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The Relative Efficiency of The Private Health Insurance Rebate v. Direct Public Health Expenditure

Alastair Furnival, David Cullen, Catherine McGovern & Henry Ergas

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Level 34 Suncorp Place, 259 George Street, Sydney NSW 2000

T +61 (0)2 9234 3883 E alastair@evaluate.net.au

W evaluate.net.au

Authors

Alastair Furnival and Catherine McGovern are Principals at Evaluate.

Dr David Cullen AFCHSM FRSPH FRSS is Adjunct Professor of Health Economics at the National Centre for Social and Economic Modelling at the University of Canberra.

Professor Henry Ergas AO is Professor of Infrastructure Economics at the University of Wollongong's SMART Infrastructure Facility.

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Executive Summary

This paper seeks an answer to the question: is a dollar spent by government via private health insurance (PHI) more or less efficient than a dollar spent directly in the public system?

There are multiple dimensions to this problem, and a survey of literature shows competing views. However, there are reasonable grounds for believing that the gains to consumer welfare from subsidising PHI are no less than, and may be greater than, those from putting more money into the public system.

This is not a comparison of quality or outcomes in the public and private systems. Rather it is a review of expenditure efficiency.

For context we look at the history of PHI in Australia, which is substantially longer than the history of universal public care. From that, we note that – far from being a novel activity – the use of PHI subsidy by Australian Governments has a history that extends back to the first part of the 20th Century.

Prior to the introduction of Medicare, this led to insurance coverage amongst Australians of up to 80% of the population, which provided for high standards of healthcare, albeit with a minority relying to some extent on charitable or uncompensated care.

From there, we look at the economic effects of PHI on two fronts.

First, we consider allocative efficiency, which looks at the overall effect of health expenditure through direct purchase: dollar for dollar expenditure by the Commonwealth.

Here we find that there are some respects in which health expenditure via the PHI Rebate is more efficient than direct expenditure through the public system. At the heart of this finding is the fact that because of user-funded premiums, PHI makes a lower call on the public purse, and hence avoids some of the deadweight costs of taxation.

Secondly, we look at the welfare effects of spending a marginal dollar variously: in the public system; via the PHI Rebate; or as a user-payment from private consumers.

We measure welfare gains as a reduction in the opportunity cost of waiting for care: bypassing queues is the principal role of payments made by PHI; and the shift in demand to insured care reduces the waiting time of public patients.

The results of this analysis show that there is a greater welfare gain from the PHI rebate than from marginal investment in public care. In other words, holding everything else constant, redirecting a dollar of public expenditure from the PHI rebate to public hospitals would reduce efficiency. This result seems reasonably robust to changes in the modeling parameters used in the analysis.

We note that where extras are a stapled component of PHI including hospital insurance, there can be sound policy reasons for applying the rebate to them. Primary among those reasons is the role of extras in attracting relatively young and healthy consumers. In the absence of those consumers, charges would likely have to rise, though we do not quantify the costs and benefits of alternative scenarios in that respect.

Finally, we make some observations on the broader value of PHI, beyond the marginal effects.

Introduction

The question we consider in this paper is whether a dollar spent on healthcare via private health insurance (PHI) is more or less efficient an investment in the Australian healthcare system than a dollar transferred into the public health system. This is in turn an evaluation of the economy-wide efficiency of the PHI Rebate.

In 2014, the Commonwealth Government's National Commission of Audit (NCOA) opined:

> *A rise in the share of the nation's income devoted to health care is not necessarily a matter of policy concern as long as the expenditure is cost effective, used efficiently, and the benefits outweigh its opportunity cost (including the excess burden of the taxes raised to pay for the expenditure).*[1]

This question of cost-effectiveness is what we are testing here. In doing so – as suggested by the Commission – this paper is indifferent to the actual scale and mix of healthcare expenditure as long as it is productive.

The preliminary hypothesis was that marginal returns on health expenditure should be roughly equal, with greater gains available from inframarginal effects. By the marginal effects, we refer to gains which occur from the direct application of insurances, to relieve pressure on the public system. And by inframarginal, we refer to the broader benefits of having competing systems, such as the impact competition can have on innovation and experimentation.

The expectation that there would be little marginal gains from preferring either social or private insurances assumed that supply constraints would limit short-term competitive gains whereas, in the longer term, competition should raise the productivity and quality of all providers.

It is important from the outset to emphasise that our interest is in the effects of financing choices rather than hospital selection. These are not identical: the use of PHI in public hospitals is an increasingly widespread practice, though it may be ill-conceived, because it undermines the primary goal of the insurance model, which is to support a separate and competing system; and there continues to be substantial purchase of private hospital services by Commonwealth and State Governments in order to decrease waiting times and lists.[2]

Having looked specifically at the differential effects of 'social health insurance' and PHI, we find that the positive marginal welfare effects of funding via private insurance exceed those of public health finance.

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[1] National Commission of Audit. (2014). *Towards responsible Government*, Appendix 1-9.3, p.194. http://www.ncoa.gov.au/report/appendix-vol-1/9-3-pathway-to-reforming-health-care.html , accessed 27 July 2017.

[2] In 2014-15, 10.1% of expenditure in public hospitals was funded by health insurers, premium rebates, out of pocket costs and other non-government sources (including compensation schemes) — in particular, private health insurers (including premium rebates) accounted for 3.1% of expenditure in public hospitals. Conversely, 12.8% of expenditure in private hospitals was funded by governments, not including premium rebate expenditure – this represents the direct purchase of private hospital services by government. Some 4.0% of all government hospital funding (purchases of services), not including premium rebate expenditure, was in private hospitals. See: Australian Institute of Health and Welfare. (2016). Health Expenditure 2014-15. Table A3.

This is not simply a matter of the discounted Government contribution to care which occurs via PHI: we are primarily interested in comparing dollar for dollar rather than relative share of costs (although this is also considered).

Rather, welfare gains are due to effects on waiting times and the demand characteristics of health consumers. Welfare gain measures are critical to provide a true picture of whether scarce resources, particularly tax revenues, are being allocated efficiently.

Traditional comparisons between different levels of health expenditure look at expenditure as a percentage of gross domestic product (GDP) which can be misleading. For example, World Bank data from 2014 shows that 9.4% of Australian GDP (from all sources) is spent on health compared to 9.1% for the United Kingdom; and 17.1% for the United States.[3] However, expenditure should not be regarded as a good indicator of healthcare access, outcomes, or equitable distribution. In particular, there is widespread confidence that an Australian in need of urgent surgical intervention will be more readily assured of access than a US resident.

For Australians, equity of access is a central expectation of the health system, alongside quality and effectiveness: notwithstanding that it may require competing suppliers as well as some means-testing. To this end, we start from a point of indifference to the broad mix and consumption across the system, rather focusing on what changes in funding patterns would deliver greater marginal gains.

We are naturally aware that there remain ideological biases toward different healthcare models at all corners of politics. However, we share the view that:

> *The debate on private vs. public seems anachronistic … It is no longer a question of private vs. public but rather, "what is the best and most efficient mix for the local context?"*[4]

Our conclusion is therefore not that all public expenditure should be reallocated to one sector or another, which would be unlikely to be desirable even in a greenfield environment. However, we do believe there is compelling evidence that subsidising PHI is at least at the margin more welfare-maximising than re-diverting such monies to the public sector.

Why PHI?

At this point, we pause to briefly comment on what private health insurance actually does, and what are its goals. This is important, as it informs the succeeding methodologies for examining whether Government contribution via the PHI Rebate is efficient in terms of those goals.

First, it is well-understood that Government funding for hospital services is limited, mostly by a combination of: the population's tolerance for taxation; and, the expectation that tax income will be spent on a mix of services, not just healthcare.

[3] World Health Organization. (2017). Global Health Expenditure database. http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS, accessed 27 July 2017

[4] Hsu, Justine. (2010). *The relative efficiency of public and private service delivery*. World Health Report (2010) Background Paper, No.39: p.5.

The consequence of this is a requirement for rationing: in hospital care, this is done via waiting lists. The fact that care in public hospitals does not attract a user charge may lengthen the waiting lists, to the extent to which it induces moral hazard by consumers or health care providers.

There are welfare losses from waiting lists, and substantial costs associated with maintaining the quality of life of those in the queue.

Conversely, PHI allows insured persons the choice of opting out of the waiting list, and being treated more expeditiously, in a private hospital. At the same time, they receive some other benefits, including doctor selection.

There is a mix of public and private benefits here. The private benefits are captured in the insured patient's experience: having rapid treatment; peace of mind from having selected a service provider; potentially avoiding comorbidities or longer recovery associated with treatment delays.

This may be paid for by a mixture of PHI and out-of-pocket copayments.

There are also public benefits associated with this activity. Some of these are related to the private experience: patients receiving timely interventions will have less time out from workforce participation[5]; and earlier intervention may save costs in the future.

However, the broad public benefit is a reduction in the length of the public waiting list. This is measured in our paper as a welfare gain, associated with shorter waiting times. Again, some of this is a private benefit (individual patients in the public space being treated more quickly) and some of it is shared (reduction in interruptions to workforce participation, and reduction in non-hospital health costs).

This combination of private and public benefits from PHI is why there is merit in some public participation in PHI funding, to increase the rate of insurance across the population.

History of Private Health Insurance in Australia

In investigating the history of PHI in Australia, we have identified a theme common in both literature and, most likely, with the broader community also. Government involvement in, and support for, the PHI sector is frequently positioned as a recent phenomenon, and one closely associated with the reforms introduced by the Howard Coalition Government in its early years.

In reality, Australian Government support and involvement in PHI significantly pre-dates this period. Current health financing arrangements reflect the blending of social and voluntary insurance which have underpinned Government's subsidisation of health throughout the second half of the twentieth century.[6] This demonstrates the long term view of the value delivered by the sector to the Australian health system and the centrality of the values of choice and access which it underpins.

[5] Time out of the labour force is not in itself a welfare cost, if it reflects a choice to consume more leisure. However, illness forces involuntary leisure, which is a cost. There is also a tax wedge, so higher involuntary leisure imposes a broader cost on third parties in the form of lower tax receipts.

