Where do you run after you run for cover? A model of the demand for private health insurance in Australia

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Introduction

With rising health care costs worldwide, many policy makers are interested in identifying mechanisms for lowering the costs of 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 its public support if it is seen as only 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 primarily a nonlinear income-based subsidy for purchasing private insurance. Incentives were created for low and high income individuals and families to purchase insurance by lowering the effective premiums they had to pay. The second reform in 1999 granted a 30 percent federal subsidy on allowed health insurance premiums. The third reform changed the structure of private health insurance

premiums. After the reform in July 2000, individuals aged 30 to 65 purchasing insurance face higher, age-based premiums. 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 successful at convincing people to purchase private health insurance at that time.

Although the setting we examine is specific to Australia, the issues we address are of widespread interest. We build a structural model of the three reforms using premiums as our price terms, and address questions such as the following. Who did premium reforms convince to purchase private health insurance? Were the reforms successful at attracting the *young* or the *old* enrolees into private health insurance? Were these reforms successful at attracting relatively *high or low income* enrolees into private health insurance? If the government makes a one-time threat to raise prices in the future if people do not take a specific action (purchase private insurance) what can one expect after that from people who to not respond to that threat?

To address these issues, we take advantage of a series of questions asked as part of the Australian National Health Survey 2001. The survey asked not only whether the respondent was covered by private health insurance, but also about the timing of this coverage. By distinguishing how long a person had been insured at the time of the survey, 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. Variations in the timing of when the survey was conducted from 2000 to2001 provide further identification of the impacts. 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.

As hinted at by the title of this paper, the three reforms implemented in Australia collectively had a significant impact on enrolments in private health insurance. Their impact can largely be understood as a broad-based "running for coverage", rather than a purely rational response to changes in relative prices. In our analysis, we explore how well the policy reforms can be understood in terms of price responses, and use our model to predict the impact of undoing each of the reforms separately and in combination. The insights from our model will be useful to policy makers and researchers trying to understand the impact of insurance reforms that affect the relative price of private health insurance.

Literature review and policy setting

There is a rich literature on the demand for health insurance. Cutler and Zeckhauser (2000) provide a broad overview. Much of the empirical literature is from the US market where employment-based insurance coverage is common. For example 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 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. Private health insurance in Australia supplements the public health insurance system. 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. Butler (1999) derives a similar result for Australia. He analyses the demand for hospital coverage, with or without ancillary coverage, and finds the elasticity to be -0.44.[1] Using aggregate time series data over the same sample period that we examine here, Butler (2002) estimated the price elasticity of demand for private insurance from recent policy changes to be only -0.23.

Three policy reforms introduced in Australia from 1997 to 2000 provide a natural experiment for studying the sensitivity of supplementary health insurance to premium changes and other policy reforms. 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. Hall et al (1999) and Butler (2002) provide a useful summary of these reforms.

1997: Private Health Insurance Incentives Scheme

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 under A$35,000 for singles and A$70,000 for families with one child.[2] Households purchasing private insurance received a subsidy of from A$25 to A$450 per year, with the amount depending on the breadth of the policy purchased and the number of 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 these low income households. The "stick part" of the reform was introduced at

[1] Other studies of the demand for private health insurance in Australia are Savage and Wright (2003) and Barrett and Conlon (2003).
[2] Over the period from 1997-2000 the Australian dollar exchange rate varied from US$0.62 to US$0.79.

the other end of the income distribution. High income households purchasing insurance, defined as singles with incomes over A$50,000 and families with a household income over A$100,000 were eligible for a rebate of their Medicare levy surcharge, which was 1% of their income. For households just at these income thresholds, the tax levy rebate represents A$500 for singles and A$1000 for families, again, a sizable discount, which in high income households can even exceed the price of private insurance policy. 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, single coverage
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1999: The 30% Rebate

Starting on 1 January 1999, the "carrot" portion of the 1997 reform was eliminated and replaced with a constant 30% rebate, available to all regardless of income. The "stick" portion of the1997 reform was left intact, so that high income households continued to be eligible for the 1% Medicare levy surcharge rebate. The nonlinear schedule for the effective premium is shown in Figure 1 as a broken dashed line.

2000: Lifetime Health Cover

The third policy change reflected a departure from the uniform community rating to a system of progressively increasing premiums for private health insurance, announced on September 29, 1999. Under the old system all enrollees 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, 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 older enrollees up to age 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 time increase, as were all individuals who had already turned age 65. After the policy was implemented an individual aged, for example, 50 would pay 40% more for the same policy in each future period than those who had enrolled prior to the deadline. Figure 2 illustrates the schedule of premiums by age that was in place after July 2000. The figure shows how the financial incentive increases with age between 30 and 65.

The 2000 lifetime health cover reform was accompanied by extensive publicly-subsidized advertising under the theme "Run for Cover". Given the one time increase in premiums proposed, this reform, together with the intensive advertising campaign created an incentive for households to enroll in a private health insurance plan. After implementation, individuals can switch among plans without any premium increase. This reform is interesting in that it is the expectation of a future premium increase rather than a reduction in the current premium that drives behavior.

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

As others have noted, the impact of the 1997 reform was small, almost indetectable using aggregate level data, while the 1999 and 2000 reforms had a more substantial impact. Figure 3 illustrates the level of overall enrolment in private health insurance over time for the sample period 1984-2001. The three policy reforms are shown with vertical lines, superimposed against the aggregate market share of private insurance. Butler (1999, 2002) analysed this aggregate pattern and not only noted the small responses to the 1997 and 1999 reforms, but also looked at the average age of enrolments over time, but without attempting to develop an individual choice based model as we do next.

Figure 3. Private health insurance penetration
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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 at time t, U^I_{it} can be written as

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

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 premium at time t+1 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} to be 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 in either 2000 or 2001. 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, for the Medibank Private insurance SmartCover hospital policy, 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 $\Delta \text{P} = P^{e}_{i,t+1} - P_{i,t}$ 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

$$U^{I}_{it} = X_{i,T}\alpha + \tilde{P}_{i,t}\beta + \Delta\tilde{P}^{e}_{i,t+1}\gamma + POL_t\delta + \tilde{\varepsilon}_{i,t} \qquad (2)$$

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 demand for insurance to be downward sloping, the premium coefficient (β) 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 abated.

