Run for Cover Now or Later?
The impact of premiums, threats and deadlines on supplementary private health insurance in Australia

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Abstract

Between 1997 and 2000 the Australian government introduced three policy reforms that aimed to increase private health insurance coverage and reduce public hospital demand. The first provided income-based tax incentives; the second gave an across-the-board 30% premium subsidy; and the third introduced selective age-based premium increases for those enrolling after a deadline. Together the reforms increased enrolment by 50% and reduced the average age of enrollees. The deadline appeared to induce consumers to enroll now rather than delay. We estimate a model of individual insurance decisions and examine the effects of the reforms on the age and income distribution of those with private cover. We interpret the major driver of the increased enrollment as a response to a deadline and an advertising blitz, rather than a pure price response.

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1. Introduction

With rising health care costs worldwide, many policy makers are interested in identifying mechanisms for lowering the costs of health services provided by the public sector. One mechanism that is common is to encourage consumers to purchase private health insurance, and to foster private rather than public provision. With careful design, private insurance coverage can potentially attract a broad range of enrolees, reduce the demand for scarce public resources and enable public funds to be more effectively targeted at publicly desired services. With ineffective design, private insurance may lose public support particularly if it is seen as favouring the healthy and wealthy, or it may become financially unsustainable if it primarily attracts high cost enrolees, or does not attract a sufficient volume of enrolees to cover administrative costs.

This paper examines individual decisions to enrol in private insurance in Australia in order to understand the impact of government programs designed to encourage enrolment. We study the impact of three significant reforms undertaken in Australia over the period from 1997 through 2000 that were intended to increase enrolment in private health insurance and reduce public health care costs. The first of these in 1997 was a non-linear, income-based subsidy for purchasing private insurance. Incentives were created for low and high income individuals and families to purchase insurance by lowering effective premiums. Those on low incomes received a premium rebate and those on high incomes paid a tax penalty, the Medicare Levy Surcharge, if they did not have private hospital cover. The second reform in 1999 granted a 30 percent federal subsidy on allowed health insurance premiums. This replaced the previous rebate for low earners but the tax penalty for high earners remained. The third reform, Lifetime Health Cover (LHC), aimed to encourage people to take out insurance earlier in life and to maintain their cover. After the reform was introduced in July 2000, new entrants faced premiums based on the age at entry. This change in the age structure of premiums was accompanied by extensive publicly-subsidized advertising under the theme “Run for Cover,” which is frequently viewed as having been a key element influencing people to purchase private health insurance at that time. The premium increases under LHC encouraged consumers without insurance not to procrastinate. Previously the default (non-enrolment) involved no penalty. The LHC deadline required an active decision to avoid a price increase. In contrast, the timing of the response to the 30% subsidy to premiums had not involved any penalty; individuals could benefit from the subsidy whenever they chose to enrol, now or later. This may explain the very different responses to the two reforms.

Although the setting we examine is specific to Australia, the issues we address are of widespread interest, especially for countries with a large publicly-funded health sector and a

supplementary privately-insured sector.[1] We build a structural model of the reforms using premiums as our price terms, and address a number of questions. Who did the premium reforms convince to purchase private health insurance? Were the reforms successful at attracting young or old enrolees into private health insurance? Were these reforms successful at attracting relatively high or low income enrolees into private health insurance? Which consumers chose to enrol before the deadline when faced with a one-time threat to raise prices in the future if they procrastinated?

To address these issues, we take advantage of a series of questions asked as part of the Australian Bureau of Statistics National Health Survey 2001 (NHS2001). The survey asked not only whether the respondent was covered by private health insurance, but also about the timing of coverage. By distinguishing how long a person had been insured at the time of the survey[2], and modelling the changing incentives of the government insurance reforms over time, we are able to identify not only the overall impact of the three reforms, but also the demand responsiveness and distribution of incentives for each of the three reforms separately. While our approach is not as powerful as using a panel data set, it nonetheless helps us understand the distributional impact of the three reforms and results in new insights. In our analysis, we explore how well the policy reforms can be understood in terms of responses to current and future prices and non-price incentives, and use our model to predict the impact of the reforms separately and in combination. The insights from our model will be useful to policy makers and researchers trying to understand how the design of insurance reforms impact on coverage.

2. Literature review

There is a rich literature on the demand for health insurance. Cutler and Zeckhauser (2000) consider the optimal design of health insurance in a second best setting, which involves trading off the gains from risk pooling and the losses associated with moral hazard and demand inducement by providers. There is a substantial empirical literature for the US market where employment-based insurance coverage is common. For example, Ettner (1997) estimates a logit model of supplementary insurance using the 1991 Medicare Current Beneficiary Survey, and finds strong wealth effects but little evidence of self-selection on the basis of observed health status. Gruber and Ebonya (2003) find a very small after-tax price elasticity of insurance take-up and a modest elasticity of plan choice using data for postal

[1] Despite very different health care systems, in 2002 government funding of health care was 6.5% of GDP in Australia, 6.4% in the UK and 6.5% in the US. Public systems in the UK and Australia provide health care for the entire population while most of US public expenditure focuses on those aged over 65 (Medicare) and those on very low incomes (Medicaid). Overall health expenditure levels were of course quite different: 14.6% in the US; 9.5% in Australia and 7.7% in the UK.

[2] The survey was conducted over four quarters during 2000 and 2001.

employees in 1994, and Abraham, Vogt and Gaynor (2002), using the 1996 Medical Expenditure Panel Survey, find small behavioural price responses to health plan switching and take-up. A key reference examining the demand for supplementary health insurance is Finkelstein (2002) which examines the impact of a tax subsidy to employer-provided supplementary health insurance in Quebec. She finds an elasticity of employer coverage with respect to the tax price of about -0.5.

In France, where public coverage is universal but incomplete and 85% of the population has supplementary insurance to reduce the co-payments associated with public treatment, Buchmueller et al (2004) find that no evidence that sicker people purchase more cover. In Catalonia, where the public system coexists with a developing supplementary private system, there is strong evidence of a preference by a significant percentage of the population for the public system per se; 22% state that they would never purchase private cover (Costa-Font and Font-Vilalta (2004)).

In the UK private insurance cover is about 14%. Besley, Hall and Preston (1999) find that demand for private health insurance is related to non-market barriers to public care such as waiting time and that private coverage is associated with being well-off, middle-aged and voting for the Conservative Party. They also find that high-income individuals who are privately insured continue to use the NHS for a large array of treatments. Propper (2000) also finds that those who use private services in the UK are a distinct social group (richer, more conservative, less committed to equity goals). Nevertheless, she finds a complex interaction between use of public and private care and that public and private health services tend to be complementary. Rising use of private health services in the UK is associated with the erosion of free publicly provided health care.

In Ireland private insurance coverage has increased from 15% to about 40% over the last three decades, despite increased access to public care, annual premium increases and reduced tax relief. Harmon and Nolan (2001) examine this growth and find that it is driven by perceptions about waiting time and quality in the public system as well as the usual socioeconomic and demographic factors.

Although Australia provided a model for the Irish public health system, the relationship between changes in insurance premiums and level of cover has been quite different in the two countries over recent decades. Following the introduction of universal free access to hospital care in Australia in1984 the level of private insurance cover steadily fell, the percentage of the insured aged over 65 continued to rise and this generated real premium increases, reinforcing the downward trend. Butler (1999) analyses the demand for hospital coverage and

finds a price elasticity very similar to Finkelstein's result for Canada. Because premium and claims are not observed at family level, he uses state variation in premiums and age-related claims data to construct his price variable. Using aggregate time series data over the same sample period that we examine in this paper, Butler (2002) estimates the price elasticity of demand for private insurance to be only -0.23.

