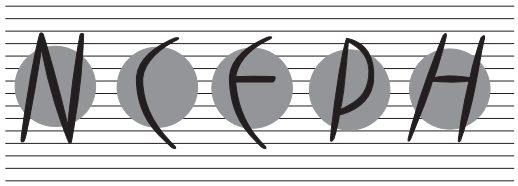

The Pasts and Futures of Private Health Insurance in Australia

Casey Quinn

NCEPH Working Paper Number 47

W O R K I N G P A P E R S

NATIONAL CENTRE FOR EPIDEMIOLOGY AND POPULATION HEALTH

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By 1997 only about 30% of the population in Australia was covered by private health insurance. Using what has been labelled a 'carrot and stick' approach, the government implemented three policies to alternatively entice and coerce Australians into joining private health funds. These were the Private Health Insurance Incentives Scheme, the *Private Health Insurance Incentives Act* 1998 and lifetime community rating. They were of two basic types: financial incentives based upon subsidies and punitive taxation, and 'equity' incentives which mitigated premium rating restrictions.

At various times prior to and since the implementation of these policies, there has been much and varied prediction of both their impact on demand for private health insurance and the likely result if they had not been implemented. This paper follows up these predictions to determine which if any were borne out, or were likely to be. It also adds to these predictions its own estimates of future membership of health funds now that lifetime community rating has been introduced by using a non-deterministic Autoregressive Integrated Moving Average process. Among the results of the study is the conclusion that, if the long-term decline in membership witnessed in the 1990s resumes, the government has most likely bought itself a decade of respite before demand for private health insurance falls once again to levels seen in 1997.

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1. Introduction

On February 7th, 2000, the Senate Community Affairs Legislation Committee sat for consideration of additional estimates. Among these were new estimates for the projected cost of the *Private Health Insurance Incentives Act* 1998, legislation which was geared towards reversing an historically declining trend in private health insurance coverage, and easing the pressure on public hospitals. It was estimated at the time that this policy would cost $1.09 billion in the first year[1]. This subsequently turned out to be an underestimation, with new estimates showing an increase to $1.67 billion. Re-estimation of cost for the so-called 'out years'[2] also showed an increase, from an initial $1.36 billion to $2.19 billion[3]. Some of that discussion follows.

> "
> **Mr Borthwick** — One of the points was that the coverage of private health insurance was on a very steady decline. So when Dr Wooding says you have to see what otherwise would have happened, we were having a decline of about two per cent per annum. We have not got a decline of two per cent per annum; we have got an increase of 214,000. The pressures on the public hospital system would have been intolerable if we had kept on having that sort of decline, which seemed to be running over a span of years.
> **CHAIR** — That is the point. Wasn't there demonstrable evidence?
> **Mr Borthwick** — Exactly right. There was demonstrable evidence.
> **CHAIR** — When people dropped out, the demand on the hospitals increased. One can therefore only presume that as people come back the demand on the hospitals will decrease.
> **Senator Chris Evans** — We are trying to get to how you measure that. You can assert that, Mr Borthwick - that is what the government does. But I am asking: How do we test that?
> **Mr Borthwick** — We had a long record of experience going back to the mid-eighties or so, which showed trend rates in the take-up of private health insurance. There was a very steady, inexorable decline in the private health industry.

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[1] Department of Health and Aged Care submission to the Senate Community Affairs Legislation Committee's inquiry into the bills before their introduction into Parliament in 1998.
[2] The initial estimates were for four years – the costs for the budget year at the time and three forward years, or 'out years'.
[3] Senate Community Affairs Legislation Committee, Consideration of Additional Estimates, February 7th, 2000.

> **Senator Chris Evans** — I suspect the jury is still out as to whether that has been halted - whether this is a blip or whether this has reversed that long-term trend. I suspect you would say to me, if you are consistent, 'We do not know that yet.'
> **Senator Herron** — It is the first time there has been a change in 16 to 20 years. At least concede that.
> **Senator Chris Evans** — I concede that. All I am saying is whether that has halted the general decline in insurance is probably a question that is not answerable.
> **Mr Borthwick** — You have to look at the longer term. But between rebate changes, lifetime health cover changes and changes in the structure of the industry, I think we are headed in the right direction."[4]

This excerpt helps to elucidate the issues providing demarcation lines for the two sides of this argument, namely those that were in favour of the 30% rebate as an appropriate tool for the government's policy and those who were against it. Specifically, these issues were; the ultimate cost of the rebate to the government, whether or not those funds would in fact have been more effective if given directly to public hospitals, the actual subsequent increase in health fund membership and the duration of any increase given a lack of protection for consumers from the premium increases which were held to have contributed to the original decline. The government concurred with the Majority Report of the Senate Community Affairs Legislation Committee into the *Private Health Insurance Incentives Bill* 1998 that this bill would increase membership in health funds significantly and with some degree of longevity. The Minority Report of the committee, along with dissenting reports from the Australian Democrats and the Green party, took the view that the expected increases in membership of up to 50% were best (that is to say, the most optimistic) estimates both in terms of the expected increase and the estimation itself. Further, they favoured the arguments submitted to the committee that the decline in membership would only continue, as an ad valorem subsidy failed to address the cost factors pushing up prices and promoting adverse selection in the industry.

Quite apart from the arguments that were made at the time and are being made still concerning the efficiency and equity of the rebate, and leaving aside also the questions over to what extent any success in promoting health insurance would ease the pressure on

[4] Senate Community Affairs Legislation Committee, Consideration of Additional Estimates, February 7th, 2000, p 125.

the public health sector[5], the argument over the trend in health fund membership is an interesting one. During the inquiry into this bill, both submissions to and debate within the government gave rise to a variety of predictions, both of the consequences if no rebate were granted and those if the rebate were granted, both immediately and even years into the scheme[6]. This paper attempts to follow up these predictions and see which, if any, find the most support empirically. It will also add to them its own estimates of future levels of health fund membership now that lifetime community rating has been introduced. It does so using a non-deterministic Autoregressive, Integrated Moving Average methodology to model fund membership levels dynamically. More rigorous methodologies are proposed and discussed in later sections.

2. The Inevitable Decline of Private Health Insurance

The history of private health insurance in Australia is a chequered one, due in part to both the existence and nature of publicly financed and/or provided health care. Australia had at one point in fact the distinction of being the only country to have instituted compulsory universal health insurance and then removed it (Hall 1999), only to have instituted it once more with the introduction of Medicare in 1984. This tergiversation in the public role in health care has taken its toll on the demand for private health insurance, whose coverage rates nationally were at peaks of 80% in 1970 (Hall 1999). This fell during the period in which Medibank and Medibank II, the precursor to Medicare, were in operation[7], and rose sharply again after its discontinuation in 1981 (see Figure 1). It fell abruptly once more to 50% upon the introduction of Medicare; an event distinguishable by the sharpest

[5] 'Saving' the public health sector from increasing demands being placed upon it by those leaving the private sector was an important reason for the government pursuing subsidies for private health insurance.
[6] See Appendix I for some of these estimates.
[7] The decline in coverage of 18% points in the year immediately following the introduction of Medibank has in fact been the greatest in the last thirty years. The increase in coverage in the year following its removal was around 12% points (Industry Commission 1997).

drop overall. After reaching rates as low as 30% in 1998, insurance coverage currently sits marginally below 45% nationally, having again declined over the past year[8].