Data

We use data from the National Health Survey (NHS), 2001 conducted by the Australian Bureau of Statistics (ABS). This detailed household survey is conducted at six yearly intervals. The 2001 survey contains information on 26,862 persons, each from a distinct "income unit". From the full sample, we dropped all dependent children regardless of their

age as well as all individuals age 23 or under.[3] We also omitted individuals with missing health status or household income data. Our final estimation sample included information on 13,358 income units. We separately model 'single' (N=4394) and 'family' (N=9144) 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 was 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. As described below, we use this variable to characterize the timing of the insurance purchase decision. 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 household choice of when to purchase hospital care coverage (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 purchased.

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 is separated into female and male income for families. 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 use an age spline for the estimation (age, age less 30, age less 65 with dummy variables for age greater than 30 and age greater than 65). The average age of singles is higher than for individuals in families reflecting the higher concentration of those aged over 65. 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 state of residence, level of qualifications, born overseas, whether employed and occupation category.

Table 1: Means and standard deviations
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[3] 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.

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. Therefore we constructed a pseudo panel data set using the survey data from the NHS 2001. Our approach models the insurance choice as a series of binary decisions made each time that a new policy reform is implemented.

The first sample period included all 14,107 households regardless of whether they had ever purchased private health insurance or not. The dependent "insure" variable for this sample was a binary variable for whether the individuals had purchased insurance more than five years ago, and all policy variables were set at their pre-1997 reform levels. The second sample period included only those who had not purchased insurance more than five years ago, and the dependent variable took on a value of one only for households that had purchased their private health insurance between two and five years ago. The effect of the 1997 incentive scheme policy reforms were 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 again included only those households not insured more than two years ago, and which for most people captured the 1999 reform of a 30% premium rebate. These reforms were modeled through their effect on the premiums and through a policy dummy. Because the household surveys were not all done in the same quarter, for some respondents, the 1999 reforms occurred during the period of "between 2-5 years ago" while for others the reform was between one and two years ago. The fourth and final sample were those not yet insured one year prior to the survey, and for most but not all of the sample, spanned people facing the impact of the 2000 health insurance reform, "run for cover." Here for most of our sample, we modeled the impact of the reform as if it affects the price of insurance in the future, captured through a term for the change in premium.

We model the choice process as a series of binary choices, with a choice made once during each period. 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 piled up immediately before the policy change, so that a discrete choice rather than a continuous choice framework seemed more appropriate.

Results

Table 2 presents results of the pseudo-panel logit estimation for singles (in part (a)) and families (in part (b)). Bolded values indicate that the estimate is significant at the 5% level. The current and future price variables (pnow and pdelta) have the expected signs, and are large in magnitude and significant except for families where the effect of current premium is small and insignificant. Income is very significant for families and male income has about a 50% larger impact than female income. The price-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.

At mean levels of income and premium, the implied elasticity of insurance probability with respect to the premium is close to -1 for singles and close to zero for families. For both singles and families, the elasticity becomes smaller in magnitude over the period of the reforms. For singles the absolute value of the mean elasticity by age decile is less than 1 for the bottom 50% and greater than 1 for the rest. For families it is about 0.01 for the bottom 8 deciles and 0.04 for the oldest 20%. For both singles and families the mean elasticity varies more by income decile. Singles have an average absolute elasticity of about 1.2 in decile 1 declining to about 0.2 in decile 7. By decile 10 the mean elasticity is close to zero. There is a similar pattern for families, with an average of about 0.1 in the bottom decile declining to 0.01 in decile 9 before rising slightly in the top decile.

Smoking and drinking are negatively related to insurance but smoking has a large and significant impact for both singles and families. The higher the number of long term health conditions the higher the probability of being insured. Interestingly 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; no post school qualifications; being either unemployed or not in the labour force and having a non-manager occupation.

Table 2: Logit results
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The complex effect of age on enrolments is summarised in Figure 4 which presents the sum of age-related impacts ($\beta' X$) before and after the reforms. The solid line indicates the age impact prior to the three policy reforms; the dashed line gives the corresponding impact after the reforms. The latter sums the impacts of age and the policy dummy interacted with age. Prior to the reforms the age impacts are similar for singles and families, with enrolment increasing with age up to 65 then remaining constant or falling slightly. The policy reforms changed the slope of the age impacts from positive to negative between ages 30 and 65 and reinforced the prior age impacts outside this age band.

Figure 4: The impact of the private health insurance incentives by age
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Figures 5 and 6 summarise the data and the predictions arising from the model for singles and families. The pattern of time in cover and predicted time of enrolment are presented by deciles of age and income.[4] The data distribution of time enrolled in private health insurance shown on the left side of the figure can be compared with the predictions of the timing of enrollment arising from the estimation on the right side. The latter are simulated using the data for each observation in each policy period. Comparing across the figures indicates how well the estimated models predict the data for both single and family contracts.

Figure 5: Data and model predictions by age and income deciles for singles
and
Figure 6: Data and model predictions by age and income deciles for families
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Prior to the reforms enrolment increased with age up to about 60 for both singles and familes then either remained fairly constant (singles) or fell slightly (families). The effect of the reforms was to substantially increase enrolment 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,

[4] Separate deciles of age are created for singles and families used in the estimation while income deciles are defined across all income units in the dataset.

signifying a reduction in the adverse selection concerns. Income is a very strong predictor of the purchase of private health insurance, and Figures 5 and 6 show that this relationship was reinforced over the period, with high income individuals becoming even more likely to purchase private health insurance in response to the policy reforms.

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 change in coverage was driven by the 30% price subsidy or by the 'run for cover' lifetime health cover reform. To explore this issue we use the estimated model to predict coverage when separate components of the private health insurance incentives are removed.

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 different 2000 scenarios: the first explores the effects of removing only the effect of the age-related premiums (labelled no 2000) and the second the effects of removing the 2000 policy dummy as well (labelled no 2000/pol dum). The policy dummy captures the effects of the 2000 policy reform that are unrelated to price. Table 7 presents the results 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 future age-related premium increase 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 from removing the age-related higher premium. This is not surprising because the threat did not apply to those aged less than 30 and more 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 an impact independently of price threats.

For singles the impacts by income decile are more 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 levy surcharge reduces premiums. The non-price impacts are larger than price effects in upper income deciles.

Figure 7: Remove the 2000 reform
and
Figure 8: Remove the 1999 reform
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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 t*he 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 8. 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.