[6] Cullen, David, *Review of the Pricing Arrangements in Residential Aged Care: Historical Perspectives.* Background Paper 4, Commonwealth of Australia, 2003.

The early years

The forerunners of today's private health insurers can be found in the activities in the 19th century friendly societies: not-for-profit 'self-help' financial organisations and mutual funds that pre-dated most welfare provisions by governments, and aimed to support individuals during times of need through mutual self-funding. Many of these organisations – often called 'mutuals' – operated in Australia in the 1800s and continued into the early 20th century.[7]

During the years between the two World Wars - particularly during the 1930s - this system came under stress, as did the free doctor services provided to poor patients through charitable hospitals. This decade also saw the emergence of hospital or medical based health funds, such as the Hospital Contributions Fund of New South Wales (HCF) in 1932.[8]These years also saw various Governments – the Cook Government in 1913, the Bruce/Page Government in 1928 and the Lyons Government in 1938 – consider the introduction of government-run social insurance schemes although these did not progress into practice.[9]

Post-World War II

The post-World War II period saw the establishment of a more extensive social services system under the Menzies Government. This expansion was informed by the Government's approach establishing a 'partnership between the government and the individual through the union of governmental aid and voluntary effort'[10] and included the introduction of the Voluntary Health Insurance (VHI) scheme established by the *National Health Act 1953.*

Under this system, existing insurers acted as agents for the VHI scheme and received subsidies from the Commonwealth in the form of benefits and underwriting of the claims by the chronically ill.[11]

The VHI subsidies had a crowding-out effect by ensuring non-subsidised products could not be price-competitive, making it nearly impossible to conduct health insurance outside the scheme: only not-for-profit organisations that met the Department of Health's prudential requirements were permitted access to the VHI scheme.[12] In addition, during this period, PHI contributions became tax-deductible. This system of fiscal advantages and financial incentives existed until 1974.[13]

The *National Health Act 1953* also established Australia's system of community rating for PHI together with open enrolment.

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[7] Private Health Insurance Administration Council (PHIAC). (2015). *Competition in the Australian Private Health Insurance Market*. Research Paper 1, June 2015.

[8] HCF. (2017). *2016 Year in Review*. https://www.hcf.com.au/content/dam/hcf/pdf/about-us/2016%20Year%20in%20Review.pdf, accessed 18 July 2017.

[9] Cullen, David, *Review of the Pricing Arrangements in Residential Aged Care: Historical Perspectives.* Background Paper 4, Commonwealth of Australia, 2003.

[10] Cullen, David, *Review of the Pricing Arrangements in Residential Aged Care: Historical Perspectives.* Background Paper 4, Commonwealth of Australia, 2003.

[11] Private Health Insurance Administration Council (2015). *op. cit.*

[12] Scotton, RB and MacDonald, CR. (1993). *The Making of Medibank.* School of Health Services Management, University of New South Wales, Australia.

[13] Colombo, F and Tapay, N. (2003). *Private Health Insurance in Australia: A Case Study*. OECD Health Working Papers No. 8, OECD, 30 October 2003.

Under community rating, insurers are not permitted to charge differential premiums to individuals based on any risk factor, such as age, gender or health status. This has the result that all individuals holding the same PHI product living in the same State pay the same premium for that product. In addition, private health insurers are not permitted to refuse cover to any individual regardless of their risk or other status.

By prohibiting risk-rated premiums, and preventing insurers from refusing customers, these regulations can induce insurers to engage in potentially inefficient 'risk selection', whereby they seek to discourage high risk consumers and attract low risk consumers through the design of insurance options. At the same time, they can induce adverse selection by customers, older and more ill Australians will have a higher expected return on their premiums. In those ways, they compound the difficulties PHI faces in competing with an alternative product—coverage through the public system—that is provided on an uncharged basis. Maintaining a viable PHI industry in the presence of these distortions has required a range of public policy interventions, ranging from rebates to Lifetime Health Loading (discussed below).

Towards a mixed public/private model

In 1970, PHI coverage reached a national peak of 80%.[14] By the time of the Whitlam Labor Government's election in 1972, however, there was a significant impetus towards the establishment of a national social health insurance scheme following the implementation of similar programs in Europe during the period of post-war reconstruction.

Medibank was intended as: "a universal, compulsory, publicly-administered and funded health insurance scheme."[15] The dismissal of the Whitlam Labor Government and the subsequent election of the Fraser Coalition Government saw a significant restructure of Medibank with the universal system of cover dismantled and a return to a substantially PHI-funded model supported by public subsidies.

At the same time in 1976, Medibank Private, managed by the Health Insurance Commission, was established as a government owned private health insurer, operating in all states and territories. Private health insurance coverage, which had fallen during the period of Medibank's operation, rose sharply after the discontinuation of Medibank Mark II in 1981,[16] and tax rebates for PHI were introduced.[17] Coverage in the early 1980s was between 55% and 68% of the population.[18]

The election of the Hawke Labor Government in 1984 saw the establishment of Medicare, the second iteration of a universal, publicly funded national insurance scheme. This remains the major funder of Australia's health care system.

[14] Quinn, C. (2002). *The Pasts and Futures of Private Health Insurance in Australia*. NCEPH Working Paper Number 47, National Centre for Epidemiology and Population Heath, The Australian National University, December 2002.
[15] Private Health Insurance Administration Council (2015*). op. cit.*
[16] Quinn, C. (2002). *op. cit.*
[17] Colombo, F and Tapay, N. (2003). *op. cit.*
[18] Australian Bureau of Statistics. (2001). 'Health expenditure: Private health insurance'. *Australian Social Trends, 2001*. http://www.abs.gov.au/AUSSTATS/abs@.nsf/2f762f95845417aeca25706c00834efa/0aaf3311ebcd3646ca2570ec000c46e4!OpenDocument, accessed 19 July 2017.

Following the introduction of Medicare, subsidies for PHI ceased, following the earlier removal of tax rebates for PHI in 1983.[19] PHI coverage dropped sharply to 50% and coverage then continued to fall slowly but reasonably consistently over the next ten years.[20]

A number of policy initiatives were introduced to address the fall in PHI coverage, recognising its perceived value and broad population cover.[21] Initiatives included:

- The introduction of requirements in 1988 compelling funds to enable portability by recognising waiting periods already served by policy holders moving between insurers;
- Changes to minimum insolvency requirements in 1988; and,
- Changes to the Medicare Levy in 1995.[22]

At the same time, a number of other events in the broader economy were acting to generate a perfect storm for PHI: a situation that led to additional and significant changes in how Government approached private insurance.

1996 – the 'perfect storm'

Economic downturns in the 1990s, following the 1980s banking crises, drove funding cuts to public hospitals, particularly in Southern Australia. Further, the introduction of 'casemix' funding and its operation as a savings measure meant that public hospitals were under significant pressure, with safety and quality issues being regularly raised both in the media and more generally.

The economic downturns also impacted the private sector, with PHI becoming largely unaffordable for average families as unemployment rose and real wages stagnated or even fell. Community rating acted to compound this issue as older (or sicker) individuals paid the same premium as younger, healthier members. Given that individuals could join PHI funds at any point of their lives, including when they were older and almost certain to lodge claims exceeding the value of their premium, community rating resulted in young people in PHI attracting premiums exceeding their true risk.

Given that this provided little or no incentive for younger people to hold PHI, many of them exited the sector. Adverse selection (the deterioration in the quality of the insured pool as healthier consumers opt out) in turn reduced the effectiveness of risk pooling and increased the premiums required to cover the sicker population retaining their insurance.[23]

The intersection of these conditions created the elements of a 'perfect storm': with premium increases rising rapidly; leading to a further fall in the number of lower claiming members whose premiums were in fact essential to the wellbeing of the sector. Premium rises above ten percent became common, sometimes several times within a twelve-month span, leading to more members dropping their cover. This downward

[19] Colombo, F and Tapay, N. (2003). *op. cit.*
[20] Quinn, C. (2002). *op. cit.*
[21] Colombo, F and Tapay, N. (2003). *op. cit.*
[22] Private Health Insurance Administration Council. (2005). *op. cit.*
[23] Colombo, F and Tapay, N. (2003). *op. cit.*

spiral threatened the very existence of the PHI sector with only about 30% of the population holding hospital cover by 1997.[24]

Stabilising the private health insurance market – a package of reforms

That the system was in crisis was recognised by the Howard Coalition Government which introduced a number of measures designed to support the PHI sector, while providing room for the public hospital sector to stabilize.

There was significant concern regarding the impact of falling PHI coverage on the sustainability of public hospitals with then Minister for Health and Ageing, the Hon Dr. Michael Wooldridge, stating in a submission to a Senate Inquiry that:

> *...the health of the publicly funded health sector depends upon a vital private sector. Having some six million Australians with PHI directly pays for around one-third of the costs of hospital care in Australia. If there were no private sector, the extra costs borne by the taxpayer would simply be unsustainable.*[25]

The packages of reforms introduced as a result of these concerns fundamentally took two forms: financial incentives based around subsidies and taxation; and incentives which ameliorated premium rating restrictions. At the same time, it was assumed that incentivising a broader population base back into PHI would allow for a better balanced risk pool, and therefore fewer and lower premium rises.

The packages were introduced over time with some of the earlier initiatives further developed and replaced over time.

The Private Health Insurance Incentive Scheme (PHIIS)

- A tax rebate or reduced premium

In July 1997, the PHIIS was introduced as a government-funded reduction in the cost of PHI premiums for those individuals in the lowest income band. This reduction could be accessed in one of two ways, either as a tax rebate for the individual or as a reduced premium. This was an early form of means testing.

- The Medicare Levy Surcharge (MLS)

In addition to the rebate or reduced premium, the PHIIS also introduced an additional contingent incremental Medicare levy for those in the highest income band who did not hold private health hospital insurance.

