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Abstract

Many governments with dual public and private health systems subsidize private health insurance (PHI) with the aim to ease the burden on the public system. Understanding how elderly individuals respond to subsidies is important because they can benefit more from PHI but often find it unaffordable. There is an extensive literature on the demand for PHI, but less is known about the elderly's responses to PHI incentives. We leverage a unique age-specific policy in Australia which provided higher rebates for individuals over the age of 65. Using administrative tax data, we examine the effects of premium subsidies on PHI take-up decisions of elderly individuals under an event study difference-in-differences framework. We find that higher rebates led to a modest and transitory increase in PHI take-up. The estimated price elasticity of PHI demand is in the -0.1 to -0.2 range in the first two years of the policy. Moreover, the demand responses were more elastic among those with low incomes. Our results suggest that a more targeted subsidy program, with a focus on low-income elders, would be more effective in increasing PHI take-up.

JEL classification: H51, I13, I18.

Keywords: private health insurance, tax rebates, elderly, Australia

1. Introduction

Private health insurance (PHI) markets in many high-income countries are considered as a key element of their health coverage systems and commonly subsidized by governments (OECD, 2004). For example, the Australian government has implemented several interventions to increase PHI coverage over the past three decades. Every year, the government subsidizes the PHI industry by paying A$6 billion in rebates to reduce premiums and A$3 billion to cover private inpatient services (Duckett & Nemet, 2019). One of the primary goals of the provision of subsidies for PHI is to reduce the burden on the public system directly and indirectly through increased use of private health services.

A critical benchmark for evaluating the effectiveness of PHI incentives is to understand the responses of older adults because they spend significantly more on health care than other populations. As people age, their demand for health care increases and could benefit more from having PHI; however, they are more likely to find PHI unaffordable as their income declines.

There is an extensive literature on the demand for PHI internationally (Finkelstein, 2002; Frean, Gruber, & Sommers, 2017; Gruber & Washington, 2005; King & Mossialos, 2005; López Nicolás & Vera-Hernández, 2008; Rodríguez & Stoyanova, 2008) and in the Australian context (Bilgrami, Cutler, Sinha, & Cheng, 2021; Buchmueller, Cheng, Pham, & Staub, 2021; Cheng, 2014; Kettlewell, Stavrunova, & Yerokhin, 2018; Palangkaraya & Yong, 2005, 2007; Palangkaraya, Yong, Webster, & Dawkins, 2009; Stavrunova & Yerokhin, 2014). However, there is little evidence on how older adults respond to PHI incentives since most of the prior studies do not include or focus on them.

In this paper, we examine the impact of financial incentives in PHI on the take-up decisions of older adults by leveraging a unique natural experiment in Australia. In April 2005, the government increased the PHI rebate rate from a universal 30 percent to 35 percent for those aged 65 to 69 and from 30 to 40 percent for those aged 70 and older, regardless of income levels. This age-specific nature of the scheme provides a useful framework for examining the sensitivity of the elderly's responses to PHI incentives. Using Australian tax return data between 2001 and 2012, we employ an event study difference-in-differences model with individual fixed effects to account for unobserved time-invariant characteristics. To obtain relatively comparable groups, we focus on the effects on PHI take-up among the young elderly (age 65-74) and use the near-elderly (age 60-64) as a control group. We estimate the policy effects for separate elderly groups to reflect differential rebate rates by age and explore how higher rebates affected PHI take-up across populations with different socioeconomic backgrounds.

Our results show that the rebate increase had a modest and transitory effect on PHI take-up among the elderly. A 5 percentage point increase in PHI rebates for those aged 65 to 69 led to 0.55 and 0.85 percentage point increases (equivalent to 0.94 and 1.46 percent increases) in take-up in the first two years following the rebate increase, respectively. A 10 percentage point increase in PHI rebates for those aged 70 to 74 led to 0.86 and 1.55 percentage point increases (equivalent to 1.49 and 2.68 percent increases) in take-up in the first two years, respectively. We estimate the overall price elasticity of PHI demand for the elderly to be in the -0.1 to -0.2 range. Importantly, this was a short-term impact, which only persisted for two years after the policy was implemented.

Our heterogeneity analyses provide evidence that income is a key factor associated with the elderly's decisions to buy PHI. We find that PHI demand was more elastic among the low-income elderly, who had substantially lower ex-ante level of PHI coverage. In contrast, the effect on take-up among the higher-income elderly was small or statistically insignificant. The heterogeneity of demand responses is less significant across other socioeconomic characteristics. We confirm the robustness of our results through a series of alternative specifications, placebo tests, and a triple-difference design.

Our paper proceeds as follows. Section 2 gives background on PHI policies in Australia and briefly relates our analysis to the previous literature. Section 3 describes the Australian tax return data and provides descriptive statistics. Sections 4-6 present the regression framework, empirical results, and robustness checks, respectively. Section 7 discusses policy implications and concludes.

2. Private Health Insurance in Australia

Australia has a universal public health insurance program, Medicare, through which all Australians can obtain subsidized primary care and medications, as well as free care in public hospitals. Despite universal public insurance coverage, PHI exists in parallel with Medicare, and about half of the Australians have PHI cover (Colombo & Tapay, 2003; Duckett & Nemet, 2019). Individuals with PHI can choose to be private patients in public hospitals or access private hospitals, and thus they have more freedom to choose care providers and quicker access to treatment. Because older adults generally face a higher health risk and are more likely to have chronic conditions associated with long waiting time in public hospitals, private health care could help maintain mobility and avoid more serious health complications down the track.

Beginning in the late 1990s, the Australian government took a multifaceted approach to increase PHI coverage, which included the introduction of the Medicare levy surcharge (MLS) in July 1997, a universal 30 percent PHI rebate in January 1999, and the Lifetime Health Cover (LHC) in July 2000. Although there are several studies on the effects of these policies (Cheng, 2014; D. Doiron, Fiebig, & Suziedelyte, 2014; Denise Doiron & Kettlewell, 2018; Einarsdóttir et al., 2012; Eldridge, Onur, & Velamuri, 2017; Ellis & Savage, 2008; Palangkaraya & Yong, 2005, 2007; Palangkaraya et al., 2009; Stavrunova & Yerokhin, 2014), it is difficult to disentangle the independent effects of the three different policy incentives because they were implemented within such a short period of time. Findings from more recent studies on later policy changes generally suggest that the demand for PHI is price inelastic in Australia, likely due to the existence of public insurance (Bilgrami et al., 2021; Buchmueller et al., 2021; Cheng, 2014; Kettlewell et al., 2018). However, there is still much to learn about how policy changes impact PHI take-up among the elderly, who could benefit more from having PHI.