For families, removing the 30% rebate increases coverage for age deciles 3 to 9, and for all income deciles. This arises because the impact of the current premium on enrolment is found to be small and insignificant for families while the impact of the future price rise is large and significant. When the rebate is removed the future age-related price rise of lifetime health cover is larger and this induces higher enrolment.

Conclusions

To date 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 investigate the impacts of removing specific aspects of the policies in order 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 lifetime health cover policy of 2000, which was accompanied by the extensive 'run for cover' advertising campaign. Butler (2002) argues that lifetime health cover, the cheapest policy in terms of government expenditure, was the most effective. Others have argued that it was the combination of lower premiums and lifetime health cover that increased enrolment by about 50% in 2000. The simulations in this paper suggest that the 30% rebate and the lifetime health cover reform combined to increase coverage for singles with the relative impacts varying across age and income deciles. However for families all of the impact appears to be due to the lifetime health cover reform. Had the 30% rebate not been in place when the 2000 reform was introduced, more families would have taken out private health insurance.

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

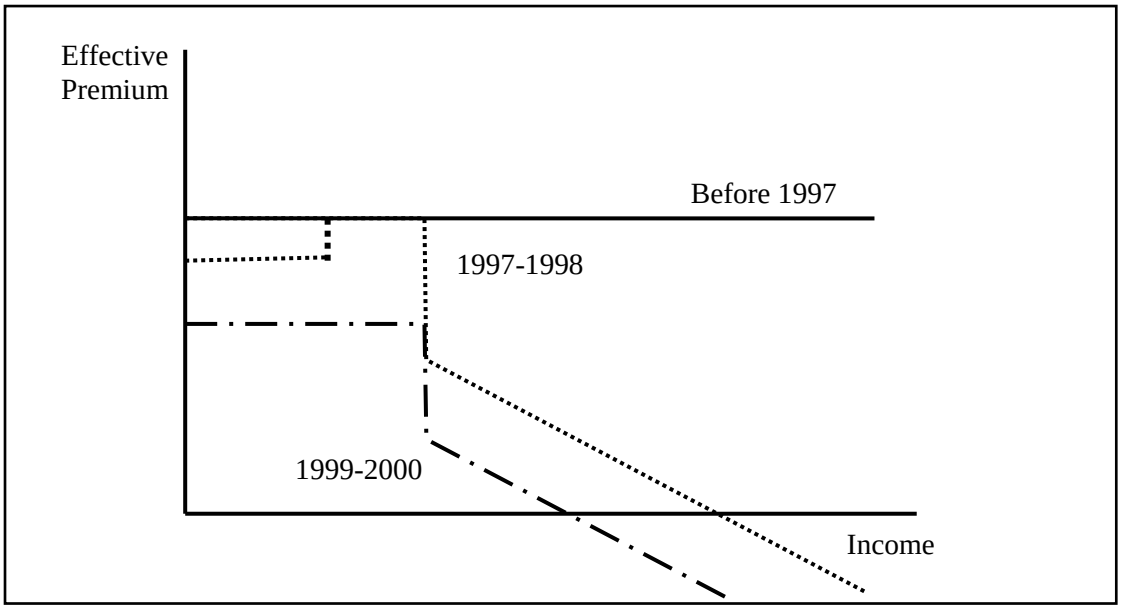


Figure 2. Effective premium by age, before and after July 2000 reforms.

