Lifetime Fairness? Taxes, Subsidies, Age-Based Penalties and the Price of Private Health Insurance in Australia

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Outline

1. Motivation
   - High efficiency price of "equitable" PHI
   - Improve scheme while maintaining community rating?
2. Our Contribution
   - Compute prices of PHI policies
   - Propose a fair schedule of ABPs

Background

- Australia has a universal, compulsory, tax-financed health care financing scheme ("Medicare")
- Private health insurance (PHI) is "voluntary"
- PHI coverage fell from around 80% in 1970, to 50% in 1984 following Medibank/Medicare
- Mandatory community rating of PHI was maintained

Background

- Voluntary insurance, asymmetric information: attendant problem may be adverse selection (Akerlof 1970; Rothschild and Stiglitz 1976)
- Community rating may exacerbate adverse selection
- In Australia, community-rated PHI markets experienced an adverse selection "death spiral" (Butler 2002)
    - also see Butler (1999) for an estimation of price elasticities of PHI

PHI Membership in Australia

- By December 1998, coverage had fallen to 30.1 per cent
- 1986-1998: coverage of the 70+ years-old population increased from 31.5 to 36.4 per cent, while coverage of the 25-34 years-old population fell from 46.5 to 22.1 per cent (AIHW 2000).
- The Howard Government introduced a range of measures to encourage PHI membership

PHI Policy in Australia

- Private Health Insurance Incentives Scheme (July 1997)
  - Fixed subsidies for low-income groups who take out PHI
  - Tax penalties (MLS) for high-income earners who do not
- The 30% Rebate
  - Introduced January 1999 and available to all PHI purchasers
- Lifetime Cover (LC)
  - age-based "community-rating"
  - penalties for late joiners

PHI Policy

- The LC scheme was the most effective of these policies
- Elsewhere (Brown and Connelly 2005a, 2005b; Brown and Connelly 2006) we have been critical of this scheme and proposed some alternatives
- Is there still an adverse selection dynamic?
- The MLS has, to date, held whatever dynamic still exists in check.
- Threshold increases in May 2008 budget will have an effect on pool

The Model

- Standard (EU) insurance theory: risky income distribution with mean k and a certain income k, a risk-averse individual prefers the certain income
- A risk-averse individual offered an actuarially fair premium will purchase the policy and experience a welfare gain thereby (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.

The price of insurance

- 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:

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

- 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.

Cross-subsidisation

- Unfair premiums are common for a variety of reasons
  - administrative costs, imperfect competition, asymmetric information (Rothschild and Stiglitz 1976); regulation-induced cross-subsidies (community rating)
- But there is also evidence of cross-subsidies in experience-rated markets (Herring and Pauly 2006a)
  - and of observable but unused information in such markets (see, e.g. Finkelstein et al.)

A characterisation of cross-subsidisation under insurance

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

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

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

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

- $C_l^p > \$1.00$ and $C_h^p < \$1.00$
  - i.e. for every dollar of expected benefit, *l*s pay more than one dollar and *h*s pay less than one dollar.

Characterisation of Australian PHI arrangements

- Let:
  - $\bar{z}$ represent the mean risk in the insurance pool
  - $\overline{H}$ be the mean loss
  - 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 PHI in Australia

The price of insurance, as previously defined, (2), thus becomes

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

Computation of (8) and comparison to unity is central

- Recall that price may be fair (=1), unfair but favourable (<1), or fair but unfavourable (>1)

Real lifetime annual premia

- The LC scheme is designed to attract and maintain membership of younger people
- We compute the price (actually a mean price) over the lifetime by summing across all membership periods:

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

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

(Optionally) the purchase decision

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

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

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

- compute expected income and certain income components of (9) and (10) for income levels where the tax penalties (previously) applied
  - 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))

Data

- Private Health Insurance Administration Council (PHIAC)
  1. number of members by gender and age
     - use the hospital table (only)
     - number of members by 5-year age group (to 95+)
  2. proportion of the Australian population with PHI
  3. benefits paid
  4. number of 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 3. by 1.

     Similarly, the mean cost per insured event for the (insured) members of the jth age group ($\overline{H_j}$) may be derived by dividing 2. by 1.

Data

- Medibank Private Ltd
  - insurance policies and premiums
- We use only publicly-available data: we do not know what mix of policies was *actually* purchased, by whom.

Results

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

Age	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
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

Results

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

Age	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
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
90-94	\$0.17	\$0.10	\$0.16	\$0.09	\$0.17	\$0.10

Results

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

	Mean (annual) lifetime prices		
Joining age	Persons	Males	Females
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

Results

Table 3: Simulated 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	One child		Two children		Three 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
20-24	\$1.08	\$0.76	\$0.81	\$ 0.57	\$ 0.65	\$0.46
25-29	\$0.70	\$0.49	\$0.58	\$ 0.40	\$ 0.49	\$0.34
30-34	\$0.58	\$0.41	\$0.49	\$ 0.35	\$ 0.43	\$0.30
35-39	\$0.69	\$0.48	\$0.57	\$ 0.40	\$ 0.48	\$0.34

Results

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

Joining age	Multiplier	Basic cover	Comprehensive cover
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

Results

Table 4 (cont'd): Fair lifetime premium multipliers and premia by joining age

Joining age	Multiplier	Basic cover	Comprehensive cover
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

Results

Table 4 (cont'd): Fair lifetime premium multipliers and premia by joining age

Joining age	Multiplier	Basic cover	Comprehensive cover
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

Results

- A good linear approximation to our results is a 6% ABP/ABD

Summary

- LC scheme produces prices that are unfair and there is an inherent adverse selection dynamic
- The MLS is the glue that holds the scheme together
  - the fears of an exodus from PHI are well-founded
  - (the ABPs have also been weakened recently)
- Our next work will examine the likely effect of the recent T changes on selection, premia and adverse selection
- *The paper can be downloaded from www.acerh.edu.au*