Analyses of the factors influencing private health insurance in Australia reveal similar socioeconomic and demographic factors to those found elsewhere. For example, Savage and Wright (2003) and Barrett and Conlon (2003), using the National Health Surveys of 1989 and 1995, find that the probability of insurance increases with income, age, being married, born in Australia, employed (full- or part-time), with white collar occupation, post-school education and with number of chronic conditions. Cover is found to be lower for those with poorer self-assessed health and more risky behaviours (smoking, high alcohol consumption, low exercise and being overweight). Across countries the background institutional structure can be very different so it is not surprising that the factors associated with coverage also differ. For example, where the public system provides very high coverage across the population it is less surprising that the insured can represent a favourable selection of the population. However some factors seem to have a similar impact irrespective of the country, notably higher income increases supplementary cover.

The behavioural decision making literature is also relevant to the analysis of insurance reforms in this paper.[3] One part of this literature, beginning with Tversky and Kahneman (1986), analyses the effect of framing on decisions. The default option (the outcome if no action is taken) has been shown to play an important role in the outcome. This literature which began in psychology has had considerable impact in marketing[4] and in economics where the major focus has been on self control problems and imperfect commitment mechanisms in decisions involving saving for retirement. The model in Laibson (1997) suggests that financial market innovations that increased liquidity could lower the commitment to retirement savings by consumers with hyperbolic discount functions. This may have contributed to lower US savings rates in recent periods. Thaler and Benartzi (2004) compare the retirement savings incentives of defined-benefit and defined-contribution plans and show that a voluntary opt-in, involving a fixed share of income saved, increased savings rates markedly.

Choi, Laibson, Madrian and Metrick (2005) investigate the conditions under which default non-enrolment (the standard) and default enrolment are optimal and show that requiring an

[3] We thank Karen Eggleston for this observation.
[4] See, for example Johnson, Bellman and Lohse (2002) on the effect of framing on opting in versus opting out.

active decision (no default and compulsory choice) is optimal when consumers have a strong propensity to procrastinate and preferences are highly heterogeneous. Using data from a large firm they show that requiring active decisions increases participation by 28 percentage points and achieves savings three months after hiring that would have taken three years under a non-enrolment default. Madrian and Shea (2001) show that higher savings under an initial enrolment default persist over time because of inertia on the part of consumers who perceive the choice of the default as advice.

O'Donoghue and Rabin (1999) examine self-control problems, captured as time-inconsistent preferences for immediate gratification, in a model where consumers must undertake an action once during a period of time. The activity may involve immediate rewards and delayed costs, or the reverse. Consumers are either sophisticated (they foresee future self control problems) or naïve (they don't). They find that naïve consumers procrastinate on immediate-cost activities and act too soon on immediate-reward activities. Sophistication lessens the former effect but exacerbates the latter. Sophistication can result in unexpected outcomes with present-based preferences (higher savings and lower levels of consumption of an addictive good than is optimal for those with time-consistent preferences) and O'Donoghue and Rabin suggest that models with some degree of naivety may be more realistic.

In the Australian private health insurance setting prior to LHC, for younger consumers costs are immediate and rewards are delayed. We would expect time-inconsistent consumers with some degree of naivety to procrastinate. With the LHC reform however, the higher premium that would be incurred in all future periods if enrolment is delayed is likely to act as a commitment device for naïve consumers to act now. The accompanying government advertising campaign could be viewed by consumers as well-informed advice not to delay enrolment in private health insurance; subsequent inertia could result in consumers maintaining their cover even in periods when costs outweigh benefits.

A more favourable selection of clients is in the interests of health funds which can offer cover at a lower average premium. However, in the presence of universal free public hospital treatment, it is not clear whether it is welfare-improving for consumers to enrol now rather than later. This will depend on the individual time profile of future claims for private hospital treatment, the gains of private over public treatment (shorter wait times, doctor of choice, higher quality hospital accommodation) and out-of-pocket costs arising from private treatment.

3. Policy setting

The Australian Medicare system provides universal, tax-financed assistance for health care and involves a complex set of interactions between the public and private sectors. All residents are entitled to free public hospital treatment anywhere in Australia. All outpatient medical services and a large proportion of inpatient services are provided by private practitioners paid by fee-for-service with a fixed rate of reimbursement from the government via Medicare. In public hospitals specialists treating public patients are either salaried or are private practitioners paid on a sessional basis. The latter group usually work in private hospitals as well, and both may also treat private patients in public hospitals. Medicare also subsidises drugs listed on the Pharmaceutical Benefits Scheme. Patients face out-of-pocket costs from a number of sources: hospital charges for private treatment, gaps between the fee charged and the Medicare reimbursement rate for privately-provided medical services whether as inpatients or outpatients and prescription co-payments.

Private health insurance in Australia supplements the public health insurance system. Individuals or families purchase private insurance directly from a registered health fund; most funds are not-for-profit and have open membership. Insurance is limited to covering private treatment in either a public or private hospital, to a portion of the medical fees charged for private in-hospital treatment, prostheses and devices provided to private in-patients, and to ancillary services which include dental care, allied health services such as physiotherapy, complementary care such as chiropractic and acupuncture. Hospital and ancillary insurance may be purchased separately. Annual premiums vary depending upon the extent of cover, the front-end deductible and the state of residence. Community rating has been a distinctive feature of the Australian system from the introduction of Medicare in 1984 until the 2000 LHC reform. It means that all applicants for a policy must be accepted by the fund and the premium paid cannot vary by age, health status or any other personal characteristic.

Private health insurance coverage of the population fell steadily after the introduction of Medicare in 1984 but did not fall below 30%. While this is quite high compared with other countries with national public health insurance, 30% was considered a critical threshold for the government that could place unsustainable demands on the public hospital system. This lead to government initiatives designed to increase enrolment in private health insurance and relieve the pressure on the public system. The three policy reforms introduced in Australia from 1997 to 2000 provide a natural experiment for studying the sensitivity of supplementary health insurance to changes in policy settings. These reforms created variation in insurance premiums over time, across age and income, and according to number of children and family

status, and thus permit us to understand changes in the composition of who demands insurance.[5]

Effective 1 July 1997 a "carrots and sticks" policy was introduced. The "carrot" was available to lower income households, defined as those with annual incomes below A$35,000 for singles and A$70,000 for families with one child.[6] In 1998-99, not long after the policy was introduced, over 70% of single individual households had gross incomes of less than A$30,000 annually so a large percentage would have been eligible for the rebate. For couples without dependants about 80% earned less than A$70,000, while for those with dependants the figure was around 70%.[7] Households purchasing private insurance received a subsidy of between A$25 and A$450 per year, with the amount depending on the breadth of the policy purchased (hospital cover, ancillary cover or both) and the number of dependent children. Since these carrot amounts represent up to a quarter of the total cost of such policies at the time, this was a significant subsidy for eligible households.

The "stick" component of the 1997 reform was introduced at the upper end of the income distribution. High income households purchasing insurance, defined as singles with incomes over A$50,000 and families with household income over A$100,000 were eligible for a rebate of the Medicare levy surcharge, which was 1% of their taxable income. For households just at these income thresholds, the tax levy rebate effectively reduces the insurance premium by A$500 for singles and A$1000 for families, again, a sizable discount. In high income households the tax reduction can exceed the premium so that the effective premium is negative. Figure 1 illustrates the nonlinear schedule of the "effective premium" by income levels for single individuals as a dotted line for a hospital-only insurance policy that had a constant premium before 1997.