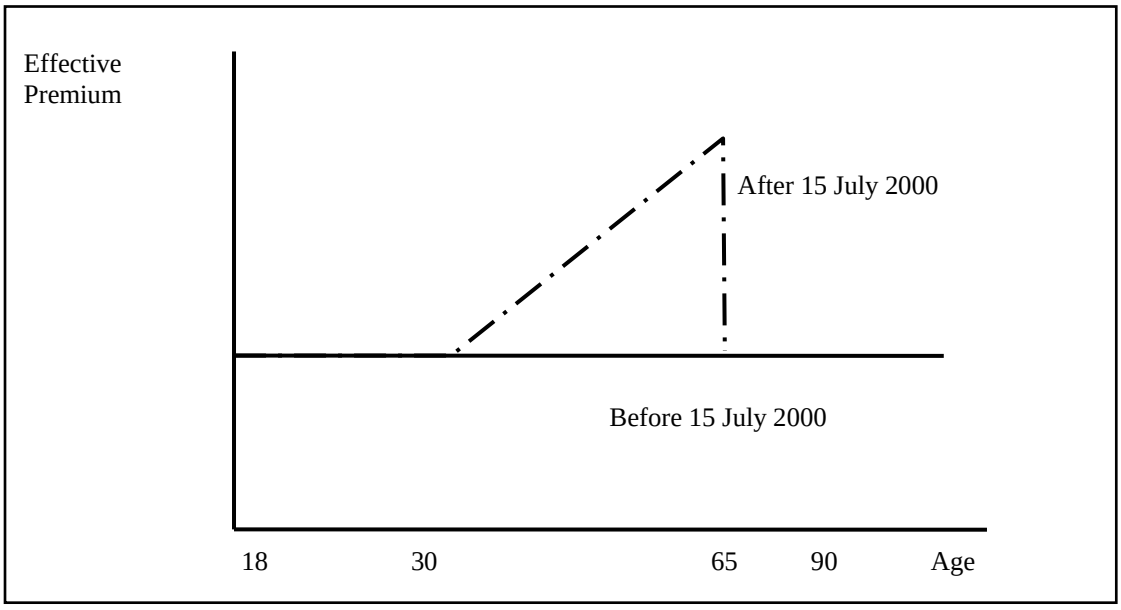


Figure 3. Private health insurance penetration

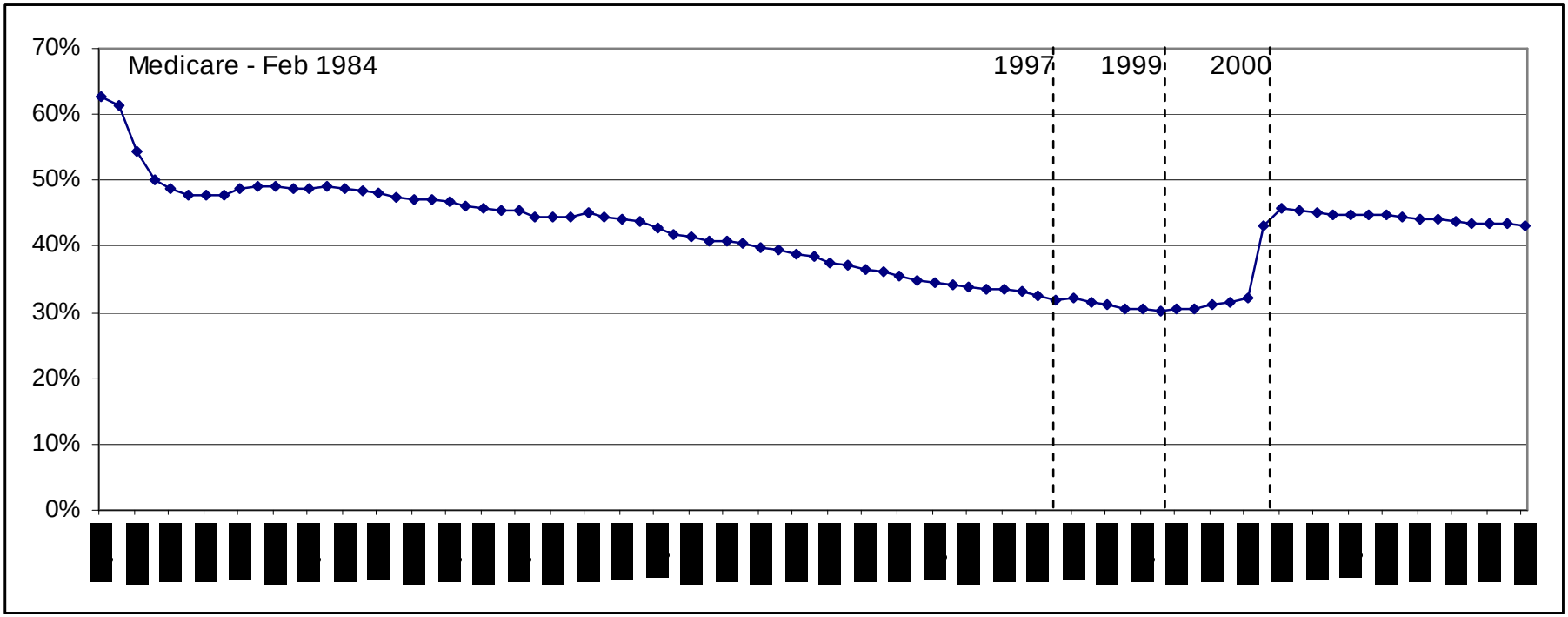


Table 1: Means and standard deviations

	Single		Family	
	Mean	StdDev	Mean	StdDev
hospital coverage	38.4%	48.6%	52.8%	49.9%
insured more than 5 years	25.6%	43.7%	34.7%	47.6%
insured 2 to 5 years	2.7%	16.1%	3.2%	17.7%
insured 1 to 2 years	5.2%	22.1%	8.1%	27.3%
insured less than 1 year	4.9%	21.7%	6.8%	25.1%
annual person income $'000	27.68	24.61	.	.
annual unit income $'000	.	.	55.36	38.26
annual female income $'000	12.67	18.40	20.69	19.63
annual male income $'000	15.01	24.54	34.67	30.64
annual insurance premium $'000	1.07	0.10	2.13	0.20
sole	.	.	10.2%	30.2%
children	.	.	1.02	1.17
AGE	53.81	17.97	46.21	14.46
agegt30	86.3%	34.4%	86.7%	34.0%
ageless30	24.27	17.26	16.58	13.97
agegt65	32.2%	46.7%	13.0%	33.6%
ageless65	3.16	5.31	1.03	3.12
female	53.8%	49.9%	53.6%	49.9%
NSW	21.6%	41.2%	22.0%	41.4%
VIC	20.4%	40.3%	20.5%	40.4%
QLD	15.7%	36.3%	18.1%	38.5%
SA	14.5%	35.2%	10.6%	30.8%
WA	11.9%	32.3%	12.4%	33.0%
TAS	7.0%	25.5%	6.6%	24.9%
NT	1.7%	13.0%	1.4%	11.9%
ACT	7.3%	26.1%	8.3%	27.6%
excellent	14.5%	35.2%	18.6%	38.9%
verygood	28.1%	45.0%	33.1%	47.0%
good	30.9%	46.2%	30.8%	46.2%
fair	18.7%	39.0%	13.2%	33.9%
poor	7.9%	26.9%	4.3%	20.2%
number long term conditions	3.23	1.68	2.72	1.68
smoke	24.4%	43.0%	20.5%	40.4%
drinks	1.20	2.57	1.12	1.95
not employed	52.5%	49.9%	36.0%	48.0%
concession card holder	52.5%	49.9%	34.7%	47.6%
tertiary	16.2%	36.9%	18.0%	38.4%
diploma	8.2%	27.4%	10.5%	30.7%
certificate	23.5%	42.4%	26.7%	44.2%
school	52.0%	50.0%	44.8%	49.7%
Not Australian born	25.6%	43.7%	28.6%	45.2%
urban not capital city	25.1%	43.4%	23.9%	42.6%
non urban / rural	9.2%	28.9%	13.0%	33.6%
professional	11.8%	32.3%	14.9%	35.6%
assprof	5.9%	23.6%	8.2%	27.4%
trade	5.3%	22.4%	7.4%	26.2%
advclerk	1.8%	13.2%	3.2%	17.6%
intclerk	7.8%	26.8%	10.6%	30.7%
intprod	3.8%	19.2%	4.8%	21.3%
elclerk	2.9%	16.8%	4.1%	19.8%
labourer	4.0%	19.7%	4.9%	21.6%
Number of observations	4394		9144	

