
CHERE
CENTRE FOR HEALTH ECONOMICS
RESEARCH AND EVALUATION


UNIVERSITY OF
TECHNOLOGY SYDNEY

UTS:CHERE

The Centre for Health Economics Research and Evaluation (CHERE) was established in 1991. CHERE is a centre of excellence in health economics and health services research. It is a joint Centre of the Faculties of Business and Nursing, Midwifery and Health at the University of Technology, Sydney, in collaboration with Central Sydney Area Health Service. It was established as a UTS Centre in February, 2002. The Centre aims to contribute to the development and application of health economics and health services research through research, teaching and policy support. CHERE's research program encompasses both the theory and application of health economics. The main theoretical research theme pursues valuing benefits, including understanding what individuals value from health and health care, how such values should be measured, and exploring the social values attached to these benefits. The applied research focuses on economic and the appraisal of new programs or new ways of delivering and/or funding services. CHERE's teaching includes introducing clinicians, health services managers, public health professionals and others to health economic principles. Training programs aim to develop practical skills in health economics and health services research. Policy support is provided at all levels of the health care system by undertaking commissioned projects, through the provision of formal and informal advice as well as participation in working parties and committees.

University of Technology, Sydney
City campus, Haymarket
PO Box 123 Broadway NSW 2007
Tel: +61 2 9514 4720
Fax: + 61 2 9514 4730
Email: mail@chere.uts.edu.au
www.chere.uts.edu.au

Joiners and leavers stayers and abstainers: Private health insurance choices in Australia

Stephanie A Knox[1], Elizabeth Savage[1] Denzil G Fiebig[1,2], Vineta Salale[1,2]

CHERE WORKING PAPER 2007/8

1. Centre for Health Economics Research and Evaluation
Faculty of Business
University of Technology, Sydney

2. School of Economics
University of New South Wales

First Version: October 2007
Current Version: October 2007

Abstract

The percentage of Australians taking up Private Health Insurance (PHI) was in decline following the introduction of Medicare in 1984 (PHIAC). To arrest this decline the Australian Government introduced a suite of policies, between 1997 and 2000, to create incentives for Australians to purchase private health insurance. These policies include an increased Medicare levy for those without PHI on high incomes, introduced in 1997, a 30% rebate for private hospital cover (introduced 1998), and the Lifetime Health Cover (LHC) policy where PHI premiums are set at age of entry, increasing for each year older than 30 years (introduced 2000). In 2004 the longitudinal study on Household Income and Labour Dynamics in Australia (HILDA), included a series of questions on private health insurance and hospital use. We used the HILDA data to investigate the demographic, health and income factors related to the PHI decisions, especially around the introduction of the Lifetime Health Cover policy. Specifically we investigate who was most influenced to purchase PHI (specifically hospital cover) in 2000 as a response to the Lifetime Health Cover policy deadline. Are those who have joined PHI since the introduction of LHC different from those who joined prior to LHC? What are the characteristics of those who have dropped PHI since the introduction of LHC? We model the PHI outcomes allowing for heterogeneity of choice and correlation across alternatives. After controlling for other factors, we find that LHC prompted moderately well-off working age adults (30-49 yrs) to purchase before the 2000 deadline. Young singles or couples with no children, and the overseas born were more likely to purchase since 2000, while the relatively less well-off continue to drop PHI in spite of current policy incentives.

1. Introduction

The universal Australian public health care system, Medicare, was introduced in 1984. Subsequently the private health insurance coverage of the population fell steadily, reaching its lowest level of just over thirty percent in 1998. Governments of both political persuasions at the Commonwealth level, argued that if the decline of private health insurance was to continue it would place unacceptable pressure on public hospitals in the future. Therefore over the last decade the Commonwealth introduced a suite of policies to create incentives for Australians to purchase private health insurance with the aim of promoting choice and relieving pressure on the public hospital system.

In 1997, the government introduced a private insurance tax rebate for low income singles and families and a tax surcharge (one percent of taxable income) for those on high incomes. The tax surcharge could be avoided by purchasing private health insurance. In 1999, the income-tested rebate for low earners was replaced with a constant thirty percent premium rebate, available to all regardless of income. In 2000, the Lifetime Health Cover policy (LHC) reform introduced an age gradient into the premium schedule. After July 15, 2000, all new private insurance enrollees aged over 30 pay a premium loading in future period of two percent for each year of age over 30 at entry. The loading is capped at 70 percent. Irrespective of age, people already insured prior to the deadline who maintain their private insurance coverage are exempt from the loading. The 2000 reform was accompanied by extensive publicly-funded advertising under the theme "Run for Cover". As a result of these insurance incentives, private insurance coverage in Australia increased from 30.1 percent in 1998 to 43 percent in 2000, a jump of nearly 50 percent, most of which occurred just prior to July 2000. There was also a change in the mix of the insured population with large fall in the percentage aged over 65.

Three policies have remained relevant in 2000 and since:

1) the increased Medicare levy for 'high income' earners who did not purchase private hospital cover;
2) the 30% rebate for the purchase of hospital cover; and
3) The Lifetime Health Cover policy.

Previous Australian research on private health insurance falls into three categories: analysis of insurance demand prior to the reforms of the last decade; analyses of the PHI incentives overall; and analyses of the incentives that focuses on heterogeneity across individuals or families.

The factors influencing the demand for private insurance coverage prior to LHC have been examined using the ABS National Health Surveys (NHS). Using the NHS surveys undertaken between 1983 and 1995, Schofield et al (1997) examine PHI the changing composition of PHI coverage of the population. They identify a decline among middle income families compared with both upper and lower income groups and a smaller decline among families headed by a person over 55 years old than younger families. They also find that rising premiums had the greatest impact on low income families. Using the 1989 and 1995 NHS data respectively, Savage and Wright (2003) and Barrett and Conlon (2003) found a strong association between demand for insurance and income. Savage and Wright also examined the association between

utilisation and insurance for private hospital length of stay. They found that insurance could more than double the average length of private hospital stay.