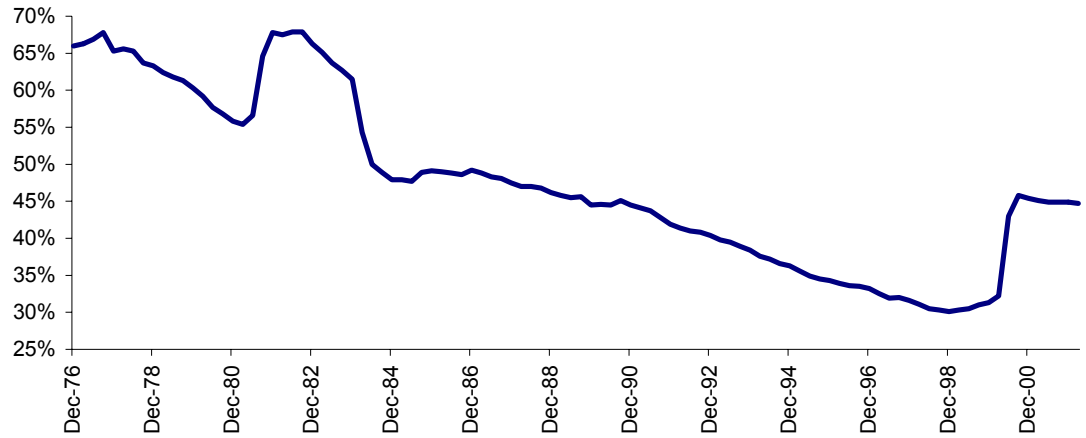

Figure 1 – Decline in Hospital Cover, 1976-2001

This led to grave concern that the systemic strain in the public health sector was being exacerbated by an inheritance of patients leaving the private sector. In a submission to the inquiry into the Private Health Insurance Incentives Bill the then Minister for Health and Ageing, Dr. Michael Wooldridge, stated that:

> "…the health of the publicly funded health sector depends upon a vital private sector. Having some six million Australians with private health insurance directly pays for around one-third of the costs of hospital care in Australia. If there were no private sector, the extra costs borne by the taxpayer would simply be unsustainable."

2.1 Private Health Insurance Incentives (1997-2000)

Using what has been labelled a 'carrot and stick' approach, the government administered three policies to alternatively entice and coerce Australians into joining health funds. These policies were of two basic types; financial incentives, based upon subsidies and

[8] Rates are based upon membership data compiled by the Private Health Insurance Administration Council, for the period ending March 31st, 2002. Full coverage details are available on their website,

punitive taxation, and what might be called equity incentives which mitigated premium rating restrictions.

2.1.1 The Private Health Insurance Incentives Scheme

The Private Health Insurance Incentives Scheme (PHIIS) was a policy that took effect as of July 1997. It was a targeted scheme combining both of the aforementioned carrots and sticks. For three income brackets the scheme provided subsidies of specified amounts for those within the lowest bracket who subscribed to eligible insurance policies. Individuals in the highest bracket were taxed punitively via the Medicare Levy Surcharge[9], while those within the central bracket were subject to neither[10].

Estimates at the time were that this scheme would cost the government some $600 million annually, the equivalent of about 11.5% of all Commonwealth expenditure on public hospitals at the time (Hall, De Abreu Lourenco and Viney 1999). The same estimates predicted that the measure would generate membership uptake by 950 000 people, either because of the subsidy[11] or in order to avoid penalisation, each accounting for 677 000 and 275 000 people respectively.

2.1.2 The Private Health Insurance Incentives Act 1998

The *Private Health Insurance Incentives Act* 1998 was an amendment to, or rather an expansion of the PHIIS, replacing it as of January 1st 1999. It is now more commonly referred to as simply the 30% Rebate, as that was its major accord. The Medicare Levy Surcharge for individuals and families was retained, but significant alterations were made to the subsidy that, under the PHIIS, had been given to those with lower incomes who purchased private health insurance. The rebate structure of pre-specified dollar amounts

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http://www.phiac.gov.au/statistics/membershipcoverage/index.htm

[9] This was a punitive tax of 1% on single incomes on or above $50,000 p.a. and family incomes on or above $100,000. This was waived on a pro rata basis for each day on which you had private health insurance.

[10] Details of the scheme can be found at http://www.health.gov.au/archive/1999/phiis/elib.htm, though Butler (2002) provides an excellent analecta of both the subsidies and the eligibility criteria.

[11] The subsidy could be granted as an immediate premium reduction, a rebate from the Health Insurance Commission which was implementing the policy, or a tax offset for that year (Butler 2002).

was replaced with an ad valorem subsidy of 30%, granted as either a tax offset or a premium reduction (with the 30% appertaining to the premium purchased by each individual or family), and the eligibility criteria for policies was removed completely.
Most significantly perhaps, so too was the means testing of the rebate. This meant that all individuals eligible for Medicare were eligible for the 30% rebate if they joined a health fund, and gave all those within the PHIIS's highest income bracket the opportunity to both attract the 30% rebate and avoid the Medicare Levy Surcharge[12]. In an effort to make insurance more attractive the Private Health Insurance Incentives Act also contained the requirement that health funds offer policies that involved no gap, or known gap, coverage[13].

2.1.3 The Lifetime Community Rating Scheme

Known also as Lifetime Healthcover, this took effect – after a deadline extension – from July 15th 2000, and was built upon the previous policies, in that it did not remove or supersede any of the previous incentives, but involved only a tweaking of community rating to allow some degree of risk discrimination on the part of health funds. The deadline extension came because of the pressure being placed upon administration within health funds. Although the scheme had been announced in September 1999, some nine months earlier, the bulk of the advertising and promotion took place in the final months of the period, so that demand would peak as the deadline drew near. Achieving this desired effect however meant that within only weeks of the deadline it became clear that the health funds could not register all members, causing the deadline to be extended from its initial date of July 1st 2000 by two weeks.

[12] This was in order to protect health funds from inheriting an adverse risk selection, such as was supposed to be the likely result of only offering the rebate to low income earners. Offering a universal rebate would, conversely, protect both the risk pool of health funds and community rating generally. This issue can be seen more fully addressed in the Senate Community Affairs Committee's Majority Report on the Private Health Insurance Incentives Bill.
[13] The gap here is the difference between doctor's fees and Medicare schedule fees, which had hitherto meant that while a public patient in a public hospital was fully covered, a private patient in a public hospital could receive substantial bills. Gap fees such as this dissuaded people from joining when, subject to the availability of a bed, they could be fully covered as a public patient. They were widely held to be a main cause of individuals either not insuring or seeking treatment as a public patient, even when insured.

It was in order to ameliorate the effects of moral hazard and adverse selection that the Commonwealth announced the Lifetime Community Rating Scheme. Health funds were now allowed to charge a base premium for individuals under 30 years of age, while charging an additional 2% for each year that the individual was over 30 years of age at the time they joined the health fund. The cap on this was a 70% increase, concomitant with those entering when 65 years of age and over, who were therefore exempt from further penalty. This policy had the advantage of being a concession to the private health insurance industry and bearing no direct cost for the government.

2.2 Policy Outcomes

The results of these incentives can be seen in Figure 2 below. Note where the implementation of each policy is marked, including the 'announcement effect' of lifetime community rating.

