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Abstract

Australia has voluntary private health insurance (PHI) markets in which open enrolment and community rated premiums are mandated by government. Historically, adverse selection in these markets led to a substantial decline in coverage, giving voice to fears about the viability of PHI markets in the longer-run. In order to preserve community rating but improve the PHI pool, the Australian Government instituted a novel scheme of age-based penalties (ABPs) for individuals who join a PHI fund later in life. This paper computes the price of health insurance under the so-called Lifetime Cover (LC) scheme and shows that the LC scheme *per se* is not appropriately calibrated to prevent another adverse selection death spiral (Butler 2002). Based on our results, we recompute age-based penalties that would result in a fair price of PHI for all age groups. The premium multipliers we derive suggest a premium ratio of 10:1 for the oldest and youngest joiners. Our premium multiplier sequence is well-approximated by a linear ABP scheme that is approximately three times that of the present LC scheme for older joiners.

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1 Introduction

In most countries, private health insurance (PHI) membership is not compulsory. In voluntary PHI markets, an attendant problem is adverse selection: many individuals who would benefit from buying private health insurance are unwilling to do so, either because the premiums available exceed the expected insurance benefits or because they are denied coverage due to discoverable risk factors, such as chronic diseases.

In Australia, where PHI is voluntary and open enrolment is mandated, an adverse selection death spiral (Butler 2002) had characterised PHI markets. In response to this problem, Australia has made a novel attempt to counteract adverse selection through, *inter alia*, an age-based penalty (ABP) scheme. Individuals who buy and maintain PHI avoid the ABP altogether. Furthermore, those who maintain private health insurance are guaranteed to have the option of being privately insured at the prevailing community-rated premium, irrespective of their risk profile at any point in the future.

In the United States, it is well-known that many millions are uninsured. The percentage of uninsured persons in the United States in 2001 was 5 times higher for people aged 19 to 34 (40% uninsured) than for people aged 55-64 (8% uninsured) (Hoffman & Wang 2003) . One concern has been with the denial of PHI cover to people with chronic diseases, or insurance offers that entail prohibitively high (and perhaps unfair) premiums. Some states in the U.S. have reacted by making the denial of coverage illegal through guaranteed issue and community rating laws (Herring and Pauly 2006b). Another concern in the U.S. has been with the consequences of being reclassified as high risk. The Health Insurance Portability and Accountability Act (HIPAA) of 1996 ensures that high-risks cannot be dropped or have their premiums increased by more than others insured by that firm. These policies may have the unintended consequence of increasing the average risk level of those who are insured; although recent work has found little evidence of this in individual markets (Herring and Pauly 2006b). Adverse selection implies that an increased average risk level, in this case by mandating that private insurers cover high risks at a premium below their expected benefit, may drive the better risks among the insured out of the market or into low-risk pools in other firms (Rothschild and Stiglitz 1976). This may result in a net reduction in insurance rates at the population level and may lower economic welfare.

The Australian ABP scheme offers the following alternative: for those who buy and maintain private insurance when they are young and relatively healthy, there is guaranteed issue at the community rated premium, independent of any subsequent risk level. If one becomes high risk while not privately insured, however, while there is still guaranteed issue, an increasing ABP is also imposed on the PHI premium, and it applies for all subsequent insurance periods. Thus, in a sense, the Australian arrangements are similar to those in U.S. jurisdictions that have mandated guaranteed issue for the uninsured, but have not regulated premiums. Both policies "punish" new joiners, either by adding an ABP to the community rated premium or by allowing (perhaps prohibitively) high risk-rated premiums. The Australian Government also has pursued two more conventional policies to promote the purchase of private health insurance: a tax on middle-to-high-income earners for not buying PHI and a direct *ad valorem* subsidy on the insurance premium for purchasers of PHI.

This paper examines the extent to which a range of private health insurance (PHI) policy measures in Australia have affected the *price* of PHI, defined as the ratio of premiums to expected benefits, by age. Using data on health insurance expenditures, by age, as well as data on hospitalisation frequencies and episodic costs, we compute the price of PHI for each age group in the Australian population with PHI and examine the dynamics of prices and membership over time. We conclude that the propensity for an adverse selection death spiral still exists in Australian PHI markets, but that this has been kept in check by tax penalties that the Australian government has imposed on middle-to-high-income earners who do not buy PHI. We also offer an alternative scheme of age-based taxes that is nevertheless consistent with the general framework of the existing LC scheme.