The introduction of the insurance incentives generated considerable research. Butler (2002) analysed the "carrots and sticks" financial incentives for PHI and found that the membership uptake that occurred was largely attributable to LHC, a policy that had virtually no cost to government. He also examined the changing age composition of the insured pool after September 2000, and observes that the increasing average age of those insured suggests the possible reappearance of an adverse selection dynamic. He argues that the 'trick' delivered by LHC may not be maintained in the longer term. Walker et al (2005) present an historical analysis of the impacts of the different PHI incentives in terms of the proportion of Australians having hospital insurance cover by age, gender and socioeconomic status. They found that the increased cover was due mainly to the richest 20% of the population. Among the poorest 40% the impact was minimal.

Dawkins et al (2004) found strong evidence that households most affected by the PHI policy changes were those with high socio-economic standing and high income and little evidence that the policies alleviated the burden of public hospitals. Vaithianathan (2004) argues that the subsidy to health insurance should have been an effective means to increase PHI coverage, but was ineffective because community rating was ineffective. Despite community rating rules which prohibit age adjusted premiums, Household Expenditure Survey data indicate that young adults pay considerably less for their insurance than older adults. She concludes that insurers circumvented community rating through plan design, screening older consumers into more expensive plans. She also found that the penalty of 2 per cent per year for delaying insurance, introduced as part of the lifetime cover plan, is too low to be effective.

Doiron et al (forthcoming) investigated the relationship between *ex ante* risk and private health insurance using the NHS 2001 and found a strong positive association between self-assessed health and private health cover and identify the factors responsible for favourable selection. They found that those persons who engage in risk-taking behaviours are simultaneously less likely to be in good health and less likely to buy insurance.

Palangkaraya and Yong (2005) attempted to isolate the effects of the different insurance incentives using 1995 and 2001 NHS data. Focusing on single individuals their counterfactual analysis indicates that LHC caused between 42% and 75% of the overall increase in PHI membership. Ellis and Savage (2005) developed and used NHS 2001 data to estimate a model of individual decisions to enroll in private health insurance order to understand the effects of the PHI reforms on the age and income distribution of those with private cover over time. They conclude that the major impacts of the three reforms can be understood as a broad-based “Run for Cover”, a response to a deadline and an advertising blitz, rather than a pure price response. They also found that LHC would have had a larger impact on coverage for families without the 30% premium subsidy.

Lu and Savage (2006) used the 2001 NHS to examine the impact of increased private insurance coverage on use of both public and private hospital systems focusing on how behaviour varies with insurance duration. They found that those who enrolled in response to the incentives behave more like the uninsured than the long-term insured.

While the insurance incentives substantially increased the proportion of the population with supplementary private insurance, the impact on the use of the public system by new entrants appears to be quite modest. They conclude that using financial PHI incentives is not a cost-effective way of reducing pressure on public hospital systems.

Feibig et al 2007 analysed private health insurance behaviours among respondents to the 2001 NHS to identify insurance 'types' according to stated reasons for buying health insurance. They found considerable evidence of unexplained heterogeneity among the privately insured population and that insurance type is significantly associated with hospital utilisation, particularly the probability of being admitted as a public or private patient. The government's insurance incentives were more attractive to particular types of the insured population and this limits their effectiveness in reducing pressure on the public hospital system.

In this paper we use the HILDA data to further explore heterogeneity of private health insurance choices. We investigate demographic, family, health and income factors related to respondent's private health insurance decisions in the light of recent policy changes. We focus on whether these policy changes attracted a different demographic to purchase private health insurance than previously. We are also interested in describing those who have dropped private health insurance since the introduction of LHC. Since the policies only apply to the purchase of hospital cover, we have excluded ancillary cover only from our definition of private health insurance.

We identify six distinct groups: those who purchased private hospital cover before LHC; those who reported they took up private hospital cover in 2000 in response to the LHC deadline; those who took up private hospital cover after 2000 (i.e. after the LHC premiums were in place); those who dropped private hospital cover after 2000; those who had dropped private hospital cover prior to 2000 and remained uninsured; those who had never purchased private hospital cover. We model the insurance decisions using a multinomial probit model which allows for heterogeneity of choice and correlation across alternatives. We use our preferred model to simulate predicted probabilities for each alternative outcome. To illustrate our results we constructed a series of hypothetical index individuals for each outcome alternative of interest, setting the levels of the explanatory variables to give a high simulated probability of choice for that alternative. We then use the index individual as a base to examine the effect of a change in the level of each explanatory variable on the probability of choice for the alternative of interest, keeping all other variables at the level of the index individual.

These results focus on the three groups whose decisions would be affected by Lifetime Health Cover: those who joined PHI because of the lifetime Health cover deadline, those who joined after the deadline and those who dropped hospital cover since the introduction of the policy.

2. Data

The Household Income and Labour Dynamics of Australia (HILDA) study is a longitudinal population survey which commenced in 2001. HILDA is a representative sample of Australian households. In the baseline 2001 survey all members of 7,682 selected households were enumerated and members aged 15 years and over were

interviewed. Respondents have been followed across time and interviews are conducted every 12 months. New household members are included in subsequent interview waves, while ever they share a household with a baseline respondent. The survey covers questions on income, expenditures, education, occupation and other roles, demographics, health, family formation, risk behaviours, attitudes and life events. The HILDA sample and method have been described in detail elsewhere (http://melbourneinstitute.com/hilda/).

In Wave 4 of HILDA conducted in 2004 respondents were asked a series of questions on private health insurance and hospital usage. Did respondent currently have private health insurance? If yes, did it include hospital cover? When did he/she join? And if he/she joined in 2000 was that as a response to the LHC policy? If the respondent was not currently insured, had he/she ever had hospital cover in the past and if so how long ago did he/she drop hospital cover?

From these questions we created six groups based on the respondent's most recent decision in relation to the purchase of private hospital cover insurance.