The PHI rebate, the primary policy focus of this paper, is an amount the government contributes towards the costs of individuals' PHI premiums. Individuals can receive the rebate as a lower insurance premium or as an offset in their annual tax returns. From April 1, 2005, the universal 30 percent rebate was increased to 35 percent for those aged 65 to 69 years and to 40 percent for those aged 70 years and older, due to the Private Health Insurance Incentives Amendment Bill. With annual premiums being approximately A$1000 for singles and A$1700 for families in 2003-2004 (the year before the policy change) (Cheng, 2014), this rebate increase would translate to a modest reduction in annual premiums by around A$50 (singles, age 65-69) to A$170 (families, age 70+). From October 31, 2008, the income threshold for the MLS increased and started to adjust for inflation.[1] There was no further adjustment on the rebate until the Fairer Private Health Insurance Incentives (FPHII) reform was implemented on July 1, 2012 (the start of the financial year 2013), which simultaneously lowered the rebate and increased the MLS for high-income earners. Table 1 summarizes the PHI rebate rates by age group and the MLS requirements during financial years 2001-2012.

Kettlewell et al. (2018) used a survey data set in New South Wales (45 and Up Study) with a regression discontinuity design to assess the effectiveness of the 2005 rebate policy. They estimated the local average treatment effect on individuals around the older age threshold, 68 to 72 years old, and found that the policy had little impact on PHI take-up among this group.

[1] This was resulted from the Tax Laws Amendment (Medicare Levy Surcharge Thresholds) Bill, passed in May 2008. The income threshold for the MLS increased from A$50,000 to A$70,000 for singles and from A$100,000 to A$140,000 for families in financial year 2009. Individuals with income above the threshold were required to pay additional 1 percent of taxable income if they did not have PHI.

However, their results were limited by reporting biases and the small sample size inherited in the survey data. To provide a more in-depth study, we investigate the effects of this policy using administrative tax return data with a different analytical perspective.

3. Data

3.1 Sample Definition

We use 2001-2012 tax return data from the Australian Taxation Office (ATO) Longitudinal Information File (ALife) on a 10 percent random sample of all individual tax filers.[2] ALife data are organized by financial year, which ends on June 30, with the next financial year beginning on July 1.[3] Thus, our study period spans from July 1, 2000 to June 30, 2012. We stop our sample in 2012 because the later FPHII reform simultaneously changed the rebate and MLS policies, making it difficult to identify the impact of the rebate increase.

We focus on Australian tax filers aged 60 to 74 years, excluding those residing outside of Australia. Because the 2005 policy affected individuals over the age of 65 but not those under 65, we define the young elderly (age 65-74) as the treatment group and the near-elderly (age 60-64) as the control group. Overall, the sample includes 1,612,160 person-year observations for 306,936 unique tax filers.

3.2 Variables

Our main outcome of interest is whether a tax filer has an appropriate level of private hospital cover in each financial year, recorded in the ALife data.[4] If eligible, an individual can claim the rebate as either a refundable tax offset or a premium reduction which lowers the insurance price charged by insurers. In the latter case, insurers will send the PHI coverage

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[2] The sample is drawn from the latest release, ALife 2018.
[3] For example, financial year 2001 data cover the period between July 1, 2000 and June 30, 2001.
[4] An appropriate level of cover must have an excess of $750 or less for singles and $1,500 or less for families.

information directly to the ATO. We control for baseline demographic characteristics, including age, gender, spousal status, and state and remoteness of residence. Individual income is used to analyze the heterogenous effects in Section 5.3. This is the total taxable income or loss in years when an individual filed a tax return. While some income tests for surcharges and benefits are calculated at the household level, income is reported on an individual basis in Australian tax returns.

ALife data also include some outcomes of tax assessment, allowing us to identify whether a tax filer is entitled to a tax rebate, a tax offset, and/or subject to the MLS. In particular, we use the variable "income for MLS purposes" to determine a tax filer's MLS income tier to parse out the potential confounding effect due to changes in the MLS income thresholds. Income for MLS purposes is the sum of taxable income, reportable fringe benefits, total net investment losses, reportable super contributions, and any amount on which family trust distribution tax has been paid. If a tax filer has a spouse, the combined income for MLS purposes is used.

3.3 Descriptive Statistics

Table 2 presents the summary statistics by age group in the pre-policy period (2001-2004). The demographic characteristics were similar across all three age groups. Not surprisingly, the total income decreased with age for these older adults. The mean PHI coverage rates ranged between 57 and 59 percent for all groups. Because our sample focuses on tax filers and excludes those with the lowest incomes who are not subject to taxes, the average PHI coverage rate is higher than the average rate for all Australians (Australian Institute of Health and Welfare, 2017). The trends in PHI take-up are parallel across groups in the pre-policy period (Figure A1), and more importantly, the baseline parallel trends assumption is supported by our event study results below.

3.4 Data Limitations

There are a few caveats with our data. First, ALife data only include those who filed a tax return, and about one-third to half of the ATO clients aged 60-74 are non-filers (Polidano et al., 2020). They are most likely to have earned less than the tax-free threshold, with some exceptions (for example, low-income individuals may still lodge a tax return if they receive age pensions or need to claim a tax rebate or offset). It is worth noting that taxable income does not include sources such as tax-free superannuation income in retirement. Therefore, a retiree could have much lower taxable income than a working-age individual and thus more likely to be excluded in the data. Second, we do not observe partial enrollment (i.e., having PHI cover for only part of the year), nor do we know whether individuals downgrade or upgrade their insurance cover throughout the financial years. In other words, we can only measure changes in PHI coverage at the extensive margin but not at the intensive margin.

Despite these caveats, the administrative data have the significant advantage of avoiding misreporting and measurement error issues, often seen as a limitation in prior research on PHI using survey data (Bilgrami et al., 2021; Buchmueller et al., 2021; Ellis & Savage, 2008; Kettlewell et al., 2018; Palangkaraya & Yong, 2005, 2007; Palangkaraya et al., 2009). ALife data also provide information on some tax assessment outcomes for program eligibility, which allows for more precise estimation of the effects; for example, the MLS requirement depends on income sources that are not available in other datasets.

4. Empirical Methods

Using the 2005 age-based policy as a natural experiment, we study how older adults respond to PHI financial incentives caused by higher rebates. To assess differential changes in the rebate rate by age, we split the elderly group into 65-69-year-olds and 70-74-year-olds.