Background

Australia has a system of public insurance that is universal and compulsory. Despite this fact, more than 40% of the population holds private health insurance (PHI) for hospitalisation. This is one of the highest rates of PHI coverage in the world for countries with universal health care. This relatively high rate of PHI coverage has, however, not been achieved without considerable government intervention. Between 1984 and the late 1990s, PHI coverage fell from 50% to 30.1% of the population as a result of adverse selection in community-rated PHI markets. This has been characterised as an adverse selection death spiral (Butler 2002). Over the past decade, the Australian Government has made a number of attempts to raise the level of PHI coverage in Australia by introducing a series of tax-and-subsidy measures and age-related late-joiner penalties to boost PHI coverage. The range of measures has been discussed in some detail in the existing literature; see, e.g. Hall, De Abreu Lourenco and Viney (1999), Butler (2002) and Brown and Connelly (2005, 2006). Private health insurance coverage in Australia has not only grown, but also appears to have stabilised in recent quarters.

The measures in place in Australian PHI markets, at the time of writing, include:

1. The subsidy (or rebate) on PHI policies.
2. The Medicare Levy Surcharge (MLS) tax on mid-to-high-income earners who do not have PHI.
3. The Lifetime Cover scheme, which penalises people who join the PHI pool later in life. The ABP is calculated by taking the number of years beyond 30 and multiplying this number by 0.02, or 2 percent. Note that the penalty is paid in every year after initially purchasing PHI.

Specifically, the rebate applies to all PHI policies based on the age of the oldest person covered. The subsidy is 30% of the premium paid for individuals 65 years, 35% of the premium paid for 65-69 year-olds, and 40% of the premium paid for individuals 70 years and older. The subsidy may be taken either as a reduction in the price of the policy at the time of purchase, or as a tax rebate when an income tax return is filed. The MLS is payable by individuals who earn $50,000 or couples/families that earn $100,000 but do not have PHI; it is calculated as 1.0% of taxable income.[1] The ABPs essentially involve loading the base premium by a fraction that is calculated as the number of years beyond 30 that a person first took out PHI, times 0.02 (*e.g.*, a person who joined at 40 years pays a premium that is 1.2 times the base premium for the duration of membership).

The Model Under standard insurance theory, when faced with a choice between a risky income distribution with mean k and a certain income k, a risk-averse individual prefers the latter. Thus, the welfare of a risk-averse person is raised when he/she purchases health insurance at the actuarially fair price (Arrow 1963):

$$P_i = z_i H_i \tag{1}$$

where P_i is the actuarially fair premium for the ith individual, z_i is the probability of the loss event (e.g., of hospitalisation) for the ith individual and H_i is the value of the loss (e.g., the cost of the hospital episode) to the ith individual if the event occurs. Note that the premium (P_i) is in fact the price of an insurance *policy*, not the price of insurance *per se*. The price of health insurance (p_i) is the price per dollar of expected benefit or, equivalently, the ratio of the expected loss to the premium:

[1]Just prior to the publication of this Working Paper, the government announced that the thresholds were to be increased to $100,000 for singles and $150,000 for couples.

$$p_i = P_i/z_i H_i \tag{2}$$

Note that it follows from (1) that $P_i/z_i H_i = \$1.00 = p$, i.e. by definition, a premium is actuarially fair if the price per dollar of expected benefit is one.

Actuarially unfair prices for private health insurance are, however, common place in practice. Typically-emphasised reasons for this include the existence of asymmetries of knowledge between the insurer and insured about risk and loss expectations, for administrative loadings, and monopoly pricing (Rothschild and Stiglitz 1976). Institutional arrangements such as mandated community rating, where low-expected-loss individuals (ls) pay the same premium for a policy as high-expected loss individuals (hs), also result in unfair prices. There is also evidence, though, that cross-subsidisation also occurs in experience-rated insurance markets (Herring and Pauly 2006a).