1. Joined Prior: those who purchased private hospital cover before Lifetime Health Cover.
2. Joined because of Lifetime Health Cover (LHC): those who stated they took up private hospital cover in 2000 because of LHC.
3. Joined After: those who took up private hospital cover after 2000.
4. Left After: those who dropped private hospital cover after 2000.
5. Left Prior: those who had dropped private hospital cover before 2000, including those who still held extras cover.
6. Never: those who had never purchased private hospital cover, including those who had only ever held ancillary cover.

Since the questions on private health insurance cover were only asked in Wave 4 of HILDA we adopted a retrospective cohort approach to model the factors related to private health insurance decisions. The outcome was most recent decision in relation to the purchase of private hospital cover insurance in Wave 4 of HILDA. The explanatory variables were responses recorded in Wave1 of HILDA. We chose Wave 1 as the baseline because that was the closest time period to the 2000 policy changes and therefore was the best available measure of the respondent's status at the time of the policy changes. In addition differences between Waves 1 and 2 in income, financial assets and health were calculated to measure the effect of prospective changes after 2001 on more recent decisions to purchase or drop private hospital cover after the introduction of LHC.

Explanatory variables fall into five categories:

1. *Demographic variables* included age, sex, region of residence, education, occupation, country of birth and languages spoken other than English. Family formation variables included couple status, the number of respondent's resident children < 25 years and the age of the youngest resident child.
2. *Health variables* included long-term illness or disability, the Short Form Health Survey (SF-36) items and scales, alcohol consumption, smoking status and exercise.

3. *Financial variables* included individual, partners and household wages, benefits and financial assets, attitudes to financial risk and self-assessed prosperity.
4. *Retrospective life events* in the 12 months prior to 2001 included self-report of financial improvement or worsening, losing a job, being promoted, changing jobs, retiring, marriage, separation, reconciliation, becoming pregnant, a new baby, injury or illness for self or family.
5. *Prospective changes* in the 12 months from 2001 to 2002 included personal and household income and financial assets, changes in disability/illness and SF-36 self-assessed health.

In the analysis we used the balanced panel of respondents aged 18 years and over who had complete data for the relevant variables in Wave1 to Wave 4. There were 13,191 respondents 18 years and over in Wave 1 of HILDA. The balanced panel aged 18 years and over from Waves 1 to 4 comprised 9,377 respondents, 98% of whom answered the self-completion questionnaire in Wave1. Eight respondents did not answer the questions on private health insurance in Wave 4. This gave a final sample of 9,196. Half of the sample (49.6%) held private hospital insurance in 2004. A further 336 (3.6%) held ancillary cover only. A quarter of respondents (25.7%) had never held any private hospital cover. The private health insurance choice (hospital cover only) categories used in the analysis are shown in Table 1.

TABLE 1 NEAR HERE

The majority of respondents who had dropped private hospital cover by 2004 had done so 8 or more years ago (1779 of 2281). Of those who had dropped private hospital cover after 2000, half (219 of 424) had done so less than 2 years ago. A summary of the characteristics of the total sample and each choice category is shown in Table 2.

TABLE 2 NEAR HERE

Respondents with private hospital cover in 2004 were more likely in 2001 to have tertiary qualifications, to be living in a major city, to be a non-smoker and have higher average wages than those without insurance. A greater proportion of those who took up hospital cover in response to LHC policy were couples with children, compared to the other groups. Those who joined private hospital cover after 2000 had a marked increase in household wages from 2001 to 2002. In contrast those who dropped private hospital cover after 2000 had a marked decrease in household wages from 2001 to 2002.

3. Modelling strategy

In order to examine the explanatory variables on PHI choice, assume that each individual has an unobserved utility associated with each of six discrete outcomes. Individuals then choose the alternative with the highest utility.

With a linear random utility model this implies:

(1) $U_{ij} = x_i'\beta_j + \varepsilon_{ij}; \quad j = 1,..,6$

where **x** represents the vector of control variables. Under the assumption that the disturbances are distributed as iid type I extreme value, this random utility framework motivates the use of the multinomial logit model. Initially STATA was used to fit a multinomial logit model with the six PHI categories as the outcome.

All explanatory variables were fitted in the full model in groups of related variables, specifically demographics, relationship and family formation, education and occupation, health, wages, benefits and financial assets, health risk and financial risk, retrospective self-reported life changes, prospective changes in income and financial assets.
The number of variables in the model from each group of explanatory variables was reduced using backward elimination from the full model. The objective was to retain in the model those variables from each group with the greatest explanatory power, without omitting any important variables from the model. Each group of explanatory variables was reduced in the presence of all other variables, starting with the least significant variable in the group. A variable was kept or dropped based on the likelihood ratio test (alpha = .05) and the next least significant variable was tested and so on. After all variables had been tested, the next family was then reduced the same way. Age, sex, health and income are all known important explanatory variables for health insurance behaviour. Therefore appropriate measure(s) of each of these characteristics were kept in the model regardless of their significance in the sample. The final model was tested for adequacy against the full model using the likelihood ratio test. To ensure that no important explanatory variables had been omitted from the model, the coefficients in the final model were compared with the full model for any substantial changes in size.
The final model was tested for the assumption of independence of irrelevant alternatives, using formal tests and by running a series of binary logit models of each alternative outcome against the reference outcome "never had private health insurance" to check any changes in the coefficients.

The variables retained in the final model were age, sex, partner status, number of children, age of youngest child, occupation, education, language, country of birth, region of residence, self-assessed health, disability or long-term illness, smoking status, weekly exercise, individual wages, benefits and financial assets, partner's wages and financial assets, total household wages, self-reported prosperity and attitude to financial risk, recent loss of job, recent illness or disability in the family, recent worsening of financial situation, recently married, prospective changes in household wages, benefits and financial assets.