Since the MLS income threshold started to increase every year from financial year 2009 (Table 1), we analyze the effects for two data periods: 2001-2008 and 2001-2012. For the latter, we disentangle the impact of PHI rebates from the impact of MLS threshold changes by focusing on those who were not affected by changes in the MLS rules.

4.1 Dynamic estimates for the period 2001-2008

We begin our analysis with the data from 2001 to 2008. To estimate the effects, we use an event study difference-in-differences framework where there are two treatment groups of different treatment intensities, but the timing of treatment is the same. We check for the existence of parallel trends in the outcome prior to the policy implementation and examine how PHI take-up evolved among the elderly groups versus the near-elderly after the rebate policy kicked in. We estimate the following model:

$$PHI_{ijt} = \sum_t \beta_t^{65-69} Elder_j^{65-69} \cdot Year_t + \sum_t \beta_t^{70-74} Elder_j^{70-74} \cdot Year_t + \gamma X_{ijt} + \mu_i + \alpha^{65-69} Elder_j^{65-69} + \alpha^{70-74} Elder_j^{70-74} + \sum_t \lambda_t Year_t + \varepsilon_{ijt} \quad (1)$$

where i is an individual, j is an age group (60-64, 65-69, 70-74), and t represents a financial year (2001-2008, leaving 2005 as a reference year). The dependent variable (PHI_{ijt}) is a binary variable that takes the value of one if individual i in age group j had an appropriate level of private patient hospital cover for the entire financial year t. $Elder_j^{65-69}$ and $Elder_j^{70-74}$ are indicators for those aged 65-69 and 70-74, respectively. μ_i is a vector of time-invariant unobservable individual fixed effects.[5] The covariates (X_{ijt}) consist of demographic characteristics: age, age squared, gender, spousal status, state, and remoteness of residence. ε_{ijt} is an error term. Observations are at the individual-year level, and standard errors are clustered at the individual level.

[5] For example, educational attainment, risk attitude, and prior health history are fixed but unobserved in the data.

The parameters of interest are β_t^{65-69} and β_t^{70-74}, which reflect mean differences in PHI take-up between the elderly, separately for 65-69-year-olds and 70-74-year-olds, and the near-elderly in the post-policy years (t = 2006-2008) relative to the year when the policy was implemented (2005). Examining the pre-trends (t = 2001-2004) using this model allows us to assess the validity of the identifying assumption that the treatment and control groups would experience the same time trend in PHI take-up in the absence of the policy. We control for differences in observable characteristics between the treatment and control groups which may affect PHI take-up. Because the sample includes individual-year observations from the same individuals, the inclusion of individual fixed effects is important to account for underlying time-invariant characteristics of these individuals. In addition, α's control for time-invariant and unobserved group differences to ensure that identification does not come from level differences across age groups. λ controls for the year fixed effects.[6]

Our estimates of the effects rely on variation at the age group by year level coincident with the timing of the rebate increase. This empirical strategy will identify the impact of higher rebates as long as there were no other reasons why PHI take-up would be changing, relatively, for elders and near-elders during the study period. The estimated coefficients over the pre-policy years (2001-2004) in Column 1 of Table 1 show that the effects before 2005 are all statistically insignificant, providing evidence that supports the validity of the parallel trends assumption.

4.2 Long-run analysis for the period 2001-2012

We expand our analysis using four additional years of data (2001-2012). During these four years, there were changes in the MLS income threshold, a tax surcharge on high-income individuals without PHI (Table 1). One concern is that the MLS policy may affect our treatment

[6] The year fixed effects together with the age variable also control for birth cohort fixed effects.

and control groups differently because the near-elderly are more likely to be subject to the MLS than the elderly.

We attempt to isolate the impact of higher rebates from changes in the MLS thresholds by focusing on tax filers who did not face any changes in their MLS requirement throughout the study period. To do this, we use the tax filers' actual tax assessment outcome for the MLS income test (referred to as income for MLS purposes, Section 3.2) to classify the sample into three MLS income groups: (1) below the pre-2008 thresholds, (2) between the pre-2008 and post-2008 thresholds, and (3) above the post-2008 thresholds (Table 1). Because the MLS requirement remained the same for MLS income groups (1) and (3), we analyze the effects of higher rebates on these two groups using Equation (1). For MLS income group (2), the combination of higher rebates along with loosened MLS mandates is expected to have mixed effects on PHI take-up. On the one hand, the increase in rebates would encourage their PHI take-up. On the other hand, they would be less likely to buy PHI without being subject to the MLS. In our sample, only 3 percent of the observations (48,540 out of 1,612,160) are in MLS income group (2). Hence, our long-run analysis still covers most of the sample.

4.3 Treatment effect heterogeneity

We further conduct stratified analyses using Equation (1) to test for heterogeneity in policy effects by socioeconomic characteristics, including gender, spousal status, remoteness of residence, and pre-policy income quartile. Because the entitlement to PHI rebates depends on the age of the oldest person a policy covers, and individuals can claim their spouses' share of PHI rebates if their spouses do not file a tax return, we would expect to see a larger effect for males and for those with spouses in our sample. To study how the effects differ by income level, we determine the tax filers' income quartile using their total income in financial year 2004, one year prior to the policy implementation. Because many older adults might transit in and out of work or shift to part-time jobs, we also use two and three consecutive years of income in the pre-policy years as extra robustness checks.

5. Results

5.1 Effects of higher rebates on PHI take-up

Table 3 shows the estimation results using Equation (1). Based on 2001-2008 data, higher PHI rebates for the elderly led to a small increase in PHI take-up initially (Column 1). For 65-69-year-olds, who were eligible for a rebate increase from 30 to 35 percent, the effects are estimated at 0.55 and 0.85 percentage points in the first two years of the policy, respectively. These are equivalent to 0.94 and 1.46 percent increases in PHI take-up relative to their pre-policy mean PHI coverage rate of 58.41 percent. For 70-74-year-olds, who were eligible for a rebate increase from 30 to 40 percent, the effects are estimated at 0.86 and 1.55 percentage points in the first two years of the policy, respectively. These are equivalent to 1.49 and 2.68 percent increases in PHI take-up relative to their pre-policy mean PHI coverage rate of 57.80 percent.

The event study estimates show that the effects of higher rebates on PHI take-up did not persist over time. In the third year after the policy implementation, the effects became negligible and statistically insignificant for both elderly groups. In addition, these estimates show that the effects before 2005 were all statistically insignificant, validating that there were no other events that affected the relative PHI take-up between the elderly and the near-elderly.