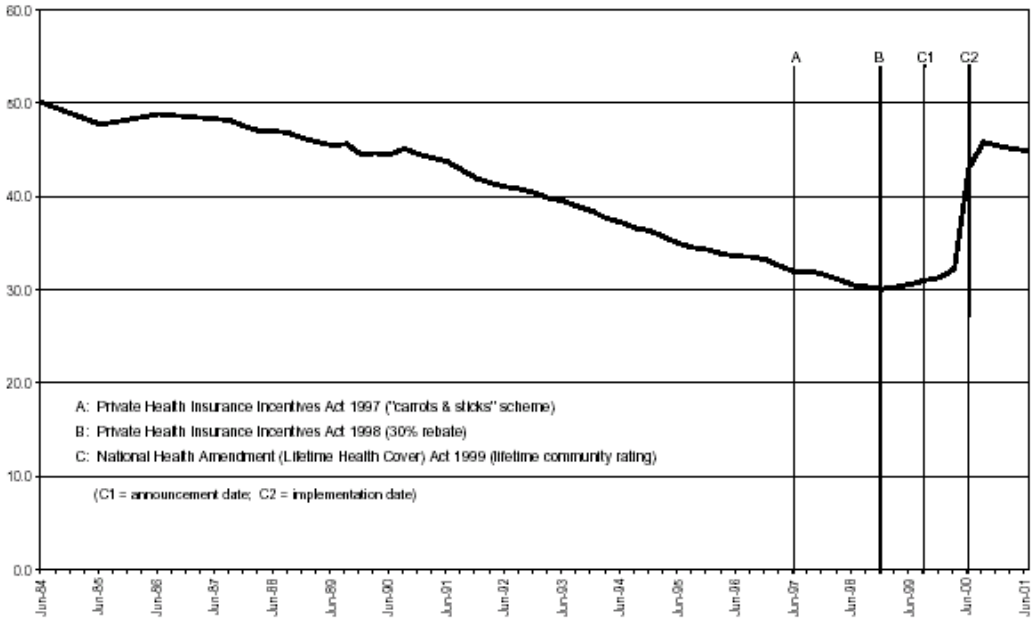

Figure 2 – Private Health Insurance Incentives [Source: Butler (2002)]

Note also that this pertains to policies for hospital cover. Clearly the PHIIS had little effect, halting the decline in health fund membership for only one quarter before it

returned to its previous trend. The 30% rebate had greater success, albeit slowly. All told an increase in membership of 7% can be observed, although this is a contentious figure due to the overlapping nature of the announcement of lifetime community rating prior to its implementation. The greatest increases in membership in fact come in this period of overlap, making it difficult to determine to which policy the increase is attributable. Easily the most successful policy was the lifetime community rating scheme, which lead to membership returning to rates of around 45% nationally, not seen since the 1980s.
Defence of the two former initiatives – and particularly the 30% rebate – has come primarily in order to defend the now $2.8 billion cost being carried. Such defence is based around the following arguments;

1. That the level of coverage subsequent to the implementation of each initiative must be gauged relative to what might have been the case had the incentive not been granted. For example, the PHIIS should be measured not against coverage immediately before July 1997, but rather against some later hypothetical period in which the PHIIS did not exist.
2. That we can only observe states with neither a rebate nor lifetime community rating, the rebate and no lifetime community rating, or both. What is unobservable is a state with lifetime community rating and no 30% rebate. The argument then is that the success of the final policy is attributable in part at least, to the prior existence of the subsidy.

As part of a worst-case scenario presented to the Senate inquiry, the Australian Health Insurance Association (AHIA) made the claim that 'while private health insurance membership losses have been declining (sic) at a relatively constant figure, it is more than likely the system will suddenly go into free-fall'. The main thrust of their estimation
was that membership rates would decline to zero by 2016 (see Appendix) unless the dropout rate were to compound, or go into 'free-fall', in which case it would fall to zero within only five years from the time the free-fall began. This free-fall was also held to be unpredictable, while they considered even the first estimates conservative. No account was made either of the model used to arrive at this forecast, or its derivation. Using a long

run exponential trend the Industry Commission (1997) was able to forecast a far softer decline, so soft in fact that insurance coverage fell only to 11% nationwide by the year 2030 (see Appendix). Given that this forecast used only data from June 1994 to June 1996, it is assumed that a more accurate prediction lies somewhere between these two. Frech, Hopkins and MacDonald (2002) in fact used a deterministic trend for the period 1990-1997 to arrive at results quite similar to those presented in the current study.

3. Forecasting Methodology

Looking at private health insurance coverage since 1976 (see Figure 1) there is certainly an illusion – though a convincing one – of linearity in the declining trend. Even between 1981 and 1984 when Australia was temporarily without compulsory universal health care the decline looks to be on a path barely different to that observed either side of it. Upon closer inspection though it can be seen that the trends vary across loose periods in time, within which they are fairly stable. The demarcation for these periods can be seen in the policy initiatives of the government as well as other events mentioned earlier, namely;

- The 2.5% levy on taxable income introduced in 1976.
- The removal of Medibank, increased subsidies to health funds, and awarding of a 32% income tax rebate for basic hospital cover in 1981.
- A doctor's dispute affecting public hospitals, which began in 1984.
- Withdrawal of subsidies to private hospitals, and health funds being made to contribute to medical costs and the reinsurance pool[14] in 1986-1987.
- The recession in the early 1990s.

This segregation was used in order to test the hypothesis that the period 1981-1983 was simply a structural shift, and could be adjusted to fit the remainder of the series, an approach consistent with analyses by Gilchrist (1976) and Meyler, Kenny and Quinn

[14] The reinsurance pool is a form of mandatory insurance for health funds, into or from which they contribute or withdraw funds depending upon how the risk profile of their members changes. The government had been subsidising contributions to the pool.

(1998). We can see within each period differences in the average quarterly decline in health fund membership. Average decline in percentage points exhibits almost identical coefficients of variation though, except for the 1981-1983 period. Chow tests for structural change performed in both SAS and Shazam support this proposition. The results in both cases find a structural change in the series only in 1981.

Observations from late-1984 onwards were used for the identification and estimation of an Autoregressive, Integrated Moving Average (ARIMA) model for forecasting alternate and future series[15]. This ensured a substantial and relatively stable series could be captured that was of a fairly reliable size, and also ensured that the final model would not be built around too local a mean. Thus, while still hardly a global parameterisation, it should give more accurate estimation in other periods. By using the longer time period the model would hopefully be able to smooth out over changes or shocks such as in 1986-1987 and 1991-1992, and enable forecasts to allow for them in the future. Interestingly, the results of the model used here were quite similar to those of Frech, Hopkins and MacDonald (2002) who used a narrower time series.

3.1 Autoregressive, Integrated Moving Average Processes

Autoregressive Moving Average (ARMA) models are what are known as mixed models, in that they are a parametric combination of both the Autoregressive process;

$$y_t = \phi y_{t-1} + a_t \qquad \textit{First-Order Autoregressive Process (AR(1))}$$

or

[15] Data used in the estimation of insurance coverage and its forecasting, and indeed all data used that is sourced to the Private Health Insurance Administration Council, is provided by PHIAC on their website, http://www.phiac.gov.au/statistics/membershipcoverage/index.htm
Tables are available for membership and benefits of hospital and ancillary policies, by age cohort and gender. Note that in the later quarters of the series this study used data labelled Preliminary, which by this time may have been Revised and could be slightly different. For the purposes of this study only basic hospital cover was used. Coverage under ancillary policies can be seen, and in fact is fairly similar to hospital over time.
All graphs and analysis based upon such data however are the work and responsibility of the author.

$$(1-\phi B)y_t = a_t$$

where

y_t is some time series y in the t^{th} period.

a_t is some error term for the series in the t^{th} period ($\hat{y}_t - y_t$).

