PRIVATE HEALTH INSURANCE CHOICE IN AUSTRALIA: THE ROLE OF LONG-TERM UTILISATION OF HEALTH SERVICES*

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Abstract

Individual choice of health insurance in Australia is limited to supplementary health insurance policies provided by private (though government-regulated) health insurance funds. This supplementary insurance provides an outlet for consumers who desire a higher level of health care than that provided by the compulsory government-managed Medicare health insurance scheme. And it provides budgetary relief to the government to the extent that it covers health care that would otherwise be provided by the government. Study of insurance choice in Australia is clearly of relevance to any regime with a mix of compulsory basic cover and optional supplementary private cover.

Despite relatively stable institutional arrangements since the 1984 establishment of Medicare, the proportion of Australians covered by hospital insurance policies purchased from private health insurance funds has declined steadily from 49 percent of population in 1986 to 36 percent of population today. Here we investigate whether or not long-term health risk is a major determinant of health insurance choice in this environment. This is done using an unusually rich data set, the NCEPH Record Linkage Pilot, which has administration records on individual health care utilisation over the past five years and several measures of health status. In addition to studying the decision on whether or not to insure, we model data on the amount spent on insurance, the duration of time that people hold health insurance, and the self-stated reasons for holding health insurance.

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1. INTRODUCTION

Individual choice of health insurance in Australia is limited to supplementary health insurance policies provided by private (though government-regulated) health insurance funds. This supplementary insurance has two components: hospital insurance that provides a potentially higher quality of care than that under Medicare, and ancillary medical insurance that covers many services such as dental, optical and physiotherapy that are not covered under Medicare. Basic hospital and core medical services are provided by Medicare, a compulsory government-managed health insurance scheme established in 1984.

This supplementary private insurance provides an outlet for consumers who desire a higher level of health care than that provided by the compulsory government-managed Medicare health insurance scheme.[1] And it provides budgetary relief to the government to the extent that it covers health care that would otherwise be provided by the government.[2] Study of insurance choice in Australia is clearly of relevance to any regime with a mix of compulsory basic government cover and optional supplementary cover.

Despite relatively stable institutional arrangements since the 1984 establishment of Medicare, the proportion of Australians covered by hospital insurance policies purchased from private health insurance funds has declined steadily from 49 percent of population in 1986 to 36 percent of population today.

Here we investigate whether or not long-term health risk is a major determinant of health insurance choice in this environment. A priori one expects such a link, especially given community-rating rather than experience-rating of insurance premia.

The two usual sources for individual-level analysis of health insurance choice are the Australian Health Insurance Surveys conducted by the Australian Bureau of Statistics (ABS) annually from 1979 to 1983 and biannually from 1986 to 1992, and the ABS Australian Health Surveys conducted roughly every five years in 1977-78, 1983, 1989 and currently in 1995. The former has quite detailed health insurance information but no health status measures, while the latter has measures of both, though the data on health insurance is less detailed. Other data sets that have occasionally been used are the ABS Health Expenditure Surveys, conducted in 1984 and 1988-89, which have data on health insurance expenditures, and the TQA Surveys of Health Care and Insurance, conducted in 1987 and 1989. Studies using these various data sets all find income to be a very important determinant of health insurance choice, but find remarkably few other major determinants.

This study instead uses data from the National Centre for Epidemiology and Population Health (NCEPH) Record Linkage Pilot data set. These data link a 1989 Australian Heart Foundation survey, a 1992 NCEPH survey that includes a section on health insurance coverage, five years of hospital data and Health Insurance Commission claims data, for a sample of Canberra residents. The RLP data on health status and utilisation are very detailed, and have been studied elsewhere. The data from the health insurance section have not been previously analysed.

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[1] Private health insurance is the source of 37 percent of private health expenditures and 12 percent of total health expenditures (AIHW(1994)).

[2] This is the case for hospital insurance but not ancillary insurance.

The data are unique in providing virtually complete information on health care utilisation over the past five years, and we consider the importance of past utilisation over this longer period of time in determining the various aspects of health insurance choice. The data also allow analysis of the amount spent on insurance, the duration of time that people hold health insurance, and the self-stated reasons for holding health insurance. These additional dimensions of insurance choice are seldom studied, particularly in a regression context.

A summary of institutional arrangements, models of insurance choice and previous empirical studies is given in section two. The four topics - choice, expenditure, duration and self-stated reasons - are analysed in sections three to six. Section seven concludes.

2. BACKGROUND

Current health insurance arrangements are summarised in, for example, AIHW (1994) and Willcox (1991). The compulsory government health insurance program Medicare pays 85% of schedule fee for out-of-hospital professional medical services.[3] On the hospital side Medicare covers completely the cost of public (shared ward) accommodation in public hospitals and the cost of treatment provided by doctors employed by the public hospital. The cost of pharmaceutical drugs is subsidised by a separate government program, while non-core medical services such as dental, visual and physiotherapy are not covered by any government programs.

Supplementary private insurance has two separate components. The first component is **hospital insurance** which covers most but not all of the costs of in-hospital treatment by doctors chosen by the patient rather than hospital doctors, accommodation more private than shared-ward, and treatment in private rather than public hospitals. This is fairly substitutable with Medicare. The second component is **ancillary insurance** which covers many non-core medical services, notably dental, visual and physiotherapy, not covered by Medicare. This is a substitute for paying directly out-of-pocket.

Ancillary cover is purchased separately from hospital cover, with no discount given for joint purchase of the two. Both hospital and ancillary policies are sold at **community-rated premia** rather than experience-rated prices. Specifically, any given policy sold by a given health fund in a given Australian state is sold at the same price to all holders of that policy, with family policies sold for twice the price of single policies.

The essential choice is that of hospital cover. Hospital cover reimbursements comprise over 70% of total health insurance reimbursements, and the majority of those with private insurance purchase both hospital and ancillary cover with few purchasing only cover for ancillaries.

