The Introduction of Ex-ante Risk Equalisation in the Australian Private Health Insurance Market: A First Step

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Abstract

In April 2007, the 'Reinsurance' arrangements in place since 1956 were replaced by a 'Risk Equalisation' scheme in the Australian private health insurance market. However, the new arrangements maintained a de facto ex-post (retrospective) claims-equalisation scheme. Equalisation transfers across competing health insurers could instead be achieved by means of a system of ex-ante prospective risk-adjusted subsidies with higher incentives for efficiency and lower incentives for selection compared to ex-post claims equalisation. This paper examines the option of introducing demographic scales for ex-ante (prospective) risk equalisation and its implications on the actual financial transfers (that is, risk-adjusted subsidies flows) across funds. The findings of this paper serve as an information basis for future policies aiming at improving efficiency and preventing selection in the Australian private health insurance market.

Introduction

The main problems with Australia's 'risk-equalisation' scheme (effectively an *ex-post*, or retrospective, claims-equalisation scheme) is the absence of incentives for efficiency, conjoined with the presence of incentives for selection in the Australian competitive market for private health insurance (PHI). A similar level of transfers across insurers could be achieved, with higher incentives for

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efficiency and lower incentives for selection, by replacing the current claims equalisation (CE) scheme with a system of *ex-ante* (prospective) risk-adjusted subsidies (that is, risk-equalisation (RE) scheme) or payments across insurers. In fact, most countries (Belgium, Israel, the Netherlands, etc.) which have introduced a centralised-finance/decentralised-delivery health system have based their 'risk-equalisation' scheme on prospective risk-adjusted subsidies supplemented, if at all, by retrospective risk-sharing arrangements (van de Ven *et al*. 2007; van de Ven *et al*. 2003; van Barneveld *et al*. 2001).

In this paper, the key research questions can be summarised as follows:

1. How to construct an *ex-ante* risk-equalisation scheme in the absence of available insurers' individual claims data?
2. What are the consequences in terms of inter-funds RE transfers (that is, risk-adjusted cross-subsidies) of modifying the current *ex-post* retrospective age-based CE into an *ex-ante* prospective demographic (that is, age/gender) RE scheme within the Australia PHI market?[2]

Section 2 provides an overview of how the Australian private health insurance market is currently regulated and examines the case for *ex-ante* risk equalisation as an alternative to the current *ex-post* CE scheme. The data and the methods adopted in our analysis are discussed in sections 3 and 4. Section 5 presents the results of several demographic scales for an *ex-ante* (prospective) risk-equalisation scheme and the implications of a transition from an age-based CE to an age/gender-based RE on the inter-funds subsidies flows (that is, financial transfers). The conclusions and the policy implications are summarised in section 6.

The case for prospective risk equalisation in the Australian private health insurance market

Regulations and subsidies in the Australian PHI

For many years following the introduction of Medicare in 1984, the proportion of PHI holders diminished from about 50 per cent to about 30 per cent in 1997, with increasing evidence of a regulation-induced selection spiral driven by community-rating with open enrolment regulations (Butler 2007; Connelly and Brown 2006; Lu and Savage 2006; Brown and Connelly 2005; Vaithianathan 2004; Butler 2003 and 2002; Hall 1999). Although the aim of community-rating

2 Demographic scales for prospective RE represent the first step towards the implementation of morbidity-based *ex-ante* risk equalisation (van de Ven and Ellis 2000).

(with open enrolment) has been to implement cross-subsidies between low- and high-risk groups, it obviously creates incentives for risk-selection. In addition, community-rating (with open enrolment) does not adequately address adverse-selection problems in competitive markets for voluntary health insurance (like the Australian PHI market) (van de Ven and Ellis 2000; Schut 1995).

Since 1997, the government has intervened in the Australian competitive market for PHI by introducing several forms of explicit subsidies with the aim of providing incentives to (low-risk) consumers to buy PHI and to support community-rating. Explicit subsidies include the 30–35–40 per cent premium rebate (that is, premium-related subsidy) to individuals who purchase PHI; a tax penalty of 1 per cent of taxable income payable by single individuals with taxable incomes in excess of $70 000 p.a. ($140 000 p.a. for couples) if they do not hold PHI (that is, the Medicare levy surcharge); and an *ex-post* (retrospective) CE scheme (that is, since 1956 referred to as reinsurance, renamed risk-equalisation in 2007). While collectively these measures finally stabilised PHI coverage at around 43% of the population since 2005, they are not optimal as they lead to the trade-offs between affordability, efficiency and selection (van de Ven and Schut 2007; Paolucci *et al*. 2006; van de Ven and Ellis 2000; van de Ven *et al*. 2000). As pointed out by van de Ven and Schut (2007), the only escape from these trade-offs is *ex-ante* (prospective) risk-equalisation. To the extent that some high-risk individuals are insufficiently subsidised, the *ex-ante* risk-equalisation payments can be complemented by one or more of the above-mentioned forms of subsidy: premium-based subsidies, *ex-post* claims-equalisation and implicit cross-subsidies enforced by premium-rate restrictions for a specified insurance coverage. The better the subsidies are adjusted for relevant risk factors, the less these complementary strategies are needed, and the less severe is the trade-off (van de Ven and Schut 2007; Paolucci *et al*. 2006).

The risk-equalisation scheme since 2007[3]

In April 2007, the reinsurance scheme introduced in 1956 was replaced by a risk-equalisation scheme. The reinsurance scheme in place until 2007 functioned as an *ex-post* claims-sharing arrangement (that is, claims equalisation) among insurers. In particular, equalisation of funds was based on 79 per cent of insurers' hospital claims costs for individuals aged over 65 and for all members (including those younger than 65) with more than 35 days in hospital during the year. The Private Health Insurance Administration Council (that is, the regulator/sponsor) received quarterly information from the health funds, calculated an average claims cost for each State[4] and calculated an average claims cost for

3 For a detailed overview of the previous reinsurance and current risk-equalisation schemes in Australia, we refer to Connelly *et al*. 2010, Armstrong *et al*. 2010, and Armstrong and Paolucci 2010).