B is a so-called backshift operator

ϕ is the autoregressive parameter,

and of the Moving Average process;

$$y_t = a_t - \theta a \qquad \textit{First-Order Moving Average Process (MA(1))}$$

or

$$y_t = (1-\theta B)a_t$$

where

θ is the moving average parameter[16].

An example of a first order ARMA model then is

$$(1-\phi B)y_t = (1-\theta B)a_t \qquad \textit{ARMA(1,1) Process}$$

An ARMA model also requires that (i) the time series must be stationary, and (ii) the time series must be invertible, respectively. The ARIMA model is used for non-stationary series that are integrated, meaning they can be made stationary by differencing, and it is this differenced series that is then fit with an ARMA model. An example of an ARIMA (1,1,1) – with one period of autoregression, one period of differencing and one period of moving average, respectively – is given by

$$(1-\phi B)(y_t - y_{t-1}) = (1-\theta B)a_t \qquad \textit{ARIMA (1,1,1) Process}$$

[16] See Mills (1996) for a more detailed presentation of Autoregressive and Moving Average models.

or

$$(1-\phi B)\nabla y_t = (1-\theta B)a_t$$

The stationarity condition is that $|\phi| < 1$ while the invertability condition is that $|\theta| < 1$. This also gives rise to another commonly used model specification in forecasting time series, the deterministic trend. This is when both ϕ and θ equal 1 and a time parameter exists, so the value of the series at any point will depend upon its starting values and current point in time. Forecasting can then be done using even a simple linear trend. Frech, Hopkins and MacDonald (2002) in fact use a deterministic model fairly effectively against private health insurance coverage. In this study a non-deterministic ARIMA was specified, in order to both allow capturing some long term impact of current or past events, and to minimise error from mis-specifying the series. Given that the series was made quite stationary by first differencing, and satisfied tests for unit roots, this choice appeared justified[17].

3.2 Model Identification and Estimation

Using SAS, the best indications from the Autocorrelations, Partial and Inverse Autocorrelations were that one of either an ARIMA (2,1,1), (2,1,2), (2,1,3) or (3,1,3) would be most appropriate. The results of comparison are below.

Table 1 – Comparative Variance and Information Criteria

Parameters	Variance	AIC	SBC
(2,1,1)	0.000017	-419.164	-411.359
(2,1,2)	0.000016	-421.925	-412.169
(2,1,3)	0.000016	-420.024	-408.316
(3,1,3)	0.000018	-414.901	-401.242

It can be seen from the table above that the selection criteria – minimum variance, minimum information criteria – all favour the specification of an ARIMA (2,1,2).

[17] While Frech , Hopkins and MacDonald (2002) use a deterministic model, their choice was no less justified, as it was simply based upon different assumptions concerning the data generation process.

Autocorrelation checks of the residuals for white noise also indicated that this was not an over-parameterisation. Estimation of this specification using the ARIMA procedure in SAS gave the following;

Table 2 – Conditional Least Squares Estimation Results

Parameter	Coefficient Estimate	Std Error	t Value	p Value	Lag
Mean	-0.0036	0.0007	-5.2900	<.0001	0
MA1, 1	-0.7683	0.0671	-11.4500	<.0001	1
MA1, 2	-0.9426	0.0654	-14.4100	<.0001	2
AR1, 1	-0.5448	0.1468	-3.7100	0.0005	1
AR1, 2	-0.6630	0.1483	-4.4700	<.0001	2

This, in terms of functional form, appears as set out below in its final derivation (see Appendix II for a complete derivation):

$$\hat{y}_t = 2.20774\mu_t + 0.45525y_{t-1} - 0.11824y_{y-2} + 0.66299y_{t-3} + a_t + 0.76829a_{t-1} + 0.9426a_{t-2}$$

where the mean μ_t is some local average decline (for this model it is of course an average for the period 1984:3-1997:2).

3.3 Test Predictions

Single-step ahead forecasts were made in various sub-sections of the series before the model was used for any long-term forecasting[18]. One of these was almost the entire period, using single-step-ahead forecasts until December 1989, and thence forecasting solely upon on the strength of the model. This enabled the estimates to be checked period by period, as well to see how capably the model allows for the brief shock in 1990-1991. The results of the forecasts for the later quarters in the period can be seen below (see Table 3, Figure 3).

Table 3 – Observed v. Predicted Insurance Coverage, 1990-1993

Quarter	Observed Coverage	Forecast Coverage	Forecast Error	Std Error
Mar-90	44.60%	43.85%	-0.01	0.01
Jun-90	44.50%	43.06%	-0.01	0.01
Sep-90	45.10%	43.13%	-0.02	0.01
Dec-90	44.50%	42.82%	-0.02	0.00
Mar-91	44.10%	42.15%	-0.02	0.00
Jun-91	43.70%	41.93%	-0.02	0.00
Sep-91	42.80%	41.70%	-0.01	0.00
Dec-91	41.90%	41.18%	-0.01	0.00
Mar-92	41.40%	40.82%	-0.01	0.00
Jun-92	41.00%	40.57%	0.00	0.00
Sep-92	40.80%	40.15%	-0.01	0.00
Dec-92	40.40%	39.75%	-0.01	0.00
Mar-93	39.80%	39.45%	0.00	0.00
Jun-93	39.50%	39.09%	0.00	0.00
Sep-93	38.90%	38.69%	0.00	-0.01
Dec-93	38.40%	38.36%	0.00	-0.01

The standard error of the estimate looks quite promising, as does the error variance, only 0.00003. The closeness of this fit can also be seen in the graph. As expected there is some error around the time the recession and premium increases coincided.

[18] Due to the brevity of the series, comparison took place over some of the same time periods that were used in model identification and estimation, but this doesn't appear to have contributed to any noticeable bias.

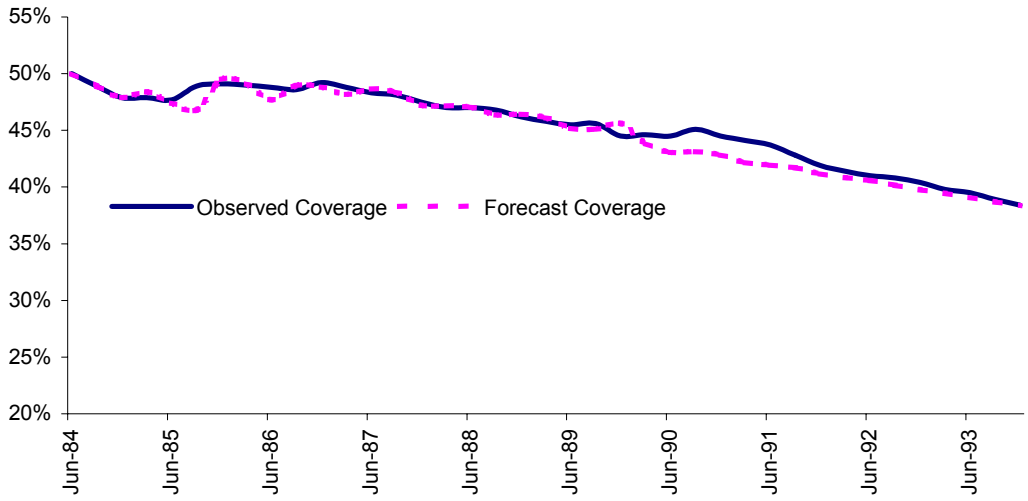

Figure 3 - Observed v. Predicted Insurance Coverage, 1984-1993

The model was also fitted to pre-Medicare data, namely from 1976 onwards, and it was found to have performed remarkably well. This is surprising given the changes to health care that had taken place, but the predictions held with quite small degrees of error even until mid-1997. For purposes of parsimony only every December quarter has been presented here.