All private insurance funds are required to offer a package, defined by the federal government, called the **basic hospital** table. This covers the cost of shared ward accommodation as a private

[3] A doctor can elect to directly bill ("bulk bill") Medicare 85% of the schedule fee, in which case the patient pays nothing, or can directly bill the patient any amount, in which case the patient will end up paying the difference between the charge and 85% of the schedule fee. Private health insurance funds are precluded from selling policies to cover any gap.

patient in a public hospital (where private patients can be treated by the doctor of their choice rather than by hospital staff doctors); part of the fee for private hospital accommodation and day hospital facilities; and the 25% gap between Medicare benefits and schedule fees for medical services received by private patients in both public and private hospitals.[4] Supplementary or **top hospital** tables provide basic hospital table cover, plus higher benefits for private hospital accommodation and private hospital costs such as theatre costs. Most hospital insured choose top hospital table cover, with the basic hospital table playing little role beyond defining the minimum level of private insurance hospital cover.

An economic model of discrete choice among mutually exclusive health insurance policies, as in the regulated Australian market, is given in Cameron, Trivedi, Milne and Piggott (1988). This is based on Phelps (1976) who considered a continuous range of health insurance policies with continuous variation in coinsurance rates and deductibles. Cameron (1995) presents a one-period version of the model of Cameron et. al. (1988), which is reproduced here.

The consumer maximises the expected utility function

$$EU = \int U(C, H(\mathbf{e}, s \mid \mathbf{A}))\cdot f(s)\, ds$$

where C denotes consumption of non-health goods, H denotes health measured in income equivalent units, $f(s)$ denotes the a priori distribution of (uncertain) health states s, and U is increasing in both arguments. The level of health is determined by health inputs $\mathbf{e}$ and health state s, through a production function $H(\mathbf{e}, s \mid \mathbf{A})$ that varies with consumer's attributes $\mathbf{A}$. The budget constraint given choice of the j-th insurance policy is

$$y = C + R_j + \mathbf{p_j}'\mathbf{e_j}$$

where R_j denotes the premium for the j-th policy and $\mathbf{p_j}$ denotes the vector of prices under insurance policy j. These prices are net after insurance reimbursement, so that $\mathbf{p_j}$ is the patient copayment and the ratio of $\mathbf{p_j}$ to total price is the coinsurance rate. Maximization occurs in three-steps: (1) For each policy j and health state s choose C^*, $\mathbf{e^*}$ to maximize $U(\cdot)$ subject to the budget constraint; (2) For each policy j compute EU_j^*, the expected (over s) utility of the maximum from (1); (3) Choose the policy k with the maximum EU_j^*, $j=1,\ldots,m$.

Australian regression studies using a logit model for whether or not insured include Scotton (1969), Cameron et. al. (1988), Cameron and Trivedi (1991), Ngui, Burrows and Brown (1990) and ABS (1995). All but the first use data from the Australian Health Insurance Surveys or Australian Health Surveys. In addition, Willcox (1991) does cross-tabulations on data from TQA Research (1989). All studies find that income is by far the most important determinant of health insurance choice, with little role for health status (excellent, good, fair, poor) and utilisation (doctor visits in the past two weeks and hospitalisations over the past year).

[4] Initially private patient in-hospital medical services were reimbursed by Medicare at 100% of schedule fee, but on September 1 1985 this was reduced to 75%. For public patients there is no such charge.

Only the last two of these studies investigate the current post-1984 Medicare regime.[5] ABS (1995) finds, surprisingly, that after controlling for other individual characteristics health insurance is more likely to be chosen by those whose self-rated health status is good or excellent, while Willcox (1991) finds that only slightly more unhealthy (48%) had insurance than those with average or better health (44%), where the health index was based on health service utilisation in the past year.

These results are at first glance surprising, as a priori one expects health insurance demand to increase with health risk, especially since due to community-rating an individual's insurance premium does not increase with health risk. The reason it may arise is that an increase in health risk encourages insurance choice by allowing increases in utility through better quality treatment but decreases utility due to increases in out-of-pocket costs associated with this better quality treatment.

Specifically, consider hospital insurance and let insurance policy 1 be Medicare with no premium and no coinsurance, and insurance policy 2 denote private insurance with premium R_2 and out-of-pocket costs. For given health event s, private insurance is desirable according to whether or not

$$U(y - R_2 - \mathbf{p_2}'\mathbf{e_2}, H(\mathbf{e_2})) \;\; > \text{ or } < \;\; U(y, H(\mathbf{e_1})).$$

For progressively worse health events, it is reasonable to assume that the first argument $(y - R_2 - \mathbf{p_2}'\mathbf{e_2})$ decreases relative to y, while the second argument $H(\mathbf{e_2})$ increases relative to $H(\mathbf{e_1})$, and the combined effect is ambiguous.

3. HEALTH INSURANCE CHOICE

In section 2 it was observed that the relationship between health risk and private insurance choice is very weak. A theoretical explanation for this possibility was presented. An alternative explanation is the limited nature of the measures of health risk used. In particular, the Australian Health Surveys obtain data on doctor visits in the past two weeks and hospital visits in the past year so that over two-thirds of individuals are observed to have no past utilisation. Here more detailed data on doctor visits and hospitalisations over the past five years are used.

The data set is the National Centre for Epidemiology and Population Health (NCEPH) Record Linkage Pilot data set. These data link samples of Canberra residents from a 1989 Australian Heart Foundation survey, a follow-up 1992 NCEPH survey of 555 people aged 23-73 years that includes a section on health insurance coverage, several years (we use 1988-92) of hospital data, and several years (we use 1988-92) of Health Insurance Commission claims data, for a sample of size 521 with complete information. The data set is summarised in McCallum, Lonergan and Raymond (1994). The specific health insurance questions and the constructed health insurance and regressor variables are summarized in Appendix A.

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[5] Except for the year 1975-76, private health insurance policies before 1984 provided basic cover for hospital and medical services, not just supplementary cover.