This meant that, for single people earning over $80,000 and families with incomes over $180,000, their mean rate of taxation would increase by an additional 1% increment if they failed to take out private insurance. As identified by the Department of Health, the MLS is essentially ‘a tax on people that earn over

[24] Quinn, C. (2002). *op. cit.*
[25] The Hon Dr. Michael Wooldridge, quoted in: Quinn, C. (2002). *op. cit.*

a certain amount and don't have PHI hospital cover'.[26] It is separate from the normal Medicare Levy and is positioned as an incentive and savings measure, not a revenue measure.

Hospital Purchaser Provider Agreements

Hospital Purchaser Provider Agreements had been introduced in 1995, following the passage of the *Health Legislation (Private Health Insurance Reform) Amendment Act 1994*.[27] Designed to allowed private health insurers to negotiate with hospitals to pay them above the Medicare Benefits Schedule (MBS) fee where there was an agreement for in-hospital medical services, the intent of these Agreements was to facilitate simplified billing practices and, critically, enable the elimination of out-of-pocket costs for patients.[28] Changes to the Hospital Purchaser Provider Agreements were made in April 1998 to help achieve its objective of reducing medical gaps experienced by consumers.[29]

The Australian Government Private Health Insurance Rebate

The PHI rebate, effective from January 1999, was a universal rebate of 30% on PHI premiums. Funded by the Government, those with PHI could access the rebate either as a reduced premium or as a tax rebate. The 30% rebate replaced the earlier means-tested PHIIS rebate and was designed 'to help people meet the cost of PHI'.[30]

In 2005, the PHI rebate was increased for people 65 to 69 years old from 30% to 35%, and to 40% for people 70 years old and over. The changes applied to both new and existing PHI members.

Lifetime Health Cover

Lifetime Health Cover (LHC) "is a Government initiative that began on 1 July 2000. It was designed to encourage people to take out hospital insurance earlier in life, and to maintain their cover throughout their life."[31] This was done by permitting (making) health insurers to charge differential premiums based on the members' age at the time they first took out private hospital cover.

Lifetime Health Cover regulations mean that anyone who takes out PHI pays a loading of 2% on their premium for each year of age they are over 30. No loading exists for those who hold private health insurance prior to their 30th birthday.

This loading lasts for ten years from the time that the insurance is first purchased and is capped at a maximum of 70%. For example, someone taking out PHI for the first time the day after their 45th birthday would attract a 30% loading on their premium and pay an incremental 30% of the listed premium price each year for the following ten years.

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[26] The Department of Health. (2017). 'Private Health Insurance', http://www.health.gov.au/internet/main/publishing.nsf/Content/private-1, accessed 20 July 2017.

[27] Health Legislation Amendment (Private Health Industry Measures) Bill 2002, Bills Digest No. 143 2001-02, http://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/bd/bd0102/02bd143 (accessed August 2017).

[28] Australian Bureau of Statistics. (2001). *op. cit.*

[29] Health Policy Solutions, 'Impact of the changing role of private health insurers on clinical autonomy', 11 November 2015, https://www.surgeons.org/media/22316534/HPS-Report-Health-Insurance-and-Clinical-Autonomy-Nov-2015.pdf, (accessed August 2017).

[30] The Department of Health. (2017). *op. cit.*

[31] The Department of Health. (2017). *op. cit.*

As a grandfathering effect, those who held cover before 1 July 2000, later extended to 15 July 2000, were exempt from paying the Lifetime Health Cover regardless of their age at that date. This operated effectively as an amnesty or grace period for those taking out new cover prior to the 15 July date.

No-gap or known gap products

No-gap or known gap products were introduced in July 2000 in order to encourage health funds to offer policies that either enabled members to avoid paying out-of-pocket expenses or allowed them to know in advance what those out-of-pocket costs would be. Unless private health insurers introduced one or more policies involving a no-gap or known gap, they were not permitted to offer members access to the 30% PHI rebate as a premium reduction.[32]

Impact of these reform measures

The impact of the reform measures was significant and immediate. In the March quarter of 2000, private health insurance coverage was 32% for hospital insurance and 33% for ancillary insurance. Over the June quarter of that year, coverage rose significantly with hospital coverage reaching 43% and ancillary coverage 39%. The September quarter saw a continued increase with those with hospital coverage reaching 46% and those with ancillary cover to 41%.

This rise in coverage resulted in an additional 415,200 people aged 30 years and over covered by PHI by September 2000, compared to June of the same year. Notably only 11,300 of those people were paying higher premiums as a result of the Lifetime Health Cover regulations.[33] This indicates the major impact this policy had on people's decision to invest in PHI, with the vast majority taking up insurance during the amnesty period.

In 2006, the Explanatory Memorandum for the *Private Health Insurance Bill 2006* stated that the 30% Rebate; the increased rebate for older Australians; Lifetime Health Cover; and the No-Gap and Known Gap arrangements had 'helped ensure a viable and sustainable private health sector, while also improving the capacity of the public hospital system to deliver services to the Australian community'.[34]

Variations to the regulatory regime over time

Since the initial changes enacted by the Howard Government, a variety of measures have been introduced that have changed the original reform package. The majority of these relate to regulatory changes regarding the rebate, with the aim of restraining government expenditure and most were announced by the Rudd Labor Government in the 2009-10 Budget.

At the time, the Government argued that the measures would also make the operation of the PHI rebate fairer and financially sustainable while supporting consumer choice in health care. Since its introduction,

[32] Australian Bureau of Statistics. (2001). *op. cit.*
[33] Australian Bureau of Statistics. (2001). *op. cit.*
[34] The Parliament Of Australia, House of Representatives. (2006). *Explanatory Memorandum – Private Health Insurance Act 2006 (and others),* http://parlinfo.aph.gov.au/parlInfo/download/legislation/ems/r2673_ems_45c273f9-92b8-4faa-b9ee-17ca60e182e0/upload_pdf/307054%20a.pdf;fileType=application%2Fpdf, accessed 19 July 2017.

the cost of the PHI rebate had grown steadily and, in 2010–11, cost $4.7 billion.[35] In the same year, the percentage of the population covered by private hospital health insurance was 45.3%.[36]

Means testing the rebate

In the 2009-10 Budget, the Australian Government announced its intention to introduce income thresholds at which different rebate levels would apply: essentially a means test on access to the PHI rebate. This affected not only those Australians in receipt of the 30% rebate but also those older Australians who received the higher 30% or 40% rebate levels if their income was within the new thresholds.

As a result, individuals would no longer universally receive the 30% originally introduced in 1999 but rather would, depending on their income level, receive a 30%, 20% or 10% rebate or, for those over the highest income threshold, no rebate at all.[37]

This change was estimated to save $6.78 billion over four years and commenced on 1 July 2012.

Changing the Medicare Levy Surcharge

In the same Budget, the Government proposed changes to the MLS with a sliding scale related to income. As a result, those on higher incomes without insurance were liable to pay higher penalty contributions, ranging from the original 1% levy to new rates of 1.25% or 1.5% depending on income level.

Removal of the rebate from Lifetime Health Cover loading

Announced at the same time as the above two measures, the Australian Government also advised that that they would remove the part of the PHI rebate then payable on the Lifetime Health Cover loading. This commenced on 1 July 2012 and was estimated to save $386 million over four years, since at that time 1,052,994 people in Australia had a Lifetime Health Cover loading payable on their PHI.[38]

As at March 2017, some 1,058,409 people were subject to a Lifetime Health Cover loading; the number of people subject to the LHC loading decreased by 89,855 over the preceding 12 months. Over the year, 125,050 people had their loading removed after paying a loading for ten years.[39]

Indexation of the rebate to the Consumer Price Index

The Government also announced that the rebate on PHI would be indexed against either the Consumer Price Index (CPI) or the level of the premium increase, whichever is lower. This initiative, which commenced

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[35] Biggs, A. (2011). *Legislation to means test the private health insurance rebate re-introduced – debate continues*. Parliamentary Library, http://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/FlagPost/2011/July/Legislation_to_means_test_the_private_health_insurance_rebate_re-introduceddebate_continues, accessed 20 July 2017

[36] Private Health Insurance Administration Council. (2011). *Annual Report 2010-11 – The Operations of Private Health Insurers.* http://www.apra.gov.au/PHI/PHIAC-Archive/Documents/Annual-Report-on-Operations-2010-11-web-version.pdf, accessed 21 July 2017.

[37] Biggs, A. (2011). *op. cit.*

[38] Cabinet document, 'Removal of the Australian Government Rebate on Private Health Insurance from Lifetime Health Cover Loadings', https://www.health.gov.au/internet/main/publishing.nsf/Content/foi-disc-log-2013-14/$File/Document%2010%20-%20removal%20of%20rebate%20on%20PHI%20from%20LHC%20loadings.PDF, accessed 21 July 2017.

[39] APRA. (2017). Private Health Insurance Quarterly Statistics, March 2017. http://www.apra.gov.au/PHI/Publications/Pages/Quarterly-Statistics.aspx, Accessed 27 July 2017.

on 1 July 2014, affects lower and middle income earners and, as a result, the value of the 30% rebate is dropping each year.

For low income earners, what was previously a 30% rebate on their PHI is now effectively a 26% rebate[40] and this will also apply at other tiers of the rebate. The effective value of the rebate will continue to fall as a percentage while health inflation and premium increases remain above CPI.

Freezing income thresholds at 2014-15 levels

Income thresholds for rebate eligibility and the MLS are frozen at 2014-15 levels through 2017-18, saving a projected $370.9 million between 2018-21. The saving arises from bracket creep.

In 2014, the Abbott Coalition Government announced that the income thresholds then applying to the Medicare Levy Surcharge and PHI Rebate would not be indexed for three years, from 1 July 2015 to 30 June 2018. Until this point, the income thresholds had been indexed annually to account for the rise in income needed to meet inflation. In announcing that the indexation would be frozen for three years, the Budget said the savings made would be invested in the Medical Research Future Fund.

In the 2016-2017 Federal Budget, the Turnbull Coalition Government announced a continuation of the indexation freeze for a further three years. This means it will be in operation at current levels until 30 June 2021.

Current Situation

The impact of the above changes has been to slow the growth of the cost to the Commonwealth of the PHI rebate and, given that the number of people eligible for a rebate will fall over time, expenditure on the rebate is forecast to continue its decline.