Variables in the final model were inspected for functional form. Age was non-linear on the logit for the alternatives "joined because of lifetime health cover" and "joined after lifetime health cover". Age was therefore entered as spline variables with break-points at age 31, 46 and 66 to capture the age-related effects of the LHC policy. Increasing positive financial assets and increasing negative financial assets predicted a greater probability of having private health insurance relative to no financial assets. Therefore to capture this non-linear relationship, financial assets was fitted as two ordinal variables, positive financial assets with 6 ordinal categories ($0 to $9999, $10,000 to $19,999,…..,$40,000 to $49,999, $50,000 and above) and negative financial assets with 2 ordinal categories (< -$10,000, $0 to -$9999).

Smoking status that was missing for Wave1 was imputed from later waves of the panel where possible. There were 510 observations with incomplete data that were omitted from the model (5.5% of the balanced panel). The number of complete cases in the final multinomial logit model was 8,686.

The final multinomial logit model failed the test for independence of irrelevant alternatives (IIA) (Small-Hsiao test, $p<.001$). Therefore we investigated models that relaxed the IIA assumption using the "mdc" procedure in SAS V9.1. We chose a multinomial probit model that assumes the error term ε_{ij} for each alternative is normally distributed, but allows error terms to be heteroskedastic and correlated across alternatives. Two multinomial probit models were fitted and compared:

1. An approximation to multinomial logit with restrictions on the error terms to be homoskedastic and uncorrelated across alternatives.
2. The unrestricted multinomial probit model that allowed the error terms to be heteroskedastic and freely correlated across alternatives.

The fit of the unrestricted model was compared to the fit of the model with homoskedastic variance and uncorrelated error terms, using the likelihood ratio test. The final preferred model was used to simulate predicted probabilities for each alternative for each respondent. A dataset was created with hypothetical observations to observe the effect of changing levels of each explanatory variable on the estimated probability of the alternative outcomes.

A series of index individuals were created, one for each outcome alternative, as a base to examine the effects of each explanatory variable on the probability of that particular outcome. The model coefficients were used to select levels of the explanatory to create an individual with a high probability for a particular outcome. The explanatory variables were then varied one level at a time to estimate their effects on the probability of the alternative of interest, keeping all other variables at the level of the index individual. Index individuals were created for the three alternatives of most interest; purchasing hospital cover because of lifetime health cover, joining after 2000, and leaving after 2000.

The effects of age were estimated holding all other explanatory variables at the level of the sample mean.

4. Results

The goodness of fit of the multinomial logit and multinomial probit models are summarised in Table 3. The unrestricted multinomial probit fitted the data better than the multinomial probit model with homoskedastic independent error terms (LR chisq (64, 14) $p < .0001$). We therefore proceeded with the unrestricted multinomial probit as the preferred model for the analysis.

TABLE 3 NEAR HERE

The characteristics of the three index individuals are summarised in Table 4 along with their predicted probabilities for each choice alternative.

TABLE 4 NEAR HERE

Joined because of LHC

The index individual for joining private health insurance because of Lifetime Health Cover was a 40 year old married man with one child aged 5-14 years, a non-smoker with no long-term health conditions, in a professional position with tertiary qualifications, with an annual wage of $100,000, whose partner is not working and with no financial assets. The full details of the LHC index individual are listed in Table 4. The estimated probability of joining because of LHC for the index individual is 38%, much higher than the overall sample rate of 6%. The probability of joining prior is also higher for this individual than for the sample rate (55% versus 39%).

TABLE 5 NEAR HERE

The effect of age on the probability of joining because of LHC holding all other variables at the sample mean, are shown in Figure 1 and the effects of changing the levels of the index individual are shown in Table 5. To provide a comparison with those who joined prior Table 5 also shows the changes in probability of having joined prior for each change in the level of the LHC index individual.

In summary based on the index individual characteristics associated with an increased probability of having purchased private hospital cover in 2000:

- Being aged 31-45 years
- Having 1 school-aged child
- A single income between $60k and $120k
- No financial assets
- Described their financial circumstances as “just getting by”
- Family member had had a recent injury or illness
- Were born in Australia from a Non-English speaking background or born in Asia/Pacific region

Being recently married, higher partner’s wages and higher financial assets reduced the probability of joining because of LHC deadline relative to having already joined before the introduction of the LHC policy. Having a larger younger family also decreased the probability of joining because of the LHC deadline relative to having already joined prior.

Variables that did not affect the probability of joining because of LHC, included smoking status, having a long term disability or health problem, occupation or qualifications, reporting being financially worse in the 12 months prior to 2001, or any changes in income or financial assets following 2001.

Joined After 2000

The index individual for joining private hospital cover after the introduction of Lifetime Health Cover (Joined After 2000) was a 29 year old male with partner and no children, a non-smoker, with no long-term health conditions, in a professional occupation. The full details of the Joined After index individual are listed in Table 4. The estimated probability of having joined after 2000 for the index individual is 41%.

The effect of age on the probability of joining after 2000 holding all other variables at the sample mean, are shown in Figure 2 and marginal changes based on the index individual are shown in Table 6.

In summary based on the index individual the following characteristics were associated with an increased probability of having purchased private hospital cover after 2000:

- Turning 30 years of age after 2000,
- Being single or in a couple with no children in 2001
- Having no financial assets in 2001
- Not becoming financially worse-off in 2001
- Having no increase in benefits from 2001 to 2002
- Being from a non-English speaking background and/or born overseas
- Having a long-term illness or disability

Variables with negligible effect on joining private hospital cover after 2000 included smoking status, region of residence, having a family member with a recent illness or disability and changes in financial assets after 2001.

Left After 2000

The index individual for leaving private hospital cover after the introduction of the lifetime health cover policy is a 35 year old female, in a working couple with 3 children, the youngest under 5 years old. She smokes regularly and has no long-term illness or disability. Her individual wages are $50,000 and her partner's wages are $70,000. The full details of the index individual are shown in Table 4. The estimated probability of the index individual being in the group that left private hospital cover after 2000 is 46%.