Table 2: Logit results

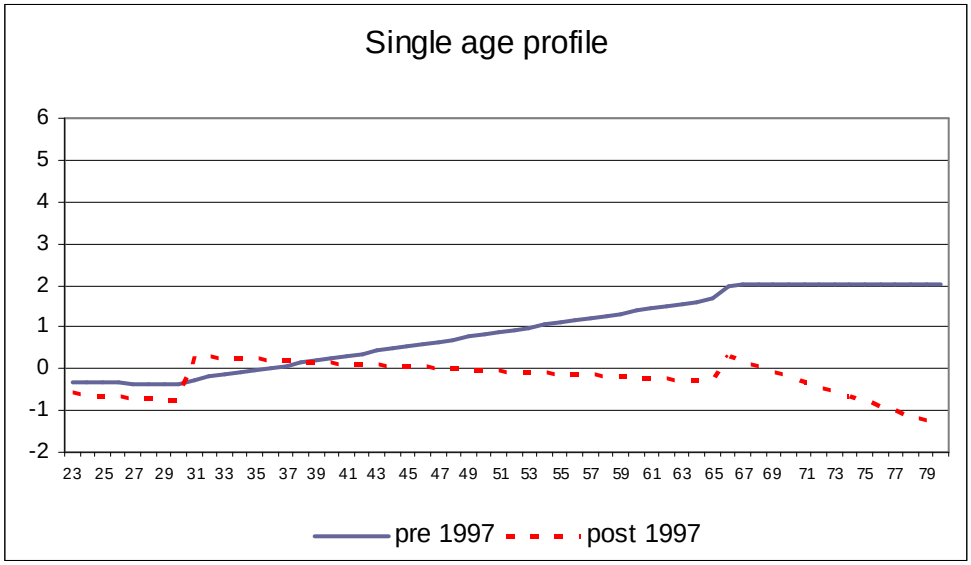
(a) Singles

Policy variables			Health and health risks			Socio-demographics		
Parameter	Estimate	Pr > |Z|	Parameter	Estimate	Pr > |Z|	Parameter	Estimate	Pr > |Z|
effective premium	**-1.71**	<.0001	very good	-0.04	0.69	income	0.01	0.15
premium change	**1.54**	0.01	good	**-0.20**	0.04	female	**0.33**	<.0001
1997 policy	-1.43	0.49	fair	**-0.37**	0.00	age	-0.01	0.81
1999 policy	-0.03	0.86	poor	**-0.47**	0.00	age > 30	0.08	0.76
2000 policy	**0.72**	<.0001	long term cond	**0.11**	<.0001	age - 30	0.07	0.21
pol * (age)	-0.01	0.87	daily smoker	**-0.60**	<.0001	age > 65	**0.33**	0.06
pol * (age > 30)	**1.00**	0.00	drinks per day	**-0.03**	0.05	age - 65	**-0.05**	0.00
pol * (age - 30)	-0.06	0.43						
pol * (age > 65)	0.37	0.38						
pol * (age - 65)	-0.05	0.21						
premium*income	**0.01**	0.00						
Log L	-3847.3622							

(a) Families

Policy variables			Health and health risks			Socio-demographics		
Parameter	Estimate	Pr > |Z|	Parameter	Estimate	Pr > |Z|	Parameter	Estimate	Pr > |Z|
effective premium	-0.07	0.75	very good	0.00	0.93	income female	**0.01**	0.00
premium change	**1.92**	<.0001	good	-0.06	0.32	income male	**0.01**	<.0001
1997 policy	-2.30	0.11	fair	**-0.21**	0.01	female	**0.12**	0.01
1999 policy	**0.46**	<.0001	poor	**-0.61**	<.0001	age	**0.09**	0.04
2000 policy	**0.59**	<.0001	long term cond	**0.06**	<.0001	age > 30	0.05	0.74
pol * (age)	0.04	0.45	daily smoker	**-0.46**	<.0001	age - 30	-0.02	0.65
pol * (age > 30)	0.26	0.17	drinks per day	0.00	0.93	age > 65	**0.53**	0.00
pol * (age - 30)	**-0.14**	0.01				age - 65	**-0.10**	<.0001
pol * (age > 65)	0.28	0.53				children	0.03	0.13
pol * (age - 65)	0.08	0.08				sole parent	**-0.19**	0.03
premium*income	0.00	0.43						
Log L	-9239.47							

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



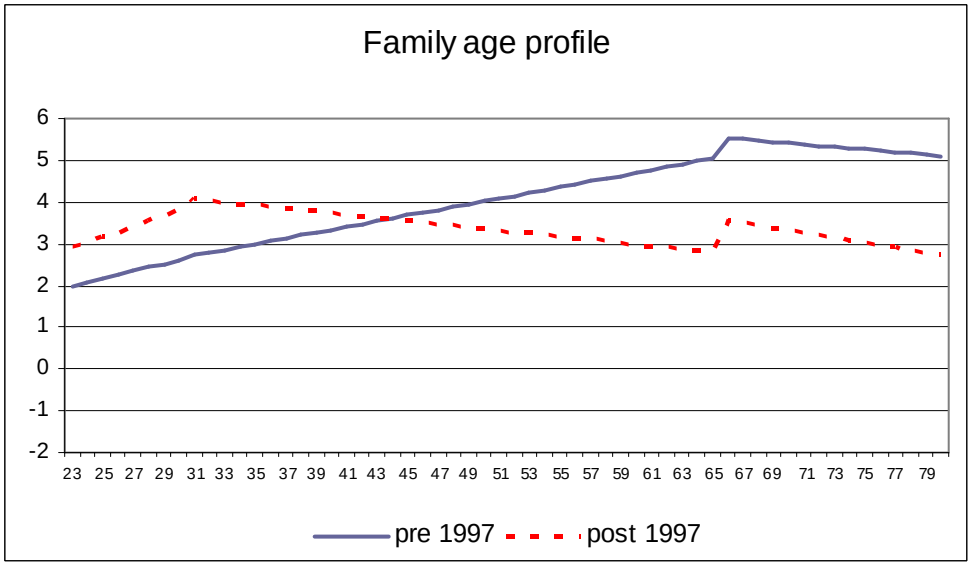
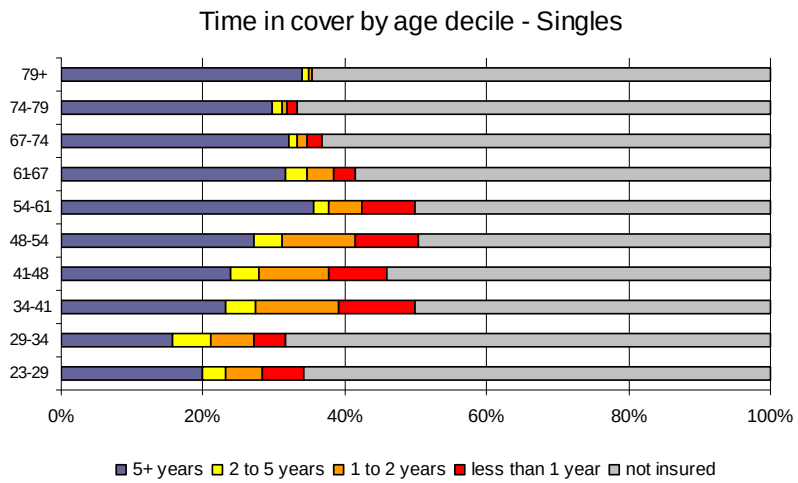
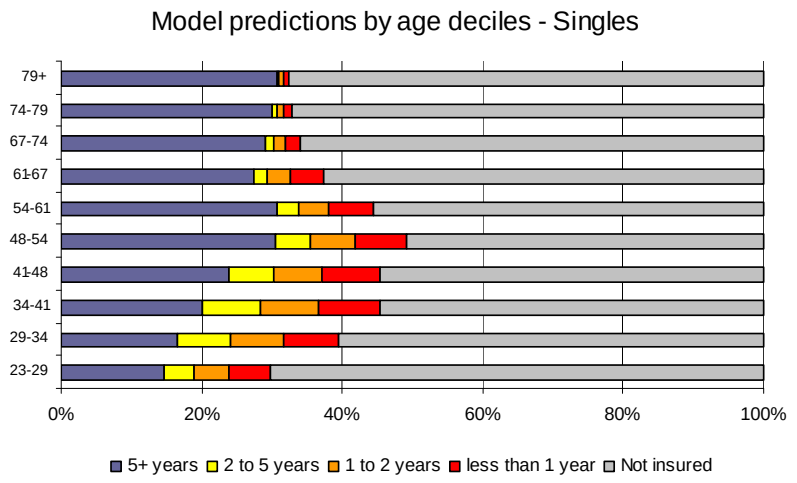
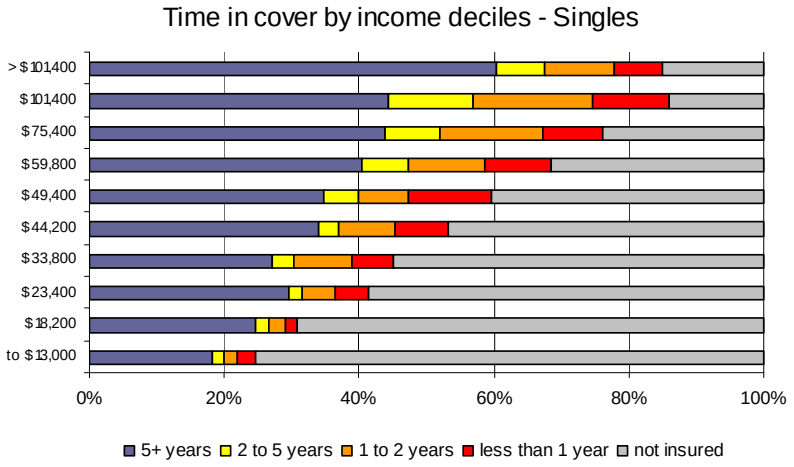