Under community rating, the premium for insurance is invariant with respect to individual's risk and loss expectations. For precisely this reason the *price* of insurance, defined as the price per dollar of expected insurance benefit, is not uniform across risk and loss types. Assuming only two risk types, ls and hs, community rating may be characterised as a system of insurance cross-subsidies (Pauly 1970, Pupp 1981) from ls to hs. In a competitive community-rated insurance market with two risk types, no excess profits, and no taxes or subsidies of insurance we may write:

$$C_l^p = P + \lambda_l P \tag{3}$$

$$C_h^p = P - \lambda_h P \tag{4}$$

$$\lambda_l = \lambda_h \tag{5}$$

$$C_l^p > C_h^p, \tag{6}$$

where C_l^p is the price charged to low-expected-loss individuals, C_h^p is the price charged to high-expected-loss individuals, λ_l is the premium loading for ls and λ_h is the premium discount for hs. Under the assumptions above, $C_l^p >$ \$1.00 and $C_h^p <$ \$1.00, i.e. for every dollar of expected benefit, ls pay more than one dollar and hs pay less than one dollar. Thus, the uniform premium (P) results in unfair prices that are are favourable to hs and unfavourable to ls. However, note that some ls may still find the purchase of insurance welfare-maximizing: whether or not this is the case depends jointly on the degrees of risk-aversion and premium unfairness.

An aforementioned source of inefficiency that is associated with community rating is adverse selection, wherein h-types are over-represented in the PHI pool.

Let $\bar{z}$ represent the mean risk in the population and $\overline{H}$ be the mean loss. Thus, the community rated premium is $\overline{zH}$. *For an individual*, the premium payable for a given policy, under the Australian ABP scheme may be represented as:

$$C_i^p = (1 + A \times 0.02) \times \overline{zH} - R_i \tag{7}$$

where A is the number of years beyond 30 that a person first took out PHI and R_i is the applicable (age-based) rebate/subsidy. The price of insurance, as previously defined, (2), thus becomes

$$p_i = C_i^p / z_i H_i = [(1 + A \times 0.02) \times \overline{zH} - R_i] / z_i H_i \tag{8}$$

The imposition of the ABPs is intended to attract and maintain customers from an early age. In particular, the healthy young may insure against future penalties, that would otherwise arise due to the ABP, by maintaining insurance when p_i is less than one. Thus, it is useful to sum (8) across all ages after 30 and compute the implicit (real) annual price of PHI when it is computed for a particular joining age. This necessitates adding subscript A, which corresponds to the period of initial purchase past age 30, and L, which corresponds to the point of death, as

$$p_i = \sum_{A=1}^{L} C_{iA}^p / \sum_{A=1}^{L} Z_{iA} H_{iA} = [(1 + A \times 0.02) \times \overline{zH} - R_{iA}] / \sum_{A=1}^{L} z_{iA} H_{iA}$$

$$= (L - A)[z_{iA} H_{iA} / (1 + A \times 0.02) \times \overline{zH} - \sum_{A=1}^{L} R_{iA}] \tag{9}$$

Now assume, for simplicity, that all three PHI measures apply to all consumers (1. and 3., in fact, always do) and that this policy covers the entire loss $H_i$of insured individuals, otherwise known as full insurance.

A utility-maximising individual's decision whether or not to buy private health insurance may be represented as a choice between an uncertain (uninsured state) income distribution with expected income-utility:

$$E(U) = zU(Y - H - T) + (1 - z)U(Y - T); \quad T = f(Y; Y > 50,000) \tag{10}$$

where T is the MLS tax penalty, and the certain (insured state) income-utility:

$$U = U(Y - (1 + A \times 0.02) \times \overline{zH} - R_i) \tag{11}$$

Recall that R_i is positive for all purchasers of health insurance and $T \geq 0$, depending on income. Thus, neither of these measures is predicted to *lower* the likelihood that good risks buy PHI. On the other hand, as has been emphasised elsewhere (Brown and Connelly 2005, Connelly and Brown 2006) the incentives produced by the age-based penalties of the ABP scheme do not uniformly increase the attractiveness of insurance (i.e., increase (11)). The ABPs could, for example, discourage older "low-risk" individuals from initially taking out insurance while they remain low-risk.

The utility functions (10) and (11) are not estimable. However, recall from (1) that a risk-averse individual will always choose the certain equivalent (11) in preference to a risky distribution (10) with the same expected value. By extension, one can infer that if the value of (8) $>$ \$1.00, the individual will prefer to purchase insurance rather than self-insure. Of course, values of (8) $>$ \$1.00 are sometimes consistent with welfare-maximizing purchase of insurance for the reasons outlined above. We also estimate (9) based on the youngest cohort in the sample. In this paper, we use these facts and the available data to estimate the impact of an array of Australian Government policies on the desirability of PHI.