4 Note that the Australian Capital Territory is included in New South Wales.

each fund operating in each of those States. Where funds had higher than the average claims, they received money from the reinsurance pool, and where they had lower than the State average, they paid money into the pool. The pool is a quarterly zero-sum calculation.

Although the so-called risk-equalisation scheme has replaced and modified the reinsurance scheme in many ways (see below), *de facto* it maintained the features of an *ex-post* (retrospective) claims-equalisation (CE) rather than an *ex-ante* (prospective) risk-equalisation (RE) scheme. The current CE is 'a system to share the hospital costs and some general treatment costs of high risk groups among private health insurers', with the purpose of allowing 'a more equitable treatment of health funds with different coverage of high-risk groups to support community rating' (PHIAC 2007). First the Age-Based Pool (ABP) has been introduced with the purpose of matching more closely the increase in claims by age and, in particular, it replaces the two age-bands (+/- 65 years old) of the reinsurance scheme with a set of eight age groups with varying proportions of the claims cost increasing with the age of the claimant (see Table 1).

Table 1: From the 'old two age-bands system' to the 'new ABP'

Age	% of claims-costs pooled under 'Reinsurance'	% of claims-costs pooled under 'Risk-equalisation'
0–54	0%	0%
55–59	0%	15%
60–64	0%	43%
65–69	79%	60%
70–74	79%	70%
75–79	79%	76%
80–84	79%	78%
85–89	79%	82%
90–94	79%	82%
95+	79%	82%

The pooling of claims costs for all individuals with hospitalisation in excess of 35 days in a 12-month period was replaced by a High Cost Claims Pool (HCCP), where benefits in excess of $50 000 in a 12-month period are pooled (after the operation of the age-based pooling). In practice, the HCCP shares the costs of high-cost claimants where they are not otherwise shared by the ABP. The HCCP was implemented to protect small funds from large claims in lieu of genuine excess-loss compensation schemes (van de Ven and Schut 2007; Paolucci *et al*. 2006). Risk equalisation transfers about $50 million per quarter among the health funds. PHIAC expects this to grow as the insured population continues to age (PHIAC 2007).

The old reinsurance scheme only included hospital costs, whereas from 2007 these costs are eligible for pooling within the *ex-post* (retrospective) CE scheme: hospital benefits, hospital substitute benefits, chronic-disease management program benefits, and high-cost claimants' benefits *(Division 69, Private Health Insurance Act 2007)*.

The construction and operation of ex-ante risk equalisation

The construction of *ex-ante* prospective RE scheme by the regulator consists of three parts:

(a) the choice of risk adjusters; namely, the characteristics of the enrolees and of the insurers which best predict future healthcare expenditures. This choice is shaped by statistical considerations, data availability, social norms regarding responsibility (for example, smoking) and discrimination/affirmative action (such as minorities' health), and the need to minimise the information asymmetry between the insurers and the regulator.

(b) the creation of optimal cost groups; namely, where the variance in cost between groups is maximised and variance within groups is minimised.

(c) setting the prospective capitation rates (relative-risk scale) for the (exhausting and mutually exclusive) groups defined by the set of the risk adjusters chosen.

Ideally, the set of risk adjusters includes socio-demographic and health status characteristics of the enrolees, which are risk factors likely to be used by insurers for risk selection or to risk-rate premiums in the PHI market,[5] modified, maybe, by public health considerations. In reality, this set is unknown to the regulator, and the risk-based grouping of the population for the calculation of the risk-adjusted subsidies depends on the availability of data, the statistical skills and the sophistication of the regulator. In most countries, the set of risk adjusters adopted by the regulators includes demographic characteristics (such as age and gender), and in some countries health status indicators (for example, Diagnostic Cost Groups and Pharmaceuticals Cost Groups in the Netherlands). The prospective rates are ideally calculated from actual costs of a representative sample of the enrolees as reported by the insurers using individual claims data. At least during the first years after the introduction of a risk-equalisation scheme, the insurers' individual claims data are not readily available in most countries — either because of technical and IT difficulties or because of the

5 Although premium rate restrictions (i.e. community-rating per product per insurer) have been applying already for a long time as a regulatory tool to prevent insurers from risk-rating in the Australian private health insurance market, there is anecdotal evidence of premium differentiation via product differentiation (Paolucci 2008).

insurers' reluctance to provide commercial data. In such cases, other sources reporting on healthcare utilisation by the population together with individual characteristics can be used.

The introduction of *ex-ante* (prospective) risk equalisation and the improvement of the current formula by adding to age other sensitive risk factors such as gender (that is, a demographic model), even without using insurers' individual claims data, would be largely beneficial in terms of reducing insurers' incentives for risk selection and would, overall, increase efficiency and affordability compared to the current *ex-post* (retrospective) risk equalisation. *Ex-ante* risk equalisation is based on the notion of a 'standardised person'. Demographic scales (that is, age/sex) can be derived, first, by calculating the age–/ex-specific means ('the cell method') of the measure of cost (utilisation), and then by dividing them by the overall mean. The 'standardised person' (SP) is the average which is indicated by 1 (SPs). The scale values indicate to how many SPs every person is equivalent, according to her age and sex. This approach is convenient for policy purposes, since it separates between the size of the budget and the budget ('voucher') per SP, on the one hand, and the risk-adjusted allocation of the budget among the insurers, on the other. In some cases, 'total medical care costs' are unavailable, while the available data include utilisation of specific services (for example, visits to the dentist, to GPs, inpatient hospital nights, and so on).