Figure 5: Data and model predictions by age and income deciles for singles







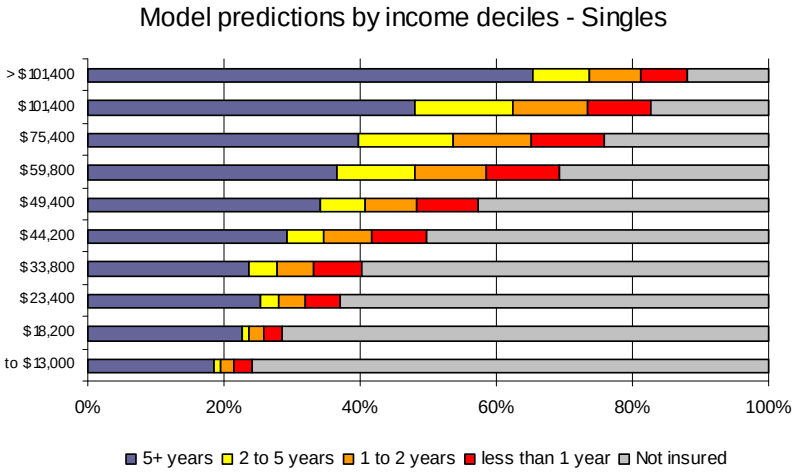
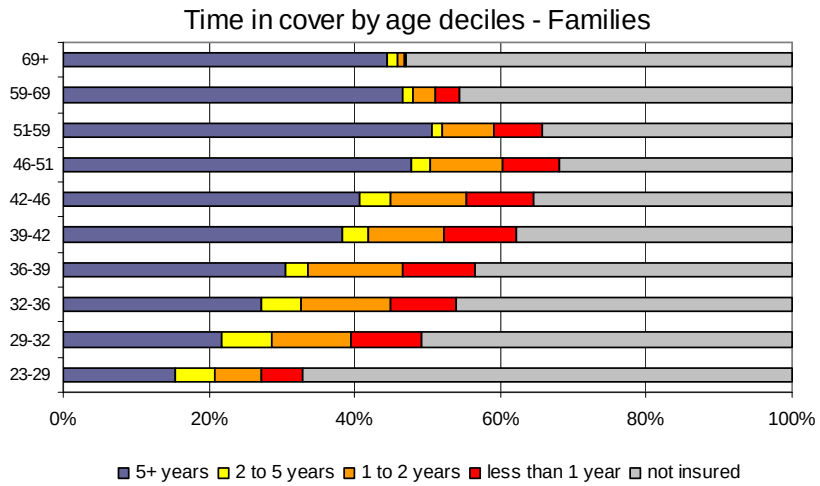
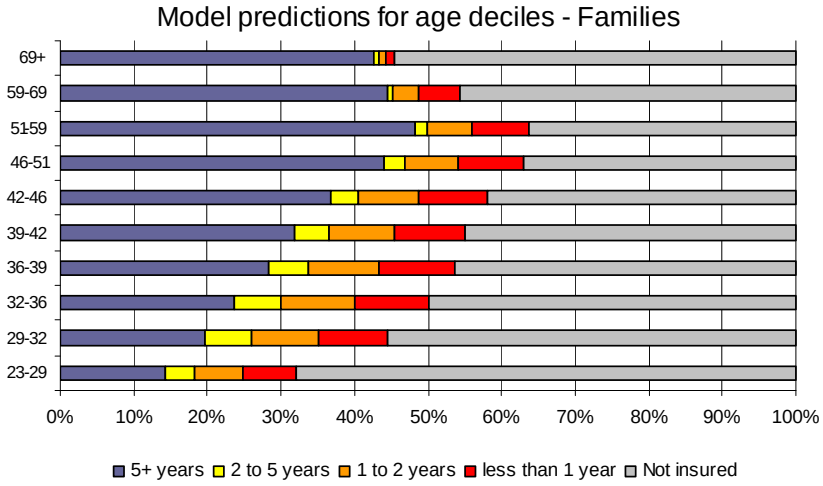
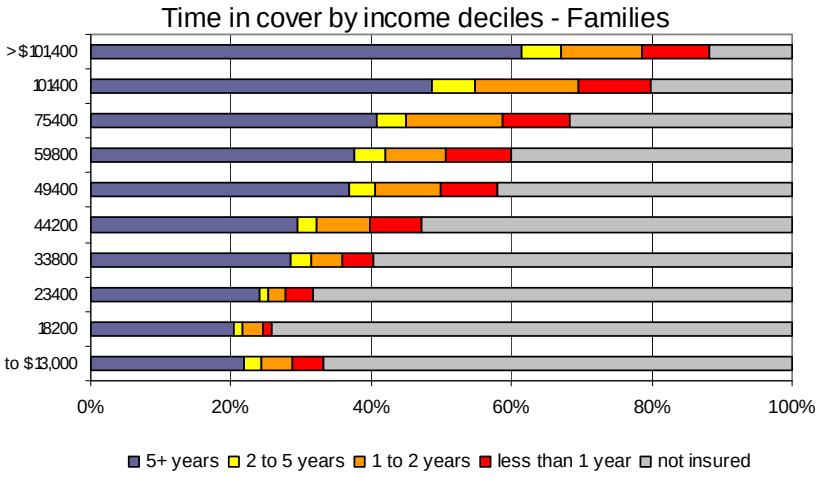