Figure 1. Effective premium versus income over three time periods
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Beginning January 1 1999, the "carrot" portion of the 1997 reform was eliminated and replaced with a constant 30% subsidy to health insurance premiums, available to all regardless of income. The "stick" component of the 1997 reform remained intact, so that high income insured households continued to be eligible for the 1% Medicare levy surcharge rebate. The non-linear schedule for the effective premium is shown in Figure 1 as a broken dashed line.

[5] Hall et al (1999) and Butler (2002) provide detailed summaries of these reforms. Hall and Savage (2005) provides an overview of the Australian health care system focusing on interactions between the public and private sectors.
[6] Over the period from 1997-2000 the Australian dollar exchange rate varied from US$0.62 to US$0.79 and from GB£0.46 to GB£0.40 .
[7] ABS, 2001, Government Benefits, Taxes and Household Income, 1998-99, ABS 6537.0

The third policy change, announced in September 1999 reflected a departure from uniform community rating to a system of premiums that progressively increased with age. Under the previous system all enrolees in a given plan were charged the same premium regardless of their age. Initially announced for implementation on 30 June 2000 but later delayed until 15 July 2000[8], this reformed introduced an age gradient into the premium schedule. Under the new system, all individuals aged 30 and under pay the base premium, whereas new enrolees aged between 31 and 65 pay a premium loading of two percent for each year of age beyond 30. The premium loading is thus capped at 70 percent. Irrespective of age, people already insured before the policy was implemented were exempt from this one-off increase, as were all individuals aged 65 at the deadline. After the policy was implemented an individual aged, say 50, would pay 40% more for the same policy in each future period than those of any age who had enrolled prior to the deadline. Figure 2 illustrates the schedule of premiums by age following the introduction of LHC. The figure shows how the financial incentive to insure prior to the deadline increases with age between 30 and 65.

Figure 2. Effective premium by age, before and after July 2000 reforms
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The 2000 LHC reform was accompanied by extensive publicly-funded advertising under the theme "Run for Cover". Given the one-off increase in premiums proposed, this reform together with the intensive advertising campaign, created an incentive for households to enrol in a private health insurance plan before the deadline. After implementation, individuals could switch among plans and still pay the base premium. In this reform is it is the expectation of a premium increase for all future periods that drives behaviour rather than a reduction in the current premium.

The aggregate impact of the 1997 reform on insurance coverage of the population was small, almost undetectable, while the 1999 and 2000 reforms had a more substantial impact. Figure 3 shows the percentage of the population with private health insurance for the period 1982-2007. The timing of the three policy reforms is shown with superimposed vertical lines and the shaded are indicates the period of the NHS2001 data collection. Butler (1999, 2002) analysed this aggregate pattern and noted the small responses to the 1997 and 1999 reforms. He also examined the average age of enrolees over time, without attempting to model individual choice.

Figure 3. Private health insurance penetration
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[8] The delay was caused by the inability of the funds' phone-lines and websites to cope with consumer demand.

4. Conceptual framework

We assume that households choose whether to purchase private health insurance so as to maximize their own expected utility in each period. We focus on the choice of a representative private health insurance policy and ignore plan heterogeneity which is not available in the data. The utility to household *i* of having private health insurance *I* at time *t*, U^I_{it} can be written as

$$U^I_{it} = U\left(X_{i,t}, P_{i,t}, P^e_{i,t+1}, B_t, \varepsilon_{i,t}\right), \tag{1}$$

where $X_{i,t}$ is a set of person-, household- and time-specific variables relevant to the utility of private insurance, $P_{i,t}$ is the premium cost facing household i at time t, $P^e_{i,t+1}$ is the household's expected future premium if they do not purchase insurance at time t, B_t is a set of characteristics of the private health insurance market at time t, and $\varepsilon_{i,t}$ is an error term capturing unobserved factors influencing the utility of purchasing insurance. The consumer will purchase private insurance at time *t* when $U^I_{it} > U^{NI}_{it}$. Without loss of generality we normalize the utility of not having insurance at time t to be zero ($U^{NI}_{it}=0$) and think of U^I_{it} as the net gain in utility from purchasing insurance.

Unfortunately we do not observe the entire history of *X*, *P*, P^e and *B* facing each household over time. Therefore we are forced to use proxies for each of these. For the $X_{i,t}$ variables, we use their value at time T, the time of the household survey. For time-invariant or perfectly foreseeable variables, such as age, gender, and education this does not create any problems; for time changing-variables such as income, the proxies are imperfect and introduce measurement error. For the premium terms, $P_{i,t}$ and $P^e_{i,t+1}$, we use observed premiums in 2004, by state and type of cover (single or family) for a specified plan, the Medibank Private SmartCover hospital policy[9] and track the impact of the various government policies over time on the effective premium paid by the consumer. Rather than entering in $P^e_{i,t+1}$ as a separate variable, we use $P_{i,t}$ and $\Delta P = P^e_{i,t+1} - P_{i,t}$ to capture price effects. Finally, to capture the benefit features and market environment facing purchasers of private health insurance at time t, B_t, we introduce policy dummies POL_t. After linearising the utility function, the utility parameters that we estimate are of the form

$$U^I_{it} = X_{i,T}\alpha + \tilde{P}_{i,t}\beta + \Delta\tilde{P}^e_{i,t+1}\gamma + POL_t\delta + \tilde{\varepsilon}_{i,t} \tag{2}$$

We also explore selected interactions between premiums and demographic variables (income), and between the policy dummy variables and demographic variables (age). In order for the

[9] Medibank Private has about 30% of the total private health insurance market.

demand for insurance to be downward sloping, the difference between the coefficient on current premium (β) and the coefficient on the expected change in premium change (γ) must be negative, and the coefficient on the expected increase in the premium (γ) should be positive. Coefficients on the policy dummy variables can be positive or negative depending on other covariates in the model, and according to whether the attractiveness of private health insurance has increased or decreased.

5. Data

The NHS 2001, conducted by the Australian Bureau of Statistics is a detailed representative household survey conducted at six yearly intervals (ABS, 2002). The 2001 survey contains information on 26,862 persons. Within each household the respondents include: one adult aged 18 years or more, one child aged 7-17 years and all children aged 0 – 6 years. From the full sample, we drop all dependent children regardless of their age as well as all individuals age 23 or under.[10] We also omit individuals with missing health status or household income data. Our final estimation sample includes information on 13,358 income units. We separately model 'single' (N = 4,394) and 'family' (N = 9,144) units. Following convention, "family" income units include couples (with or without children), and single adults with children.

Two survey questions define our dependent variable. The first one is based on the response to the question: When did you purchase private health insurance? This question was asked only of people who said they were currently insured. The possible responses for those with hospital cover are : "5 years or more", "2 years to less than 5 years", "1 year to less than 2 years", and less than 1 year". As described below, we use this variable to characterize the timing of the insurance purchase decision in relation to the four policy periods: "before the 1997 reform", "after the 1997 reform but before the 1999 reform", "after the 1999 reform but before the 2000 reform" and "after the 2000 reform" . The second question of interest was whether the individual purchased insurance coverage only for hospital care, only for ancillary or for both types of coverage. We focus here on modeling the purchase of coverage for private hospital care (regardless of whether ancillary coverage was purchased), because hospital coverage is the more expensive, more common, and most meaningfully subsidized form of private health insurance.