2 Methods and Data

Using PHI industry data (PHIAC 2007) on membership and expenditures, along with industry premium data, we estimate the price of private health insurance by age and gender, simulate the effects of the applicable taxes and subsidies on those prices, and compare them to actuarially fair (but community-rated) premiums for 5-year age groups. Essentially, we estimate (8) and (2) and compare the results of these to show whether the price of insurance is actuarially fair in each age group. In addition, we compute the expected income and certain income components of (9) and (10) for income levels where the tax penalties apply and ask whether or not, *solely on the basis of the income tax implications*, might individuals/families purchase an insurance policy *even though* the premium is unfair (i.e., when (8)>(2))? Finally, we produce some illustrative results of the ABP scheme and tax provisions for low-risk old individuals who have not previously held PHI. The only other work of this nature that has been conducted for Australia was undertaken by Butler (1999). His work was, however, primarily concerned with estimating elasticities for private health insurance and was conducted for a pre-ABP period.

The PHIAC (2007) data available to us are 5-year age-group aggregates, by gender, disaggregated into hospital and ancillary PHI cover. The data do not enable us to determine which members hold both hospital and ancillary cover, so our exclusive focus is on the hospital PHI. Quarterly observations are available on (i) the number of members, (ii) the proportion of the Australian population with PHI, (iii) the total insurance benefits paid, and (iii) the number of hospital episodes. Since the insured event is hospitalisation, the mean probability of the insured event in the jth age group ($\overline{z_j}$) may be derived by dividing (iii) by (i). Similarly, the mean cost per insured event for the (insured) members of the jth age group ($\overline{H_j}$) may be derived by dividing (ii) by (i). This is the mean fair premium for the jth age group ($\overline{z_j H_j}$) derived. All price data were converted to constant 2006-2007 Australian dollars. Due to seasonality in the quarterly series, we report annual means for our series.

Detailed data on the characteristics (e.g., the inclusions and coinsurance provisions) of hospital policies purchased were not available to us, nor was the value of premiums collected. Furthermore no matching time-series of premiums is available. Thus, in order to compute the price of insurance, we must make an assumption about the policy types purchased. To be conservative, we selected the lowest-price hospital PHI policy available from the largest Australian private health insurer, Medibank Private Ltd. The policy chosen is called "First Choice Hospital" and it contains the most basic inclusions this insurer offers at the premium of \$586.79 in Australia's most populous state, New South Wales (see www.medibank.com.au for details). There are several reasons that this is a conservative assumption. First, this policy is unlikely to be attractive to older consumers, high-expected-loss types, and couples planning to use private hospital services for childbirth. Second, and notwithstanding our assumption that full insurance is available, this policy has some coinsurance provisions.

Finally, note that we do not know how the benefits data are distributed as between individuals and households, let alone the family composition of households that have PHI. Although family premiums are computed simply as twice the singles premium, unfortunately the effect is not a simple linear transformation with respect to the computation of our price (8) variable. Specifically, when we compute the price of insurance for children of dependent age, we essentially ignore the fact that the majority of these children must be covered by parents' or guardians' policies. This is quite an important limitation, which we address by constructing family unit scenarios towards the end of the paper and recomputing the price of insurance.

3 Results

Table 1 presents the central results on the price of health insurance, by age group and gender, with and without the rebate. Recall that a premium (P_i) is actuarially fair if it results in a price (p_i)=\$1.00 per dollar of expected benefit: a price of more than \$1.00 suggests a premium that is actuarially unfair and unfavourable to the insured, while a price of less than \$1.00 suggests a premium that is unfair but favourable to the insured. The effect of the rebate is, universally, to reduce the price of PHI. However, Table 1 shows that the premiums for the 0-4 to 45-49 age groups are, on average, unfair and unfavourable, with or without the subsidy. The premiums for women and persons age 25-39 are unfair but favourable, presumably due to the predominance of obstetrics and related services in this age group. Gross premiums are closest-to-fair in the 50-54 years age group, but in all older age groups are unfair but favourable to the insured. The effect of the rebate on actuarial fairness, around this age group, is the most noteworthy: prices net of the subsidy become actuarially unfair and favourable to the insured around this age point. Notably, the price of insurance for the oldest old is extremely low, with or without the rebate. Without the PHI rebate, 70+ year olds were paying twenty-three cents or less per dollar of expected PHI benefit. With the 40% PHI rebate, this age group now pays less than fourteen cents per dollar of expected benefit.

Finally, note that the first two columns of price data on "persons" provides an effective way of considering whether or not PHI premiums are fair, *on average*, for an adult couple of the same age. The PHI premium for a couple is simply double that of the singles premium.

