.6614 |
| Mental and behavioural conditions     | -0.0983   | 0.0668 | 0.1413 |

Hosmer and Lemeshow Goodness-of-Fit Test = 0.2415 \*\* and \* denote statistical significance at the .01 and .05 level, respectively.

In terms of the health-risk factors, Table 3 shows that the middle aged and older people are more likely to subscribe to PHI. Similarly, people with alcohol consumption are more likely to take out PHI. The sample statistics reveal that people who consume alcohol are on average wealthier. This result is consistent with the information in Table 1 and with the income effect on purchasing PHI in the extant studies. On the other hand, people with health-risk factors such as tobacco smoking, high blood pressure, insufficient physical activities, and very high distress levels are less likely to purchase PHI compared to others, again consistent with the summary statistics in Table 1. This finding suggests that there are other unspecified determinants of PHI demand for these high-risk consumers, such as income and risk aversion, and adverse selection does not arise in this group. With respect to the long-term health conditions, we observe the positive relationship between people with cancer and PHI while people with asthma are less likely to subscribe to PHI. Therefore, adverse selection occurs for people with cancer but is not associated with people with asthma.

### Implications

In the paper, we examine whether adverse selection occurs in the insured group and identify mixed results for different health risk categories. Further investigation should address whether high-risk people not subscribing to PHI is mainly because of the increasingly expensive PHI premiums relative to their income. High-risk factors have a direct impact on long-term health conditions; therefore, it should be a focus of PHI policies. As one particular finding, consumers with asthma (a chronic disease contributing significantly to the burden of health care expenditure and a major cause of ill health and poor quality of life affecting some 10.8% of the Australian population) are much less likely to purchase PHI. Thus, chronic disease health policy could concentrate on this high-risk group for further improvement of policy results.

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