Table 4 – Observed v. Predicted Insurance Coverage 1982-1997

Quarter	Observed Coverage	Forecast Coverage	Forecast Error	Std Error
Dec-76	66.00%	66.00%		
Dec-77	65.30%	67.82%		
Dec-78	63.30%	63.70%		
Dec-79	60.30%	59.93%		
Dec-80	55.80%	56.18%		
Dec-81	67.80%	54.11%		
Dec-82	66.30%	53.44%	0.1286	0.1940
Dec-83	61.50%	51.95%	0.0955	0.1552
Dec-84	47.90%	50.36%	-0.0246	-0.0514
Dec-85	49.10%	48.91%	0.0019	0.0039
Dec-86	49.20%	47.50%	0.0170	0.0346
Dec-87	47.50%	46.07%	0.0143	0.0301
Dec-88	46.20%	44.63%	0.0157	0.0340
Dec-89	44.50%	43.19%	0.0131	0.0294
Dec-90	44.50%	41.75%	0.0275	0.0617
Dec-91	41.90%	40.32%	0.0158	0.0378
Dec-92	40.40%	38.88%	0.0152	0.0376
Dec-93	38.40%	37.44%	0.0096	0.0249
Dec-94	36.30%	36.01%	0.0029	0.0081
Dec-95	34.30%	34.57%	-0.0027	-0.0079
Dec-96	33.20%	33.13%	0.0007	0.0020
Dec-97	31.60%	31.50%	0.0010	0.0030

This series of forecasts had an error variance of 0.0004 also, though it did have more variation earlier in the series because of the period in which Australia was without universal health insurance. The full series can be seen graphically, below

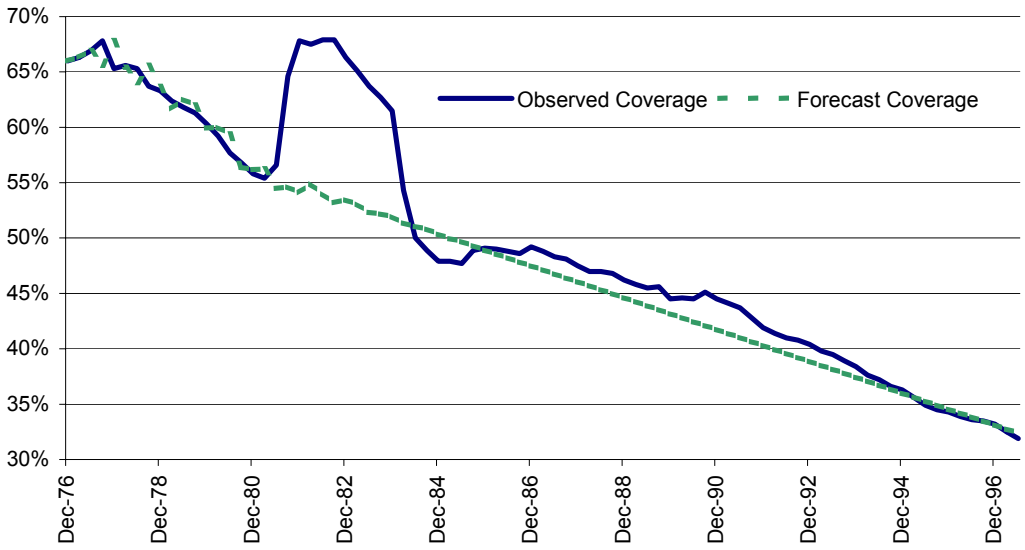

Figure 4 - Observed v. Predicted Insurance Coverage, 1976-1997

3.4 Forecasting

The culmination of this was to assess the claims being made prior to the introduction of the Private Health Insurance Incentives Act that private health insurance coverage was declining fast and would disappear completely if something were not done, similar to claims also made prior to the PHIIS. Forecasts showed however that insurance coverage largely declined as much as it always had and, interestingly, that the PHIIS seems to have merely delayed it by one quarter (see table 5).

Table 5 – Observed v. Predicted Insurance Coverage, 1997-1998

Quarter	Observed Coverage	Forecast Coverage	Forecast Error
Mar-97	32.50%		
Jun-97	31.90%		
Sep-97	32.00%	31.31%	-0.01
Dec-97	31.60%	30.89%	-0.01
Mar-98	31.10%	30.72%	0.00
Jun-98	30.50%	30.30%	0.00
Sep-98	30.30%	29.85%	0.00
Dec-98	30.10%	29.58%	-0.01

This apparently simple single period shift rightward can also be seen graphically below.

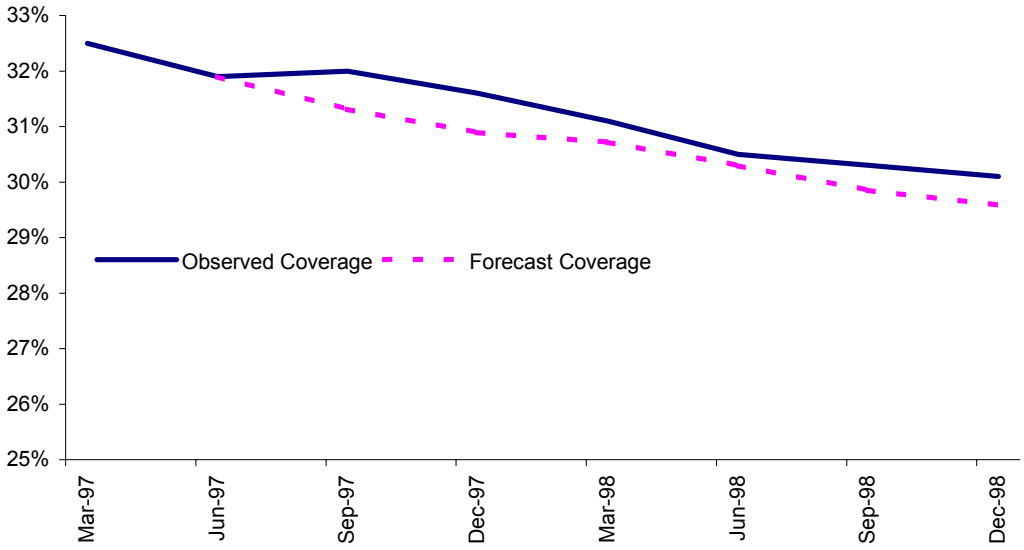

Figure 5 - Observed v. Predicted Insurance Coverage, 1997-1998

Using forecasts to make a similar comparison between coverage after the Private Health Insurance Incentives Act and what might otherwise have been showed a more positive result (see table 6);

Table 6 – Observed v. Predicted Insurance Coverage, 1997-2000

Quarter	Observed Coverage	Forecast Coverage	Forecast Error	Std Error
Mar-96	33.90%	33.90%	0.00	0.01
Jun-96	33.60%	33.60%	0.00	0.01
Sep-96	33.50%	33.50%	0.00	0.01
Dec-96	33.20%	32.96%	0.00	0.00
Mar-97	32.50%	32.64%	0.00	0.00
Jun-97	31.90%	32.29%	0.00	0.00
Sep-97	32.00%	31.90%	0.00	0.00
Dec-97	31.60%	31.55%	0.00	0.00
Mar-98	31.10%	30.96%	0.00	0.00
Jun-98	30.50%	30.84%	0.00	0.00
Sep-98	30.30%	30.37%	0.00	0.00
Dec-98	30.10%	30.01%	0.00	0.00
Mar-99	30.30%	29.55%	-0.01	0.00
Jun-99	30.50%	29.19%	-0.01	0.00
Sep-99	31.00%	28.96%	-0.02	0.00
Dec-99	31.30%	28.53%	-0.03	-0.01
Mar-00	32.20%	28.12%	-0.04	-0.01
Jun-00	43.00%	27.84%	-0.15	-0.01

Clearly the abrupt departure from the predicted trend towards the end of the series is due to the introduction of lifetime community rating in July 2000 (see also Figure 6, below). Whereas conclusions in 1997 that the PHIIS had at least slowed or stopped the decline in insurance were false, the Private Health Insurance Incentives Act did lift health fund membership, albeit slowly.