Of course, the data presented in Table 1 depend on several simplifying assumptions, the most important of which are that (i) the insured population buys a prescribed individual, rather than family policy, and (ii) that the policy chosen is the most frugal available. Additionally, the unfair prices in Table 1 ignore the ABPs, which make policies for all age groups >25-29 more expensive. Note, though, that the magnitudes of premiums for the oldest old suggest that even the applying the maximum ABP scheme penalty– a 70% premium loading for people who join at 65 years or older – may not be particularly disuasive: 1.7 times the prices currently paid by these groups still generates an actuarially unfair *and favourable* price for the oldest of the old. Note that the lifetime average price of insurance for those over thirty is \$0.45 overall, \$0.67 for men, and \$0.39 for women.

Table 2 presents the results in Table 1 with the ABPs added by sex and by age that a person *initially purchased* PHI. The subsidy and ABPs are included. The first column lists the price of insurance p using equation (8).

Table 1: Estimated mean prices of private health insurance in Australia, with and without the private health insurance rebate, by gender and age

Age	Mean annual prices ($\overline{p_A}$) and mean annual subsidised prices ($\overline{p_A}$-R_A) of private health insurance (price per dollar of expected benefit) for the Ath age group					
	Persons		Males		Females	
	$\overline{p_A}$	$\overline{p_A}$-R_A	$\overline{p_A}$	$\overline{p_A}$-R_A	$\overline{p_A}$	$\overline{p_A}$-R_A
0-4	$2.40	$1.68	$2.17	$1.52	$2.71	$1.90
5-9	$9.43	$6.60	$8.62	$6.04	$10.47	$7.33
10-14	$8.81	$6.17	$8.91	$6.23	$8.71	$6.10
15-19	$3.59	$2.51	$3.88	$2.72	$3.33	$2.33
20-24	$2.36	$1.65	$2.92	$2.04	$2.00	$1.40
25-29	$1.30	$0.91	$3.10	$2.17	$0.89	$0.62
30-34	$1.03	$0.72	$3.22	$2.25	$0.66	$0.46
35-39	$1.26	$0.88	$2.70	$1.89	$0.85	$0.60
40-44	$1.57	$1.10	$2.22	$1.55	$1.24	$0.87
45-49	$1.36	$0.96	$1.63	$1.14	$1.18	$0.83
50-54	$1.04	$0.73	$1.11	$0.78	$0.98	$0.68
55-59	$0.75	$0.53	$0.74	$0.52	$0.77	$0.54
60-64	$0.52	$0.36	$0.49	$0.34	$0.56	$0.39
65-69	$0.36	$0.24	$0.33	$0.22	$0.40	$0.26
70-74	$0.26	$0.16	$0.24	$0.14	$0.30	$0.18
75-79	$0.21	$0.13	$0.19	$0.11	$0.23	$0.14
80-84	$0.19	$0.11	$0.17	$0.10	$0.20	$0.12
85-89	$0.17	$0.10	$0.16	$0.10	$0.18	$0.11
90-94	$0.17	$0.10	$0.16	$0.09	$0.17	$0.10
95+	$0.19	$0.11	$0.17	$0.10	$0.19	$0.11

Note: Data are presented in 2006 Australian dollars (AUD1=USD0.74; 31 June 2006) and were computed using Equation (8).

Sources: Computed from PHIAC (2007) and Medibank Private Ltd (2007).

For simplicity, we report the ages initially joined at the mid-points of the age intervals in Table 1. For instance, for all persons, the price of insurance for a 42 year old buying private insurance for the first time is $1.29, which is actuarially unfair and unfavourable. Note that the tax mainly affects the price of insurance at the highest ages, which is not surprising because it increases with age. This is also the average price paid for insurance by age. For instance, a person buying PHI for the first time at age 57 would pay an average of $0.59 for PHI between the ages of 57 and 92, which is higher than the average price of $0.45 per year if he or she initially bought PHI at age 30. The price is higher than he or she would pay without ABP or if he or she was an insured at some point between ages 30 and 57. However, insurance is still overwhelmingly actuarially unfair but favourable.

Clearly, the initial tax is too high, which may keep low risks from initially buying PHI after age 30. This may in fact drive out low-risks under 40 who, for whatever reason (liquidity constraints, temporary unemployment), did not buy PHI at age 30 and therefore must pay the tax to initiate coverage. At older ages, the increased expected expenditures far outweigh the tax penalties for not maintaining PHI.