For individuals with private insurance distinction is made between two levels of hospital insurance - basic hospital and top hospital - and one level of ancillary cover - any ancillary. Health insurance coverage statistics are given in Table 3.1. 70% of respondents held some form of insurance. Of those holding insurance, 73% had both hospital and ancillary insurance, 24% had hospital cover only and 3% had ancillary cover only. Of those holding hospital cover, 76% had top hospital. Table 3.1 also gives comparable Australian figures from the 1992 AHS.

The percentage of people in the RLP sample holding insurance (70%) is remarkably high compared to the June 1992 figure of 43% for Australia from the Private Health Insurance Administration Council (PHIAC), which uses membership figures provided by health insurance funds. At least half the difference can be explained by the following reasons. First, higher insurance coverage rates are found using survey data rather than PHIAC data.[6] Second, the age group (23 - 73) in the RLP sample is more likely to be insured.[7] Third, residents of Canberra are more likely to be insured than the average Australian.[8] It is possible that some of the remaining differences reflect selection biases in follow-up from the initial Australian Heart Foundation survey sample.

The decision to purchase any sort of health insurance cover is modelled. Key variables posited to be determinants of health insurance are defined in Table A.4. Descriptive statistics for these variables are given in Table A.5, which shows that the sample excludes the young and old, with ages between 23 and 73 years. (The smaller sample size of 521 vs. 555 arises due to loss of people who refused access to medical records). The means and standard deviations for the insured and uninsured are compared in Table 3.2. Most striking is the higher average household income ($63,00 vs. $43,000) and lower likelihood of being single (0.10 vs. 0.29) of the insured. Also on average the insured are somewhat less likely to have visited a GP (21 vs. 26 visits) or spent time in hospital (2.3 vs. 3.8 days) over the past five years, and no more or less likely to have seen a specialist (5.7 vs. 5.4 visits). The number of health conditions, however, is somewhat higher for the insured (2.0 vs. 1.6). While there is no obvious relationship with age, more detailed analysis shows insurance cover is lower for young and old and higher for middle-aged, so regressions include a quadratic in age.

The regression model for health insurance choice is the following logit model:

$$\Pr(DINS_i = 1) = 1 / (1 + \exp(-X_i'\beta)), \qquad i = 1,...,N,$$

where DINS is an indicator variable equal to one if the person has private health insurance cover and zero if they do not, X denotes the regressors, and the subscript i denotes the i-th of N individuals in the sample.

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[6] Thus for June 1992, the ABS (1993, Table 2) reported Australian coverage of 48% compared to the PHIAC figure of 43%, the latter figure being the sum of 41.0% with hospital cover (PHIAC (1994, Table 10a) plus 2.4% with ancillary cover only (PHIAC (1994, Figure 11).

[7] From ABS (1993) 49% of contributor units (not persons) headed by a person aged 25-64 have health insurance, compared to 44% across all ages.

[8] From ABS (1993) 49% of contributor units and 54% of persons in the ACT, i.e. Canberra, had private health insurance cover in June 1992, compared to Australian figures of 44% and 52%.

Regression results from a sample of size 521 are given in Table 3.3. A reasonable approximation is to multiply the regression coefficients by 0.2 to obtain the increase in the probability of insurance due to a one unit increase in the regressor.[9] The regression results essentially follow the simple comparisons of means in Table 3.2. The probability of health insurance increases by 0.04 with a $10,000 increase in income ($0.0198 \times 0.2 \times 10$), decreases by 0.12 if single, decreases by 0.02 with an extra 10 GP visits over five years, and increases by 0.03 with an additional health condition. The statistcally significant quadratic relationship with age implies that insurance cover peaks at age 50.[10]

The health utilisation and status variables apply only to the respondent, whereas insurance choice is a household decision. To control for this a logit model for singles only (37 of 83 singles have insurance cover) was estimated, with a reduced set of regressors. From the last column in Table 3.3, only income was statistically significant, though the signs of the insignificant coefficients are the same as those for the full sample estimates.

We conclude that

- Income, marital status and age are the major determinants of whether have health insurance.
- The relationship with health utilisation measures over the past five years and health status measures is weak, with the exception of number of current health conditions.
- There is a weak positive relationship with specialist visits, while the relationship, if any, with GP visits and hospital days is negative.

4. HEALTH INSURANCE EXPENDITURE

The purchase of health insurance is a major component (37% in 1990-91) of private health expenditures.[11] Individual expenditures on health insurance have been studied by McClelland (1991) and Willcox (1991) using 1988-89 ABS Health Expenditure Survey data. McClelland (1991, Figure 8) finds that 41% of health and medical household expenditures were for private health insurance cover, consistent with the aggregate AIHW estimates. Income is by far the most important determinant of expenditures. For those with insurance, expenditures on insurance were 1.6 times higher for those in the highest income quintile compared to those in the lowest income quintile. (No correction was made for household size). The only regression reported is OLS for total health expenditure, for those with non-zero expenditures (McClelland (1991, Table A1)). Willcox (1991) cross-tabulates expenditure on insurance with income, using both 1984 and 1988-89 ABS Health Expenditure Survey data, with qualitatively similar results.

Means and standard deviations for health insurance expenditures, for various types of health insurance cover, are given in Table 4.1. We focus on family cover, as the sample sizes for single

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[9] This uses $dp/dX = p(1-p)\beta$ for the logit model, where p=Pr (DINS=1) is evaluated at its sample mean value of 0.72.

[10] Similar results to those in Table 3.3 are obtained if we instead model insurance cover for a smaller sample with reported rather than imputed income, model insurance cover for families only, or model hospital cover (rather than insurance cover which additionally includes 14 people who have only ancillary cover).