Means and standard deviations of variables at the time of the survey are presented in Table 1, for single and family income units. At the time of the survey 38% of singles and 53% of individuals in family units had hospital cover. These rates had increased from 26% and 35% over the period of the insurance reforms. Annual income is measured in A$'000 and for

[10] The question of how long a person had been insured at the time of the survey had a maximum value of "5 or more" years. The data is meaningful only for non-dependents aged 23 or over.

families is separated into female and male components. Number of children and a dummy for sole parents are included for family income units. Because insurance coverage varies with age and age is a key component of the third reform, we include an age spline in the estimation that captures the age-related features of the 2000 reform (age, age less 30 and age less 65 with dummy variables for age > 30 and age > 65). The average age of singles is higher than for individuals in families reflecting a higher concentration of those aged over 65 among singles. There are five categories of self assessed health status (excellent, very good, good, fair and poor). The variable 'concession card holder' indicates whether the individual has a health card that lowers the cost of selected medical services and pharmaceuticals. Two measures of risk behaviour are included: whether the individual is a daily smoker (smokes) and the average daily number of standard alcoholic drinks (drinks). We also include number of long term conditions, and variables for state of residence, level of qualifications, country of birth, employment status and occupation category.

Table 1: Means and standard deviations
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6. Estimation strategy

Ideally, to model the choice of private health insurance we would use panel data with time varying values of income, household demographics, insurance plan choice, benefits and premiums. Unfortunately panel information of this nature is not available. We initially explored using a duration model, which conceptualizes individuals as making choices continuously over time, however we found empirically that the changes in enrollment due to the 2000 reforms were concentrated immediately before the policy change, so that a discrete choice rather than a continuous choice framework seemed appropriate.

We construct a pseudo-panel data set using the survey data from the NHS 2001. The pseudo panel contains up to 4 observations for each single or family unit, each representing a different policy period. Our approach models the insurance choice as a series of four binary decisions mapped from responses to the timing of insurance question. Because the household surveys were not all done in the same quarter, the mapping from time of purchase to a policy regime is not one-to-one. For example, for some respondents, the 1999 reforms occurred during the period of "between 2-5 years ago" while for others the reform was "between 1-2 years ago".

The first sample period includes all 14,107 households regardless of whether they had ever purchased private health insurance. The dependent variable for this sample (insure) is a binary variable taking the value of one for households that purchased insurance prior to the 1997 reform, and all policy variables are set at their pre-1997 reform levels. The second

sample period excludes those who had not purchased insurance prior to the 1997 reform; the dependent variable takes the value of one for households that purchased their private health insurance after the 1997 reform but before the 1999 reform, and zero otherwise. The effect of the 1997 incentive scheme policy reforms are captured by modeling how they affect premium levels by income and family size, as well as by introducing a policy dummy for this sample period. The third sample period excludes those households insured prior to the 1999 reform. The 1999 reform is modeled through its effect on premiums and through a policy dummy. The fourth and final sample period includes those not yet insured prior to the 2000 LHC reform and the "Run for Cover" advertising campaign. The 2000 reform is modeled as if it affects the price of insurance in the future, captured through a term for the change in premium, and a 2000 policy dummy. By constructing the data in this way, we model the choice process as a sequence of binary choices, with a choice made once during each period for those not previously insured. We use clustered logit estimation to correct for correlations between repeated observations.[11]

Because premiums are imputed, measurement error will result in attenuation bias. The estimated impact of current period and next period premium on the demand for insurance provides a lower bound for the true impact. Since income and family structure are used to impute the premiums, an identifying restriction is needed to avoid confounding the impact of the premium with that of income. The policy rules linking the effective premium to income and number of children are complex and highly non-linear. To identify the effect of the premium on insurance we assume that outcomes are conditionally independent of kinks and discontinuities in the policy regimes.

7. Results

Table 2 presents selected results of the pseudo-panel logit estimation for families and singles. Bolded values indicate that the estimate is significant at the 5% level. The coefficients on effective premium and expected future price change (pnow and pdelta) have the expected signs and meet the required conditions. The impact of current premium (the difference between the coefficient on premium and change in premium) is significant for both singles and families but is larger for singles. The effect of an expected future premium increase is large and significant for both groups. The mean implied elasticity of insurance probability with respect to current premium and expected change in future premium are -0.6 and 0.3 for singles and -0.4 and 0.4 for families, respectively.

[11] To access the expanded version of the survey data it is necessary to use the ABS Remote Access Data Laboratory which restricted estimation software to SAS and SPSS. We estimate the model using the SAS Genmod procedure.

Table 2: Logit results
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The effect of income is very significant for families and male income has about a 50% larger impact than female income. The premium-income interaction is significant for singles but not families. The dummies for the policy reforms tend to be larger and more significant for family units than for singles.

Smoking and drinking are negatively related to insurance but the impact of smoking is large and significant for both singles and families. Not surprisingly, the number of long term health conditions increases the probability of being insured. Interestingly however the probability of having supplementary insurance cover *increases* with self assessed health status even with the large number of controls included in the estimation, suggesting that the insured are a favourable selection of the population on the basis of perceived health. Other variables reducing the probability of private insurance are residing either in NSW or the ACT or outside a capital city (whether urban or rural); having a health concession card; being born outside Australia; having no post school qualifications; being either unemployed or not in the labour force and having a non-manager occupation.

The complex effect of age on enrolments is summarised in Figure 4 which illustrates the impact of the reforms on the probability of insurance by age. The figure compares age-related probabilities before and after the reforms for both singles and families. The simulated probabilities were calculated holding all other variables constant at their respective sample means as shown in Table 1, while varying age and the policy parameters. Base premiums were set at A$1000 for singles and A$2000 for families. The policy reforms changed the age profile substantially for singles and families, increasing the probabilities for both younger age groups.

Figure 4: The impact of the private health insurance incentives by age
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Profile of new enrollees

Figure 5 shows the distributions of the insured population before (solid) and after (hatched) the policy reforms by deciles of income (upper panel) and age (lower panel) for singles and families.[12] Income is a very strong predictor of the purchase of private health insurance, and Figure 5 shows that this relationship was reinforced by the reforms, with high income individuals becoming even more likely to purchase private health insurance between 1997

[12] We create separate deciles of age for singles and families however the income deciles used include all income units (singles and families) because decile of income unit income is provided for each observation in the dataset and cannot be reconstructed separately for singles and families from the available data.

and 2001. Prior to the reforms, enrolment increased with age up to about 60 for both singles and families then either remained fairly constant (singles) or fell slightly (families). The effect of the reforms was to increase enrolment substantially for all but the highest-age decile of families and for about the youngest 70% of singles. The broad trend in private insurance membership over the sample period was a broadening in the age distribution of private health insurance, signifying a reduction in adverse selection.

Figure 5: Time of cover by age and income deciles for singles and families
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Policy simulations

There has been considerable discussion of which aspects of the reforms between 1997 and 2000 had the major impact on increasing enrolment. In particular, discussion has focused on whether the increase in coverage was driven by the 30% price subsidy , or by the 'Run for Cover' LHC reform. The former costs between 6% and 7% of the Australian (federal) government contribution to health and continues to impose a considerable burden on the government budget. To explore this issue we use the estimated model to predict the insurance decision when specific components of the private health insurance incentives are removed.

No Lifetime Health Cover

The first simulation leaves the 1997 and 1999 reforms intact but removes the 2000 lifetime health cover reform. We compare the base level of enrolment (with all three policy reforms) with two 2000 scenarios: the first explores the effects of removing only the effect of the age-related premium changes (labelled "no 2000" in Figure 6) and the second the effects of removing the 2000 policy dummy as well (labelled "no 2000/pol dum" in Figure 6). The policy dummy captures the effects of the 2000 policy reform that are unrelated to price, notably the advertising blitz. The results in Figure 6 are presented by deciles of age and income. Results for singles are shown in part (a) and for families in part (b).