An overall scale is calculated in the following way. Suppose there are two health services covered by PHI — hospitalisations and GP visits. Denote the unit cost of an inpatient day by p_s and the unit cost of a visit to a GP by p_b. If the yearly mean number of hospitalisation days in the risk-equalisation group i is s_i and the mean number of visits to GPs is b_i , the mean total cost in group i is given by $c_i=p_s s_i+p_b b_i$. Similarly, the grand mean cost in the population is $c=p_s s+p_b b$, where s and b are the mean yearly hospitalisation days and visits to GPs in the population. The total relative scale is:

$$c_i/c = (p_s\, s_i+p_b\, b_i)/\,(p_s\, s+p_b\, b) = v_s\,(s_i/s) + v_b\,(b_i/b)$$

$$\text{where } v_s = \; p_s\, s/(p_s\, s+p_b\, b) \text{ and } v_b = p_b\, b\,/(p_s\, s+p_b\, b).$$

In other words, the scale is a weighted average of the service-specific scales in physical quantities, with the weights being the relative share of the cost of the service in total cost. The total budget for allocation among insurers is predetermined according to society's priorities and definition of acceptable costs (that is, costs to be reimbursed, Schokkaert *et al*. 2006), and is allocated among insurers according to the insurers' shares in total standardised persons. According to the Australian *ex-post* claims-equalisation scheme, a certain percentage of the claims (the percentage is increasing with age) is virtually collected into the Risk Equalisation Trust Fund (REF), and then allocated to the

insurers according to their market shares. The fundamental difference between *ex-ante* risk equalisation and *ex-post* claims equalisation (that is, the current Australian RE scheme) is that in *ex-ante* risk equalisation the total budget is set *a priori* according to society's priorities, and is allocated to the insurers according (and only) to the age (and potentially other predetermined risk-factors) structure of their populations. *Ex-post* claims equalisation re-distributes a 'budget' set exogenously, mainly made of the age-based contributions of all insurers, which are derived from the *actual* claims (costs) according to market share. The age structure of the populations determines the contribution rather than the transfer. The percentage contributions define quite arbitrarily the socially 'acceptable costs' out of total costs (benefit paid) which flow in the pool to be re-distributed across funds.

Data

Since insurers' individual-claims data are not publicly available and individual records on the use of public healthcare are segmented between Medicare, the States and the Commonwealth, preventing linkage on the individual level in the near future, risk equalisation in Australia can at present be based only on scales derived from available breakdowns of the utilisation of health services and benefits by State, age and sex. While it is agreed that demographic scales are not sufficient to remove the incentives for selection (van de Ven and Ellis 2000), international experience shows that for reasons related to data availability and social and political acceptance, the implementation of a new *ex-ante* risk-equalisation scheme should begin with (socio-) demographic scales (van de Ven *et al*. 2003). After the accumulation of some experience and the development of IT and individual level databases, one can search for sophisticated health-based scales (Stam *et al*. 2010).

In the following sections, we derive the demographic scales of an *ex-ante* RE system based on three public data sources (PHIAC 2007; AIHW 2006–07; and the NHS 2004–05) with the purpose of selecting the 'preferred' scales to adopt in further elaborations of the current risk-equalisation scheme in Australia. While the AIHW and the NHS data refer to the entire Australian population, PHIAC data refer to the insured population (about 45 per cent of the Australian population voluntarily chooses to purchase PHI).[6] Although the most relevant population for the purposes of risk equalisation among insurers is represented by PHI holders, it is also subject to changes in insurance ownership patterns over

6 PHIAC 2007, 2008.

time, and therefore the derived scales would need to be verified and updated often. Since at present CE is done by State, we present the scales by State as well. The NHS data, however, are too small to derive State-specific scales.

To simulate the implications of replacing the current *ex-post* (retrospective) age-based CE scheme with an *ex-ante* (prospective) RE scheme on the financial transfers across funds (that is, inter-funds risk-adjusted subsidies payments based on age and gender), we use PHIAC aggregate data (2007) on health insurers' actual benefits (that is, claims costs).[7]

Risk equalisation scales in Australia using publicly available data

Scales derived from PHIAC data

The data available from PHIAC include the number of hospital days, episodes (separations), fees and benefits, and the number of services used, fees and benefits for the general treatment policies. For the overall scale we used the sum of benefits for hospitals and treatments policies.[8] We used the number of hospital policy owners (9.4 million) as the relevant population size.

Figure 1 presents the four hospitalisation scales for men and women.

Up to age 75, all the scales are approximately similar. Above age 75, the scales based on days in hospital increase rapidly, while the scale based on episodes stabilises on 4 among men and 2.5 among women. The fees and benefits scales are in between. We note that if inpatient care is paid for by prospective per-case methods (DRG), the benefits should follow closely the episodes scale. If reimbursement is based on per-diem, the benefits should follow the day-scale. A possible explanation for the gap is that 'days' include long-term hospitalisation which is not covered, or is covered only partially, by the private insurers.

7 Most insurers (30 out of 39) formally authorised PHIAC to allow us to access aggregate (age-gender groups) health expenditures data per insurer for hospital care and general treatment services. The remaining nine insurers were treated as one insurer to cover the entire market.

8 Doing so, we introduced a slight inaccuracy to the calculation, since the owners of hospitals policies and of general treatments policies do not match exactly. Data on ownership of each type of policy by age and sex and state are not available, but using total population data from 2007 indicates that the inaccuracy is small: out of 10.8 million insured, 9.0 million have both policies, 0.4 million own hospital policy only, and 1.4 million persons own general treatments only.