[11] Source is AIHW (1994, Table S49). Spending on pharmaceuticals, which are generally not covered by insurance, is the next most important component of private health expenditure, accounting for 16% of the total.

cover are low.[12] Expenditures increase with level of cover, as expected. The difference between basic hospital only cover and top hospital cover only, however, is surprisingly small ($860 vs. $970). Once ancillaries are included these differences widen ($1180 vs. 1490), suggesting that ancillary expenditures by those on top hospital of on average $520 ($1490 - $970) are similar to those for ancillary only ($570), while basic cover people are more judicious in their choice of ancillary cover level.

Figure 4.1 reveals that the expenditure data are not particularly skewed. There is no need to take the logarithm of expenditures, and we consider several regression models for the level of expenditures.

The preferred regression model is OLS on levels of expenditures, for those with positive expenditures,

$$EXP_i = X_i'\beta + u_i, \qquad i = 1,...,N, \quad EXP_i > 0,$$

where EXP denotes expenditures on health insurance.

The OLS estimates are given in Table 4.2. Due mainly to missing data on insurance expenditure the sample size is 300 (from 361 of 521 with insurance cover). Income is no longer statistically significant. Now the number of children become important (with a $77 increase in annual health insurance expenditures for each extra child), as does GP visits (with an extra 10 GP visits over five years increasing expenditures by $43). Analysis for the 31 singles with insurance expenditure information reveals strong positive association with days in hospital (each extra day in the past five years increases insurance premium by $76). These results are consistent with the view that once insured, people with high risk are more likely to choose an insurance policy with lowest coinsurance.[13]

A major criticism of the above OLS model is that it breaks the insurance decision into two pieces - whether to insure and how much to insure - yet implicitly assumes that the unobserved stochastic components in the two pieces are uncorrelated with each other. If there is indeed correlation, the above estimates can be shown to be inconsistent (not just inefficient). We now consider modelling this complication.

The problem is a standard one in the econometrics literature, for example in modelling labour supply of women where many women have zero hours of work. The standard model is the sample selectivity model, a generalisation of the tobit model. We introduce two latent variables:

$$\begin{aligned} y_{1i}^* &= X_{1i}'\beta_1 + u_{1i} \\ y_{2i}^* &= X_{2i}'\beta_2 + u_{2i} \end{aligned}$$

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[12] The 31 observations for singles suggest single expenditures for a given class of cover are two-thirds those of family, whereas by law insurance policies sell a single cover policy at one-half the price of a family policy. There is no obvious explanation for this anomoly.

[13] Similar results, in terms of sign and statistical significance are obtained if we instead model the logarithm of expenditures. We also estimated by OLS the above model in levels, but including zeroes. The results for a sample of size 460 (300 insured with known expenditures plus 160 uninsured) were closer to those for the logit model of insurance choice (Table 3.3), than to those for OLS on positive expenditures (Table 4.2).

where the errors u_{1i} and u_{2i} are assumed to be joint normally distributed with variances σ_1^2 and σ_2^2 and covariance σ_{12}. The observed data are whether insured and insurance expenditures given insured

$$
\begin{aligned}
DINS_i &= 1 \quad \text{if } y_{1i}^* > 0 \\
&= 0 \quad \text{if } y_{1i}^* \le 0
\end{aligned}
$$

and

$$
\begin{aligned}
EXP_i &= y_{2i}^* \quad \text{if } y_{1i}^* > 0 \\
&= 0 \quad \text{if } y_{1i}^* \le 0
\end{aligned}
$$

Heckman (1979) observed that this model implies that the conditional mean of positive expenditures

$$E[EXP_i \mid X_{1i}, X_{2i}, DINS_i = 1] = X_{2i}'\beta_2 + (\sigma_{12}/\sigma_2^2)\cdot\lambda(X_{1i}'\beta_1/\sigma_1)$$

where $\lambda(z) = \phi(z)/\Phi(z)$ and ϕ and Φ are respectively the density and distribution functions of the standard normal. Regression of EXP on X_2 alone will produce biased estimates due to failure to include the term $\lambda(X_{1i}'\beta_1/\sigma_1)$, unless $\sigma_{12} = 0$. The Heckman two-step procedure estimates a probit model at the first step to obtain an estimate of β_1/σ_1 and hence $\lambda(X_{1i}'\beta_1/\sigma_1)$, which is used for second-step OLS regression of EXP on X_2 and the estimated term $\lambda(X_{1i}'\beta_1/\sigma_1)$.[14]

Estimation of the sample selectivity model using the econometrics package LIMDEP revealed fairly low correlation between the error in the two equations (the squared correlation coefficient between u_{1i} and u_{2i} is $(0.43)^2$ with t-ratio of 1.26 so statistically insignificant). The estimates at the second step are very similar to those for the OLS model for positive expenditures only given in Table 4.2. The main difference is that the t-ratios for GPVTOT and HDAYTOT are 20 percent lower. Thus the procedure of separately estimating insurance choice and positive expenditures given insured is a reasonable one.[15]

We conclude that:

- An adequate model of health insurance expenditure is the levels models for those with positive expenditures.
- This model can be combined with the separately estimated logit model for insurance choice in section 2 to explain expenditures for the population, including non-purchasers.
- Income is not important in explaining insurance expenditures of the insured, while age, number of children and GP visits are.

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[14] This model estimates insurance choice by a probit model, whereas the more common logit model was used in section 3. Apart from a rescaling of the parameter estimates, there is virtually no difference between estimates from the two models.

[15] This result may be surprising to those familar with labor supply estimation. A similar result is obtained, however, by Manning, Duan and Rogers (1987) for hospital expenditure data. They find that one can separately model the probability of hospitalization, and (logarithm of) expenditures given hospitalized. There is no need for a more complicated model that allow for interaction between the stochastic components of the two models.

5. DURATION OF HEALTH INSURANCE COVER

Data on length of time that people hold health insurance are not obtained in other Australian data sets. The RLP collected data on the number of years (and months) that people have been covered by insurance, given that they currently hold insurance. No data on past insurance coverage was collected for people without insurance.