We use the estimated coefficients in the first two years of the policy to calculate the price elasticities of PHI demand for the elderly, summarized in Panel A of Table A1. Considering the scenario for 65-69-year-olds, whose PHI rebate rate was raised by 5 percentage points from 30 percent (corresponding to a 7.14 percent decrease in the insurance price),[7] the estimated price elasticity of PHI demand is around -0.13 (=0.94/-7.14) to -0.20 (=1.46/-7.14). For 70-74-year-olds, whose PHI rebate rate was raised by 10 percentage points from 30 percent (corresponding to a 14.29 percent decrease in the insurance price),[8] the estimated price elasticity of PHI demand is around -0.10 (=1.49/-14.29) to -0.19 (=2.68/-14.29). Our elasticity estimates are close to the lower end of the estimates for the price elasticity for duplicate or supplementary PHI in prior research on the general population, which range from -0.2 to -0.5 (Bilgrami et al., 2021; Butler, 2002; Cheng, 2014; Ellis & Savage, 2008; Frech III, Hopkins, & Macdonald, 2003). This implies that older adults may be less price sensitive when it comes to buying PHI.

5.2 Long-term effects of premium rebates

Using 2001-2012 data, we examine the long-term effects of higher rebates on PHI take-up with consideration of changes in the MLS income thresholds after 2008. We present the estimates from separate regressions focused on the group with income below the pre-2008 MLS thresholds (<A$50,000 for singles and <A$100,000 for families) and the group with income above the post-2008 MLS thresholds (>A$70,000 for singles and >A$140,000 for families in 2009, with a slight increase in the following years, see Table 1). As mentioned in Section 4.2, both groups were not affected by the MLS threshold change so the estimated effects can be attributed to higher rebates.

As shown in Columns 2 and 3 of Table 3, only individuals with income below the pre-2008 MLS thresholds saw a positive shift in PHI take-up following the rebate increase. For 65-

[7] A 30 percent rebate means that an eligible individual pays: $0.7 \times$ PHI premium (P). When the rebate rate increased from 30 percent to 35 percent, the percent change in premium price was $(0.65\text{P} - 0.7\text{P})/0.7\text{P} \cong -7.14$.

[8] When the rebate rate increased from 30 percent to 40 percent, the percent change in premium price was $(0.6\text{P} - 0.7\text{P})/0.7\text{P} \cong -14.29$.

69-year-olds, the effects are estimated at 0.88, 1.57, and 0.60 percentage points, with statistical significance at the 5 percent level, in the first three years of the policy, respectively. For 70-74-year-olds, the effects are estimated at 1.28, 2.32, 1.06, and 0.89 percentage points, with statistical significance at the 5 percent level, in the first four years of the policy, respectively. The largest effects for this group appeared in the second year after the rebate increased, with the estimated elasticities being around -0.38 for 65-69-year-olds and -0.29 for 70-74-year-olds (Panel A of Table A1). Consistent with the results in Section 5.1, such positive effects on PHI take-up did not persist over time. On the other hand, there was no statistically significant effect on take-up among those with income greater than the post-2008 MLS income thresholds (Column 3).

5.3 Heterogeneous effects

We further examine the treatment effects across different socioeconomic groups by estimating Equation (1) for stratified samples. Table 4 shows that higher rebates increased PHI take-up in the first two years for all subgroups by gender and by spousal status. The effects were slightly larger for males than for females, and for those with spouses than those without spouses, but they were not statistically significantly different. The corresponding price elasticities of PHI demand are close to the estimates based on the full sample (Panel B of Table A1).

When analyzing the effects by remoteness of residence, we show that higher rebates led to a statistically significant increase in PHI take-up among individuals living in major cities (Column 1 of Table 5), also with similar elasticity estimates as the full sample (Panel C of Table A1). However, the estimates were statistically insignificant in reginal or remote areas (Columns 2 and 3 of Table 5), mostly due to the larger standard errors or the smaller sample size, especially for those in remote or very remote areas.

We find some interesting heterogeneity in take-up responses by pre-policy income quartile (Table 6). Higher rebates led to larger increases in PHI take-up among the elderly in the bottom quartile. On the contrary, the effects for the upper three quartiles were small or statistically insignificant. Using the second year post-policy coefficients, the estimated price elasticity of PHI demand for 65-69-year-olds (70-74-year-olds) in the bottom quartile is about -0.78 (-0.40), which is larger than the estimates of the full sample or other subgroups. It is worth noting that this low-income group originally had a substantially lower PHI coverage rate (37.56 percent for 65-69-year-olds; 33.41 percent for 70-74-year-olds) than the other income groups (Panel D of Table A1).

The income stratification results reveal that older adults with low incomes are more responsive to premium rebates, suggesting that liquidity constraints may play a critical role on their take-up of PHI. A modest premium subsidy for the low-income elderly who would not otherwise be able to afford PHI may increase their coverage. Because our data do not include those with the lowest incomes or retirees without tax filing obligations, our elasticity estimates may likely be the lower bound. In other words, the price elasticity of elderly demand for PHI may be larger if we include both tax filers and non-filers.

Prior research also found that low-income individuals are more sensitive to premium prices (Keenan, Cutler, & Chernew, 2006) and cost-sharing subsidies (DeLeire, Chappel, Finegold, & Gee, 2017), and they have higher price elasticity of PHI demand (Hinde, 2017). For the general population or high-income individuals, the policy did not seem to be as effective in increasing PHI take-up but may lead to a wealth transfer to those already with PHI, which is consistent with the findings in Palangkaraya et al. (2009) and Kettlewell et al. (2018).

6. Robustness Checks

Identification in our empirical strategy relies on the assumption that in the absence the rebate increase, PHI take-up would have evolved in a similar manner between the treatment group (age 65-74) and the control group (age 60-64). A potential threat to identification is that there may have been some other shocks over our study period, or around the age thresholds, that caused a relative shift in PHI take-up. The parallel pre-policy trends in PHI coverage in Figure 1 and the estimated coefficients in the pre-policy years in Table 3 provide evidence supporting the validity of this assumption.

In addition, we conduct several sensitivity analyses. First, we examine the robustness of our estimation results by varying the age range of the treatment and control groups. We repeat the exercise using Equation (1) with the following comparisons: the treatment group versus the control group being those aged (1) 65-69 versus 60-64; (2) 65-68 versus 61-64; (3) 65-67 versus 62-64. As shown in Table A2, the estimated coefficients using these alternative treatment and control groups do not deviate much from those reported in the main results (Column 1 of Table 3). Second, we carry out placebo tests on adjacent ages within each age group that experienced the same rebate rate during our study period, which should have no policy effects. The results in Table A3 support that the effects were not statistically significantly different within the same age group. Third, we compare the estimated effects with and without the inclusion of covariates. If the identification strategy is sound, the inclusion of baseline covariates in the model should not alter the results. As shown in Table A4, the results are similar with and without controls.