Figure 1A: PHIAC hospitalisation scales: Men (1=mean)

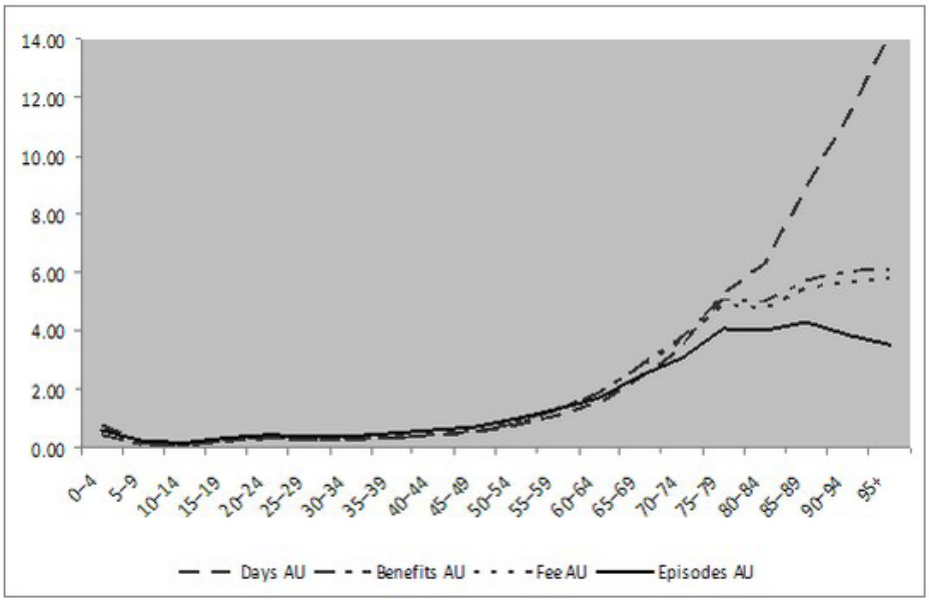


Figure 1B: PHIAC hospitalisation scales: Women (1=mean)

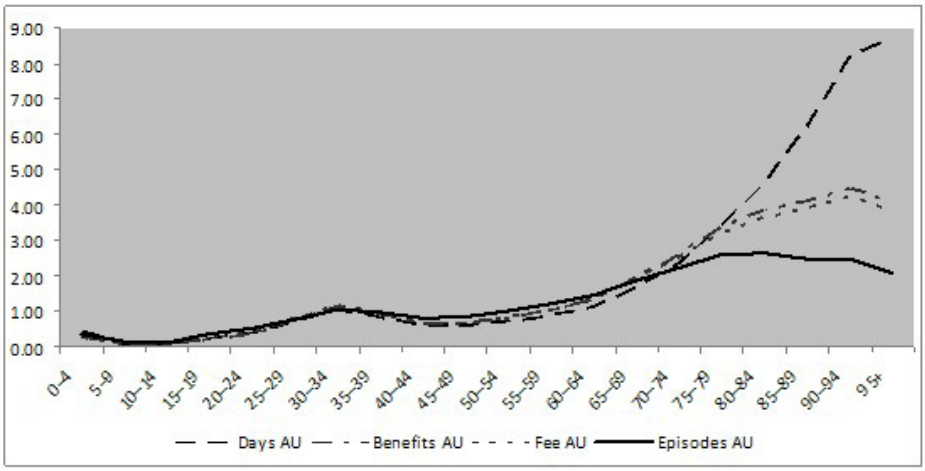


Figure 2A: PHIAC general treatments scales: Men (1=mean)

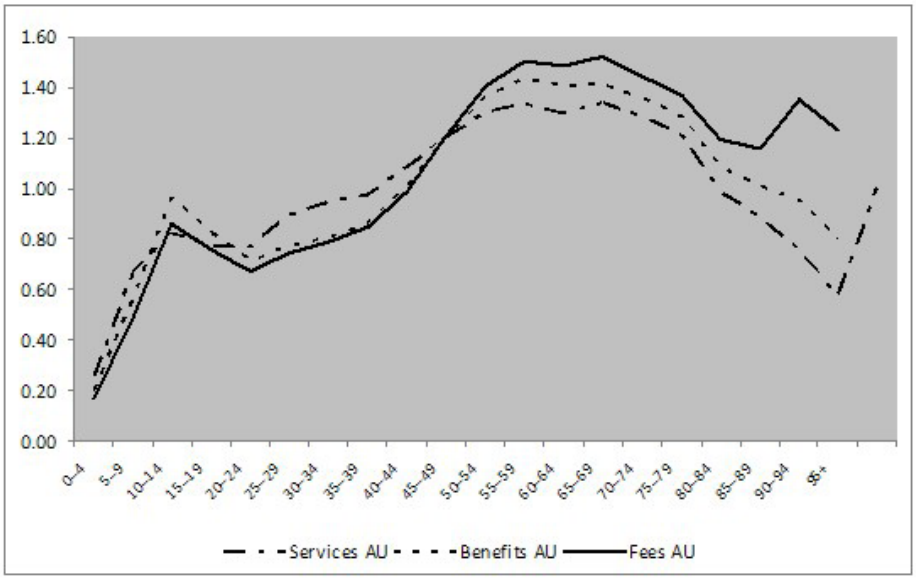


Figure 2B: PHIAC general treatments scales – Women (1=mean)