Figure 3 shows the effect of age on leaving hospital cover after 2000, with all other variables held at the sample mean. Effects based on the index individual are shown in Table 7.

In summary based on the index individual the following characteristics were associated with an increased probability of leaving private hospital cover after 2000:

- Younger age
- Having less financial assets and greater household debt in 2001
- Taking no financial risks
- Reporting a worsening of financial circumstances prior to 2001
- Having a decrease in wages and increase in benefits 2001 to 2002
- Being in an occupation other than professional
- A regular smoker

Variables with negligible effect on the probability of leaving private hospital cover after 2000 included having a disability or long-term health condition, number of children and self-assessed prosperity.

5. Conclusions

Around half of the sample had private hospital cover in 2004, compared with 45% in the Australian population as whole. At least thirty-nine percent of the sample held private health insurance prior to 2000, compared with an actual insurance rate of 30% in the Australian population at that time. The higher insurance rate in the HILDA sample may indicate that initial and ongoing participation in the study is associated with a higher probability of purchasing private health insurance.

As expected, age was found to be a very strong predictor of health insurance decisions related to the introduction of the Lifetime Health Cover policy. In the HILDA sample those who took up private hospital cover in 2000 as a response to Lifetime Health Cover had higher mean household wages than other insured groups. However in the multinomial probit model this effect disappeared after controlling for other factors. Instead it appeared that those who took up insurance in response to LHC were in fact somewhat less well-off than those who had already taken up insurance prior to the policy. This could be explained in part by the younger age of those who took insurance in response to LHC, who were mostly working age adults. This group may be at a stage where they have greater incomes on average, which are accompanied by greater financial demands than older respondents who were already insured. The multivariable analysis indicates that when comparing age peers in similar circumstances, those who were better off financially had already taken up insurance prior to the introduction of the policy. This could explain why those who took up PHI in response to the LHC policy deadline perceived they as less prosperous compared with those who had already purchased insurance. There is therefore some evidence that the LHC policy deadline succeeded in attracting more middle income earners among working age adults into PHI than previously. In many respects however, those who joined because of LHC were very similar to those who joined prior. The group who joined because of LHC may have planned to purchase PHI at a later stage, and so were particularly motivated by the deadline to bring their decision forward and avoid a future penalty.

The three major factors that affected the probability of joining after 2000 were age, number of children and country of birth. Young childless couples and those from a non-English speaking background represent a new demographic that was not inclined to purchase hospital cover prior to the introduction of the LHC policy. Like the LHC deadline group, those who purchased hospital cover after 2000 had fewer financial assets or financial commitments than those who had joined prior to the introduction of LHC.

The characteristics of the group who have purchased hospital cover after 2000 however, indicates that the ongoing effect of the policy has been to attract a larger share of younger childless couples or singles to purchase hospital cover, at least over the short-term. If the impact of LHC were a response to the deadline and advertising rather than the premium penalty (Ellis & Savage, 2005) then the rate of young people joining around age 30 should drop over time, as the memory of the 2000 campaign fades and the LHC premium penalty comes to be seen as the normal state of affairs.

We found that declining financial circumstances were the major reason for dropping hospital cover since the introduction of the LHC policy. It has been suggested that disillusionment with the value of hospital cover is a major reason for dropping PHI

since 2000. Although we do not have information about when the recent leavers first purchased insurance, the younger age of the leavers indicates that many in this group may have taken up private hospital cover as a response to Lifetime Health Cover policy, but dropped the cover because of financial difficulties rather than for any other reason.

The inclusion of another round of Private Health Insurance questions in future waves of HILDA would help clarify many of these findings and answer further questions raised by this analysis.

References

Butler JR, 2002, Policy change and private health insurance: did the cheapest policy do the trick? *Australian Health Review* 25(6):33-41.

Dawkins P, Webster E, Hopkins S, Yong J, 2004, Recent private health insurance policies in Australia: health resource utilization, distributive implications and policy options, *A Report Prepared for the Department of Premier and Cabinet, The Government of Victoria*

Doiron D, Jones G, Savage E, forthcoming, Healthy, Wealthy and Insured? forthcoming, The Role of Self-Assessed Health in the Demand for Private Health Insurance, *Health Economics*

Ellis RP, Savage E, 2005, Run for Cover Now or Later? The impact on premiums, threats and deadlines on supplementary private health insurance in Australia. *Working paper 2005-020 Department of Economics, Boston University*, Boston.

Fiebig DG, Savage E, Viney R, 2006, Does the reason for buying health insurance influence behaviour? *CHERE Working Paper* 2006/1, CHERE, Sydney, 2006.

Lu M, Savage E, 2006, Do financial incentives for supplementary private health insurance reduce pressure on the public system? Evidence from Australia, *CHERE Working Paper* 2006/11, CHERE, Sydney, 2006.

Palangkaraya A, Yong J, 2005, Effects of Recent Carrot-and-Stick Policy Initiatives on Private Health Insurance Coverage in Australia. *The Economic Record*, Vol. 81 (254) :262-272.

Schofield D, Fischer S, Percival R, 1997, Behind the decline: The changing composition of private health insurance in Australia, 1983-95, *NATSEM Discussion Paper* No. 18

Vaithianathan R, 2004, A Critique of the Private Health Insurance Regulations, *The Australian Economic Review*, vol. 37, no. 3, pp. 257–70

Walker A, Percival R, Thurecht L, Pearse J, 2005, Distributional impact of recent changes in private health insurance policies, Australian Health Review 29 (2): 167-177

Table 1: Distribution of private hospital cover choice categories in 2004 (Wave 4)

	N	Sample %
Joined prior to lifetime health cover	3,539	38.5%
Joined in 2000 in response to LHC	567	6.2%
Joined after 2000	448	4.9%
Left after 2000	424	4.6%
Left prior to 2000	1,857	20.2%
Never held private hospital cover	2,361	25.7%

Table 2: Comparison of selected demographic, financial, family and health variables in 2001 (Wave1) across private hospital cover groups