These data are duration data, but are not the form of duration data for which standard statistical methods have been developed. In particular, the Cox proportional hazards model is developed for a sampling scheme where one observes people at the time of initial insurance, and follows them to time of dropping insurance cover (a completed spell), with correction for those who still hold insurance at the end of the period of analysis (right-censoring). The data here are instead all right-censored, as none of the spells are complete.[16] Lancaster (1990. p.91, pp.185-190) calls this sampling scheme stock sampling. An attempt to estimate an underlying duration model from this data is Nickell (1979).

Two approaches can be taken in modelling these data. First, a reduced form regression approach is taken where the length of the incomplete spells is modelled, without any attempt to obtain estimates of the length of the completed spells. We estimate an OLS regression model for the logarithm of expenditures

$$\log(DUR_i) = X_i'\beta + u_i, \qquad i = 1,...,N, \quad DUR_i > 0 ,$$

where DUR denotes the number of years covered by health insurance, with only those currently covered included in the regression. The results are given in Table 5.1. By far the most important determinant of duration is age, with logarithm of duration also increasing with number of children and being single, and decreasing with education. Health status and utilisation measures are not statistically significant. Similar results are obtained by OLS in levels, though with weaker statistical significance, and each additional year of age increases duration insurance has been held by 0.57 years.

Second, information on the length of completed spells can be obtained using an approach similar to that of Hall (1982) and others, who attempt to estimate the completed duration of jobs, given information on incomplete durations of currently held jobs. This non-regression approach first aggregates all individual into age-duration groups, given in Table 5.2. While there may be some churning, as suggested by anecdotal evidence on people purchasing insurance for short periods of time to cover, for example, maternity, the data indicate that most of the currently insured have held insurance for a long period of time. In particular, over half the currently insured have held insurance throughout their adult life - 67% of 30-40 year-olds have been insured for 10 or more years, 58% of 40-50 year-olds have been insured for 20 or more years and 59% of 50-60 year-olds have been insured for 30 or more years. And only about 15% of over 40 year-olds have held insurance for less than ten years.

[16] In principal one could obtain quite complete duration data from individual health insurance companies. But this would treat people who switch from one insurance company to another as leaving insurance altogether. In fact turnover rates within individual funds are quite high, and suggest much higher movement in and out of insurance than does the analysis here.

The method of Hall (1982) then obtains transition probabilities by, for example, dividing the fraction of 40-50 year-olds with 20-30 years duration by the fraction of 30-40 year-olds with 10-20 years duration. For the data here, this occasionally produces transition probabilities above the theoretical upper bound of 1, partly because of small cell sizes but perhaps also reflecting that the implicit assumption of a stationary process is not appropriate here. This approach was not pursued further, mainly because even without further analysis Table 5.2 provides compelling evidence that insurance is held for long periods of time.

6. SELF-STATED REASONS FOR HOLDING HEALTH INSURANCE

The ABS Health Insurance Surveys of 1986, 1988, 1990 and 1992 include open-ended questions on the reasons that people purchase health insurance, with multiple responses possible. The 1989 TQA Survey also obtained similar data, discussed in Willcox (1991). Reasons for the uninsured not holding insurance are obtained in the 1992 ABS and 1989 TQA surveys. Analyses of these data have been limited to ranking the various reasons.

The RLP survey obtained data on reasons for holding private health insurance. A main reason was given, followed by additional reasons with multiple additional reasons permitted. The data are given in Table 6.1. The first column gives the exact wording of the reason.[17] The second column gives the percentage of people for whom this was their main reason, while the third column gives the percentage for whom this was a reason (main or additional). The fourth column gives the response to the related question in the 1992 ABS Health Insurance Surveys.

The main reasons given are other (32%), doctor of choice (25%), peace of mind (13%), ancillary cover (9%) and waiting lists (6%). When all reasons given by an individual are considered, these percentages increase to, respectively, 56, 51, 23, 33 and 19 percent, and in addition prefer private hospital is given as a reason by 22%. These data are reasonably consistent with ABS data, except that for the RLP data waiting lists are less important and choice of doctor more important. Perhaps due to the different wording of questions the habit and peace of mind responses are lower and the other category higher in the RLP data.

In Table 6.2 the main reason (which ABS data does not collect) for choosing private health insurance is cross-tabulated against the type of health insurance cover chosen, for 383 respondents (4 people with unknown health insurance cover type are omitted). Looking at the types of health insurance policy chosen:

- Half those with basic hospital cover only (19 of 41) have doctor of choice for their main reason of cover.
- Virtually all those with ancillary cover only (10 of 12) give desire for ancillary service cover as their main reason for insurance.
- For other types of insurance cover there is no clear main reason.

Looking at the main reasons for having private insurance:

[17] The main reason was self-stated without prompting, and then recoded to fit one of the categories. For the additional reasons, the interviewee was prompted using the menu of 11 reasons given in Table 5.1.

- Most of those with cover gaps (17 of 22) as their main reason choose top hospital cover (with or without ancillary cover).
- Virtually all with prefer private hospital (14 of 16) as their main reason choose top hospital (with or without ancillary cover) as their main reason.
- All people with ancillary cover as their main reason (34 of 34) choose a health insurance policy that includes ancillary cover, but most (24 of 34) additionally choose hospital cover and virtually all of these choose top hospital cover (20 of 34).
- People with waiting lists as their main reason are twice as likely to not purchase ancillary cover (11 of 24 or 46%) as the typical person (23%).
- People with choice of doctor as their main reason are somewhat more likely to purchase basic hospital cover (31 of 96 or 32%) as the typical person (23%).
- For other main reasons there is no clear pattern with insurance .

The type of cover purchased is broadly consistent with the main reason given. The greatest potential inconsistency is that it is possible that 24 of 34 people with ancillary cover as their main reason also purchase hospital insurance. If these 24 people dropped hospital cover, then the fraction of the population (555) covered by hospital insurance would fall by 4 percent. Also almost half the insured give reasons (habit, peace of mind, other, maternity) that are not clearly linked to any type of particular cover, and (with the exception of maternity) are relatively uninformative responses.