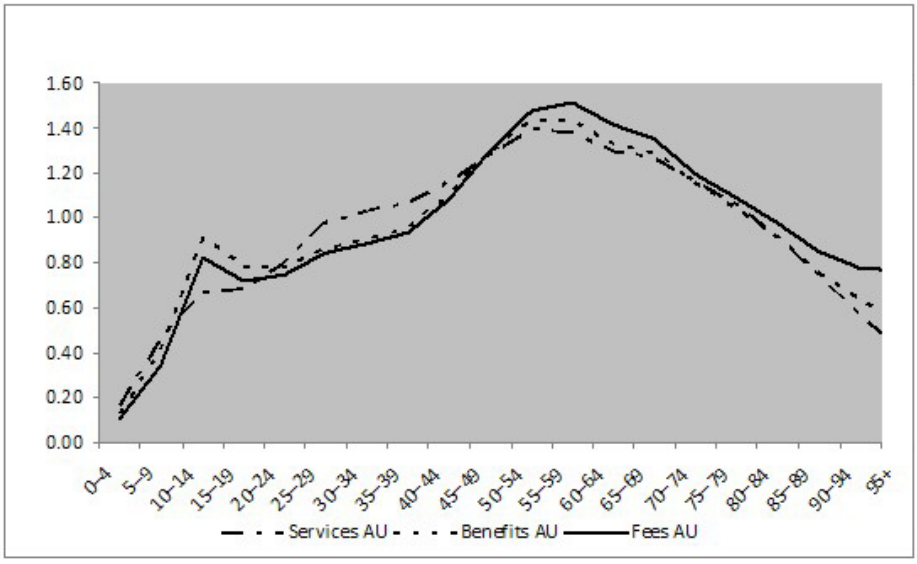


Figure 2 presents the three general treatments scales: number of services (episodes), benefits and fees.

The scales are quite similar below age 80, particularly for women. The higher scale for fees indicates the relatively higher co-payments paid by elderly persons. We chose to focus subsequently on the benefits scale.

Scales derived from NHS 2004–05 data

Although suffering from recall problems and other biases, population surveys on use of services have been used extensively for risk adjustment (Stam *et al*. 2010). The relatively small number of persons prevented the calculation of state-specific scales, and the age groups were enlarged to 10-year intervals. We built service-specific scales for dental care visits, visits to GPs and specialists out of hospitals, in hospital outpatient visits (ER, same-day admissions), and inpatient overnights. In order to combine these into an overall scale, we used cost weights that were obtained from AIHW (2006) and were modified to the services discussed, as indicated in Table 2:

Table 2: Adapted costs weights (AIHW 2004–05)

Dental care	9.9%
Out-of-hospital services (GPs, specialists, other medical)	22.6%
In-hospital outpatient visits (ER, same-day admissions)	35.2%
Inpatient overnights	32.3%
Total	100.0%

Figure 3 presents the scales for men and women separately using weighted data.

Figure 3A: National Health Survey (2004/05) Service-specific and overall scales: Men (1=mean)

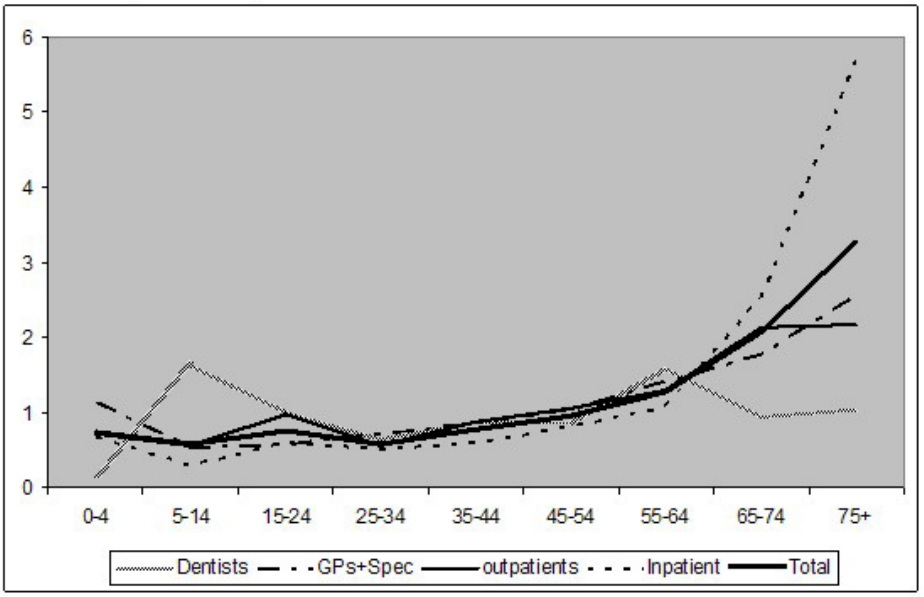
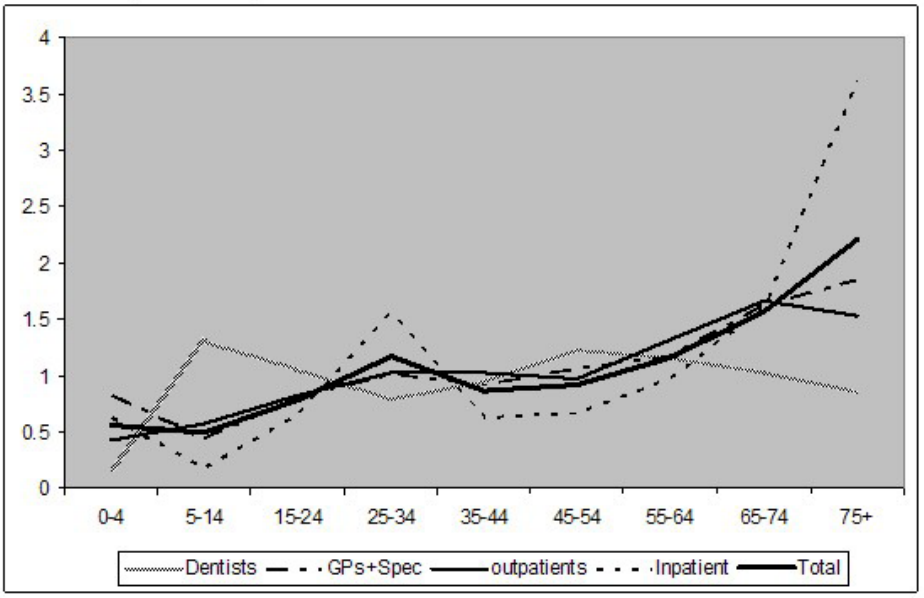