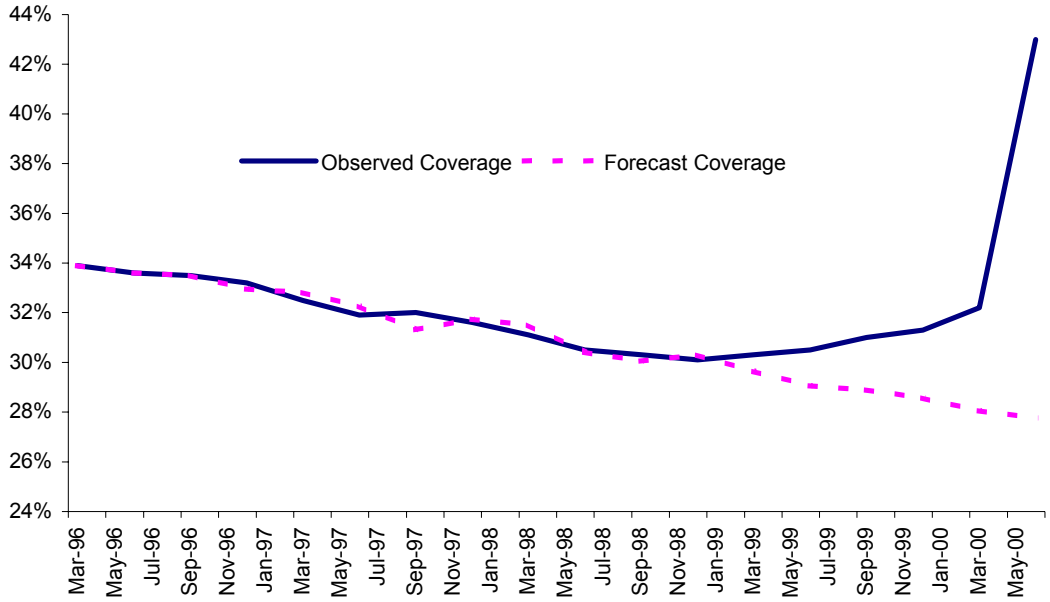

Figure 6 - Observed v. Predicted Insurance Coverage, 1997-2000

Further, to claims that were made that membership of health funds would drop rapidly to zero in a relatively short space of time, we find that such is not, or need not have been, the case. Using no particular time reference, but rather looking for the quarter in which coverage did fall to zero, the prediction is that this would have happened in 2019, assuming no intervention by the government.

4. Private Health Insurance with Lifetime Community Rating

The third of the policy initiatives mentioned earlier, lifetime community rating becomes of interest here because of how remarkably it increased demand for private health

insurance, a fact which has led to discussion also about the chronologically poor implementation of the policies (Butler 2002 and Frech, Hopkins and MacDonald 2002). Estimates of price elasticity of demand (Butler 1999) indicated that the increase pursuant to the 30% rebate would be around 10% – i.e. coverage would lift from around 30% to around 33% – which it was approaching, although the expectations of some parties were that there would be a greater recovery[19]. Much analysis has been done though of the underlying problems with health insurance, as mentioned earlier, and the expectation would naturally be that the impact of a subsidy would be quite muted if community rating remained in effect. The healthiest among us, if facing an effective price of $6, would need about an 80% rebate in order to make private health insurance a 'good buy'. The Lifetime Community Rating Scheme went a short way towards removing some of the restriction of community rating by allowing risk rating for age which, although it did not remove the higher costs for healthy people in a given cohort, did impose penalties for those people when they (re)joined later in life, older and less healthy. Thus it did make private health insurance more attractive, particularly to people over the 30 year age cut-off for lifetime community rating at the time of its introduction.

The question however is whether or not this can negate or adequately buffer adverse selection. It is true that leaving private health insurance will bring a penalty if and when an individual rejoins, but that cost is in the future and may be heavily discounted, especially if the individual still faces an unfair premium now. The potential for premium increases to flow on from the now larger pool of insured individuals is also significant, particularly as the policies of the government have nothing in them to grant control of premium increases.[20] Given this to be the case, using this model to forecast out based upon what data exists seems a valid decision. Assuming the dynamic has been left relatively unchanged the model should predict quite capably. The only concern would be that, with limited risk rating by age in place, the model may over-estimate the decline, but that is countered by the equally unknown impact upon prices that the boom in ancillary

[19] Price in this context is defined as the Premium of a policy divided by the Expected Benefit (Butler 2000). Hence it is a value for how much is paid per dollar received.

[20] This was seen only recently with the large premium increases. Particularly interesting also was little acknowledgement that the individual would face only 70% of this or any other increase, indicating that the rebate has already been assimilated into expectations concerning price.

policies will cause[21], combined with an hypothesised increased risk of adverse selection since the new entrants to the market are largely either those who would not hitherto join, or those who had left previously[22].

Support can also be found in the data which, though scant, does indicate that coverage rates are slipping again from their peak of 45.8% in September 2000. Estimation from the first quarter of 2002, using the ARIMA model with the previous parameter estimates, shows the following decline (see Figure 7);

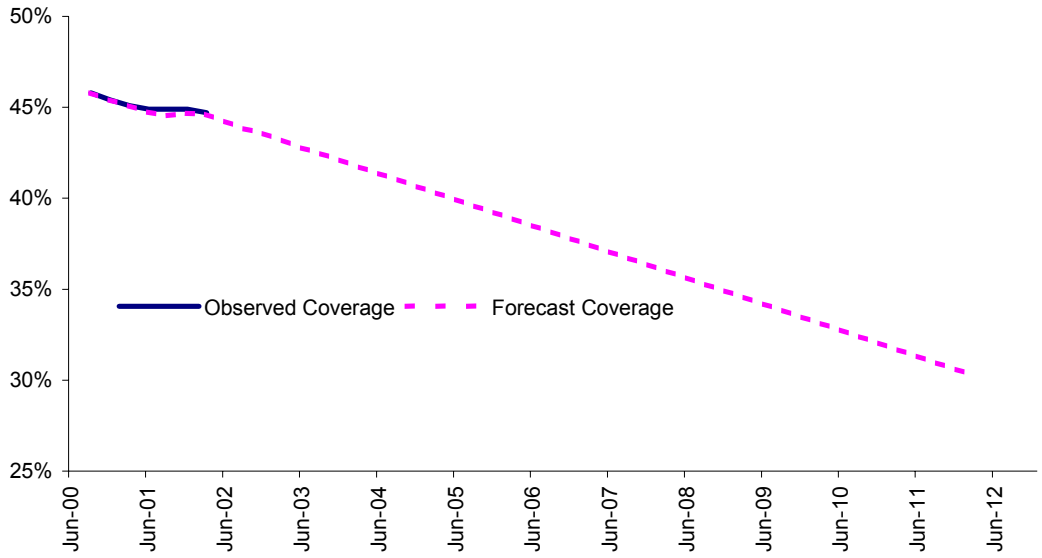

Figure 7 - Long-term Forecasts for Insurance Coverage

This was continued only until the period in which coverage fell to 30% once again. The predicted series can be seen combined with the rest of the series (see Figure 8).