Thus, this combination of subsidies and ABPs may entice only the most risk-averse to take out and maintain private insurance from age 30. Why, then, has PHI membership recently stabilised as a proportion of the Australian population? The income tax penalty (2.) – calculated at one per cent of taxable income for individuals who earn over $50,000 and couples/families that earn in excess of $100,000 – is the obvious explanation. Note, for example, that the price of the insurance product we selected, net of the 30% subsidy is $410.75 (=0.70 x $586.79), while the tax penalty for not having private health insurance is $500 for a single person who earns $50,001. Clearly, there is a strong financial incentive for mid-to-high income to buy PHI *even when* the price actuarially unfair and unfavourable. Taxing individuals into PHI is unlikely to be efficient though, for reasons that are well-established (Pauly 1970).

Other Scenarios

As was outlined above, a serious limitation of the estimates presented in Tables 1 and 2 is that they ignore the fact that, under family policies, dependents essentially "free-ride". This is an important issue because the effective price for families with dependents will be lower than is suggested by the data in Tables 1 and 2. In this section, we present some indicative simulations of family purchasers of PHI. The simulations are conducted only for those adult age groups in Table 1 for whom the price of insurance suggested

Table 2: Estimated annual mean prices of private health insurance in Australia by gender and joining age, with 2006 age-based penalties (ABPs)

Joining age	Mean annual prices over the lifetime		
	Persons (male/female mean)	Males	Females
	$\overline{p_A}$	$\overline{p_A}$	$\overline{p_A}$
32	$1.00	$2.15	$0.68
37	$1.36	$1.92	$1.08
42	$1.29	$1.53	$1.11
47	$1.05	$1.12	$0.98
52	$0.82	$0.80	$0.83
57	$0.59	$0.56	$0.64
62	$0.41	$0.37	$0.44
67	$0.27	$0.24	$0.31
72	$0.22	$0.19	$0.24
77	$0.19	$0.17	$0.20
82	$0.17	$0.17	$0.19
87	$0.17	$0.15	$0.17
92	$0.19	$0.17	$0.19

Notes and Sources: As for Table 1.

Table 3: Simulated annual mean prices of private health insurance in Australia, with and without the private health insurance rebate, by couple age, for couples with dependent children

	Couples with...							
Age of oldest adult on policy	One child		Two children		Three children		Four children	
	$\overline{p_A}$	$\overline{p_A}$-R_A	$\overline{p_A}$	$\overline{p_A}$-R_A	$\overline{p_A}$	$\overline{p_A}$-R_A	$\overline{p_A}$	$\overline{p_A}$-R_A
20-24	\$1.08	\$0.76	\$0.81	\$ 0.57	\$ 0.65	\$0.46	\$0.62	\$0.44
25-29	\$0.70	\$0.49	\$0.58	\$ 0.40	\$ 0.49	\$0.34	\$0.47	\$0.33
30-34	\$0.58	\$0.41	\$0.49	\$ 0.35	\$ 0.43	\$0.30	\$0.42	\$0.29
35-39	\$0.69	\$0.48	\$0.57	\$ 0.40	\$ 0.48	\$0.34	\$0.47	\$0.33

Notes: (i) Computed using Equation (8) and assuming that the household consists of two adult parents/guardians in the same age range, plus dependent children; (ii) based on the following assumptions: in family units three dependent children or fewer, it is assumed that all dependents are in the 0-4 years age group (this is the dependent age group with the highest expected benefit per insured), while for family units with four dependents the eldest dependent is assumed to be 5-9 years of age and the remaining three dependents are assumed to be 0-4 years of age; (iii) presented in 2006 Australian dollars (AUD1=USD0.74; 31 June 2006).

Sources: As for Table 1.

unfair individual premiums. The simulations assume that no LC penalties are incurred. Dependents are assumed, conservatively, to be in the 0-4 age range for household units with up to three dependents. This is the dependent age range with the highest expected benefit per insured. Simulations with a fourth dependent assume that the fourth child is in the 5-9 years age range. The results are presented in Table 3.

Under these scenarios, most household units face actuarially unfair but favourable prices, i.e. substantial cross-subsidisation from individuals to families with dependents is evident under the current arrangements. An obvious way to introduce greater fairness in the premium structure is to recompute family premiums as summations of fair age-based premiums for individuals. In the next section, we produce the premium multipliers that enable this to be done, given the present composition of the PHI pool.