Figure 3B: National Health Survey (2004/05) Service-specific and overall scales: Women (1=mean)



Scales from other sources

Other scales can be derived from AIHW 2006–07 data (that is, hospitalisation scales) and from Medicare-MBS 2005–06 data. The AIHW data include separations (episodes) and days in public and private hospitals by age, sex and state, including one-day admissions. The scales for TAS, ACT and NT include public hospitals only (the AU scales include all hospitalisations, however). The NT scales are unreliable due to small cells and were disregarded. The MBS data include benefits such as medical and surgical care and services, X-rays, laboratory tests, electro-cardiograms, and so on. Unfortunately, the PBS data are not available by age and sex.

Comparisons: Hospitalisation-days scales and overall scales

Figure 4 brings together the inpatient-days scales calculated from PHIAC, AIHW and NHS. The AIHW and NHS scales were 'stretched' to fit the PHIAC's detailed age groups. Up to age 75, the scales are remarkably close. For some reason, women aged 25–40 in the NHS report more inpatient days. Above age 75, among men, the PHIAC and AIHW scales are quite close, considering the truncation of the AIHW scale. Among women aged 80+, the AIHW scale is much higher than that based on PHIAC data. As discussed previously, the gap might be explained by long-term care days for uninsured women.

Four overall scales emerge: the PHIAC scales, which are based on benefits; the NHS scales, which are based on aggregating service-specific use scales; the MBS-Inpatient Days scales and the MBS-Inpatient Separations scales. The latter two are based on aggregation of the MBS scales with the AIHW inpatient scales of days and separations respectively. The weights used in this aggregation are 65 per cent for inpatient care, and 35 per cent for the MBS care (AIHW, Health expenditure by area of expenditure, 2005–06). Figure 5 presents these scales, together with a fifth overall scale, which is taken from Table 8.10 of Australia Health 2008.

Figure 4A: Combined inpatient-days scales:Men (1=mean)

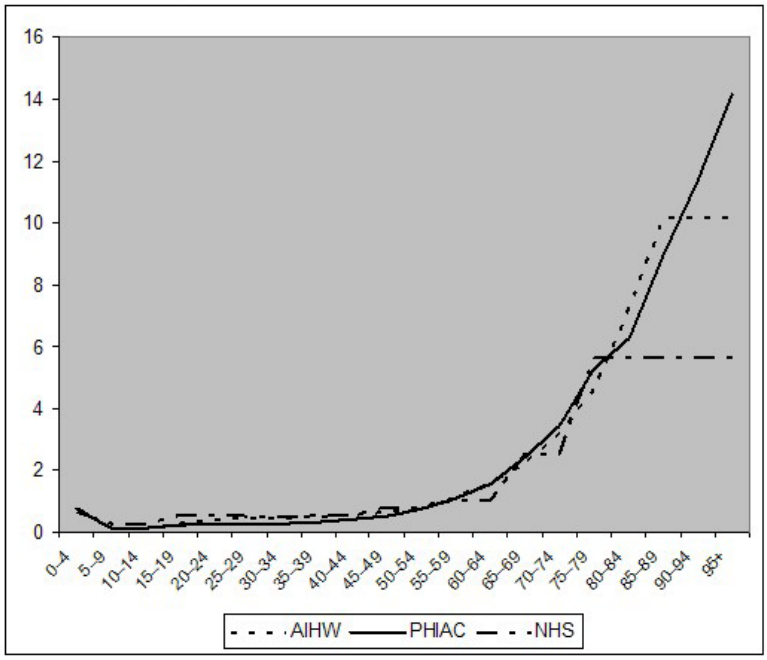


Figure 4B: Combined inpatient-days scales: Women (1=mean)

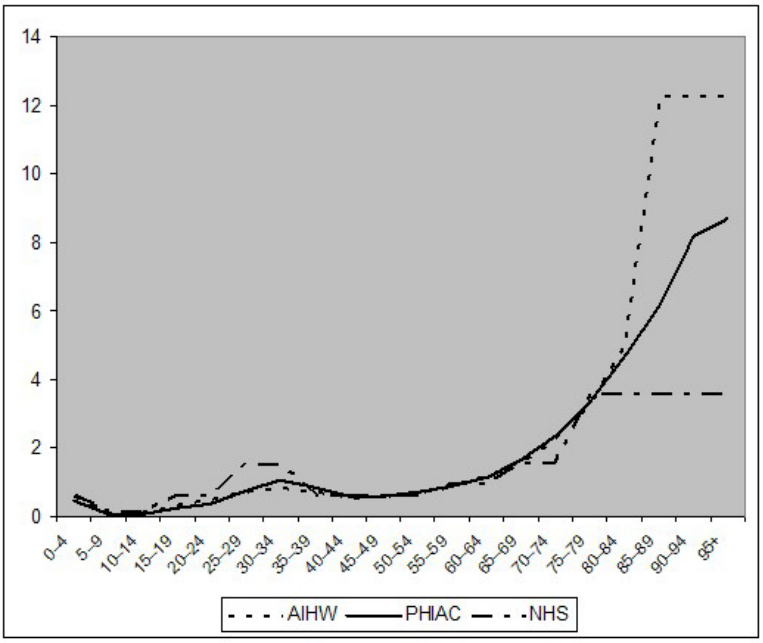


Figure 5A: Overall scales: Men (1=mean)