Fourth, although the retirement and superannuation policies remained largely the same during our study period (Polidano et al., 2020), and the Australian economy was relatively stable (Commonwealth of Australia, 2019), one may still concern that any changes related to the entitlements to age pension or other benefits at age 65 would affect PHI take-up through the budget constraint.[9] To address this, we use a triple difference design to rule out any potential effect on PHI take-up resulted from receiving pension. In the third difference, we take advantage of the fact that some tax filers are eligible for pension payments before age 60.[10] This can be identified by the "c_pension_age_eligible" variable in ALife data, which indicates whether a tax filer is age-eligible to claim pension, regardless of actual claim status. We estimate the following triple difference specification:

$$PHI_{ijt} = \beta_1 Elder_j \cdot Post_t \cdot Pension_i + \beta_2 Elder_j \cdot Post_t + \beta_3 Post_t \cdot Pension_i + \beta_4 Elder_j \cdot Pension_i + \gamma X_{ijt} + \mu_i + \alpha Elder_j + \lambda Post_t + \varepsilon_{ijt} \quad (2)$$

$Elder_j$ is an indicator for the elderly group (age 65+). $Post_t$ indexes post-policy years (2006-2008). $Pension_i$ is a binary variable that equals one if an individual is eligible to claim pension before age 65. The rest of the variables are as defined in Equation (1). As shown in Table A5, the triple difference estimates (β_1) are virtually identical to the difference-in-differences estimates.

Finally, we conduct robustness checks for the heterogenous effects by pre-policy income quartile using two and three consecutive years of income data (Tables A6 and A7). The results are virtually identical to those presented in Table 6.[11]

7. Discussion and Conclusions

This paper provides casual analyses on the effects of premium subsidies for the elderly on their PHI take-up decisions. We leverage the age-based policy of higher rebates as an exogenous variation to estimate the effects and study how such incentives affect the demand for PHI across elderly populations of different socioeconomic backgrounds. By using large

[9] The results are similar when we exclude age 65 entirely or exclude those who turned 65 in 2005.
[10] For example, veterans are eligible for age pension at age 60. In addition, women could qualify for age pension before age 65 prior to July 1, 2013. In 2001-2008 data, there are 18 percent (88,576 out of 494,379) of the observations eligible for age pension between age 60 and 64.
[11] The results using income for MLS purposes (as in Section 5.2) are also very similar.

administrative data, we overcome common misreporting and measurement error issues in many of the previous studies using survey data. Our findings provide important implications for health policy makers and contribute to the literature on the demand for PHI under a dual public and private health insurance system, which is common in many developed countries.

We find moderate PHI coverage gains in the first two years following the rebate increase. We estimate the price elasticity of PHI demand for the elderly to be around -0.1 to -0.2. These small elasticity estimates imply that higher rebates may not be very effective in expanding the overall PHI coverage for older adults. In addition, our results suggest that the effects were transitory, which could be explained by several reasons, including the rising cost of PHI and confusion in PHI. Over the past two decades, premium prices have grown at a much faster rate than wages (Bilgrami et al., 2021), and the proportion of insurance plans with excesses, deductibles, or out-of-pocket payments has also increased (Duckett & Nemet, 2019). Thus, even though people have PHI, they still need to pay high out-of-pocket costs at the time of treatment if they elect to be treated as private patients. On the contrary, it costs very little as public patients. These high costs may exceed savings from higher rebates and thus attenuate the positive effects of the rebates in terms of keeping PHI over time.

We examine the significance of treatment heterogeneity by socioeconomic characteristics and find that the demand responses were more elastic among individuals with low incomes, who had substantially lower ex-ante level of PHI coverage. Our results suggest that a more targeted subsidy program, with a focus on low-income elders, would be more effective in increasing take-up and may alleviate inequality in insurance coverage and access to health care services.

Although the responses seem to be small overall, the benefits of increasing PHI for low-income elders may be relatively high, and the rebates may still be cost effective if they deliver large health benefits and reduce pressures on the public system. Therefore, it is critical for future research to examine how PHI incentives eventually affect the choice of hospitals and health outcomes to provide a more comprehensive assessment on the full costs and benefits of the provision of subsidies.

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Table 1. Private Health Insurance (PHI) Rebate and Medicare Levy Surcharge (MLS) Policies (2001-2012)

Financial Year (FY)	PHI Rebate Rate			MLS		
	< Age 65	Age 65-69	Age 70+	MLS Rate	Income Threshold	
					Single	Family
2001 – 2005[a]	30%	30%	30%	1%	$50,000	$100,000
2005[a] – 2008	30%	35%	40%	1%	$50,000	$100,000
2009[b]	30%	35%	40%	1%	$70,000	$140,000
2010	30%	35%	40%	1%	$73,000	$146,000
2011	30%	35%	40%	1%	$77,000	$154,000
2012	30%	35%	40%	1%	$80,000	$160,000

Note: [a] Rebates increased for individuals aged 65 and older from April 1, 2005. [b] Changes in the MLS thresholds came into effect from October 31, 2008.

Table 2. Summary Statistics in Pre-Policy Period (2001-2004)

	Age Group					
	60-64		65-69		70-74	
Variables	Mean	SD	Mean	SD	Mean	SD
PHI (0/1)	0.590	0.492	0.584	0.493	0.578	0.494
Male (0/1)	0.572	0.495	0.578	0.494	0.553	0.497
Spouse (0/1)	0.770	0.421	0.771	0.420	0.723	0.447
Total Income	35,601	87,434	31,914	134,176	28,924	53,341
State (0/1)						
NSW	0.335	0.472	0.345	0.475	0.355	0.478
VIC	0.250	0.433	0.255	0.436	0.263	0.440
QLD	0.188	0.391	0.179	0.383	0.166	0.372
SA	0.079	0.269	0.081	0.272	0.081	0.272
WA	0.098	0.298	0.093	0.291	0.090	0.286
TAS	0.025	0.157	0.025	0.155	0.024	0.154
NT	0.006	0.077	0.004	0.064	0.003	0.059
ACT	0.019	0.136	0.019	0.135	0.018	0.134
Remoteness (0/1)						
Major city	0.701	0.458	0.697	0.460	0.705	0.456
Inner regional	0.201	0.401	0.209	0.407	0.206	0.404
Outer regional	0.087	0.282	0.084	0.278	0.081	0.273
Remote area	0.009	0.093	0.008	0.089	0.007	0.082
Very remote area	0.003	0.052	0.002	0.041	0.001	0.038
Observations	213,705		128,562		91,809	

Notes: The sample includes Australian tax filers aged 60 to 74 years in the ATO Longitudinal Information File (ALife) between 2001 and 2004. Observations are at the individual-year level.