Overall, removing the threat of the higher future age-related premium reduces insurance coverage, compared with the base, by 2% for singles and 7% for families. Removing the non-price aspects of the policy reduces coverage by a further 4% for singles and 5% for families. At low and high deciles of age there is no impact of removing the age-related higher premium. This is not surprising because the threat did not apply to those aged less than 30 or greater than 65. The largest price impacts are for those aged between 40 and 65, with extremely large effects for families in this age band. The non-price impacts occur across all age deciles but are particularly strong for younger deciles, even those unaffected by the age-related premium increases. These results suggest that the 'Run for Cover' advertising campaign had a significant impact independently of price threats.

For singles, the impacts by income are quite evenly distributed, with relatively small price effects, especially where the Medicare levy surcharge applies (above $50,000), and larger non-price effects in middle to upper income deciles where the younger, non-retired age groups are concentrated. For families the price effects are relatively large except for decile 10 where the Medicare Levy Surcharge reduced effective premiums to negative values. Again the non-price impacts are larger than price effects in upper income deciles.

Figure 6: No 2000 reform
NEAR HERE

No 30% subsidy to premiums

The second simulation removes the 30% rebate of the 1999 reform leaving the 1997 and 2000 reforms intact. For singles, removing the 30% rebate reduces overall coverage by 2 percentage points (from 39% to 37%). In contrast, removing the 30% rebate increases the overall coverage for families by about 2% from the base level of 53% to over 55%. The distributional impacts by age and income are shown in Figure 7. For singles the fall in coverage is higher at lower ages: between 3 and 4 percentage points in the bottom 3 deciles (ages 23 to 40); between 1 and 3 percentage points in deciles 4 to 8 (ages 41 to 73); and less than 1 percentage point above age 73. By income, the percentage losses are highest in middle deciles.

Figure 7: No 1999 reform
NEAR HERE

For families the impact is very different. Removing the 30% subsidy to premiums has the effect of *increasing* average coverage for families in age deciles 3 to 9, and in all income deciles. This arises because, compared to singles, the impact of threatened premium increase outweighs the effect of the current premium reduction. When the rebate is removed the future age-related price rise of lifetime health cover is larger and the larger threat and the deadline induces higher enrolment.

8. Conclusions

Most analysis of the impacts of the private health insurance incentives introduced between 1997 and 2000 has been undertaken using aggregate data. This paper models individual decisions to enroll in private insurance in Australia using individual level data from the 2001 National Health survey and simulates the impacts of the incentives across the age and income distributions for singles and families.

The models of the decision to enroll allow us to decompose aggregate effects into their component parts. There has been much discussion of the relative contributions of the 30% rebate introduced in 1999 and the LHC policy of 2000, which was accompanied by the extensive 'Run for Cover' advertising campaign. Butler (2002) argues that LHC, the cheapest policy in terms of government expenditure, was the most effective. Others have argued that it was the combination of lower premiums along with LHC that increased enrolment by about 50% in 2000 and that LHC would have had a much smaller effect without the subsidy.

The simulations in this paper suggest that the 30% rebate did reinforce the effect of the LHC reform for singles with the relative impacts varying across age and income deciles. However for families the analysis suggests that the impact of LHC would have been greater for families without the subsidy. Had the 30% rebate not been in place when the 2000 reform was introduced, the threat of higher future premiums after the deadline would have been more effective in stopping procrastination. Even more families would have responded to the threat and "acted now" to take out private health insurance.

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Figure 1. Effective premium versus income over three time periods, single coverage

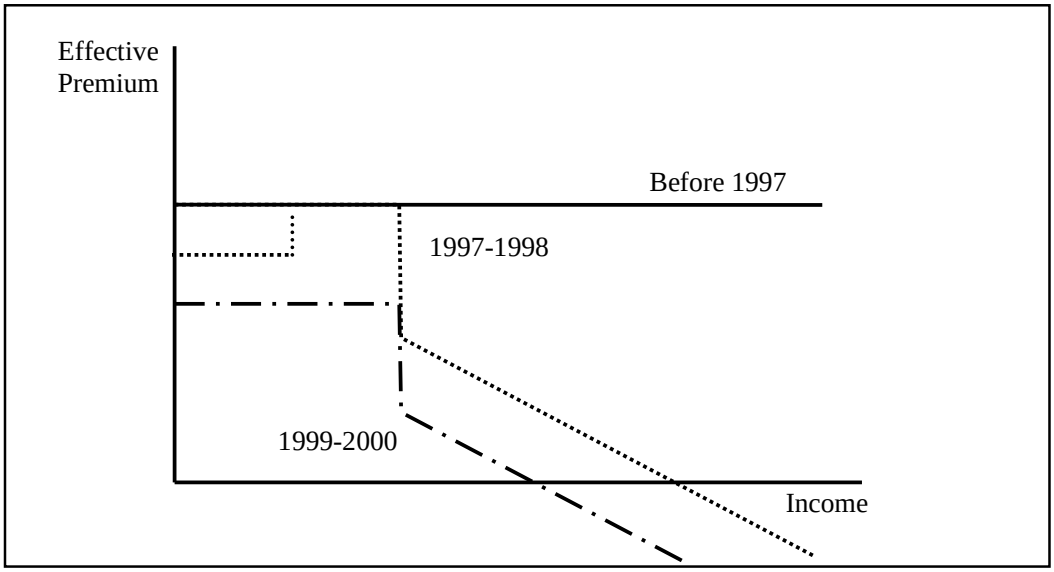


Figure 2. Effective premium by age, before and after July 2000 reforms.