In July, the Australian Competition and Consumer Commission released its annual report to the Australian Senate regarding the PHI industry. The report confirmed that affordability is a significant concern for consumers with 61% of people who had allowed their PHI to lapse citing the cost of premiums. Real household expenditure on PHI premiums was identified as having increased by 19.7% between 2006 and 2014 and above-CPI premium increases have occurred in every year since that time.

The clear issue here is that savings taken by the Government via bracket creep are contributing to a reduction in the affordability of PHI.

The ACCC report also cited *Online Research Unit* research that 21 per cent of survey respondents plan to relinquish or reduce their PHI cover in the following 12 months with 66% considering that their current policy was too expensive.

In addition, consumers are both shifting to lower-cost policies that have lower benefits, and ceasing to hold PHI altogether: with a 0.42% decline in the number of people holding hospital or combined cover. The report cited Australian Prudential Regulation Authority (APRA) figures that, in June 2015, 47.37% of the Australian population held private hospital or combined health insurance but by June 2016 that percentage

[40] Private Health Insurance Ombudsman, 'Australian Government Private Health Insurance Rebate', http://www.privatehealth.gov.au/healthinsurance/incentivessurcharges/insurancerebate.htm, accessed 22 July 2017.

had fallen to 46.95%.[41] The decline is continuing, with APRA reporting 46.5% of the Australian population holding private hospital or combined health insurance in March 2017.[42]

The ACCC also found that at the same time as the number of people with coverage was decreasing, the level of hospital benefits paid by health insurers per person increased by 4.2%, along with a 2.9% increase in general benefits per person. At the same time, average out-of-pocket expenses rose by 6.9% for episodes of hospital care.

Statistics from the Australian Prudential Regulation Authority indicate that hospital benefits paid by private health insurers increased from $13.3 billion in the twelve months to 30 June 2015 to $13.4 billion for the twelve months to 30 June 2016.[43] This is a slight drop in real terms, with total outlays falling less quickly than the decrease in the population covered.

[41] Australian Competition and Consumer Commission. (2016). *Report to the Australian Senate On anti-competitive and other practices by health insurers and providers in relation to private health insurance for the period 1 July 2015 to 30 June 2016*. https://www.accc.gov.au/publications/private-health-insurance-reports/private-health-insurance-report-2015-16, accessed 21 July 2017.

[42] Australian Prudential Regulation Authority. (2017). *Private Health Insurance Quarterly Statistics, March 2017*. http://www.apra.gov.au/PHI/Publications/Pages/Quarterly-Statistics.aspx, accessed 27 July 2017.

[43] Australian Prudential Regulation Authority. (2016). *Private Health Insurance Quarterly Statistics, June 2016.* http://www.apra.gov.au/PHI/Publications/Documents/1608-QSR-20160630.pdf, accessed 21 July 2017.

Methodology and Analysis

Current rates of subsidy

The PHI rebate varies by income, age and family status. It has been means tested since 2012 and rates have been consistently reduced over recent years. Current and recent rates are shown in Table 1 below.[44]

Table 1: PHI Rebate Rates for Past Two Years

Status	Income thresholds			
	Base tier	Tier 1	Tier 2	Tier 3
Single	$90,000 or less	$90,001 – $105,000	$105,001 – $140,000	$140,001 or more
Family	$180,000 or less	$180,001 – $210,000	$210,001 – $280,000	$280,001 or more
Age	Rebate for premiums paid 1 July 2016 – 31 March 2017			
Under 65 yrs	26.791%	17.861%	8.930%	0%
65–69 yrs	31.256%	22.326%	13.395%	0%
70 yrs or over	35.722%	26.791%	17.861%	0%
Age	Rebate for premiums paid 1 April 2017 – 30 June 2017			
Under 65 yrs	25.934%	17.289%	8.644%	0%
65–69 yrs	30.256%	21.612%	12.966%	0%
70 yrs or over	34.579%	25.934%	17.289%	0%

The principle behind the variable rebate is one of simple means testing. We note that means testing private health without means testing public care is a potential source of inefficiency as it makes consumption of public care even cheaper in a relative sense, skewing consumption decisions. However, the political limits to copayments in the public sector are well understood.

[44] https://www.ato.gov.au/individuals/medicare-levy/private-health-insurance-rebate/income-thresholds-and-rates-for-the-private-health-insurance-rebate/?anchor=Incomethresholdsfor201516201617and201718#PHIincomethresholds Downloaded July 2017

We also note that the rebate can be taken as either a discount to insurance premiums (Government payment to the insurer) or as a tax offset. While there may be some differential transaction costs between these choices, they are presumed to be small and therefore this paper does not account for them.

Finally, it also appears that health inflation is predominantly outside the control of health insurers: given the constraints provided by both Government premium caps and a falling market for PHI, we would expect that if insurers had substantial market power, they would be able to push back against higher medical supply costs. There are few signs of this occurring. As a policy matter, it would therefore make sense to look more closely at addressing the factors driving overall health inflation, rather than simply premium increases.

Allocative efficiency: return on investment

Our primary interest in this paper is the efficiency of Commonwealth Government finance for hospital-based healthcare in Australia. While we consider some issues of technical efficiency of the hospital sector itself, the focus here is on the question of marginal return on expenditure.

Our initial set of equations are prior considerations of what the Commonwealth is buying through its contribution: from these, we move the economic effect of those contributions.

The direct per-separation price for Commonwealth funding of public hospital care under activity based funding (ABF) is:

(1.1) $$AP\,^{N}_{Sep}(1+M)$$

Note that Average Price (***AP***) is used here rather than Marginal Price as there remain obvious supply constraints, so the marginal price would be expected to be higher. This is also consistent with the prevailing activity-based funding (ABF) approach to public hospital transfers. The $\boldsymbol{AP\,^{N}_{Sep}}$ would ideally be a weighted average taking into account events priced by the National Efficient Price (NEP) and the National Efficient Cost (NEC) which are set by the Independent Hospital Pricing Authority (IHPA). The former is for large hospitals and the latter for small or regional centres. It may also include purchases by the Department of Veterans' Affairs (DVA) and other agencies. This may include some purchases from private hospitals.

Throughout this paper, for notation, ***N*** (national) is used to indicate public (uninsured) healthcare, and ***P*** for care covered at least in part by private insurance.

M is the marginal excess burden of taxation, which is discussed in greater detail below.

The direct price of a PHI-funded episode of care is simply:

(1.2) $$AP\,^{P}_{Sep}$$

which may include some public hospital expenditure, i.e., insured patients in public hospitals.

For the purposes of this paper, we presume that there is no practical difference between the direct prices $AP\,^{N}_{Sep}$ and $AP\,^{P}_{Sep}$. In 2009, the Productivity Commission found that, despite substantial variance between States, the average cost for a casemix-adjusted separation was $4,302 in a public hospital and $4,172 in a public hospital.[45]

This is close to parity. Further, without access to the National Minimum Dataset which is limited to Government,[46] there is little capacity to draw conclusions as to whether the two prices have materially diverged since the Productivity Commission undertook its analysis. Accordingly, we will treat these as being in a 1:1 ratio ($\boldsymbol{AP\,^{N}_{Sep} = AP\,^{P}_{Sep}}$). Given that Governments are substantial purchasers of private hospital

[45] Productivity Commission. (2009). Public and Private Hospitals, Research Report. p.102

[46] Described here, but nil reports: http://www.health.gov.au/internet/main/publishing.nsf/Content/health-casemix-data-collections-about

services as well as public hospital, some convergence of prices might happen in any event, if governments outsourced treatments to the private sector when it has a substantial cost advantage.

The public cost of a single PHI-funded separation is given by:

(1.3) $$A\varepsilon_{Sep}^{P}[1 + M]$$

where $\boldsymbol{A\varepsilon_{Sep}^{P}}$ is the average dollar share of the rebate per separation in dollars, given by the total annual expenditure on the PHI Rebate divided by the number of separations covered at least in part by PHI. The public cost would not occur for separations for patients with PHI who receive hospital care without using their insurance (though the government would bear that cost in the form of a higher payment to public hospitals).

So, the first comparison is the direct cost between Commonwealth purchase of hospital services via the States and Territories, and the public cost per separation funded in part by the PHI Rebate.

This ratio will predictably be greater than 1, as Equation 1.1 where the Government pays full cost is always greater than 1.3 where it pays only part.

This reflects the baseline equity and efficiency policy goals of Commonwealth health funding. In particular: the introduction of means testing combined with Lifetime Health Cover and the Medicare Levy Surcharge together act as a proxy for means testing free hospital access against taxable income; and the greater allocation of funding for public v. private health service reinforces the needs-basis for funding policy.

This is essentially an accounting comparison, not a comparison of efficiency per dollars spent. For the latter, we need to consider the administrative costs of public v. private insurances.

This is our first comparison of efficiency rather than simply public expenditure. It is important because, when we look at allocation of money from the Treasury via private providers, we are naturally concerned as to its full economic cost.

So, taking into account both relative expenditure as well as the operating costs of the private sector, our comparison here is given by[47]:

(2.1) $$\frac{AP_{Sep}^{N}\left(\frac{1}{1-D_N}\right)(1+M)}{AP_{Sep}^{P}\left(\frac{1}{1-D_P}\right)\left\{1-A\psi_{Sep}^{P}+\left[A\psi_{Sep}^{P}(1+M)\right]\right\}}$$

where:

> $\boldsymbol{A\psi_{Sep}^{P}}$ is similar to the calculation of $\boldsymbol{A\varepsilon_{Sep}^{P}}$ except that it is the average public share of the PHI component per separation expressed as a *percentage*, rather than a dollar amount. It is equivalent to the average rate of the rebate as a percentage of PHI premiums (for products including hospital cover);

[47] See Appendix B for further explanation of the effect measured in this equation

$\boldsymbol{D_N}$ and $\boldsymbol{D_P}$ are the respective administrative costs of public health expenditure and PHI, with the latter expected to be higher; and,

$\boldsymbol{M}$ is the marginal excess burden of taxation (MEBT) which is the primary deadweight loss associated with public revenue raising, and is expressed as an incremental fraction per dollar of taxation.