Figure 6: Data and model predictions by age and income deciles for families







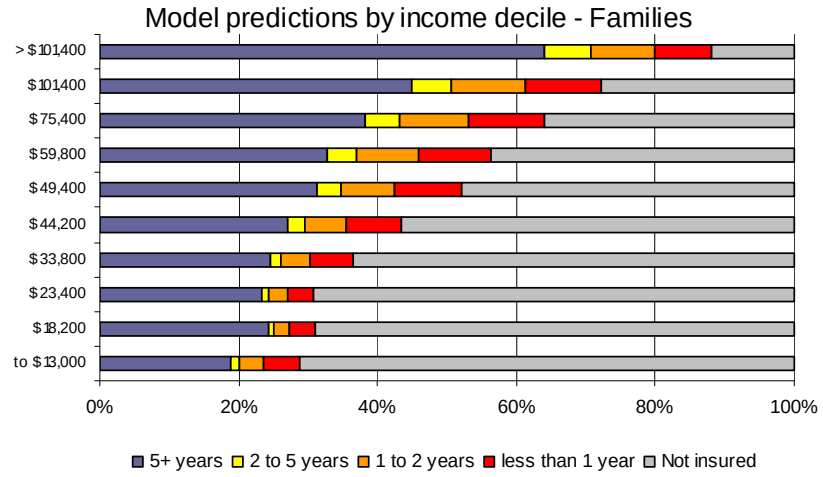
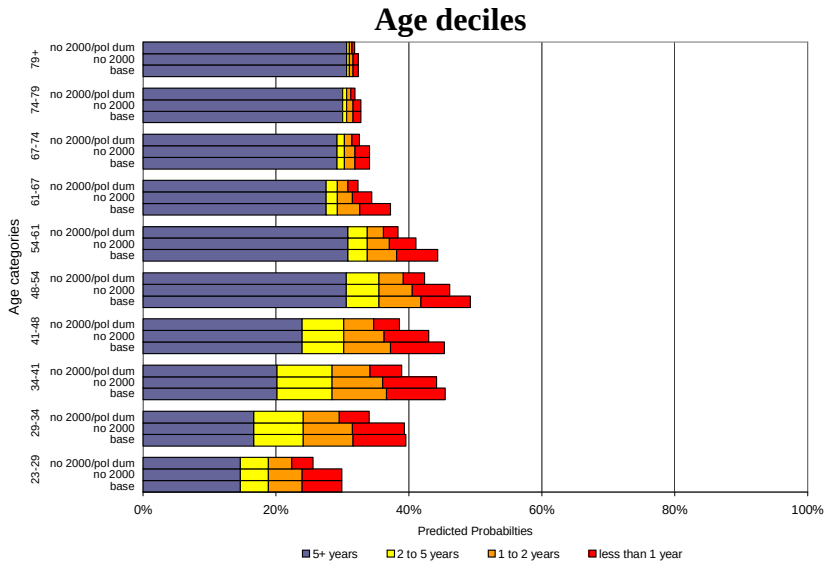
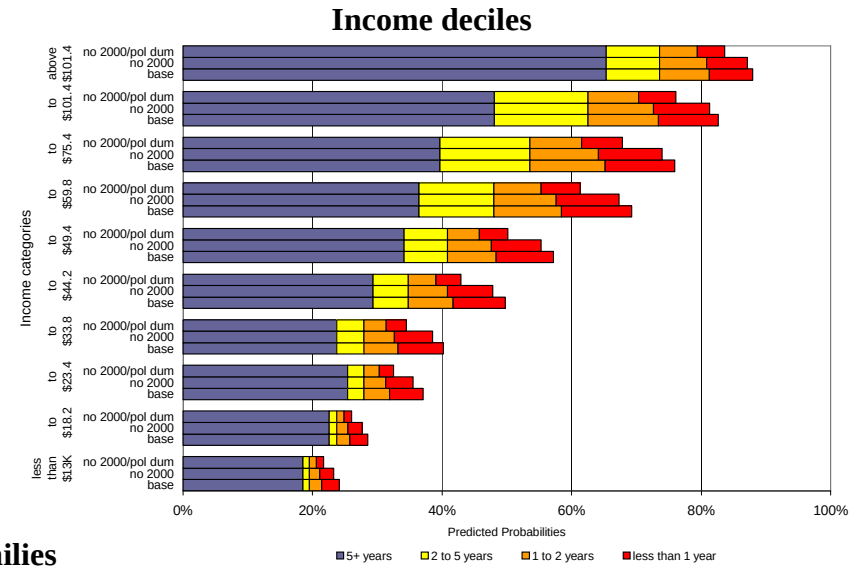