HILDA WAVE1 variables	**Joined Prior**	**Joined Because of LHC**	**Joined After**	**Left After**	**Left Prior**	**Never**	**Total**
N	***3,539***	***567***	***448***	***424***	***1,857***	***2,361***	***9,196***
%	*38.5%*	*6.2%*	*4.9%*	*4.6%*	*20.2%*	*25.7%*	*100.0%*
Mean age (years)	49.3	42.4	36.7	41.8	53.0	39.8	46.2
Female (%)	55.0	50.8	55.4	55.2	54.8	51.3	53.7
Major city (%)	63.7	62.3	69.2	59.2	46.0	51.9	57.1
Couple with children	36.2	51.2	27.5	31.8	25.6	33.6	33.7
Single no children	18.3	16.6	31.5	31.1	29.4	34.7	25.9
Tertiary qualification (%)	27.7	34.7	32.8	16.8	8.8	13.1	20.3
Smoker (%)	13.1	16.6	20.8	29.4	25.5	35.8	22.6
Long term health problem/disability (%)	18.7	13.1	17.2	24.5	35.2	23.4	23.1
Self-assessed health good or better (%)	87.9	88.9	92.1	85.6	74.9	81.2	83.7
Born in Australia	79.2	77.4	70.8	79.3	77.8	71.7	76.5
Self-reported finance worse prior 12 mths (%)	2.4	2.5	1.6	7.8	4.1	3.3	3.2
Household wages ($)	$60,130	$70,241	$61,341	$46,763	$25,717	$32,599	$46,179
Individual benefits	$1,886	$1,159	$1,995	$3,171	$5,787	$5,116	$3,523
Change in house wages 2001-02 ($)	$345	$3,183	$6,939	-$4,576	-$297	$634	$559
Change in household benefits 2001-02 ($)	$396	$307	-$553	$1,077	$628	$511	$452

Table 3: Goodness of fit summary for multinomial logit, and multinomial probit models

	Multinomial logit	Multinomial probit (restricted)	Multinomial probit (unrestricted)
N	8686	8686	8686
Parameters estimated	345	345	359
Log likelihood	-10187	-10254	-10222
AIC	21063	21199	21161
McFadden's R-square	0.2180	0.2128	0.2153

Table 4a: Characteristic of index individuals for Joined 2000 Because of LH, Joined After 2000 and Left After 2000 and probabilities of each PHI choice

Variable	**LHC index individual**	**Joined After index individual**	**Left After index individual**
Age	40 years old	29 years old	35 years old
Sex	Male	Male	Female
Region	Major city	Major city	Major city
Relationship	Partner	Partner	Partner
Disability	No disability	No disability	No disability
Language	English only	English only	English only
Occupation	Professional	Professional	Service worker
Qualifications	Tertiary	Diploma	Diploma
Country of birth	Australia	Australia	Australia
Individual wages	$100,000	$60,000	$50,000
Partner's wage	Partner's wages $0	Partner's wages $60,000	Partner's wages $70,000
Individual benefit	$0	$0	$0
Individual financial assets	No financial assets	No financial assets	Positive financial assets $0-$10,000
Partner's financial assets	No financial assets	No financial assets	$0
Change in household wages 2001 to 2002	$20,000 increase in household wages	$25,000 increase in household wages	$40,000 decrease in household wages
Change in household benefits 2001 to 2002	No change in household benefits	No change in household benefits	$10,000 increase in household benefits
Change in household financial assets 2001 to 2002	$50,000 increase in household financial assets	$40,000 increase in household financial assets	No change in household financial assets
Married previous 12 mths	Not recently married	Not recently married	Not recently married
Family illness or injury previous 12 mths	Recent family illness	Recent family illness	Recent family illness
Lost a job Previous 12 mths	Has not lost a job	Lost a job	Lost a job
Financially worse previous 12 mths	Not financially worse the last 12 mths	Not financially worse the last 12 months	Financially worse the last 12 mths
No of resident children	1 child	No children	3 children
Age of youngest resident child	Youngest child 5-14 yrs		Youngest child < 5 yrs
Regular smoker	Non-smoker	Non-smoker	Smoker
Financial risk behaviour	Takes average financial risks	Takes average financial risks	Takes no financial risk
Self-assessed prosperity	Considers self very prosperous	Considers self very prosperous	Considers self poor
Exercise	Exercises 3 times weekly	Exercises less than weekly	Exercises less than weekly
Probabilities of each private health insurance choice alternative estimated from multinomial probit			
Joined Prior	0.555	0.443	0.252
Joined because of LHC	**0.380**	0.081	0.012
Joined After	0.039	**0.409**	0.004
Left After	0.008	0.033	**0.459**
Left Prior	0.007	0.020	0.247
Never	0.010	0.015	0.012

Table 5: Change in probability of having Joined Because of LHC compared with having Joined Prior for changes in the levels of the LHC index individual.

Level	Reference level (LHC index individual)	Change in probability LHC	Change in probability Joined Prior
Female	Male	-0.042	0.049
No children	1 child	-0.032	-0.009
3 children		-0.083	0.077
Youngest Child < 5 yrs	Youngest Child 5-14	-0.041	0.047
Age 50	Age 40	-0.081	0.115
Age 32		0.026	-0.064
Age 29#		-0.132	-0.132
Regional Australia	Major city	0.034	-0.046
Australian born Non-English speaking background	Born Australia English speaking only	0.063	-0.079
Born Asia/Oceania Non-English speaking background		0.094	-0.202
Born Africa/Middle East Non-English speaking background		-0.063	-0.034
Wages $0	$100,000	-0.078	-0.146
Wages $20000		-0.047	-0.102
Wages $40000		-0.024	-0.066
Wages $60000		-0.009	-0.037
Wages $80000		-0.001	-0.016
Wages $120000		-0.002	0.012
Wages $140000		-0.006	0.024
Wages $160,000		-0.011	0.034
Partners wages $40,000		-0.018	0.037
Partners wages $60,000	$0	-0.030	0.053
Partners wages $80,000		-0.042	0.069
Partners wages $100,000		-0.054	0.084
Partners wages $120,000		-0.066	0.099
Partners wages $140,000		-0.079	0.113
Partners wages $160,000		-0.091	0.127
Couple's financial assets (neg) < -$20,000	No financial assets	-0.025	0.059
Couple's financial assets (pos) $80,000-$100,000		-0.172	0.212
No family illness/disability	Recent family illness	-0.049	0.032
Just married~	Not recently married	-0.145	0.048
Just getting by financially	Very prosperous	0.076	-0.083
Lost job last 12 months	Not lost job last 12 months	-0.080	0.040
No exercise	3 times weekly	-0.070	0.050