The examination here is whether the higher administrative costs of payment via PHI are outweighed by the opportunity cost to the economy from the deadweight loss of Commonwealth revenue raising.

The test is whether the quotient of the model is greater than 1, which would indicate efficient expenditure via PHI. Our calculations are discussed in detail below, but the rebate is efficient on this test.

What is driving this efficiency is that insured's co-contribution to PHI costs (i.e. the share of those costs not covered by the rebate) doesn't incur the marginal excess burden of taxation; obviously, if the rebate increased, that statement would be less true. And if the rebate were reduced to zero, the (1+M) term would drop out of the PHI component entirely (though PHI, which competes with a service provided at no direct charge to consumers, might not be viable were that to occur).

Effectively, the key point here is this:

1. Because it allows consumers to avoid waiting times, PHI provides a higher quality service;
2. Consumers are willing to make some contribution from their own pockets to obtain that service, and associated benefits such as hospital and doctor selection;
3. Their contribution allows the government to spend less, avoiding some of the cost of taxation;
4. As the rebate rises, that saving diminishes;
5. However, there are some consumers who are at the margin between the higher waiting time public system and the higher consumer charge in the private system and who would switch to the public system when the rebate is cut; and
6. As a result, neither a rebate set at zero nor one set at 100% will be efficient with the optimal point depending on the elasticities of demand.

This model does not positively account for the risk-management benefits of an insurance model v. a direct purchase or out-of-pocket system. Rather it is a comparison of the differential efficiency of funding health outlays via social v. private insurances.

A critical element of this analysis will be our assumed rate of $\boldsymbol{M}$. This rate is highly variable depending on the selected tax base and its associated mobility.

While recent estimates of MEBT on Commonwealth taxes range from 10% for a broader GST to 139% for incremental rates of company tax, we believe the appropriate comparator is the MEBT of income tax.

This is apposite as:

- Whereas the States receive GST, the rebate is a Commonwealth expenditure, and the personal income tax is the largest single source of Commonwealth income;
- As noted, it is a conservative figure, compared to company tax;
- There is little prospect of an increase in GST, and changes in health-related outlays, notably for the NDIS, are being funded through changes in the income tax;
- Both the incentive structure to drive purchase of PHI, and the means-testing of the PHI rebate are couched within the personal income tax system.

Using personal income tax gives us an MEBT generally agreed at around 33c ($\boldsymbol{M}$ **= 0.33**) for an extra dollar raised via income tax.[48] Compared to estimates of other taxes – for example company tax – this is a relatively non-contentious estimate, with Treasury estimates previously finding 32% for the average marginal rate.[49]

A potential issue here is that the MEBT rate rises with the marginal rate of taxation. Consequently, the economic effects of increasing income tax to cover healthcare, or using income tax to service recurrent expenditure borrowing, would be higher again than this rate. Nonetheless, for this paper, we assume that money spent at the margin between private and public funding has no effect on the MEBT rate.

A further assumption we make is that the administrative costs of PHI ($\boldsymbol{D_P}$) should not include profit. This simply reflects the fact that we have not allocated an opportunity cost of capital to public sector healthcare.

In considering this, we note it is occasionally suggested that if efficiency were equal, then it would be of necessity that the private sector expectation of profit would mean a relative reduction in actual healthcare expenditure.[50] This is confused. Capital has an opportunity cost, regardless of whether it is used in the public or the private sector. The fact that opportunity cost is brought to book in the private sector, but not necessarily in the public sector, does not alter the underlying economic reality.

Our proposed figure is $\boldsymbol{D_P}$ **= 0.085**. This is based on the last full year of all expenses divided by all revenues across all funds.[51] If reported profit were to be included, then this would rise to $\boldsymbol{D_P}$ **= 0.139**. We use this latter as a sensitivity measure. In comparison for the public sector, we will use a figure $\boldsymbol{D_N}$ **= 0.024**, based on a reported average administration component from AIHW.[52]

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[48] Murphy, C. (2016). *Efficiency of the tax system: a marginal excess burden analysis*. TTPI – Working Paper 4/2016, ANU, June 2016, p.6

[49] L Cao et al. (2015). *Understanding the Economy-wide Efficiency and Incidence of Major Australian Taxes.* Treasury Working Paper 2015-1, April 2015, p.32

[50] Dahlgren, Göran. (2014)."Why public health services? Experiences from profit-driven health care reforms in Sweden." *International Journal of Health Services* 44.3: p.510

[51] $1.91 Billion total expenses against $22.49 Billion in total fund revenue: APRA. *Private Health Insurance Operations Report 2015-16*. Financial performance tab. Released 9 November 2016.

[52] AIHW. (2014). "How much does Australia spend on health care?", *Australia's health 2014*. Australia's health series no. 14. Ch.2.2, p.3

Consideration has been given to the proposal that there may also be an MEBT associated with the Medicare Levy Surcharge, given this is a tax-based incentive, i.e., the presence of the penalty has a distorting effect.

There is certainly a distortion associated with the MLS; but it is difficult to evaluate. For those consumers who would have bought PHI in any event, the MLS has no behavioural effects, hence no MEBT. So it really depends on how much effect it has. Seen in that light, a reduction in the rebate is likely to increase the MEBT (and total welfare cost) of the MLS (as it means more consumers will only buy PHI because of it), while an increase in the rebate reduces it (because more consumers will buy PHI regardless).

Given the focus on the rebate, and on the economic impacts of reducing the rebate, the higher the welfare cost of the MLS, the weaker any case for reducing the rebate will therefore be.

From our initial considerations of direct efficiency of public v. private expenditure, we progress to the more important question: how this may be reflected in terms of household welfare gains.

Expenditure efficiency: impact on household welfare

The issue of how much of the cost of a hospital separation is met by the Government and what is the economic cost of that expenditure is only a partial examination of efficiency.

Similarly, if we were to only compare the benefits purchased in the public and private sectors, it would not deliver an accurate picture of the effect of the rebate. By "benefits purchased" we refer to the expenditure on hospital services in each sector respectively, which we have assumed may be bought at similar supply costs. To do this, our scope needs to be broadened from the private benefits received by patients to the broader welfare gains produced by reduction in waiting times.

Building on the work of Parry (2001),[53] we consider the relative welfare gains from public sector expenditure between two initial options, viz.:

1. Marginal increases in direct expenditure on public hospital services; and,

2. Marginal increases in indirect expenditure on private hospital services, via contribution to PHI.

In the Australian context, this is a choice between increased funding for hospitals from the Commonwealth via State and Territory Governments and the PHI subsidy.

The question is which of these most efficiently contributes to overall welfare. In terms of Government's capacity to contribute to welfare via the health finance system, the key measure is a reduction in the loss represented by the opportunity cost of public hospital waiting lists (the cost to consumers and the economy from avoidable waiting times).

This is a reduction to household welfare or utility, describing the cost of unmet demand for healthcare and the costs which flow from it.

Drawing on Parry,[54] proposed measurements are:

for the change in welfare from an increase in expenditure on public hospitals, we expect an incremental increase per additional dollar of public health output to be:

$$dW_t^N = \left[-s + \left\{\frac{1-s}{-\eta^N} k_a' - (1-s-c)\right\} - s\frac{dH^P}{d\hat{H}^N} - M\left\{1 - c + s\frac{dH^P}{d\hat{H}^N}\right\}\right] \quad (3.1)$$

for corresponding change in welfare from increase in Government payments to private services, we expect an incremental dollar of private health output to produce:

$$dW_t^P = \left[-s + \left(-\frac{dH^N}{dH^P}\right)\frac{1-s}{\eta^N} k_a' - M\left\{s - \frac{1-s}{\eta^P}\right\} + \frac{(1-s)}{(-\eta^P)} M\zeta^P\right] \quad (3.2)$$

[53] Parry, Ian William Holmes. (2001). *On the Efficiency of Public and Private Health Care Systems: An Application to Alternative Health Policies in the United Kingdom*. Resources for the Future.

[54] Ibid., see Parry's Appendices for derivation of equations.

where:

dW_t^N and dW_t^P respectively are the increases in welfare associated with an increased unit of public (National) or private health output at a given rate of taxation;

t is the labour tax rate (effective rate) and is for reference purposes;

s is the effective rate of public subsidy for private health care. Whereas for Parry's original calculations, s was expressed as a small tax subsidy (recognising UK policy settings), in Australia it is equivalent to our earlier measure $A\psi_{Sep}^P$ as it is a transfer from taxes raised, rather than a deduction;

η^N and η^P respectively are the price-elasticities of demand for public and private healthcare. We note here Parry's view that elasticity for PHI in the UK would be much higher than some international averages, given its low base. We would not expect this to be the case in Australia;

k_a' is the average cost of the waiting list;

c is the user fee (if any) for public healthcare;

H^N and H^P are respectively household consumption of public and private healthcare, where $\hat{H}^N$ is a limit to consumption caused by government budgetary constraints;

M is again the marginal excess burden of taxation, which is a source of deadweight loss; and

ζ^P is the expenditure (income) elasticity of demand for private healthcare. We note some common and distinctive features of the equations:

- The subsidy for private healthcare is explicitly treated as a cost to welfare in both equations, which is proper, as it is present at a discretionary rate for any mix of public and private services;
- The common term $\frac{1-s}{\eta^N} k_a'$ illustrates the relation of the subsidy to welfare gains, where an increase in the subsidy rate will reduce the overall loss through a reduction in the waiting list;
- Each equation includes a revenue financing term; and,
- We presume k_a' will be indifferent to changes in waiting list structure (see below).

We also make a range of assumptions which underpin the application of these equations. These include:

- For the purposes of evaluating the efficiency of the PHI rebate, we restrict the value of s to the subsidy itself. In particular, this means:
    - We do not include other tax-funded contributions to healthcare, including the Medicare Safety Net, Net Medical Expenses Tax Offset or the Pharmaceutical Benefits Scheme subsidy; and,

- We do not regard the Medicare Surcharge 'foregone' for those who take out PHI as a charge to Government revenue. This is because the expected or preferred value of the measure is zero, having been explicitly designed as a penalty via the tax system rather than as a revenue measure.