Lifetime fairness

What alternative scheme might work, that would improve efficiency, but does not depend on harsh income tax penalties? Taking both community rating and the "Lifetime Cover" principles as institutional constraints, our answer is to impose a premium structure that creates fair *lifetime* premiums. This can be achieved for any given joining age, by solving (9) for $p_i = 1$. Furthermore, assume that cross-subsidisation from singles to families is also abolished: family premiums are determined as the summation of individual, fair, lifetime policies.

Table 4 presents (second column) the premium multipliers that, if applied for a lifetime of PHI cover, result in fair annual premia for joiners in each age group, on average.[2] It also shows (third and fourth columns) the material effects of these multipliers on premiums for two PHI products that were offered by Medibank Private Ltd in 2006. These computations suggest, for example, that children who are enrolled from birth (ages 0-4) and maintain cover would pay just over half of the community-rated premium, while individuals ages 70+ pay more than five times the community-rated (or "base" premium. Note that this penalties-and-discounts scheme means that the oldest first-joiners pay approximately ten times the premium that is paid by individuals who have held PHI since early childhood.

Interestingly, for the five-year age groups represented in Table 4, a linear regression also fits the data very well: with only a constant and age-step "trend", the coefficient of determination (R^2) is approximately 0.95. The age-based trend coefficient is 0.31. Since our regression uses five-year intervals, this coefficient suggests that an ABP (or discount, as the case may be) of the order of 6% per annum on average is a reasonable approximation to our premium multipliers. This ABP is three times the magnitude of that which currently applies under the Australian LC scheme, even when extended to individuals ages <31.[3]

[2] We assume, arbitrarily, that the lifetime horizon is 96 years.

[3] This is somewhat ironic: the ABPs were actually *weakened* recently. The ABP is now removed for late joiners after 10 years of continuous hospital table membership. Our analysis does not take account of this change, which would strengthen the incentive effects already illustrated.

Table 4: Fair lifetime premium multipliers and annual premia by joining age

Joining age	Fair lifetime premium multiplier by joining age	Estimated premiums: most basic policy (no rebate)*	Estimated premiums: most comprehensive policy (no rebate)**
0-4	0.54	$317	$787
5-9	0.55	$323	$800
10-14	0.72	$420	$1,042
15-19	1.04	$611	$1,515
20-24	1.26	$737	$1,828
25-29	1.45	$848	$2,103
30-34	1.54	$905	$2,244
35-39	1.61	$948	$2,351
40-44	1.77	$1,037	$2,572
45-49	2.11	$1,237	$3,067
50-54	2.59	$1,520	$3,771
55-59	3.19	$1,873	$4,645
60-64	3.86	$2,268	$5,625
65-69	4.52	$2,650	$6,574
70-74	5.04	$2,959	$7,339
75-79	5.38	$3,155	$7,826
80-84	5.56	$3,260	$8,087
85-89	5.66	$3,321	$8,239
90-94	5.56	$3,260	$8,087
95+	5.26	$3,088	$7,661

Notes: (i) *Based on the "First Choice Hospital" policy, with a current base premium of $586.79; (ii) **based on the the "Blue Ribbon Hospital" policy, with a current base premium of $1455.57; (iii) premium multipliers are computed by setting $p_i = 1$ in Equation (9); (iv) presented in 2006 Australian dollars (AUD1=USD0.74; 31 June 2006) .

Sources: As for Table 1.

4 Discussion

In the U.S., many states have guaranteed issue laws for the uninsured. In the individual market, high-risk individuals cannot be denied the right to purchase health insurance. For those with insurance, HIPPA regulations ensure that persons currently insured cannot be dropped or have their premiums raised to prohibitively high levels. While these laws increase access for high-risks, they may worsen the average risk profile of those insured, which may in turn drive out relatively good risks. In Australia, there is an alternative policy. There is guaranteed issue, but with an age-based penalty for those who initially buy PHI at older ages when they are relatively unhealthy. Those who maintain insurance are not subject to the tax. The Australia age-based tax scheme known as Lifetime Cover therefore has the potential to increase access for high-risks without driving out low-risks.

Our results show the limitations of the three policies intended to correct for adverse selection. In particular, the non-linear age-based tax for not maintaining PHI is too harsh on initial on initial non-purchasers and too lenient on those initially buying insurance at higher ages. Applying, for example, Herring and Pauly's (2006a) finding that high-risk older males consume approximately 8 times more benefits than low-risk males, one can easily see that a cap on the maximum difference between premiums paid of 0.7 times will not induce low-risks to purchase and maintain PHI. Indeed, it is interesting to note that our proposed premium multipliers lead to premium relativities that are of the order discovered by Herring and Pauly (2006a).