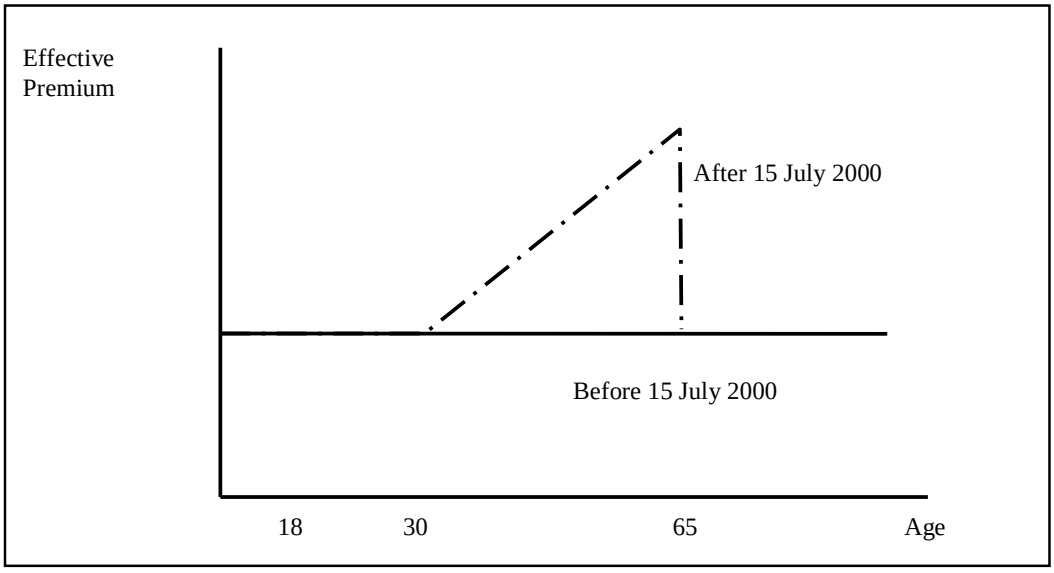
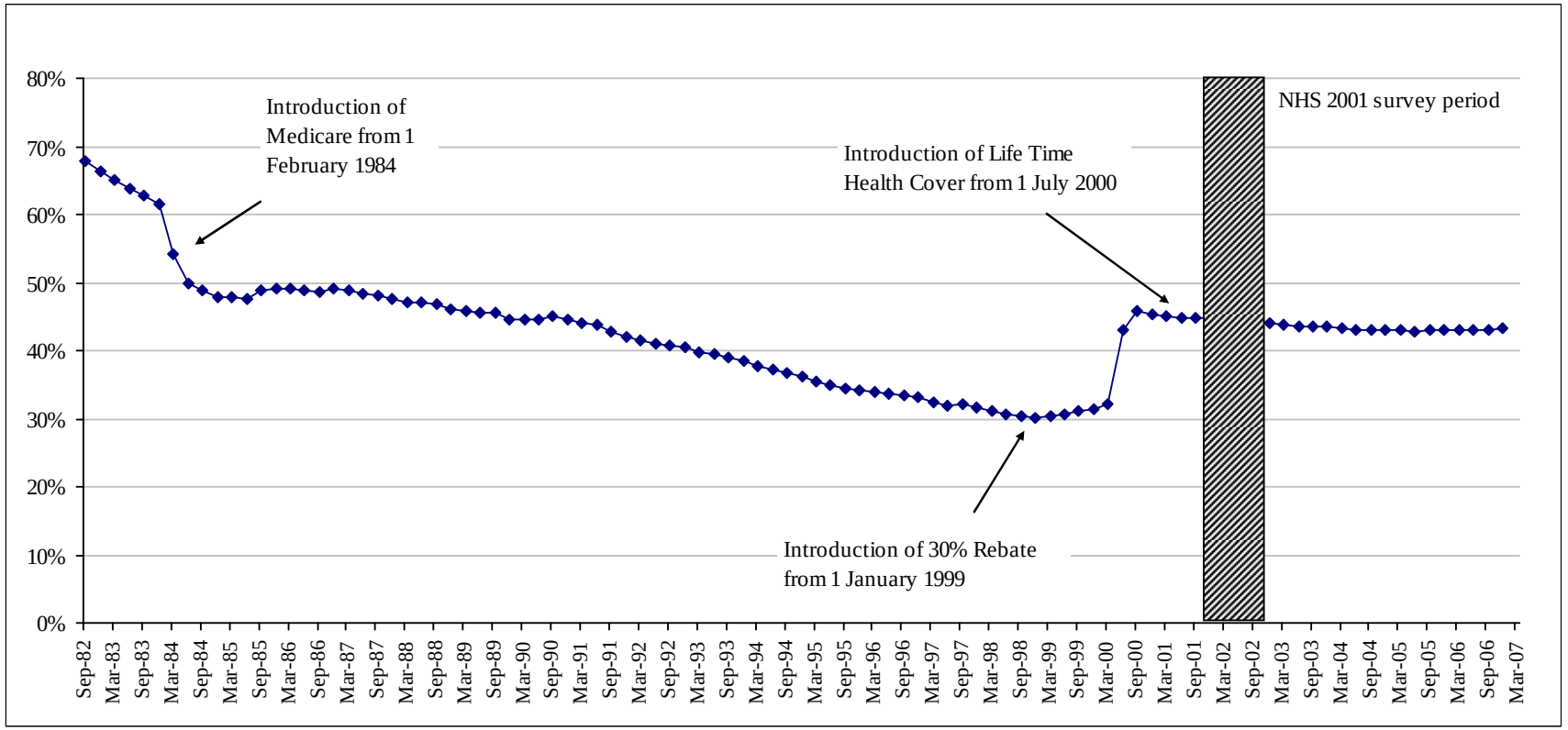


Figure 3. Private health insurance penetration, Australia 1982-2007



Source data: PHIAC (Private Health Insurance Administration Council) http://www.phiac.gov.au/statistics/trends/index.htm

Table 1: Variable means for single and family individuals

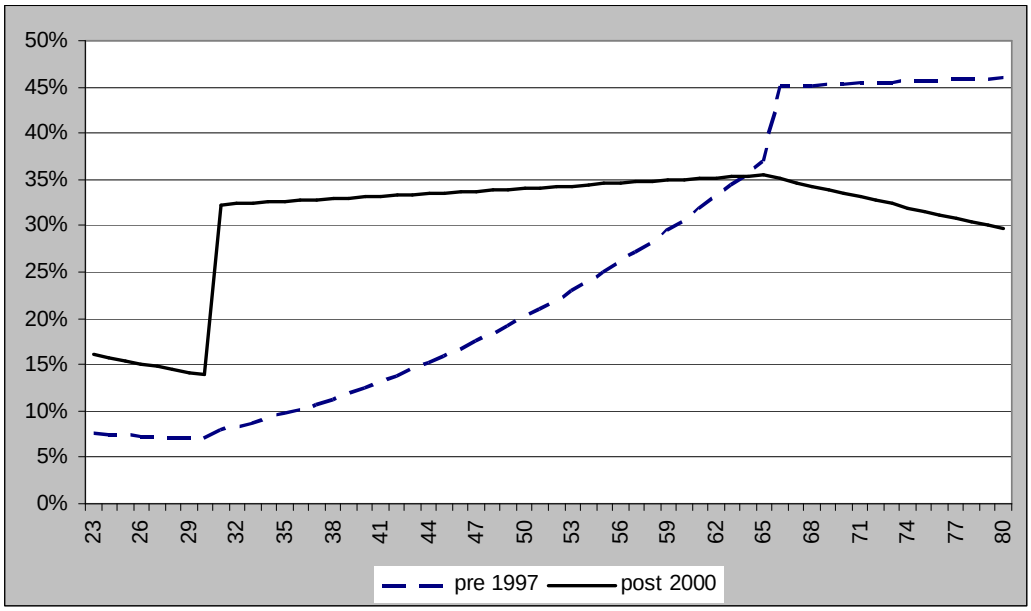
Variable	Single	Family
hospital coverage	0.384	0.528
insured more than 5 years	0.256	0.347
insured 2 to 5 years	0.027	0.032
insured 1 to 2 years	0.052	0.081
insured less than 1 year	0.049	0.068
annual person income $'000	27.677	.
annual unit income $'000	.	55.360
annual female income $'000	.	20.688
annual male income $'000	.	34.674
annual insurance premium $'000	1.068	2.130
sole	.	0.102
children	.	1.020
age	53.807	46.208
agegt30	0.863	0.867
ageless30	24.274	16.581
agegt65	0.322	0.130
ageless65	3.163	1.029
female	0.538	0.536
NSW	0.216	0.220
VIC	0.204	0.205
QLD	0.157	0.181
SA	0.145	0.106
WA	0.119	0.124
TAS	0.070	0.066
NT	0.017	0.014
ACT	0.073	0.083
excellent	0.145	0.186
verygood	0.281	0.331
good	0.309	0.308
fair	0.187	0.132
poor	0.079	0.043
number long term conditions	3.227	2.721
smoke	0.244	0.205
drinks	1.201	1.120
not employed	0.525	0.360
concession card holder	0.525	0.347
tertiary	0.162	0.180
diploma	0.082	0.105
certificate	0.235	0.267
school	0.520	0.448
Not Australian born	0.256	0.286
urban not capital city	0.251	0.239
non urban / rural	0.092	0.130
professional	0.118	0.149
assprof	0.059	0.082
trade	0.053	0.074
advclerk	0.018	0.032
intclerk	0.078	0.106
intprod	0.038	0.048
elclerk	0.029	0.041
labourer	0.040	0.049
Number of observations	4394	9144