A regression model for the reason given for health insurance cover is the following logit model:

$$\Pr(\text{REASONj}_i = 1) = 1 / (1 + \exp(-X_i'\beta_j)), \qquad i = 1,...,N$$

where REASONj is an indicator variable equal to one if the j-th reason is the reason for holding insurance, and equal to zero otherwise. This model can be estimated for the main reason, or for all reasons. Additionally, a multinomial logit model across all main reasons can be estimated, as these are then mutually exclusive categories.

Various logit models were estimated, but were generally unsuccessful in explaining the reason given. As an example, in a model for waiting lists being the main reason for insurance the only statistically significant regressors are the sex indicator, with women much less likely to give waiting lists as a reason, and single, with singles more likely to give waiting lists as a reason.

7. CONCLUSIONS

Health insurance choice is weakly positively related with specialist visits and weakly negatively related to GP visits and days in hospital. Given insurance choice, the amount spent on insurance is positively related with GP visits and days in hospital. The length of time that the currently insured have held insurance is unrelated to past utilization. The only role for measured health status is that people with more current health conditions are more likely to be insured. Overall these empirical results indicate a secondary role, at best, for the detailed past utilisation of health service measures. Income, marital status and age are the major determinants of insurance choice.

This result is at first glance surprising, especially given that health insurance premia are community-rated rather than experience-rated. The theoretical analysis of section 2 indicated that in the current Australian institutional environment, however, it is not necessarily the case that private hospital insurance choice is positively related to health risk.

An alternative interpretation of the results is that they reflect endogeneity of past utilisation. Privately insured patients face higher copayments and therefore are more judicious in thei utilisation. Such endogeneity is not relevant for health status or GP visits (which are covered solely by Medicare). It is relevant to hospital days, though for additional hospital days the copayment is essentially zero if the patient elects to be admitted to public hospital (as either a private or public patient) and to a lesser extent specialist visits. This endogeneity interpretation of the results shares with the earlier interpretation the common element that copayments matter.

Looking beyond simple choice of insurance, over half those currently holding insurance have done so for all their adult life, and while it is not clear that there is great information content in the reasons for holding insurance, the reasons are generally consistent with the type of insurance cover chosen.

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Appendix: RLP Health Insurance and Regressor Variables

NCEPH Record Linkage Pilot (RLP) for 521 Canberra Residents combines:

1989	Australian Heart Foundation Survey
1992	NCEPH Survey
1988-92	Medicare claims data
1988-92	Hospitalization data

The health insurance questions from the 1982 NCEPH survey can be broken into two parts: general questions regarding which household members are cover (Table A.1) and more specific questions for respondents who are covered by insurance (Table A.2).

Table A.1: Health Insurance Coverage Questions

Q.K1a Do you have Veterans Health Cover?
Ans: Yes. No (Go to Q.K2a).
Q.K1b What colour card do you have?
Ans: Yellow/Gold, White, Red, Purple, Other.
Q.K2a Is anyone in the household currently covered by private health insurance?
Ans: Yes, No (Stop questions if no).
Q.K2b Who (is/are) covered?
Ans: Respondent only (go to Q.K4), Spouse only, Respondent & spouse (go to Q.K4), Respondent & Children (go to Q.K3a), Children only, Spouse & Children, Whole Family, Other (specify). (Stop questions if spouse only).
Q.K3a Are any of the children covered by the family policy earning income?
Ans: Yes, No (stop questions if Children only or Spouse & Children in Q.K2b).
Q.K3b What was the gross income (i.e. before tax) of the children covered by the 'family' policy last year?
Ans: Amount in $. (Stop questions if Children only or Spouse & Children in Q.K2b).

Table A.2: Health Insurance Policy Questions asked of the Insured

Q.K4 How many months/years have you been covered by private health insurance?
Ans: Years and months.
Q.K5 With which health insurance fund are you covered?
Ans: HCF, MBF, Manchester Unity, Medibank Private, NIB, FAI Healthcare, Grand United Friendly Society, Govt. Employees Health Fund, Other (specify).
Q.K6 What level of cover do you have?
Ans: Verbal answer later recoded to basic hospital, top hospital, etc.
Q.K7 What is your present contribution rate/premium?
Ans: Nearest dollar per year, month, fortnight or week.
Q.K8a What would you say is your main reason for purchasing private health insurance?
Ans: No aid given in answering this question.
Q.K8b What other reasons do you have for purchasing private health insurance?
Ans: Probe fully from menu of 11 reasons given in Table 6.1.

Table A.3: Definitions of Dependent Variables

DINS	1 if currently insured, 0 if not
EXP	Annual expenditure on insurance
DUR	Number of years insured
REASj	1 if hold insurance for Reason j, 0 otherwise

Table A.4: Definitions of Key Explanatory Variables

Socioeconomic:	
INCOME	Annual income of individual (in 1,000's)
HINCOME	Annual income of household (in 1,000's)
AGE	Age in years
AGESQ	Age squared
DSEX	1 if female, 0 if male
SINGLE	1 if single, 0 if married
KIDS	No. of children less than 18 yrs in household
SCHYRS	Years of schooling
Utilisation:	
GPVTOT	Number of GP visits 1988-92
SPVTOT	Number of specialist visits 1988-92
HDAYTOT	Number of days in hospital 1988-92
Health Status:	
NCNOW	Number of current health conditions
TSSSNOW	Self-rated health (poor (0), fair (25), good (50), very good (75), excellent(100))

The original NCEPH sample size is 555. Linking this data to medical records reduces the sample size to 521, due to refusal of some people to release records. For the sample of 521, there are virtually no missing values for the explanatory variables, with the exception of income.

Income data for the respondent were missing in 43 of the 521 cases. For 39 of these cases income was set equal to 1.17 times the income given in the 1989 Australian Heart Foundation survey, the multiplier being obtained by regression of 1992 income on 1989 income for those with data in both periods. For the other 4 cases, all males who worked, income was set to $44,000.