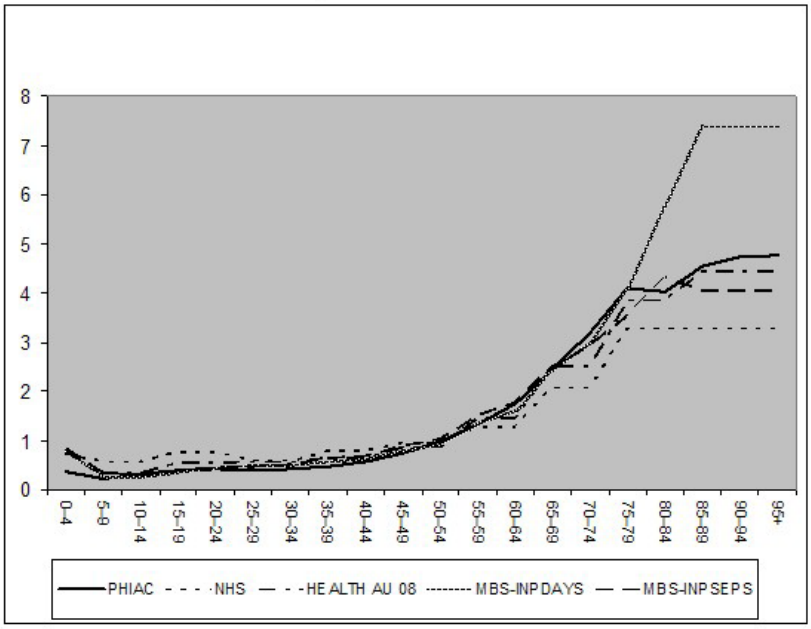
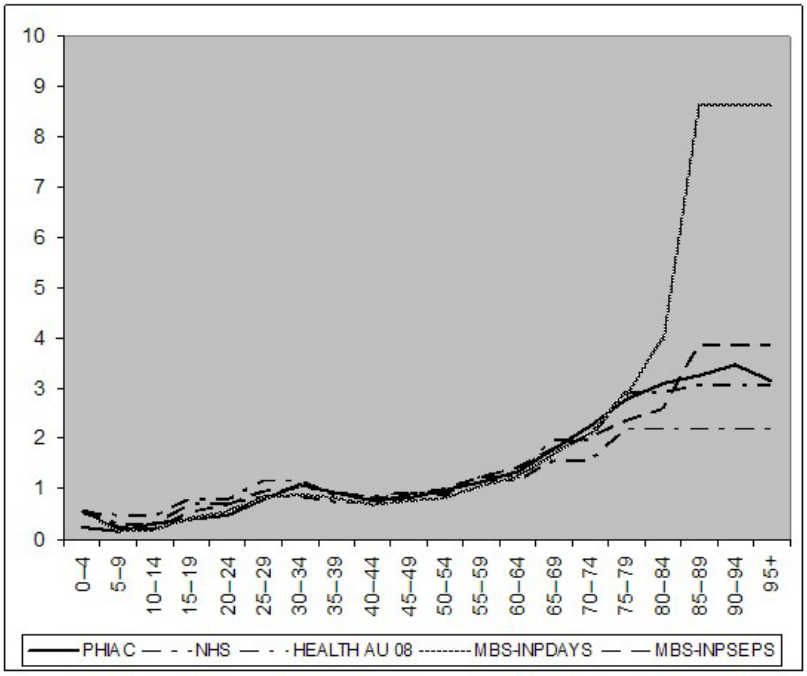


Figure 5B: Overall scales: Women (1=mean)



This scale is based on 'allocated expenditures by diseases' that covers about 65 per cent of total health expenditures (excluding hospital non-admitted patient care, community health, public health, administration, other health practitioners, transport, aids and appliances).

Up to age 60, all scales for both men and women are quite close. Above age 60, the NHS scale is considerably below the others. Up to age 75, the four remaining scales are quite similar; but above age 75, the MBS-INPDAYS scale takes off rapidly, while the PHIAC, MBS-INPSEPS and HEALTH AU 08 scales remain close to each other.

The critical question, therefore, is whether inpatient days or inpatient benefits or separations represent more accurately the resources devoted to inpatient care. If it is inpatient days, the MBS-INPDAYS scales should be adopted. Alternatively, either of the two remaining scales (PHIAC or MBS-INPSEPS) is appropriate and can be used as demographic scales for prospective RE in Australia.

The effects of the introduction of ex-ante risk equalisation on inter-funds transfers

Based on the above overall age-gender scales and the current ABP (age-based pool; that is, RE using age as the only risk factor) allocation of benefits (that is, claims costs), we simulate the effect of moving towards *ex-ante* RE on the benefits share for selected insurers in each State and in Australia as a whole. Specifically, we use the overall scales based on PHIAC data (2007) to calculate the number of standardised persons for each insurer in each State. The post-RE benefits share is the share of standardised persons per insurer on the total of standardised persons in each State and in Australia; and the pre-RE benefits share is the original distribution of benefits across the insurers. The post-RE ABP-based benefit share is the pre-RE benefits share modified by the ABP transfers. The gain or loss for each insurer is the difference between the *ex-ante* RE size of benefits and the benefits resulting from the ABP distribution. We note that the total budget (the sum of the original benefits across insurers) always remains constant.

From Table 3 it is clear that a transition from the current *ex-post* CE to an *ex-ante* RE scheme will result in gainers and losers among insurers. The identity of these gainers and losers differs across States.[9] In total Australia, about two-thirds of the funds would lose from the transition from CE to RE and the financial losses at the fund level would range from -$1.781 ($I_{15}$) — that is, 0.01 per cent of the total budget (= $21.156.000) — to -$548.222 (I_{18}) — that is, 2.6 per cent of the total budget (where I_i indexes the identity of insurers operating in the Australian PHI market). The remaining one-third of the funds would gain from the transition and the financial gains would range from $2.823 ($I_{29}$) — 0.013 per cent of the total budget — to $345.725 ($I_{30}$) — 1.63 per cent of the total budget. The main gainers (among the insurers included in this simulation) will be insurers I_{30} (= $345.725), I_{17} (= $321.303) and I_{14} ($92.565). The main losers will be I_{18} (-$548.222), I_{13} (-$137.748) and I_4 (-$93.285).