Table 2: Logit model results

		Singles		Families	
	Parameter	*Estimate*	*Pr > |Z|*	*Estimate*	*Pr > |Z|*
Policy variables	effective premium	**-1.709**	<.0001	-0.066	0.753
	expected premium change	**1.541**	0.008	**1.925**	<.0001
	premium*income	**0.012**	0.001	0.001	0.433
	1997 policy dummy	-1.427	0.494	-2.300	0.114
	1999 policy dummy	-0.030	0.858	**0.457**	<.0001
	2000 policy dummy	**0.722**	<.0001	**0.586**	<.0001
	all period dummy * (age)	-0.012	0.873	0.040	0.449
	all period dummy* (age > 30)	**1.004**	0.003	0.261	0.166
	all period dummy* (age - 30)	-0.062	0.428	**-0.145**	0.006
	all period dummy * (age > 65)	0.368	0.382	0.277	0.528
	all period dummy* (age - 65)	-0.047	0.207	0.078	0.077
Health and health	very good	-0.037	0.692	0.005	0.928
	good	**-0.204**	0.036	-0.057	0.317
	fair	**-0.374**	0.001	**-0.212**	0.005
	poor	**-0.467**	0.003	**-0.608**	<.0001
	long term conditions	**0.106**	<.0001	**0.060**	<.0001
	daily smoker	**-0.604**	<.0001	**-0.463**	<.0001
	drinks per day	**-0.028**	0.046	-0.001	0.931
Socio-demographics	income	0.005	0.152	.	.
	income female	.	.	**0.009**	0.001
	income male	.	.	**0.014**	<.0001
	female	**0.332**	<.0001	**0.125**	0.006
	age	-0.013	0.810	**0.087**	0.035
	age > 30	0.078	0.756	0.049	0.740
	age - 30	0.070	0.207	-0.019	0.650
	age > 65	**0.331**	0.061	**0.529**	0.000
	age - 65	**-0.054**	0.000	**-0.099**	<.0001
	children	.	.	0.030	0.131
	sole parent	.	.	**-0.192**	0.025
Log Likelihood		-3847.36		-9239.47	

Figure 4: The impact of the private health insurance incentives by age

(a) Singles



(b) Families

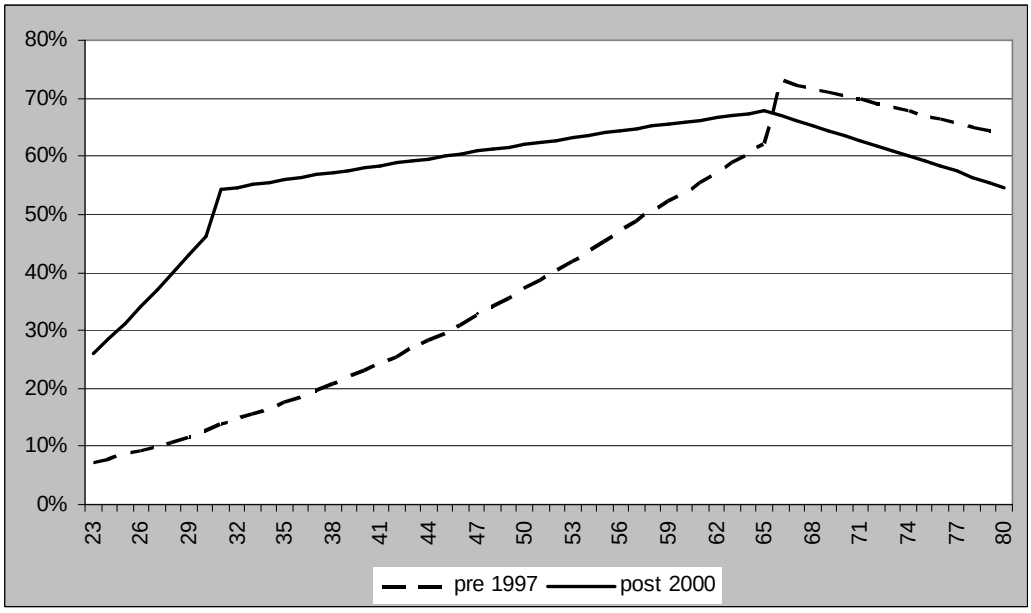


Figure 5: Insurance cover for singles and families by age and income deciles

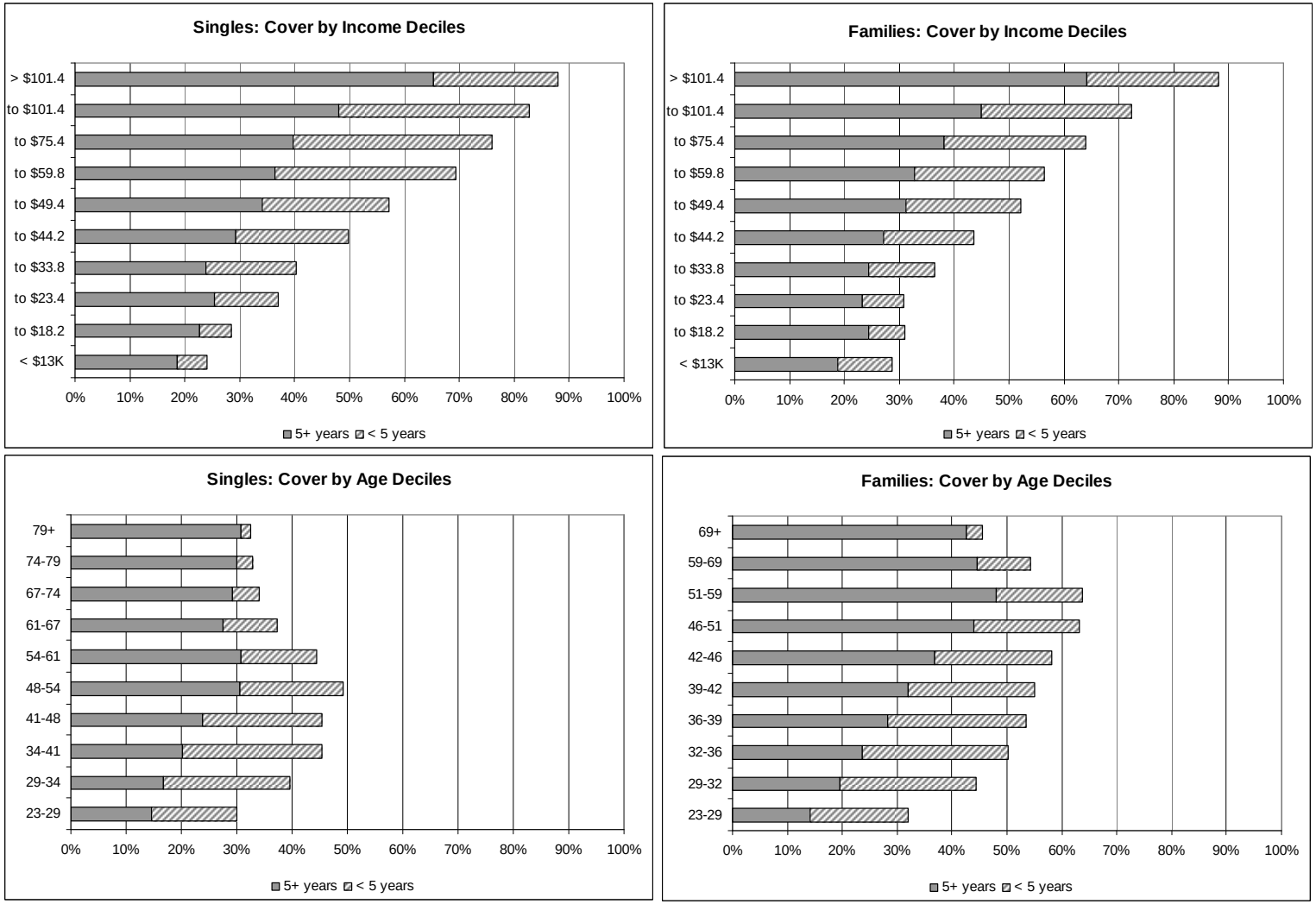
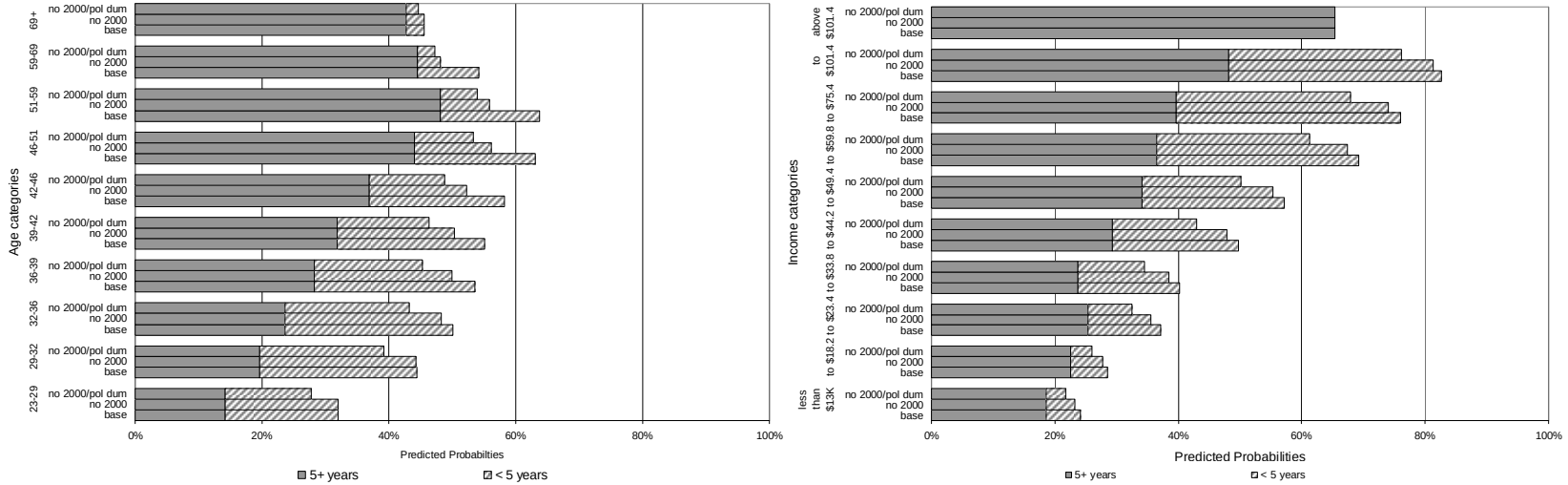