  On this, we would suggest that if the penalty were expressed as a fine, rather than an *ad valorem* measure, there would be no discussion;

- Complementing this approach, we treat the MBS contribution to specialist interventions - which is an equivalent expenditure in both public and private settings – as immaterial, as it is incorporated in the NEP. In addition, it is unaffected by marginal changes in the PHI subsidy, or by the operation of PHI;

- We presume for simplicity that in the Australian context, $\boldsymbol{c = 0}$. While in the British context, the small cost of pharmaceuticals may be included, the expected cost of public care in Australia is zero (notwithstanding that public hospitals commonly no longer provide take-home pharmaceuticals at discharge). The effect of this assumption is not insignificant as the absence of an expected copayment in the public system to some extent crowds out or reduces the market incentive for PHI and should have some effect on elasticities;

- Out-of-pocket costs for private patients are outside the parameters of this analysis, except that expected gap cost of private care may have an effect on demand for PHI. There is no doubt that there are social welfare effects from out-of-pocket costs, and that these are unevenly distributed.

  While there is a body of literature which assumes perfect capacity to discriminate based on price, this appears to be an impractical assumption. More recent research also suggests a positive relationship between increases in PHI coverage and the size of out-of-pocket costs[55], although the relationship is difficult to interpret, as the causation may run either way.

  For the purposes of our analysis, we assume that the welfare savings addressed by the PHI Rebate are entirely encapsulated within the opportunity cost of waiting k'_a . Copayments and other out of pocket costs may also contribute to this, but it is presumed that they are primarily responsible for the private benefits received by PHI holders, particularly doctor selection.

  The expenditure elasticity at the individual household level may be influenced or obscured by a range of factors, including:

  - Means testing, which is based on taxable income, not wealth or actual income;
  - Lifetime loading effects on decision to purchase;
  - Access to services, i.e., private health insurance is likely to be less attractive outside the catchments of large private hospitals; and/or,
  - Imperfect behaviour. We have considered consequences of poor individual decisions elsewhere in this paper but, in particular, neither rational calculation of future demand for

[55] Dormont, Brigitte, and Mathilde Péron. (2016). "Does health insurance encourage the rise in medical prices? A test on balance billing in France." *Health economics,* 25.9 : 1073-1089.

healthcare, nor consistent intertemporal choices, are assumed as these would require high levels of insight into PHI as an investment, rather than as an annually consumed and irregularly utilised service;

- For the purposes of comparing efficiency of expenditure, we presume – perhaps controversially – that money may be spent equally efficiently in the public and private health systems. It is important to distinguish between the efficiency of hospital operations and the efficiency of funding mechanisms.

  The assumption of roughly equal levels of technical efficiency is consistent with previous reviews of the technical efficiency of hospitals by the Productivity Commission. While it has observed that both not-for-profit and for-profit providers might increase outputs from a common level of inputs, there does not appear to be any significant difference in capacity to economise on inputs for a fixed level of outputs.[56] There are also scale effects here, with greater disparities between small hospitals, including by ownership.[57]

  Given capacity constraints in both public and private hospitals, the latter observation is more relevant. For consideration of efficiency, it is typical to **take** key inputs, i.e., total beds, supply of doctors, etc., as fixed at a given level, and then measure output given that level.[58]

  We note in support of this that there is an increasing alignment between PHI and public health's recent ABF approach. For example, contracts between PHI providers and private hospitals may now include reduction in payment for avoidable adverse events, which has long been a feature of ABF financing.[59]

- We have not included in our analysis the different treatment of capex between public and private services. Capex costs will be passed on to insurers in the private sector, but tend to be separated from the ABF in the public sector. From an efficiency perspective, a dollar of capital invested should be treated as having the same opportunity cost, regardless of whether it is invested in the public or private sector.

- For simplicity, we are not discounting outcomes of our expenditure efficiency calculations by administrative costs. This effect is tested in equation 2.1;

- While it is discussed below in greater detail, we assume that effects on waiting lists and on unmet demand for public care are indifferent to the composition of the lists. We recognise the difference in casemix affects relative efficiency of hospital operation, but:

[56] Forbes, Matthew et al (PC). (2010). "Measuring the technical efficiency of public and private hospitals in Australia". Presentation to Australian Conference of Economists. Sydney, September 27-29, 2010.
[57] For full data see Productivity Commission. Public & Private Hospitals, Multivariate Analysis: Supplement to Research Report. May 2010. Partic. p.114
[58] Cf. Asandului, Laura, Monica Roman, and Puiu Fatulescu. "The efficiency of healthcare systems in Europe: a Data Envelopment Analysis Approach." *Procedia Economics and Finance* 10 (2014): 261-268.
[59] Productivity Commission. Efficiency in Health: Productivity Commission Research Paper. April 2015. p.33

- There are medium-term constraints on public supply, including beds, theatres and specialist staff[60]. A place is a place. This may initially seem to be a limitation to the model, but in practice predicting structural changes in waiting lists will not alter overall demand for hospital accommodation;

- Waiting lists have two rationing effects, viz.:

  - Prioritising urgent care (cardiac arrest, oncology) over less time-sensitive conditions;
  - Total rationing of hospital access, within each category;

- Consequently it may be in practice irrelevant for the average cost of waiting $\boldsymbol{k'_a}$ whether private patients were to migrate to the top, middle or end of the public waiting list, and vice versa. Our reasons for this are discussed in further detail in our valuation of $\boldsymbol{k'_a}$;

- At the same time, we are aware that private hospitals may focus on diagnosis-related groups (DRGs) which are typically more in the category of 'elective surgery': private hospitals do not replicate public waiting lists, and their delays are purely due to supply of surgical services.

  The impact of this is discussed elsewhere in the paper but, given the expectation that public hospitals cater to more high-impact DRGs, it is likely that any shift from the private to the public sector will create inefficiencies, at least in the short term, through poor matching of demand and specialist capacity. These might be addressed through changes in specialist capacity, though this would take time, and it is not clear that specialists are so easily moved; and,

- It is occasionally argued that the application of the rebate should be restricted to hospital services, not general treatment or extras cover. This is not germane to our model but, at least for younger people, it is likely that the rebate on extras is an important component of the incentive to take out PHI. The converse will become true with age.

  This does not mean that our analysis would endorse a subsidy for PHI which is exclusive of hospital cover: non-hospital insurance will have no material effect on waiting lists and therefore does not meet stated welfare goals. As an observation here, it might be argued that there is a useful welfare gain in subsidising healthcare activities which are preventive, and thus reduce future demand, but this tends to add to the argument for including extras in the Rebate calculation, rather than subsidising them as a standalone.

Following from the discussion above, we consider a third case suggested by Parry, which is the efficiency of increased private user fees for private care. We have not considered his work on user fees for public care as this would violate Australian political constraints:

(3.3) $$dW_c^P \approx \left[-s + \left(-\frac{dH^N}{dH^P}\right)\frac{1-s}{\eta^N}k'_a + k'_a\left\{s - \frac{1-s}{\eta^P}\right\} + \frac{1-s}{\eta^P}\frac{M}{1+M}\zeta^P\right]$$

[60] Similar restrictions may prevail in the private sector, but we assume that the presence of copayments assists in addressing these. This would particularly occur with greater willingness of key medical staff to work.

As there is no revenue-financing effect here, we might expect that this third option will increase the stock of social welfare at a greater rate than tax-based investment in private care. We note here that the expected greater efficiency of direct private contributions over public contributions is not an argument against the PHI rebate. To the contrary, it reinforces the view that the rebate is an important measure to encourage the largest possible participation in PHI, although it is equally clear that as the rebate rises, the benefit decreases and the cost (in terms of the deadweight loss associated with financing higher levels of public outlays) falls.

We are also aware that there has been some recent discussion around direct payment of a subsidy benefit for private hospital services,[61] which superficially might appear to obviate demand for PHI. However, this notion excessively discounts the benefits of an insurance-based model (both in terms of risk-sharing and in terms of the role of insurers in managing risk) and confers substantial new risk upon Government.

[61] Senate Estimates, Community Affairs Committee Transcript. 29 May 2017. Pp.13-14

Parameters

Valuing k'_a: what is the price of the waiting list?

The datum $\boldsymbol{k'_a}$ in our equations is a measure of the valuation that consumers put on the loss associated with waiting for healthcare. Formally, it is a measure of the distribution of those valuations: with a higher value for $\boldsymbol{k'_a}$ indicating a more common valuation across the population; and a lower value indicating more disparity of perceived losses.

The valuation of $\boldsymbol{k'_a}$ is extremely complex, and it will be difficult to gain a consensus figure. Accordingly, we have not attempted a formal valuation within the scope of this paper.

We will therefore consider a broad range of measures for $\boldsymbol{k'_a}$. This accords with Parry's assumption that the average cost of waiting ($\boldsymbol{k'_a}$) must be lower than unity with the marginal cost ($\boldsymbol{k_m}$) as willingness to pay for treatment (the driver of $\boldsymbol{\eta^P}$) varies by individual.[62]

We have therefore adopted Parry's range of 0.25 to 0.75, with a mean of 0.5. The higher figure implies a lower variance from any period of waiting. These are positive figures because waiting is always a cost.

The rate of subsidy: s

For the purpose of calculating the mean rate of subsidy $\boldsymbol{s}$ we divide the total rebate paid by the number of insured persons, and calculate this as a percentage of the mean price of insurance (only inclusive of hospital cover). We recognise that insurance policies exhibit substantial heterogeneity, but our question is whether the subsidy is efficient, not the design of individual policies.

Consequently, we are interested in the rate, not the actual dollar amount.

At December of 2016, 46.6% of Australians had some form of hospital cover, down from 47.2% twelve months earlier. In terms of actual people, this was some 11,328,000.