Income data for spouse were missing in 55 of the 521 cases. For spouse's income was not obtained in the 1989 Australian Heart Foundation survey. Instead, spouse income is set equal to the cell mean of spouse income for cases where spouse income is reported, where cells are determined by gender and employment status. These values in thousand of dollars (with number of cases for which imputation was done in parentheses) are:

	Work	Home duties	Unemployed	Retired
Female Spouse of Male	28 (7)	6 (6)	0 (0)	14 (1)
Male Spouse of Female	44 (27)	0 (0)	0 (2)	21 (10)

Table A.5: Summary Statistics for Key Variables

Variable	Mean	Std. Dev.	Cases
DINS	0.69	0.46	521
HINCOME[a/]	56.2	32.6	521
AGE	46.0	12.4	521
AGESQ	2270	1193	521
DSEX	0.48	0.50	521
SINGLE	0.16	0.36	521
KIDS	0.96	1.24	521
SCHYRS	12.6	2.69	521
GPVTOT	22.3	26.5	521
SPVTOT	5.5	8.0	521
HDAYTOT	2.7	6.8	521
NCNOW	1.8	1.7	521
TSSSNOW	72.8	22.1	521

a/ 73 of these values are imputed. For the 448 cases with complete HINCOME, the mean is 58.1 and the standard deviation is 33.0.

The sample sizes used in the analysis are:

	Dep. Var. Only	Dep. Var. + Regressors
Insured / Uninsured	555	521
Insured	387	361
Insurance Durations		337
Insurance Expenditures		300

The hospitalisation records include whether or not the patient was admitted as a privately insured patient. Unfortunately this field is often missing, preventing analysis of this dimension of insurance choice.

Table 3.1: Insurance Cover (N=555)

Category	RLP (No.)[a/]	RLP (%)	ABS (%)[b/]
Basic hospital + ancillaries	47	8.5	38.9
Top hospital + ancillaries	233	42.0	
Basic hospital only	41	7.4	8.9
Top hospital only	49	8.8	
Ancillaries only	13	2.3	5.6
Don't know insurance type	4	0.7	0.2
Uninsured	168	30.3	48.7

a/ In addition, there were 18 households where the respondent was uninsured but other family members were insured: 8 spouse only, 6 children only, 4 parents only.
b/ Source: ABS (1993) Table 2: Number of persons in contributor units: type of private health insurance states and territories, June 1992. ACT figures given. ABS data do not distinguish between various levels of hospital cover.

Table 3.2: Cross-Tabulation of Insurance Status and Regressors (N=521)

Variable	**Insured** (N = 361)	**Uninsured** (N = 160)
HINCOME	62.74	41.72
AGE	46.49	44.92
AGESQ	2286	2234
DSEX	0.48	0.48
SINGLE	0.10	0.29
KIDS	0.98	0.95
SCHYRS	12.89	12.11
GPVTOT	20.90	25.70
SPVTOT	5.68	5.35
HDAYTOT	2.32	3.83
NCNOW	1.96	1.63
TSSSNOW	73.98	64.36

Table 3.3: Logit Model for Insurance Status (N=521)

	All (N = 521)		**Single** (N = 83)	
Variable	Coeff	t-ratio	Coeff	t-ratio
Constant	-4.677	3.01	-0.189	0.38
HINCOME	0.020	3.62	0.010	2.41
AGE	0.149	2.39	0.019	0.78
AGESQ	-0.001	2.23	-0.000	0.76
DSEX	0.194	0.87	-0.088	0.80
SINGLE	-0.628	1.97		
KIDS	-0.076	0.78		
SCHYRS	0.033	0.72		
GPVTOT	-0.010	1.45	-.0001	0.03
SPVTOT	0.033	1.76	0.009	1.20
HDAYTOT	-0.020	1.14	-0.012	1.28
NCNOW	0.156	2.15		
TSSSNOW	0.007	1.26		

Table 4.1: Health Insurance Expenditures by Policy Type (N=300)

	Family (N = 269)		**Single** (N = 31)	
Variable	Mean	St.Dev.	Mean	St.Dev.
BASIC HOSP ONLY	856	247	836	770
BASIC HOSP +	1182	376	702	120
TOP HOSP ONLY	970	279	707	233
TOP HOSP +	1493	430	1048	332
ANCILLARY ONLY	570	263	586	20
ALL TYPES	1305	474	880	388

Figure 4.1: Health Insurance Expenditures (N=300)