Base = LHC Index no children

~ Base = LHC Index age 32 no children

Table 6: Change in probability of having Joined After 2000 compared with having Joined Prior for changes in the levels of the Joined After index individual.

Level	Reference level (Joined After index individual)	Change in probability Joined After	Change in probability Joined Prior
Born Asia/Oceania NESB	Aust ESB	0.238	-0.240
Born Africa/Middle East NESB		0.120	-0.120
Born Europe NESB		0.158	-0.158
Australian born non-English speaking background	English speaking background	0.074	-0.084
Disability or long-term illness	No disability	0.052	-0.045
1 child	no children	-0.128	0.118
Single ~	With partner	0.041	-0.027
Age 25 years	age 29 years	-0.042	0.035
Age 40 years	age 29 years	-0.275	0.200
Age 50 years	age 29 years	-0.353	0.326
positive financial assets $30-$40k	no financial assets	-0.125	0.160
positive financial assets > $50k		-0.183	0.237
negative financial assets < -$20k		-0.113	0.123
Wages $0	$60,000	-0.027	-0.083
Wages $40,000		-0.004	-0.025
Wages $100,000		-0.003	0.033
Wages $140,000		-0.013	0.056
Wages $180,000		-0.025	0.078
Wages $220,000		-0.038	0.100
Partner's wages $0	$60,000	-0.014	-0.090
Partner's wages $160,000		-0.037	0.095
Increase benefits $10,000 2001 to 2002	No increase	-0.075	0.020
Tertiary qualification	Diploma	0.037	-0.036
school only	diploma	0.081	-0.080
Manager	Professional	-0.043	0.047
Trade		-0.062	0.024
Service		-0.063	-0.002
Clerk		-0.053	0.048
Not lost job last 12 months	Lost job last 12 months	-0.073	0.027
Financially worse off last 12 months	Not financially worse last 12 months	-0.120	0.032
Takes high financial risks	Takes average financial risks	-0.010	0.020
Takes no financial risks		-0.030	0.071
No exercise	< 1 weekly	-0.064	0.062

~ base = Index individual, partner's wages $0

Table 7: Change in probability of having Left After 2000 for changes in the levels of the Left After index individual.

Level	Reference level (Left After index individual	Change in probability Left After
Born Australia Non-English speaking background	Born Australia English speaking	-0.038
Born Asia/Oceania NESB	Born Australia English speaking	0.006
Born Africa/Middle East NESB		0.051
Wages $0	$50,000	-0.025
Wages $20,000		-0.010
Wages $80,000		-0.008
Wages $120,000		-0.036
Wages $160,000		-0.079
Wages $200,000		-0.132
No children	3 children	-0.008
Single ~	With partner	0.032
Professional	Service	-0.072
Regional	Major city	-0.026
Remote		-0.026
Not lost job last 12 months	Lost job	-0.059
Age 45 youngest child 5-15 years	Age 35 youngest child < 5 years	-0.143
Financial assets (pos) $30,000-$40,000	Positive financial assets $1-$10,000	-0.068
Financial assets (neg) < -$20,000		0.138
Financial assets $0		0.016
Non-smoker	Smoker	-0.056
No change in benefits 2001 to 2002	$10,000 increase	-0.049
Not financially worse last 12 months	Financially worse	-0.161
No change in household wages 2001 to 2002	$40,000 decrease	-0.037
No (prospective) change in wages or benefits 2001 to 2002	$10,000 increase in benefits and $40,000 decrease in wages	-0.090
Exercise 3 times weekly	< 1 weekly	-0.057
Takes average financial risk	Takes no financial risks	-0.069
Takes high financial risk		-0.050