In the prior twelve months, approximately 7.0 million Australians were registered for the PHI Rebate, at a cost of $5.9 billion up from $5.7 billion for the previous year.[63] According to the industry regulator – the Australian Prudential Regulatory Authority (APRA) - total industry premium revenue over the same period was $22.05 billion.[64,65]

Using an average amount of $5.8 billion as our dividend,[66] this gives us a mean of $\boldsymbol{s}$ = **0.263**. This is substantially higher than the UK figure of 0.05, which was only a partial tax deduction. For comparison to

[62] Parry, Op. Cit., p.16
[63] Department of Human Services. *2015-16 Annual Report*. p.53
[64] APRA, Op. Cit.
[65] Annual data from APRA does split hospital and extras (general treatment and ambulance) cover, but does not allow us to identify how much of the latter is stapled to hospital policies, and thus eligible for a rebate
[66] To match the financial rather than the calendar year

the mean, the maximum Australian rebate over the same period was 37% (aged over 70, lowest income bracket).[67]

Price elasticities of demand

The price elasticity of demand for PHI $\boldsymbol{\eta^P}$ has multiple prospective measures.[68]

There is of course a relationship between the MLS and $\boldsymbol{\eta^P}$, which is that the rate of the MLS will reduce the elasticity figure: a higher surcharge will incentivise more people to select PHI, and the *ad valorem* design of the surcharge (its calculation as a tax on income) will make PHI more attractive as incomes rise.[69] This is its function. This also interacts with means-testing to ensure that PHI remains attractive, as the subsidy falls while the surcharge increases.

There is a variety of factors which influence price elasticity, including:

- education and access to information;
- income;
- personal taste;
- age;
- health status;
- prior healthcare experience;
- ability to utilise PHI (capacity to fund copayments); and
- desire to avoid tax surcharges.

Given the complex interaction of these factors, we are suspicious of interpolating elasticity data from abstract models of healthcare expenditure. So, for the purposes of this study, we use a predicted elasticity based on consumer survey, which accords with industry experience.

From a random sample of Australians with health insurance, the research firm *Ipsos* has identified the expected responses of consumers to a reduction in the rebate.[70] The various rates, depending upon scale of reduction are:[71]

[67] https://www.ato.gov.au/individuals/medicare-levy/private-health-insurance-rebate/income-thresholds-and-rates-for-the-private-health-insurance-rebate/ Downloaded July 2017

[68] We note above some concern with Cheng's application of this datum. Further, we regard the 'effective premium' on which it is based as contestable. The proposed 'effective premium' in Cheng's case is the retail price net of both the rebate and the MLS as applicable. This makes the effective premium lower than it should actually be. For our purposes, the effective premium is the premium paid by the consumer (the retail premium minus any means-tested subsidy).

[69] For discussion see: Robson, Alex, Henry Ergas, and Francesco Paolucci. "The analytics of the Australian private health insurance rebate and the Medicare levy surcharge." *Agenda: A Journal of Policy Analysis and Reform* (2011): 27-47.

[70] http://ipsos.com.au/

[71] Data supplied by Ipsreos, commissioned by Private Healthcare Australia, 2017

Size of Reduction = n	Intend to drop = Υ_n	Intend downgrade	Implied elasticity = η^P
Status quo (n = 0)	3% = Υ_0	12%	-
25%	8%	17%	0.95
50%	9%	27%	0.68
75%	12%	26%	0.80
100%	12%	28%	0.68
100% + 15% increase	16%	31%	-

Our calculation of η^P is based on the implicit price increases, so:

4.1 $$\eta^P = \frac{-(\Upsilon_n - \Upsilon_0)}{\left[-s\left(1-\frac{1}{1+n}\right)\right]}$$

The dividend here is the reduction in the rate of people insured, and the divisor is the change in the price of insurance. We make several observations on this:

- For consistency, we have used the mean rate of s = **0.263**. While we might reasonably assume that the reduction in coverage will at least initially occur in the lower-income cohort, we have no clear evidence of this from our survey data;

- The figure Υ_0 against which we net other decreases may be interpreted as an effect of the interaction between the most recent annual rise in PHI premiums and any simultaneous or consequent changes in the mean household consumption function: By this we mean that it is a measure of perceived value against affordability, with no formal change in the rebate rate, noting that a component of premium rise is due to bracket creep against the means-tested rebate, which is not captured elsewhere in our model, this makes the measure conservative;

- The intent to downgrade cover is not insignificant, particularly as it implies a slight increase in price-elasticity between the 75% and 100% reduction; and

- There is a clearly a variety of measures here, from η^P = -0.68 to η^P = -0.95. Equally, there is some evidence of behavioural response in the survey, with the rate of η^P increasing and decreasing over different sequential increments.

From our perspective, the relevant price elasticity is one which occurs at the margin. Consequently, we have used the figure η^P = **-0.95** as our marginal price elasticity of demand. This represents the effect of an initial shock to the price of PHI. While the lower figures for greater shocks may suggest dilution as the most

sensitive cohort is already removed from the PHI pool, we remain primarily interested in marginal expenditure.

This estimate is substantially lower than Parry's UK range of -2 to -10, however, these reflect both the low rate of subsidy in the UK, alongside the absence of other incentives such as the Australian MLS. Probably more than anything though, high elasticity figures are a consequence of a small insured base. We note that a recent US study found elasticities of take-up with respect to price around one, in line with our assumption.[72]

Parry originally associated his much higher levels of η^P with the low rate of take-up in the UK. However, in 2005, looking at a slightly different dimension of the problem he scaled this back to a narrower range of 0.5-3[73].

A key observation here is that we might reasonably assume higher sensitivity to price amongst younger consumers of PHI. The temptation following this observation is to discount the potential welfare losses from excluding these consumers, as younger people will have lower rates of service consumption.

However, this is short-term thinking. If there were no lifetime loading, then it might be reasonable, but there is evidence that those who leave or fail to enter the market at a younger age may find themselves priced out later in life.

According to the Australian Taxation Office (ATO), in the 2014-15 financial year, 164,535 Australian taxpayers paid the Medical Levy Surcharge at a total cost of $218,948,416. The mean contribution was $1,331.[74]

The MLS rates are per Table 3.[75]

[72] Kruegera, AB, and Kuziemko, I. (2013). The demand for health insurance among uninsured Americans: Results of a survey experiment and implications for policy. *Journal of Health Economics* 32:780–93

[73] Parry, Ian WH. "Comparing the welfare effects of public and private health care subsidies in the United Kingdom." *Journal of health economics* 24.6 (2005): p.1201.

[74] ATO. Taxation statistics 2014–15 Individuals: Selected items for 1978–79 to 2014–15 income years 1,4. 2017. Excel Table 1B

[75] ATO. Income rates and thresholds for the Medicare Levy Surcharge: https://www.ato.gov.au/individuals/medicare-levy/medicare-levy-surcharge/income-thresholds-and-rates-for-the-medicare-levy-surcharge/ Downloaded July 2017

Table 3: Medicare Levy Surcharge Rates 2014-18:

	Base tier	Tier 1	Tier 2	Tier 3
Single threshold	$90,000 or less	$90,001 – $105,000	$105,001 – $140,000	$140,001 or more
Family threshold	$180,000 or less	$180,001 – $210,000	$210,001 – $280,000	$280,001 or more
Medicare levy surcharge	0%	1%	1.25%	1.5%

Clearly a payment of $1331 must occur either from a Tier 1 Family or Tier 2 Single. Individuals and families in these tiers are have relatively high incomes which suggests that – if this is not simply irrational behavior - later working-age consumers are being locked out of PHI due to LHC loading.

Drawing on the same dataset, we have selected a figure of η^N**= -0.5**. Our rationale for this is that the lower elasticity figure of 0.68 may be regarded as a measure of willingness to pay for private healthcare in the absence of any subsidy. η^N is an own price elasticity, which implies a willingness to pay in this case for public healthcare, if it were not free.

It may be that the price-elasticity of demand for public healthcare is even lower than this, but given various settings such as the MLS, it is not unreasonable to presume a relatively narrow band between the two data.

Given our earlier assumption that c **= 0**, there is no real basis for calculating η^N other than as a complement to the price-elasticity of demand for private care. This may have been more visible in the rapid fall of private insurance following the introduction of Medicare in 1984, though this data is somewhat aged.

Our argument for discounting this figure from -0.68 to -0.5 is that currently insured Australians are on average wealthier than uninsured consumers. Keeping in mind that this is a complementary figure, we believe the selected value is reasonable. It is also the same value originally used by Parry for the UK market, where c is still small, but non-zero.

The labour tax rate: t_L

For the labour tax burden, we have used an effective average tax rate measure from the OECD. While this is highly variable by marital status and presence of children, we have selected a lower modal rate of t_L **= 0.24.**[76] It is purely for reference.

Expenditure elasticity

We believe Parry's range of 1.0–3.0 with a median of 2.0 for expenditure elasticity of demand is also high. Instead, we have selected an observed figure of ζ^P = 1.1 which is an average of expenditure elasticities on

[76] OECD. *Taxing Wages: 2015-16 – Special Feature: Taxation & Skills*. 2017. p.54

healthcare across OECD countries.[77] This is for all healthcare consumption rather than solely within the private sector, so it may partially underestimate elasticity but, given that we account for separate price effects in our other elasticity measures, using an average seems reasonable.

The rate of substitution

We have two substitution rates required for our equations: $\frac{dH^P}{d\hat{H}^N}$; and $\frac{dH^N}{dH^P}$.

The former is the rate of increase in public care relative to the private sector, where we relax the public spending constraint $\hat{H}^N$. The latter is a more direct substitution where public contribution to the rebate is increased.

For the former, we would argue that if national healthcare output were incrementally increased, the induced increase in demand could be expected (to first order) to be spread across the public and private sectors in proportion to their current shares,[78] so:

$$\frac{\boldsymbol{dH^P}}{\boldsymbol{d\hat{H}^N}} = \frac{\mathbf{9.4}}{\mathbf{31.6}} = \mathbf{0.30}$$

Looking to the second datum, we note that the use of private healthcare will naturally increase with the subsidy. This will occur for three reasons:[79]:

1. People substitute private care for public care;

2. People change their consumption mix, increasing their overall demand for healthcare relative to other (non-healthy) goods; and,

3. People who are already in the private sector increase the amount of their insurance.

In the absence of the latter two behaviours, we would assume that the substitution effect: $\frac{dH^N}{dH^P}$ = -1

However, increases in insurance coverage and increases in consumption of health goods and services have the effect of discounting this back towards zero. In his original work, Parry estimated the latter two effects as having a relative small impact, and therefore estimated a range of -0.4 to -0.8.