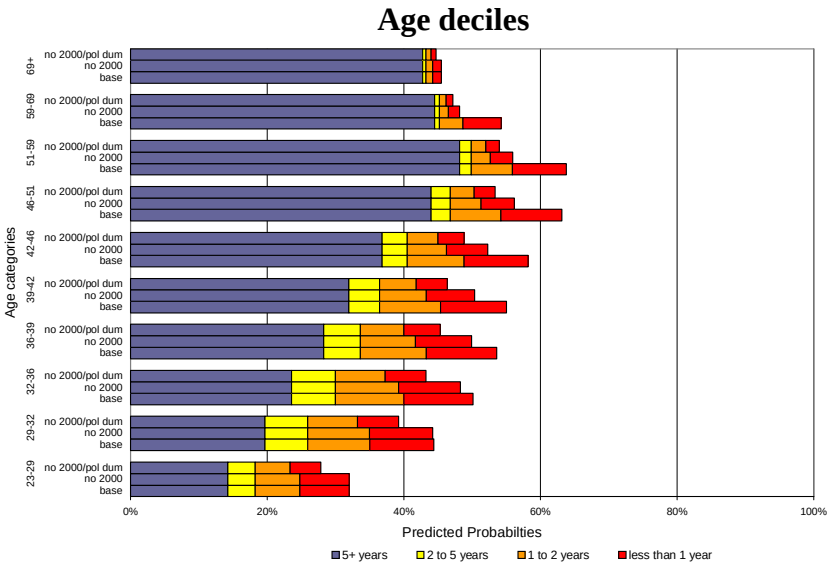
Figure 7: Remove the 2000 reform

(a) Singles





(b) Families



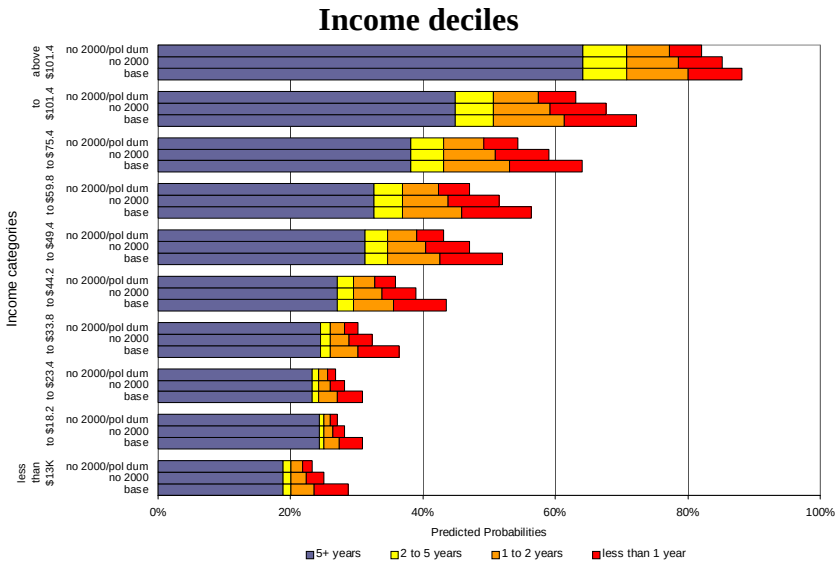
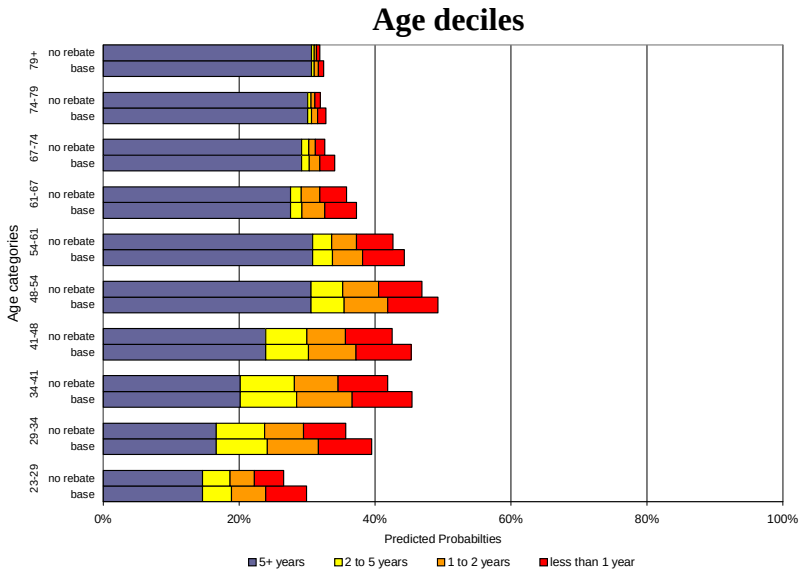
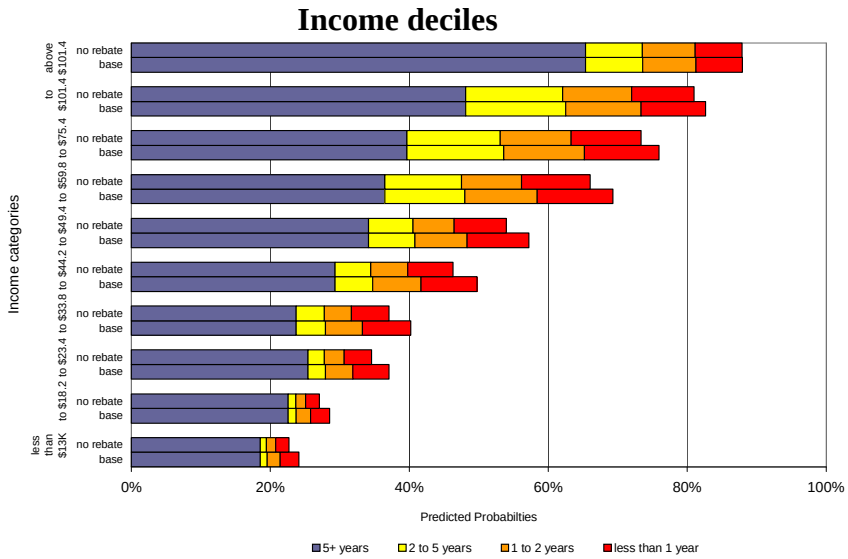


Figure 8: Remove the 1999 reform

(a) Singles





(b) Families