9 For reasons of space we haven't included the transfers at the State level, which might be made available upon request to the authors.

Table 3: Effect of switching from *ex-post* CE to *ex-ante* RE on inter-funds transfers at the national level in Australia (population and benefits are for 30.6.08, PHIAC data)

FID[1]	Pre-RE benefit shares (%)[2]	Post-RE ABP benefit shares (%)[3]	Post-RE Ex-ante benefit shares (%)[4]	Gain/ Loss (000 AU$)*[5]
I1	0.141	0.154	0.107	-10.057
I2	0.159	0.195	0.082	-24.089
I3	1.361	1.011	1.280	56.965
I4	3.414	3.876	3.435	-93.285
I5	0.057	0.069	0.042	-5.741
I6	0.476	0.537	0.379	-33.524
I7	0.168	0.192	0.116	-16.177
I8	1.353	1.259	1.610	74.194
I9	0.373	0.267	0.250	-3.612
I10	0.073	0.062	0.079	3.639
I11	0.441	0.448	0.435	-2.704
I12	0.415	0.363	0.352	-2.450
I13	16.839	17.987	17.336	-137.748
I14	27.954	28.615	29.053	92.565
I15	1.687	1.466	1.458	-1.781
I16	0.313	0.294	0.253	-8.789
I17	5.481	4.476	5.995	321.303
I18	10.533	10.859	8.267	-548.222
I19	1.940	1.699	1.830	27.697
I20	0.170	0.188	0.141	-10.128
I21	0.559	0.537	0.422	-24.334
I22	0.423	0.521	0.261	-54.996
I23	0.082	0.104	0.058	-9.645
I24	0.347	0.285	0.245	-8.486
I25	1.976	1.784	1.994	44.439
I26	0.428	0.453	0.397	-11.744
I27	0.085	0.087	0.062	-5.206
I28	0.630	0.598	0.803	43.369
I29	0.038	0.028	0.041	2.823
I30	22.085	21.583	23.217	345.725
TOTAL	100.000	100.000	100.000	0.000

[1] Funds identity.
[2] Share of claims per fund prior to the operation of the current ex-post claims-equalisation scheme.
[3] Share of claims per fund after the operation of the current ex-post risk-equalisation scheme.
[4] Share of claims per fund after the operation of the new ex-ante risk-equalisation scheme.
[5] Financial gains/losses per fund per quarter resulting from the transition from ex-post to ex-ante.
* PHIAC scale-based benefit share - ABP benefit share.

The 'new' redistribution based on *ex-ante* demographic RE matches the age–gender structure better than under the current *ex-post* CE, reducing the incentives for selection. Considering that according to RE the total benefits are taken as an *ex-ante* budget, incentives for efficiency will also be increased.

Conclusions

In this paper, we examine several options for an *ex-ante* (prospective) risk-equalisation scheme and its implications on the inter-funds subsidies flows. Since individual claims data are not publicly available, we analyse aggregate age/sex-based scales derived from PHIAC data; and scales derived from the National Health Morbidity Data (AIHW); from Medicare (MBS); and from the National Health Survey (NHS). From these sources we calculate several risk-adjustment demographic scales, to derive the 'preferred' scales to use in further elaborations of the risk-equalisation scheme in Australia. The choice of preferred scale depends on whether inpatient days or inpatient benefits or separations represent more accurately the resources devoted to inpatient care. If it is inpatient days, the preferred scale is MBS-INPDAYS, otherwise either of the two remaining scales (PHIAC or MBS-INPSEPS) is equally appropriate and can be used for a prospective risk-equalisation scheme in Australia.

Although risk equalisation in Australia can be improved at present only using demographic scales derived from publicly available data on the utilisation of health services, it is clear that demographic scales are not sufficient to remove the incentives for risk selection by the insurers (van de Ven and Ellis 2000). The next crucial step is to derive the scales for other potential relevant risk factors, such as health-based scales. These scales could be derived by linking state hospital data and expenditure data with federal medical and pharmaceutical expenditure data at the individual level. For instance, Donato and Richardson (2006) report on an exploratory inquiry into the Australian application of the US version of the diagnostic cost groups (DxCGs) risk-adjustment method to a large Australian hospital inpatient data set (1996–97 and 1997–98) for New South Wales.[10] Their study focuses on the potential usefulness of individual-level risk-adjustment methods for validating measurement of performance across healthcare providers and for allocating resources efficiently and equitably across population groups of different area health services (AHS) in New South Wales. In line with studies performed in other countries, they find that diagnosis-based

10 Although Donato and Richardson (2006) has been the first study on risk adjustment in Australia based on a large hospital data set, previous studies on the topic have been conducted by Duckett and Agius (2002) and Anthioc and Walsh (2004).

risk adjustment offers the potential to refine measures of case-mix adjustment of population groups, providing a more reliable assessment of the efficiency of different AHS (in NSW) compared to age/sex demographic methods.

The combination of inpatient hospital diagnostic information with pharmaceutical and self-assessed health status information has been shown to perform significantly better than demographic and/or inpatient-only models alone (for example, in the Netherlands — see Stam *et al*. 2010).

In particular, the introduction of ex-ante (prospective) risk equalisation and the improvement of the current formula (that is, based on more sensitive risk factors than those currently adopted, such as gender), even without using insurers' individual claims data, would be largely beneficial in terms of reducing insurers' incentives for risk selection and would increase overall efficiency compared to the current *ex-post* (retrospective) CE.

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