Figure 6: No Lifetime Health Cover

(a) Singles



(b) Families

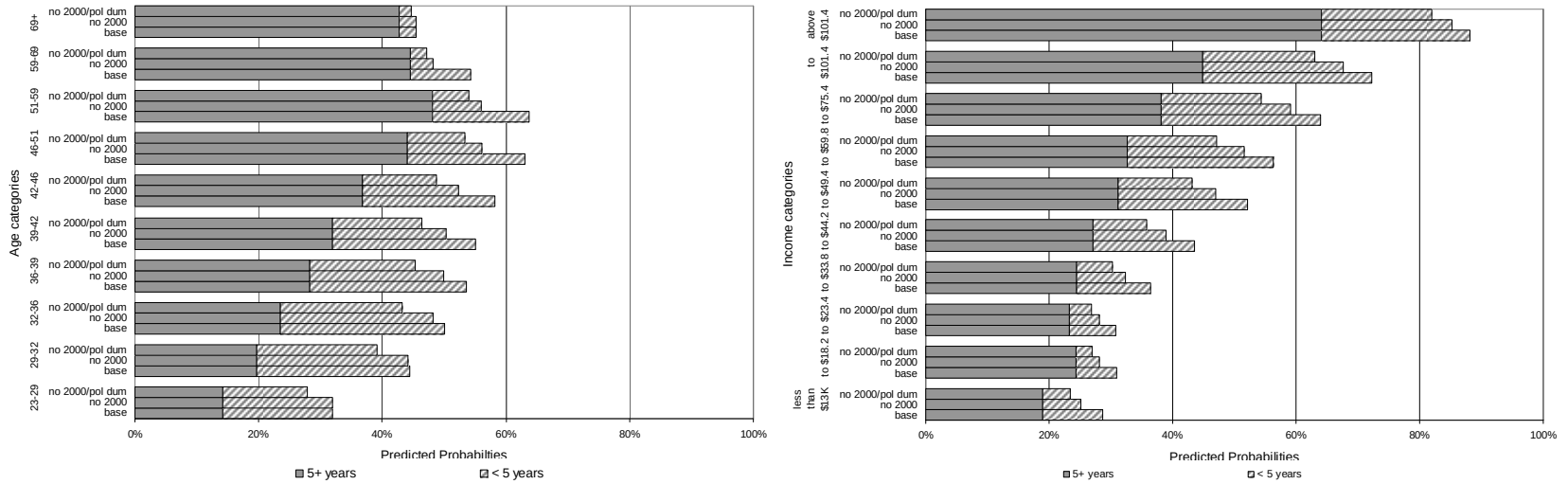
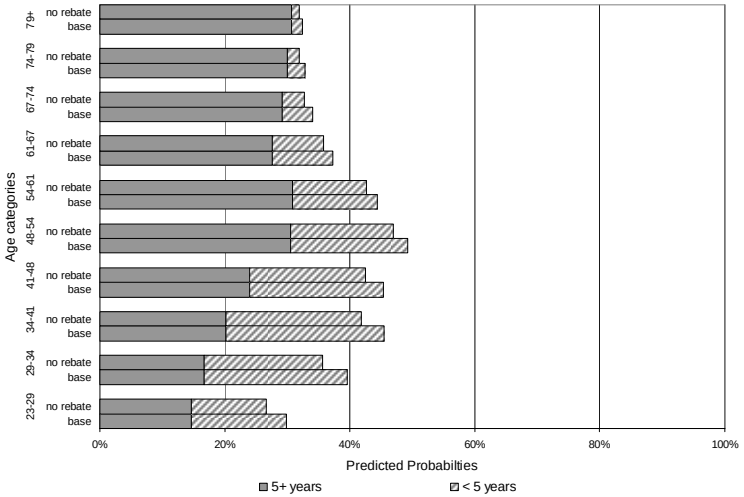
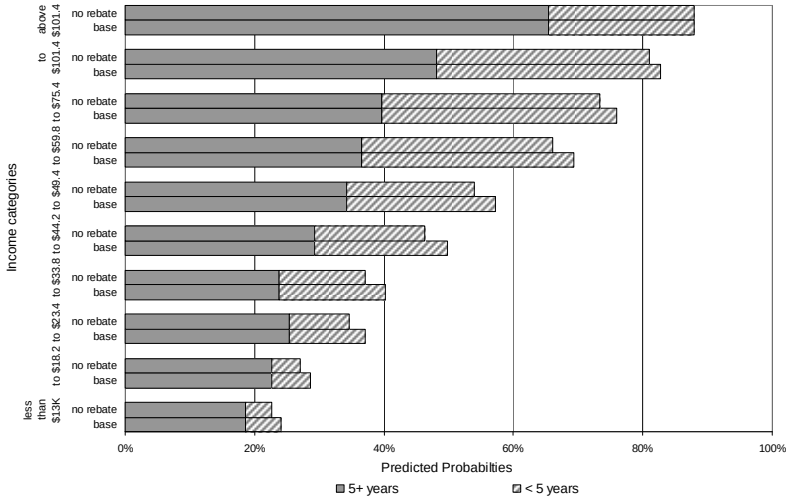


Figure 7: No 30% rebate

(a) Singles





(b) Families