[21] There is also the potential for increases in benefits and premia for hospital cover when all waiting periods lapse for certain procedures. The lag for this to flow through into health fund planning should be such that the next 6 to 12 months will show any excessive demand being placed upon them.

[22] Butler (2002) has some analysis of shifting age distributions within the pool of insured. He observes a creeping up of the average age of insureds over time, indicating that younger members are leaving health funds.

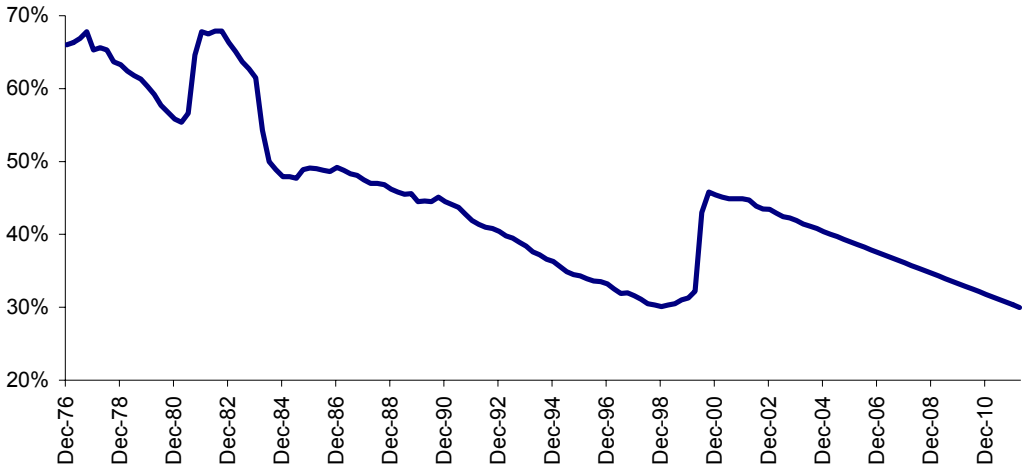

Figure 8 - Historical and Predicted Insurance Coverage

The predicted fall in insurance coverage looks most like that of the 1990s, due to the policy stability for that period[23]. Being a forecast simply of coverage as its own time series, the model can only make the same assumption about the future. Having a less localised mean initially though, it can also be seen that the decline is not quite as fast as that from 1990-1997. The prediction seen is that membership in health funds will again be 30% of the population by 2012.

5. Discussion and Concluding Remarks

As was stated earlier, the impacts that the government's policies have had are varied. After the introduction of the PHIIS for example, insurance coverage became level for only one quarter and then returned to almost precisely the decline it exhibited prior to that. One reason given for this is that health funds has already built the structured rebates into their premia, and so few people benefited. The Private Health Insurance Incentives Act was more effective, though there was not enough time prior to the introduction of lifetime community rating for the full effect of this initiative to be seen. Whether claims that coverage would return to 45% in time was justified cannot currently be tested. It does

seem though that the increase would have been nearer the 10% that was estimated using price elasticities, as even a generous rebate seems small compared to the effective prices faced by many Australians.

Lifetime community rating was undeniably successful, and did in fact take insurance coverage to 45%, but again the criticism of the policy is that no control over future premium increases was secured by the government. Thus any improvement to the inherent problems with private health insurance in Australia could easily be undone by such increases in the future. Quite apart from that however, the conclusion here is that the concessions made with lifetime community rating were sufficient to halt the decline in demand for health insurance, but if the same dynamic that has hitherto existed continues unchecked the decline has not been halted for long, and the government has only bought itself around a decade of respite before it must face the same problem as in 1998. From this point it will not fall to zero though until 2033 – 14 years after it was first predicted to reach that point prior to the introduction of lifetime community rating. Interestingly, this prediction of only a single-decade postponement is the same as that arrived at by Frech, Hopkins and MacDonald (2002) in their analysis. Using a deterministic trend from a starting point of September 2000, when coverage was at its peak, they concluded that 'at the historic rate of decline, all gains will be eroded in around ten years'. More or less will depend upon how well health funds can now retain their members. If they are able to remain attractive to the young and/or healthy, any decline will presumably be far slower. If they cannot, it could be significantly greater.

What is also interesting to note is the nature of the differences in average rates of decline between the periods specified in section 3. Although the tests for structural change indicated no significant differences in the behaviour of the decline after 1985, the average decline in each loosely defined 'period' is 0.5% per quarter greater than the one before (see Figure 9).

[23] It was in fact for this stability in policies that Frech, Hopkins and MacDonald (2002) decided to use data from 1990 onwards in their analysis.

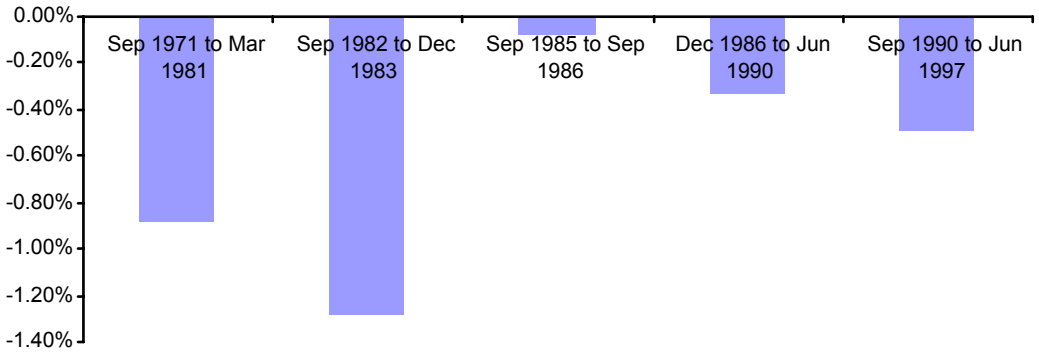

Figure 9 - Average Decline in Insurance Coverage by Period

Thus some degree of endemicity must be granted to whatever underlying event influences demand. It even lends some support – though certainly not full support or agreement – to the claim made by the AHIA that drop-out rates could compound. This in no way supports the theory of a 'free-fall', but it does indicate that successive negative influences on demand for private health insurance may well speed up the decline each time.

It also means that the government may have bought itself less than the decade of breathing room that was determined in the modelling. One of the key criticisms of the 30% rebate was that it made the government an effective price taker, and lent it no control over premium increases, and so while such a rebate could temporarily boost numbers, it could not prevent them leaving after premium increases caught up with the added demand being placed on health funds. By increasing demand for insurance so effectively the government may have increased the risk of this dynamic, as seen already by recent premium increases[24]. The 1981-1983 trend is also evidence of this. A subsequent increase in premium rates, such as was seen recently, could be enough to re-establish this pattern.

For now the debate concerns itself predominantly with the question of how well the subsidies are addressing the pressure on public and private hospitals, but there was never any concrete evidence that private health insurance was a necessary component of any

[24] By gearing their advertisements towards the young and healthy, and offering such generous ancillary packages, health funds have probably contributed also to greater benefits being paid per SEU. A wealth of literature exists on excess demand for health care resulting from subsidisation and lower effective prices. See for example Feldstein (1972).

solution. What remains to be addressed is the question of whether the subsidies for private health insurance are going to have any effect on private health insurance itself. This leads to an unattractive scenario in which the choice must be made between an expensive yet ultimately ineffective subsidy, and the risks of a crash in health fund membership should it be removed. If the predictions are correct, the industry has at least found itself time in which to find the answer.