Table 3. Effects of Higher Rebates on Take-up of Private Health Insurance

Age and year interactions	ALife 2001-2008	ALife 2001-2012	
		MLS Income < pre-2008 threshold[a]	MLS Income > post-2008 threshold[b]
	(1)	(2)	(3)
Age 65-69*FY2001	0.0021 (0.0048)	-0.0034 (0.0044)	-0.0427** (0.0181)
Age 65-69*FY2002	-0.0023 (0.0039)	-0.0065* (0.0038)	-0.0320** (0.0160)
Age 65-69*FY2003	-0.0010 (0.0032)	-0.0046 (0.0033)	-0.0089 (0.0127)
Age 65-69*FY2004	-0.0016 (0.0026)	-0.0035 (0.0027)	-0.0071 (0.0104)
Age 65-69*FY2005	–	–	–
Age 65-69*FY2006	0.0055** (0.0024)	0.0088*** (0.0025)	0.0075 (0.0085)
Age 65-69*FY2007	0.0085*** (0.0029)	0.0157*** (0.0028)	-0.0048 (0.0097)
Age 65-69*FY2008	-0.0030 (0.0034)	0.0060** (0.0031)	-0.0095 (0.0101)
Age 65-69*FY2009		0.0011 (0.0031)	-0.0096 (0.0107)
Age 65-69*FY2010		-0.0001 (0.0032)	-0.0089 (0.0110)
Age 65-69*FY2011		0.00002 (0.0033)	-0.0137 (0.0114)
Age 65-69*FY2012		-0.0025 (0.0035)	-0.0038 (0.0119)
Age 70-74*FY2001	0.0108 (0.0067)	0.0047 (0.0055)	-0.0470** (0.0227)
Age 70-74*FY2002	-0.0032 (0.0053)	-0.0085* (0.0046)	-0.0305* (0.0184)
Age 70-74*FY2003	-0.0007 (0.0042)	-0.0044 (0.0038)	-0.0215 (0.0140)
Age 70-74*FY2004	-0.0001 (0.0031)	-0.0021 (0.0031)	-0.0038 (0.0116)
Age 70-74*FY2005	–	–	–
Age 70-74*FY2006	0.0086*** (0.0030)	0.0128*** (0.0029)	0.0093 (0.0104)
Age 70-74*FY2007	0.0155*** (0.0039)	0.0232*** (0.0034)	0.0171 (0.0116)
Age 70-74*FY2008	-0.0008 (0.0051)	0.0106*** (0.0039)	0.0066 (0.0139)
Age 70-74*FY2009		0.0089** (0.0043)	0.0076 (0.0153)
Age 70-74*FY2010		0.0028 (0.0046)	-0.0095 (0.0175)
Age 70-74*FY2011		0.0026 (0.0050)	0.0035 (0.0185)
Age 70-74*FY2012		0.0027 (0.0055)	-0.0013 (0.0202)
Observations	817,113	1,275,971	93,247

Notes: The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.

[a] A$50,000 for singles and A$100,000 for families. [b] A$70,000 (140,000) in 2009, A$73,000 (146,000) in 2010, A$77,000 (154,000) in 2011, and A$80,000 (160,000) in 2012 for singles (families).

Table 4. Heterogenous Effects by Gender and by Spousal Status

Age and year interactions	Male (1)	Female (2)	With spouse (3)	Without spouse (4)
Age 65-69*FY2001	-0.0017	0.0068	0.0019	-0.0033
	(0.0063)	(0.0075)	(0.0055)	(0.0104)
Age 65-69*FY2002	-0.0014	-0.0038	-0.0003	-0.0133
	(0.0051)	(0.0061)	(0.0045)	(0.0084)
Age 65-69*FY2003	-0.0016	-0.0005	-0.0009	-0.0063
	(0.0042)	(0.0050)	(0.0037)	(0.0068)
Age 65-69*FY2004	-0.0029	-0.00004	-0.0021	-0.0010
	(0.0034)	(0.0040)	(0.0029)	(0.0056)
Age 65-69*FY2005	–	–	–	–
Age 65-69*FY2006	0.0063**	0.0044	0.0048*	0.0080
	(0.0032)	(0.0037)	(0.0028)	(0.0053)
Age 65-69*FY2007	0.0082**	0.0087**	0.0094***	0.0050
	(0.0038)	(0.0044)	(0.0033)	(0.0062)
Age 65-69*FY2008	-0.0040	-0.0019	-0.0016	-0.0070
	(0.0044)	(0.0052)	(0.0039)	(0.0073)
Age 70-74*FY2001	0.0011	0.0231**	0.0084	0.0086
	(0.0088)	(0.0104)	(0.0078)	(0.0140)
Age 70-74*FY2002	-0.0065	0.0009	-0.0055	-0.0043
	(0.0070)	(0.0083)	(0.0062)	(0.0110)
Age 70-74*FY2003	-0.0072	0.0076	-0.0027	-0.0027
	(0.0055)	(0.0064)	(0.0048)	(0.0085)
Age 70-74*FY2004	-0.0074*	0.0092**	-0.0016	-0.00003
	(0.0041)	(0.0047)	(0.0036)	(0.0062)
Age 70-74*FY2005	–	–	–	–
Age 70-74*FY2006	0.0106***	0.0060	0.0089**	0.0089
	(0.0041)	(0.0045)	(0.0035)	(0.0061)
Age 70-74*FY2007	0.0203***	0.0094	0.0162***	0.0145*
	(0.0052)	(0.0060)	(0.0045)	(0.0080)
Age 70-74*FY2008	-0.0001	-0.0023	0.0013	-0.0011
	(0.0067)	(0.0078)	(0.0059)	(0.0105)
Observations	458,260	358,853	621,605	195,508

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.