~ base = Index individual no children, no partner's wages or financial assets

Figure 1

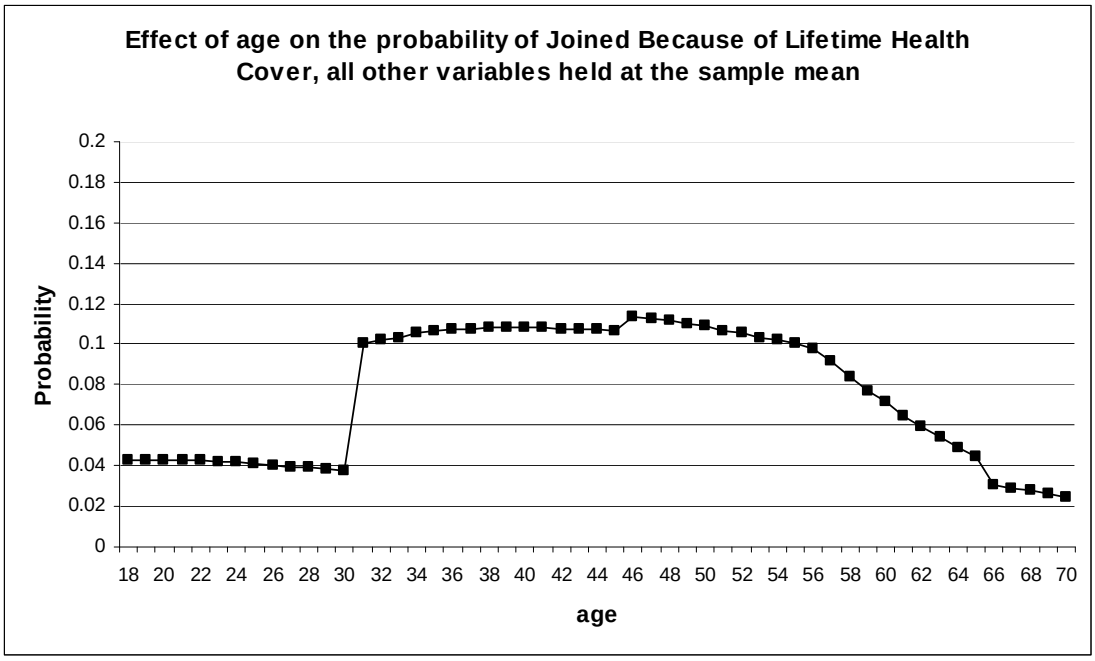


Figure 2

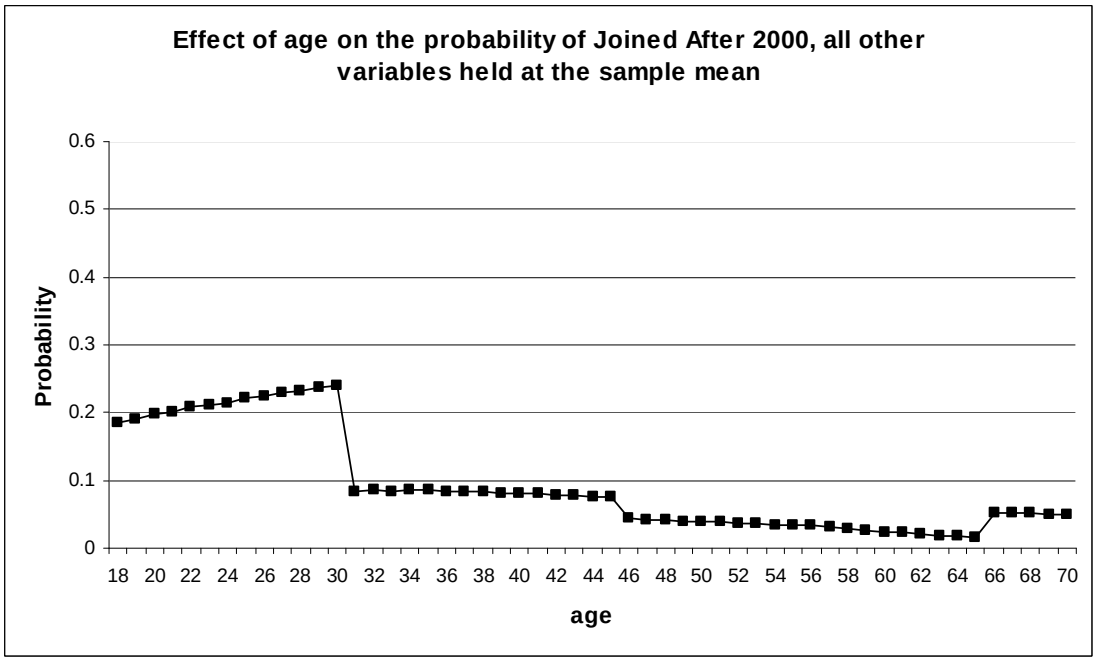
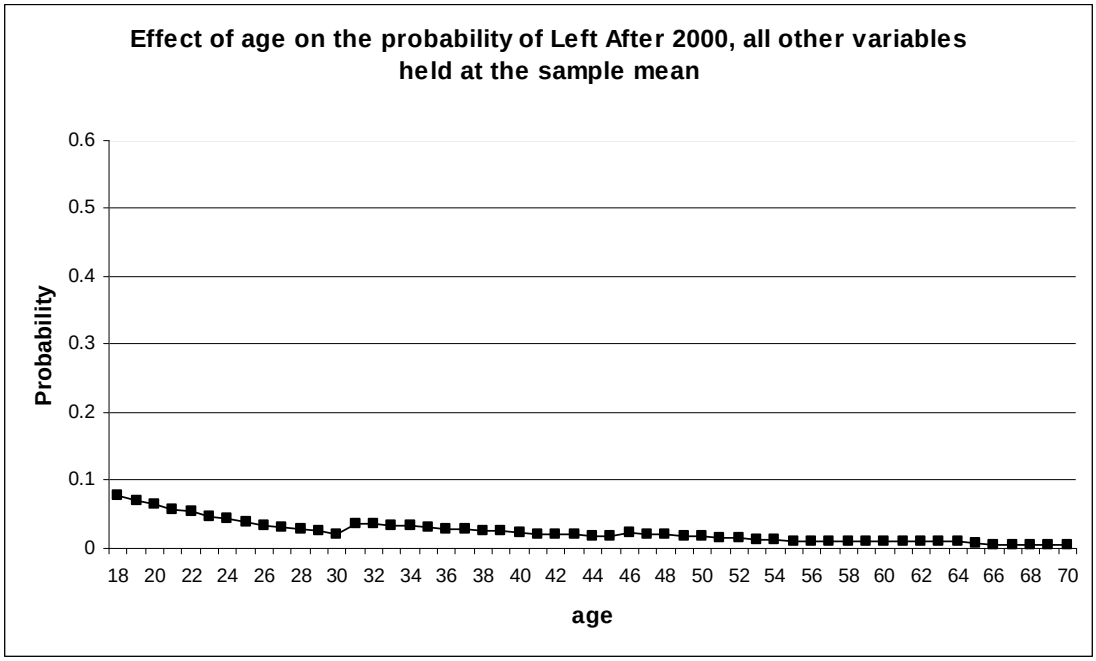


Figure 3


Effect of age on the probability of Left After 2000, all other variables held at the sample mean
Probability
0.6
0.5
0.4
0.3
0.2
0.1
0
18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70
age