However, in Australia, the broader set of options for PHI coverage should make the discount greater than for the UK. Therefore, we have estimated a range:

$$\frac{\boldsymbol{dH^N}}{\boldsymbol{dH^P}} = \mathbf{-0.4}\ \boldsymbol{to}\ \mathbf{-0.6}$$

[77] Lago-Peñas, Santiago, David Cantarero-Prieto, and Carla Blázquez-Fernández. "On the relationship between GDP and health care expenditure: a new look." *Economic Modelling* 32 (2013): 124-129.
[78] AIHW. *Health Expenditure Australia 2014-15*. Health and welfare expenditure series no.57. 2016. Table A9
[79] Parry. Op. Cit. p.15

The reason the first of these terms is positive is that it implies a marginal increase in the overall rate of care, as opposed to the latter, which is a straight substitution. This is again because in the former case, we are relaxing the public spending restraint $\hat{H}^N$. There is not a comparable restraint in the PHI sector.

Each of our parameters is listed at Appendix A.

Outputs

Allocative efficiency test

Our first test, based on equation 2.1, sought to answer simply whether the deadweight loss of taxation outweighed the greater administrative cost of PHI.

As a sensitivity test, we vary the datum D_P between:

- 1.15, where PHI administration is at 8.5%; and,
- 1.08, if we include profit as an administrative cost, to take the figure to 13.9%.

The conclusion here is that funding hospital separations via PHI rebate as opposed to direct full cost is allocatively efficient, even taking into account higher administrative costs in the private sector.

Another way of stating this data is that all else equal, a dollar spent by the Government on the PHI Rebate is up to 15% more efficient than a dollar redirected to the public system.

The key driver of this result is that the share of MEBT which occurs for the separations partially funded by the rebate is low compared to public care, and the administrative costs are thus outweighed by the deadweight loss.

Comparative welfare gains

Equations 3.1, 3.2 and 3.3 allow us to make a dollar-for-dollar comparison respectively between the choices of incremental government investment in either public or private healthcare, and increased user payments into private care.

There are multiple options for selected variables here, so the following tables show outcomes depending upon different assumptions. An important preliminary point to keep in mind with these data is that they are significant for their relativity, rather than their absolute values.

For 3.1, which determines the welfare change from a marginal dollar substituted to public health, we have three potential outcomes depending upon the value of k'_a:

Table 4: Welfare change per tax-derived marginal dollar spent on public health

k'_a	dW_t^N
0.25	-1.06
0.5	-0.70
0.75	-0.33

As noted by Parry, the welfare effect is highly sensitive to our valuation of waiting times. Transferring funds from the PHI subsidy to public health becomes less negative where we assume there is a more homogeneous value accorded by the community to waiting times. However, while we are unable to directly measure this parameter, were the variance in the value placed on waiting times relatively homogenous, we would not expect to see as much variation in the take-up of PHI as there seems to be.

The overall conclusion here is that the reduction in deadweight loss from relief of waiting times consequent on marginal redirecting funds to the public sector fails to outweigh the deadweight loss associated with revenue raising. This is consistent with our preliminary test of the MEBT.

For our equation 3.2, which examines the additional welfare gain for a marginal dollar added to PHI, we have multiple outcomes based on settings of k'_a and $\frac{dH^N}{dH^P}$:

Table 5: Welfare changes per tax-derived marginal dollar spent on private health

k'_a / $\frac{dH^N}{dH^P}$	-0.4	-0.5	-0.6
0.25	-0.23	-0.19	-0.15
0.5	-0.08	-0.01	0.07
0.75	0.07	0.18	0.29

Our base-case (0.5,-0.5) suggests that the current settings for the PHI subsidy are not unreasonable: if we were looking at the outputs as absolute numbers, it would argue for neither additional nor lower contributions to the rebate, but again, we caution that these figures should be read as relative, not absolute, given the challenges in establishing the value of some parameters.

And predictably for our equation 3.3, the effects are greater where there is no revenue-raising term:

Table 6: Welfare changes per marginal dollar from increased user fees for private health

$k_a' / \frac{dH^N}{dH^P}$	-0.4	-0.5	-0.6
0.25	-0.03	0	0.04
0.5	-0.01	0.06	0.13
0.75	0	0.12	0.23

In theory, increased copayments may have a lower efficiency cost than raising additional public revenue, though the comparison also depends on what effect those copayments ultimately have on health outcomes. However, in practice, the challenge is to balance copayments against incentives required to increase PHI participation.

Given community rating, the main effect of increased user fees is likely to be a deteriorating in the quality of the insured risk, increasing costs, and creating the risk of a vicious spiral in which PHI demand unravels, as it did in 1996.

Conclusion

Overall, using broad welfare effects as the evaluation criterion, the analysis suggests that for reasonable parameter values, a marginal reallocation of funding away from the PHI rebate to public hospital funding would be likely to reduce efficiency.

Broader Context

The preceding analysis focuses on the effect of purchasing choice on social welfare, by measuring different options' capacity to address the deadweight loss of waiting times, while considering the equivalent losses associated with economically-distorting revenue raising.

However, there are potential welfare effects of PHI which are not captured in this model. The first of these is simply the benefit of choice

As well as expanding the range of options consumers face, we expect that PHI yields benefits through the competitive effects of the private sector which it supports, and which acts as a discipline on the public sector.

These benefits are inherently difficult to quantify. They have nonetheless been stressed in recent official reports. For example, the Harper Review noted the Productivity Commission's advice regarding human services that:

> "Lack of choice can result in poorer quality and more expensive services, and less diversity and innovation. In contrast, user control of budgets creates incentives for suppliers to satisfy the needs of users, given that they would otherwise lose their business. That in turn typically leads to differentiated products for different niches."[80]

This is the mechanism which the 'voucher' of PHI provides to insured consumers, and which we would expect to drive innovation and quality increases in both the private and public sectors.

Similarly, the Productivity Commission in its review of Human Services advised:

> "Greater contestability and user choice could be part of a broader suite of reforms to improve outcomes. Even a small percentage improvement in outcomes from public hospital services could deliver significant benefits in aggregate, given the scale of service provision."[81]

Contestability and user choice are fundamental to the private sector. The size of the gains they can bring needs to be seen in the context of broader pressures on health spending.

Thus, the most recent Intergenerational Report (IGR) projects a rise in government health expenditure as a percentage of GDP of over one third, from 4.2% to 5.5% by 2054[82]. Much of this is driven by population ageing, and we would expect political factors to exacerbate this growth.

Given these pressures, it is obviously important to try to ensure the increase in demand is met as efficiently as possible. The results derived above suggest PHI has an important role to play in meeting that goal.

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[80] Harper, Ian et al, *Competition Policy Review: Final Report*. March 2015. p.230

[81] Productivity Commission. *Introducing Competition and Informed User Choice into Human Services: Identifying Sectors for Reform: PC Study Report*. November 2016. p.85

[82] Treasury. *Intergenerational Report 2015*. p.60: http://www.treasury.gov.au/PublicationsAndMedia/Publications/2015/2015-Intergenerational-Report

Appendix A: Table of Variables

Description	Designation	Value/Range
Marginal Excess Burden of Taxation (MEBT)	M	0.33
Administrative cost of public health funding	D_N	0.024
Administrative cost of PHI (and including profit)	D_P	0.085 (0.139)
Per-separation share of PHI funding (same as s)	$A\psi_{Sep}^{P}$	0.263
Labour tax rate	t	0.24
Mean rate of PHI rebate	s	0.263
Price elasticity of demand for public healthcare	η^N	-0.5
Price elasticity of demand for PHI	η^P	-0.95
Average cost of waiting (mean)	k_a'	0.25 to 0.75 (0.5)
User cost of public healthcare	c	0
Expenditure elasticity of demand for PHI	ζ^P	1.1
Substitution rate of public for private care	$\frac{dH^P}{d\hat{\mathrm{H}}^N}$	0.30
Substitution rate of private for public care	$\frac{dH^N}{dH^P}$	-0.4 to -0.6

Appendix B: Administration cost v. Deadweight Loss

This appendix explains how equation 2.1 shows allocative efficiency of the PHI rebate:

$$\frac{AP^{N}_{Sep}\left(\frac{1}{1-D_N}\right)(1+M)}{AP^{P}_{Sep}\left(\frac{1}{1-D_P}\right)\{1-A\psi^{P}_{Sep}+[A\psi^{P}_{Sep}(1+M)]\}}$$

$$\frac{AP^{N}_{Sep}\left(\frac{1}{1-D_N}\right)(1+M)}{AP^{P}_{Sep}\left(\frac{1}{1-D_P}\right)\{1+A\psi^{P}_{Sep}*M\}}$$

$$\frac{AP^{N}_{Sep}}{AP^{P}_{Sep}}*\frac{\left(\frac{1}{1-D_N}\right)}{\left(\frac{1}{1-D_P}\right)}*\frac{(1+M)}{\{1+A\psi^{P}_{Sep}*M\}}$$

$$\frac{AP^{N}_{Sep}}{AP^{P}_{Sep}}*\frac{(1-D_P)}{(1-D_N)}*\frac{(1+M)}{\{1+A\psi^{P}_{Sep}*M\}}$$

Assuming $AP^{P}_{Sep}=AP^{N}_{Sep}$, then the quotient is greater than 1 if and only if:

$$\frac{(D_P-D_N)}{(1-D_N)}<\frac{\left(1-A\psi^{P}_{Sep}\right)*M}{\{1+M\}}$$

That is if:

$$\frac{(D_P-D_N)}{(1-D_N)}*\{1+M\}*AP^{P}_{Sep}<\left(1-A\psi^{P}_{Sep}\right)*AP^{P}_{Sep}*M$$

The left hand side of the equation is the economic cost of using the funds currently spent on the administration of PHI (in excess of the costs of social insurance). The right hand side is the tax payable on the out of pockets costs of the health treatment.