Table 5. Heterogenous Effects by Remoteness of Residence

Age and year interactions	Major city (1)	Inner and outer regional (2)	Remote and very remote area (3)
Age 65-69*FY2001	0.0018	0.0026	-0.0166
	(0.0057)	(0.0092)	(0.0522)
Age 65-69*FY2002	-0.0014	-0.0043	-0.0142
	(0.0047)	(0.0074)	(0.0429)
Age 65-69*FY2003	0.0016	-0.0062	-0.0129
	(0.0038)	(0.0061)	(0.0324)
Age 65-69*FY2004	0.0019	-0.0096*	-0.0131
	(0.0030)	(0.0049)	(0.0263)
Age 65-69*FY2005	–	–	–
Age 65-69*FY2006	0.0080***	0.0001	0.0099
	(0.0029)	(0.0047)	(0.0238)
Age 65-69*FY2007	0.0103***	0.0050	-0.0417
	(0.0034)	(0.0054)	(0.0310)
Age 65-69*FY2008	-0.0021	-0.0040	-0.0176
	(0.0040)	(0.0065)	(0.0346)
Age 70-74*FY2001	0.0089	0.0166	-0.0081
	(0.0080)	(0.0129)	(0.0713)
Age 70-74*FY2002	-0.0039	0.00004	-0.0154
	(0.0064)	(0.0102)	(0.0560)
Age 70-74*FY2003	-0.0012	0.0027	-0.0269
	(0.0050)	(0.0079)	(0.0426)
Age 70-74*FY2004	0.0017	-0.0035	-0.0419
	(0.0037)	(0.0059)	(0.0362)
Age 70-74*FY2005	–	–	–
Age 70-74*FY2006	0.0105***	0.0044	0.0305
	(0.0036)	(0.0059)	(0.0304)
Age 70-74*FY2007	0.0165***	0.0134*	0.0124
	(0.0046)	(0.0076)	(0.0383)
Age 70-74*FY2008	-0.0026	0.0040	0.0073
	(0.0060)	(0.0097)	(0.0489)
Observations	571,651	237,076	8,386

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.

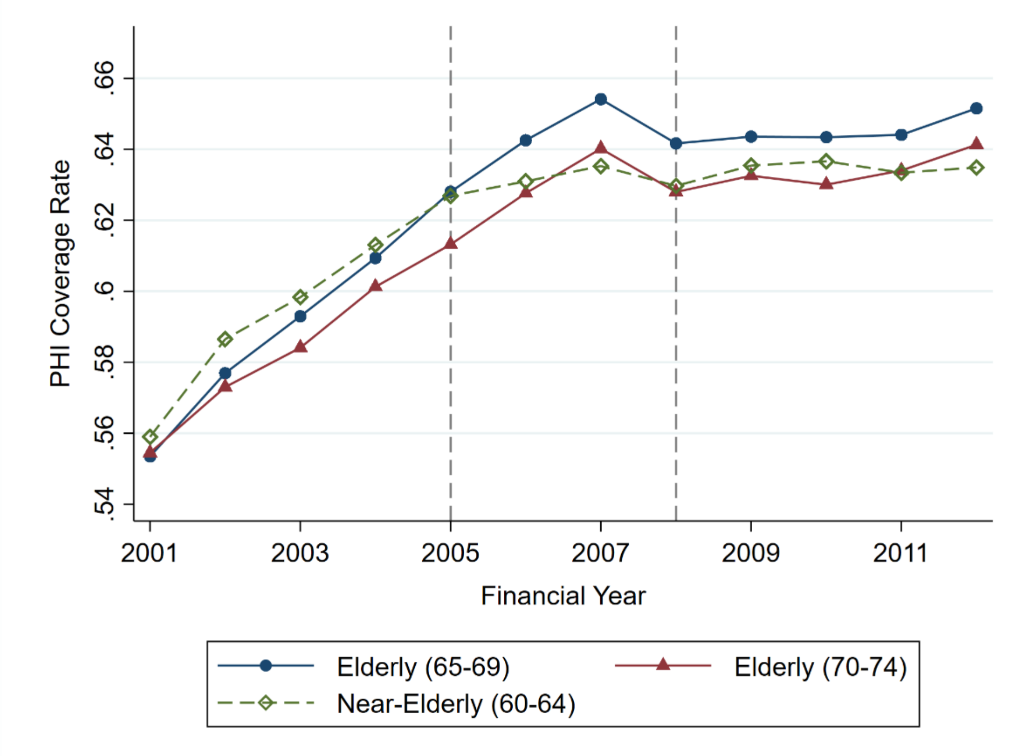
Table 6. Heterogenous Effects by Income Quartile

Age and year interactions	Income Quartile[a]			
	Q1	Q2	Q3	Q4
	$Income_{2004}$ < A$13,171	A$13,171 ≤ $Income_{2004}$ < A$24,592	A$24,592 ≤ $Income_{2004}$ < A$42,560	$Income_{2004}$ ≥ A$42,560
	(1)	(2)	(3)	(4)
Age 65-69*FY2001	0.0342*** (0.0116)	-0.0091 (0.0096)	-0.0068 (0.0094)	-0.0110 (0.0093)
Age 65-69*FY2002	0.0064 (0.0094)	-0.0041 (0.0078)	-0.0046 (0.0075)	-0.0079 (0.0075)
Age 65-69*FY2003	0.0059 (0.0074)	-0.0023 (0.0065)	-0.0023 (0.0061)	-0.0039 (0.0061)
Age 65-69*FY2004	-0.0123** (0.0057)	-0.0006 (0.0053)	0.0022 (0.0049)	0.0019 (0.0047)
Age 65-69*FY2005	–	–	–	
Age 65-69*FY2006	0.0145*** (0.0055)	-0.0063 (0.0053)	0.0100** (0.0047)	0.0045 (0.0041)
Age 65-69*FY2007	0.0209*** (0.0067)	0.0090 (0.0063)	0.0083 (0.0055)	0.0019 (0.0049)
Age 65-69*FY2008	0.0164** (0.0080)	-0.0059 (0.0077)	-0.0099 (0.0066)	-0.0051 (0.0056)
Age 70-74*FY2001	0.0383** (0.0159)	0.0054 (0.0131)	-0.0012 (0.0135)	-0.0030 (0.0131)
Age 70-74*FY2002	-0.0047 (0.0124)	-0.0002 (0.0105)	-0.0063 (0.0106)	-0.0064 (0.0104)
Age 70-74*FY2003	0.0029 (0.0092)	0.0037 (0.0081)	-0.0100 (0.0082)	0.0012 (0.0082)
Age 70-74*FY2004	-0.0097 (0.0067)	0.0088 (0.0061)	-0.0064 (0.0060)	0.0031 (0.0061)
Age 70-74*FY2005	–	–	–	
Age 70-74*FY2006	0.0118* (0.0067)	0.0004 (0.0060)	0.0082 (0.0059)	0.0135** (0.0059)
Age 70-74*FY2007	0.0190** (0.0090)	0.0063 (0.0080)	0.0194 (0.0076)	0.0220*** (0.0073)
Age 70-74*FY2008	0.0226* (0.0118)	-0.0171 (0.0106)	-0.0074 (0.0100)	0.0118 (0.0092)
Observations	166,809	182,984	201,441	216,539

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.
[a] Income quartiles are based on individuals' total taxable income in financial year 2004.