Our proposal is likely to strike protestation on equity grounds. One may, for example, object that young adults should not be captives of the historical decisions of parents (i.e., be ineligible for a discount because their parents did not buy PHI); that elderly people may be too harshly penalised by the scheme (or have earned entitlements that we do not account for); and so forth. A system of transfer payments may be an efficient way to address equity concerns of this kind.

One important limitation of our study is that the data available to us pertain to *purchasers* of PHI. One would typically expect the self-selected pool to constitute an adverse selection of individuals, although some recent evidence (Australian Bureau of Statistics 2006) suggests that the tax penalties on mid-to-high income individuals for not purchasing PHI may confound this prediction. In any event, improvements in the risk-composition of the pool would necessitate recalibrations of the age-based tax rates we have proposed here. Moreover, one would wish to base the initial calibration and recalibration on more finely disaggregated industry data than are publicly available.

Finally, the Australian government has recently increased the MLS income thresholds from \$50,000 to \$100,000 for singles and from \$100,000 to \$150,000 for couples. Our results suggest that predictions of an exodus from PHI by younger mid-to-high-income earners following this policy change are well-founded, because the prices they face for private health insurance are generally unfair. The modifications of the ABPs we propose are designed make the price of insurance fairer and encourage younger people to join and maintain PHI, without imposing punitive taxes on non-joiners.

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References

Arrow, Kenneth J. (1963). "Uncertainty and the Welfare Economics of Medical Care", *The American Economic Review,* 53: 941-973.

Australian Bureau of Statistics (2006). *National Health Survey-Summary of Results* 2004-05. Canberra: ABS.

Brown III, H. Shelton. and Connelly, Luke B. (2005). "Lifetime Cover in Private Insurance Markets", *International Journal of Health Care Finance and Economics,* 5, 75-88.

Butler, James R.G. (1999). "Estimating Elasticities of Demand for Private Health Insurance in Australia", National Centre for Epidemiology and Population Health (NCEPH) Working Paper No.43. Canberra: NCEPH.

Butler, James R.G (2002). "Policy Change and Private Health Insurance: Did the Cheapest Policy Do the Trick?", *Australia Health Review*, 25, 33-41.

Connelly, Luke B. and Brown III, H. Shelton (2006). "Lifetime Subsidies in Australian Private Health Insurance Markets with Community Rating." *Geneva Papers on Risk and Insurance-Issues and Practice,* 31, 705-19.

Hall, J., De Abreu Lourenco, R. & Viney, R. (1999). "Carrots and Sticks-the Fall and Fall of Private Health Insurance in Australia", *Health Economics*, 8, 653-60.

Herring, Bradley and Pauly, Mark V. (2006a). "Incentive-Compatible Guaranteed Renewable Health Insurance Premiums", *Journal of Health Economics*, 25, 395-417.

Herring, Bradley and Pauly, Mark V. (2006b). "The Effect of State Community Rating Regulations on Premiums and Coverage in the Individual Health Insurance Market", National Bureau of Economic Research (NBER) Working Paper. New York: NBER.

Hoffman, Catherine and Wang, Marie (2003). "Health Coverage in America: 2002 Data Update, Technical report, The Kaiser Foundation Commission on Medicaid and the Uninsured",
http://www.kff.org/uninsured/4154.cfm,
Accessed 17 September 2007. Henry J. Kaiser Family Foundation: Washington D.C.

Medibank Private Ltd (2007). "Health Cover Options",
https://secure.medibank.com.au/join/join_result.asp,
Accessed 14 February 2007. Medibank Private Ltd: Melbourne.

Private Health Insurance Administration Council (PHIAC) (2007). "Coverage of Hospital Insurance Tables Offered by Registered Health Benefits Organisations By Age Cohort",
http://www.phiac.gov.au/statistics/membershipcoverage/agecohort.htm,
Accessed 20 April 2007. Canberra: PHIAC.

Pauly, Mark V. (1970). "The Welfare Economics of Community Rating", *The Journal of Risk and Insurance,* 37, 407-418.

Pupp, Roger L. (1981). "Community Rate and Cross Subsdies in Health Insurance", *The Journal of Risk and Insurance*, 48, 610-627.

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