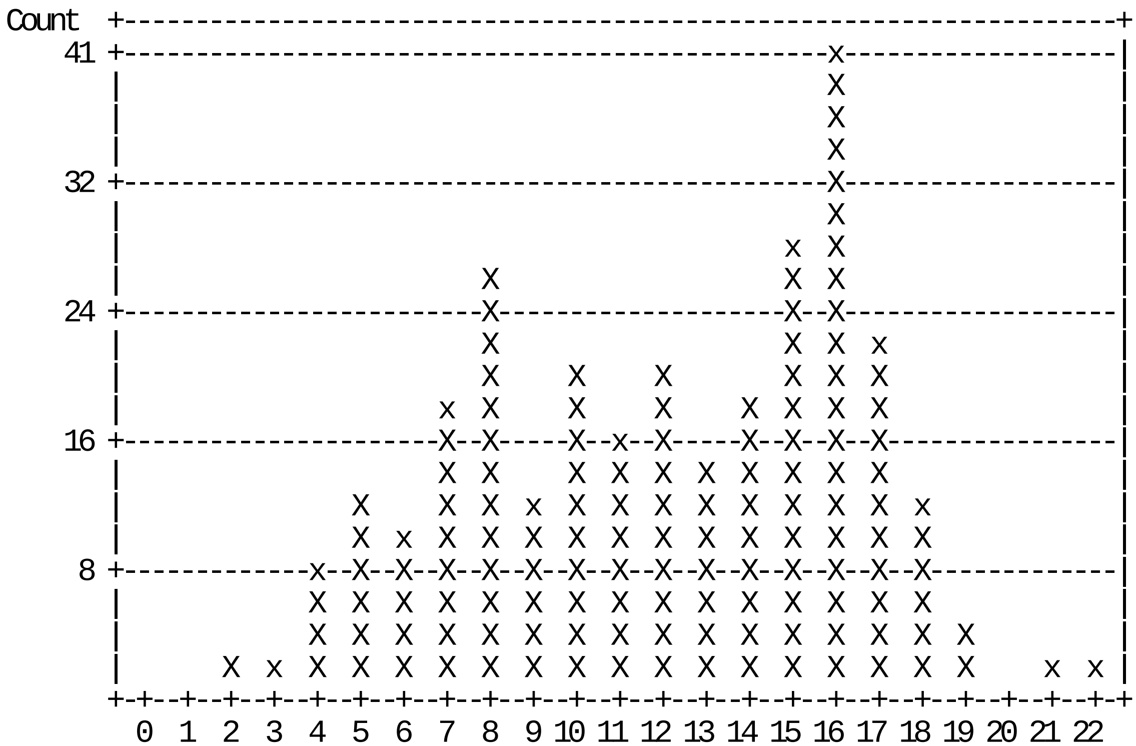

Table 4.2: OLS Regression of Level of Positive Expenditures (N = 300)

Variable	Coeff	t-ratio
Constant	238.0	0.53
HINCOME	-0.8	0.84
AGE	46.9	2.56
AGESQ	-0.5	2.32
DSEX	-59.1	1.04
SINGLE	-325.4	3.42
KIDS	77.3	3.00
SCHYRS	-8.7	0.75
GPVTOT	4.3	2.32
SPVTOT	-1.4	0.35
HDAYTOT	8.3	1.63
NCNOW	-15.7	0.85
TSSSNOW	-0.8	0.61

Table 5.1: OLS Regression of Logarithm of Positive Duration Insured (N=337)

Variable	Coeff	t-ratio
Constant	-1.423	1.75
HINCOME	-0.003	1.58
AGE	0.159	4.68
AGESQ	-0.001	3.40
DSEX	0.003	0.03
SINGLE	0.325	1.88
KIDS	0.116	2.54
SCHYRS	-0.031	1.50
GPVTOT	0.003	1.04
SPVTOT	-0.001	0.06
HDAYTOT	-0.009	1.00
NCNOW	0.020	0.62
TSSSNOW	-0.001	0.57

Table 5.2: Percentage of Age Group with given Duration of Insurance[a/]

DUR	0-10	10-20	20-30	30-40	40-		Num
AGE							
23-30	62	24	14	0	0		21
30-40	33	47	10	10	0		88
40-50	21	21	41	12	5		113
50-60	8	8	25	52			86
60-73	17	10	10	41	21		29
Num	78	80	81	77	11		337

a/ Table gives the percentage of the particular age-group (row) in a particular duration group (column). The final row gives the number in each duration group. The final column goves the number in each age group.

Table 6.1: Reasons for Purchasing Private Health Insurance in Percentages (N = 387)

REASON	MAIN[a/]	ANY[b/]	ABS[c/]
I can have the doctor of choice of my choice	25	51	32
To cover the gaps in medical/hospital treatment costs	6	14	14[d/]
Prefer private hospital treatment	4	22	29[e/]
Want ancillary service cover (dental, physio etc.)	9	33	27
To avoid public hospital waiting lists	6	33	28[f/]
To be able to have elective surgery	1	9	N.A.
To cover maternity ward/theatre fees	2	8	N.A.
Habit	0	2	16[g/]
Peace of mind	14	23	40[h/]
Support private sector insurance	0	1	N.A.
Other (specify)	32	56	5
Total	100	238	215

a/ Main reason.
b/ Sum of main reason and other reasons. Multiple reasons can be given.
c/ From ABS 1992 Australian Health Insurance Survey. The ABS questions are worded differently. Subsequent table footnotes give the ABS wording.
d/ ABS Financial reasons category.
e/ ABS Allows use of private hospitals category.
f/ ABS Shorter wait for treatment / Concern over public waiting lists category.
g/ ABS Always had it / parents had it / condition of job category.
h/ ABS Security / Protection / Peace of mind category.

Table 6.2: Main Reason for Insurance vs. Insurance Type (N=383)[a/]

REASON	Basic	Basic+	Top	Top+	Anc	Tot %	Num
Doctor of choice	19	12	10	55	0	25	96
Cover gaps	1	4	4	13	0	6	22
Pref priv. hosp.	1	1	5	9	0	4	16
Ancillary cover	0	4	0	20	10	9	34
Waiting lists	6	0	5	13	0	6	24
Elective surgery	0	1	1	2	0	1	4
Cover maternity	1	3	1	4	0	2	9
Habit	0	0	1	0	0	0	1
Peace of mind	2	7	8	34	0	14	52
Support priv. ins.	0	0	0	1	0	0	1
Other	11	15	14	82	2	32	124
Total Number	41	47	49	233	12		383

a/ Excludes 4 with insurance type unknown. Basic is basic hospital only, Basic+ is basic hospital plus ancillaries, Top is top hospital only, Top+ is top hospital plus ancillaries, Anc is ancillary only. Final row gives the number of individuals with each tyoe of insurance. Final column gives the number with each main reason.

RLP: RESULTS

Logit for Insurance Choice:	INCOME	(+)
	AGE	(ï)
	SINGLE	(-)
	SP Visits	(+)
	GP Visits	(?-)
	Hospital days	(?-)
	Hlth condns	(+)
OLS for Premium given insured:	AGE	(ï)
	SINGLE	(-)
	KIDS	(+)
	GP Visits	(+)
	Hospital days	(+)
OLS for Log(Duration) given insured:	INCOME	(?-)
	AGE	(ï)
	SINGLE	(+)
	KIDS	(+)
	SCHYRS	(?-)