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Appendix I – Predictions of Declining Health Insurance Coverage

In submissions to the Senate Community Affairs Legislation Committee inquiry into the Private Health Insurance Incentives Bill, a variety of predictions were made concerning the decline in insurance coverage if the Bill were to be blocked and the 30% rebate denied. The government had already released estimates of a 10% increase from 30% of the population covered to around 33%. The following are presented in the order in which they were submitted to the Committee.

The submission by the Australian Private Hospitals Association (APHA) use a report by TQA research into attitudes towards the rebate to predict that 'an appropriate guide to membership increases is two-thirds of the uninsured who agree a lot with the statement that they would definitely take out health insurance if it was 30% cheaper. This result is 22% of the uninsured population'. They predicted then that coverage would, as a 'best estimate', increase from 30.3% to 45.6%, or show a 15.3% percentage point (or 50% in terms of membership) increase.

The Australian Medical Association (AMA) produced similar estimates in an interesting application of affordability. Affordability is the ratio of average per capita disposable income to private health insurance premiums per person covered. The AMA determined that a 30% rebate would return private health insurance to levels of affordability experienced in 1989-90, when coverage was 44% nationally. They conclude then that a 30% rebate would return insurance coverage to the level matched historically by affordability within five years. They do not however account for the fact that coverage in 1989-90 was only at 44% as it was going down, indicating that simple affordability might not be the equivalent of demand, and so it is unlikely that some level of affordability is enough, in and of itself, to reverse the losses in health fund membership.

Conversely, the AMA also predicted that without the rebate insurance coverage would fall to around 18.5% after five years.

The Australian Health Insurance Association (AHIA) predicted no results for the rebate, but they did predict the declines, mentioned in the text, either to zero by 2016 or by 2004 using the compounding drop-out rate, and assuming that the denial of the rebate would be sufficient to begin this compounding dynamic.

Butler (1998), Clarke (1998) and Deeble (1998), of the National Centre for Epidemiology and Population at the Australian National University noted in their submission that the average reduction in premia would be only about 23%, once allowance was made for the fact that some people had a reduced premium already under the PHIIS. Using this and estimates of the price elasticity of demand for private health insurance they concluded that the percentage of the population covered by private health insurance would increase to between 32% and 36% at best.

They also made the point that because of the structural problems in Australia the decline would in all likelihood continue to decline thereafter, even though it might increase coverage initially. They attribute the speed to this decline to the new composition of the risk pool once people had joined or rejoined health funds.

Using previous trends of decline they predict that within five years coverage would have fallen to 25% had nothing been done.

The New South Wales government, in their submission, echoed the general consensus that coverage rates would stabilise at somewhere around 20% to 25% of the population. This is generally held to be the floor for demand for private health insurance. Unfortunately if this is the core of people needing such care the costs to private health insurers would presumably be too great for them to continue operation without assistance, so before insurance coverage fell to zero health funds would probably either go bankrupt or price themselves out of the market, but this is speculative.

In their report on the private health insurance industry in 1997, the Industry Commission used a long run exponential trend from 1994-1996 data to predict that insurance coverage nationwide would fall to around 11% by 2030. This average is significantly bolstered by the Queensland rate of 22% state-wide, again reflecting the consensus that a floor exists, since Queensland had free public hospital care many years prior to Medicare, and so has had a longer period of this decline to measure against. The trend however did level out in this State.

Frech, Hopkins and MacDonald (2002) predicted in their study that, had nothing been done, insurance coverage would have fallen to around 25% by the end of 2001.

Comparisons of these can be seen below (Figure 10).

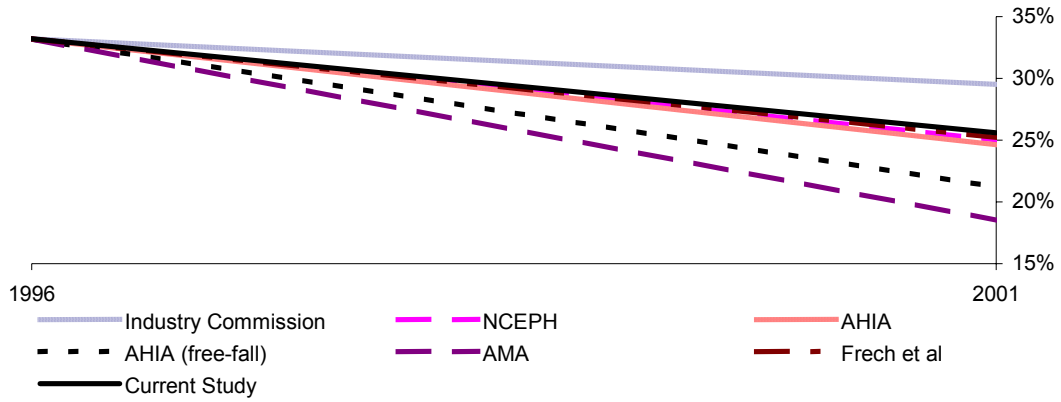

Figure 10 - Predicted Decline in Health Insurance by Various Studies

Appendix II – Complete Derivation of the ARIMA (2,1,2)

Initial estimates of the parameters were given in table 2. Primary specification of an ARIMA (2,1,2) process is as follows;

$$\nabla y_t = \mu_t + \frac{\theta(B)}{\phi(B)} a_t$$

where

$$\theta(B) = (1 - \theta_1 B - \theta_2 B^2)$$

and

$$\phi(B) = (1 - \phi_1 B - \phi_2 B^2)$$

thus

$$\phi(B)\nabla y_t = \phi(B)\mu_t + \theta(B)a_t$$

or

$$\phi(B)(y_t - y_{t-1}) = \phi(B)\mu_t + \theta(B)a_t$$

Estimates of the AR and MA parameters were that

$$\hat{\theta}(B) = (1 + .76829B + .9426B^2)$$

and

$$\hat{\phi}(B) = (1 + .54475B + .66299B^2)$$

so that

$$(1 + .54475B + .66299B^2)(\hat{y}_t - y_{t-1}) = (1 + .54475B + .66299B^2)\mu_t + (1 + .76829B + .9426B^2)a_t$$

thus

$$\hat{y}_t = 2.20774\mu_t + y_{t-1} - .54475y_{t-1} + .54475y_{t-2} - .66299y_{t-2} + .66299y_{t-3} + a_t + .76829a_{t-1} + .9426a_{t-2}$$

and the final derivation then is given by

$$\hat{y}_t = 2.20774\mu_t + .45525y_{t-1} - .11824y_{t-2} + .66299y_{t-3} + a_t + .76829a_{t-1} + .9426a_{t-2}$$

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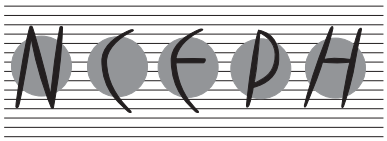

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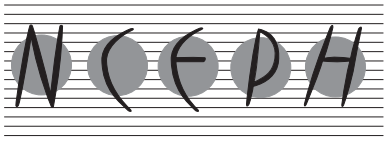

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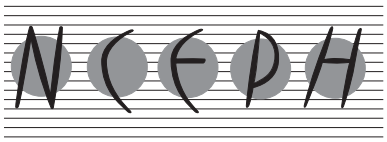

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