Appendix

Figure 1. Private Health Insurance (PHI) Coverage among the Near-Elderly and the Elderly, ALife 2001-2012



Notes: Data are from 2001-2012 ALife. The sample includes Australian tax filers aged 60 to 74 years.

Table A1. Summary of Estimated Price Elasticity of PHI Demand

A. Full sample: using estimated coefficients from Table 3

	ALife 2001-2008		ALife 2001-2012			
	All		MLS<per-2008 threshold		MLS>post-2008 threshold	
	65-69	70-74	65-69	70-74	65-69	70-74
Δ in rebate (pp)	+5	+10	+5	+10	+5	+10
%Δ in insurance price	-7.14	-14.29	-7.14	-14.29	-7.14	-14.29
Estimated coefficients						
1st year	**0.0055**	**0.0086**	**0.0088**	**0.0128**	0.0075	0.0093
2nd year	**0.0085**	**0.0155**	**0.0157**	**0.0232**	-0.0048	0.0171
Pre-policy mean	0.5841	0.5780	0.5717	0.5636	0.8605	0.8689
%Δ in PHI take-up						
1st year	**0.9416**	**1.4879**	**1.5393**	**2.2711**	0.8716	1.0703
2nd year	**1.4552**	**2.6817**	**2.7462**	**4.1164**	-0.5578	1.9680
Elasticity of PHI Demand						
1st year	**-0.1319**	**-0.1041**	**-0.2156**	**-0.1589**	-0.1221	-0.0749
2nd year	**-0.2038**	**-0.1877**	**-0.3846**	**-0.2881**	0.0781	-0.1377

B. By gender and spousal status: using estimated coefficients from Table 4

	Male		Female		With spouse		Without spouse	
	65-69	70-74	65-69	70-74	65-69	70-74	65-69	70-74
Δ in rebate (pp)	+5	+10	+5	+10	+5	+10	+5	+10
%Δ in insurance price	-7.14	-14.29	-7.14	-14.29	-7.14	-14.29	-7.14	-14.29
Estimated coefficient								
1st year	**0.0063**	**0.0106**	0.0044	0.0060	0.0048	**0.0089**	0.0080	0.0089
2nd year	**0.0082**	**0.0203**	**0.0087**	0.0094	**0.0094**	**0.0162**	0.0050	0.0145
Pre-policy mean	0.5824	0.5766	0.5865	0.5798	0.6068	0.5983	0.5079	0.5250
%Δ in PHI take-up								
1st year	**1.0817**	**1.8384**	0.7502	1.0348	0.7910	**1.4875**	1.5751	1.6952
2nd year	**1.4080**	**3.5206**	**1.4834**	1.6212	**1.5491**	**2.7077**	0.9844	2.7619
Elasticity of PHI Demand								
1st year	**-0.1515**	**-0.1286**	-0.1051	-0.0724	-0.1108	**-0.1041**	-0.2206	-0.1186
2nd year	**-0.1972**	**-0.2464**	**-0.2078**	-0.1135	**-0.2170**	**-0.1895**	-0.1379	-0.1933

C. By remoteness of residence: using estimated coefficients from Table 5

	Major city		Inner and outer regional		Remote and very remote area	
	65-69	70-74	65-69	70-74	65-69	70-74
Δ in rebate (pp)	+5	+10	+5	+10	+5	+10
%Δ in insurance price	-7.14	-14.29	-7.14	-14.29	-7.14	-14.29
Estimated coefficients						
1st year	**0.0080**	**0.0105**	0.0001	0.0099	0.0044	0.0305
2nd year	**0.0103**	**0.0165**	0.0050	-0.0417	0.0134	0.0124
Pre-policy mean	0.6257	0.6241	0.5368	0.5335	0.5431	0.5024
%Δ in PHI take-up						
1st year	**1.2786**	**1.6824**	0.0186	1.8557	0.8102	6.0709
2nd year	**1.6462**	**2.6438**	0.9314	-7.8163	2.4673	2.4682
Elasticity of PHI Demand						
1st year	**-0.1791**	**-0.1177**	-0.0026	-0.1299	-0.1135	-0.4248
2nd year	**-0.2306**	**-0.1850**	-0.1305	0.5470	-0.3456	-0.1727

D. By pre-policy income quartile: using estimated coefficients from Table 6

	Income Quartile							
	Q1		Q2		Q3		Q4	
	65-69	70-74	65-69	70-74	65-69	70-74	65-69	70-74
Δ in rebate (pp)	+5	+10	+5	+10	+5	+10	+5	+10
%Δ in insurance price	-7.14	-14.29	-7.14	-14.29	-7.14	-14.29	-7.14	-14.29
Estimated coefficient								
1st year	**0.0145**	0.0118	-0.0063	0.0004	**0.0100**	0.0082	0.0045	**0.0135**
2nd year	**0.0209**	**0.0190**	0.009	0.0063	0.0083	0.0194	0.0019	**0.0220**
Pre-policy mean	0.3756	0.3341	0.5886	0.5982	0.6870	0.7018	0.8156	0.8459
%Δ in PHI take-up								
1st year	**3.8605**	3.5319	-1.0703	0.0669	**1.4556**	1.1684	0.5517	**1.5959**
2nd year	**5.5644**	**5.6869**	1.5291	1.0532	1.2082	2.7643	0.2330	**2.6008**
Elasticity of PHI Demand								
1st year	**-0.5407**	-0.2472	0.1499	-0.0047	**-0.2039**	-0.0818	-0.0773	**-0.1117**
2nd year	**-0.7793**	**-0.3980**	-0.2142	-0.0737	-0.1692	-0.1934	-0.0326	**-0.1820**

Notes: pp = percentage points. Estimates in bold are statistically significant at the 5% level.
%Δ in insurance price:
Age 65-69: The rebate rate increased from 30 percent to 35 percent, so the percent change in premium price (P) was $(0.65\text{P} - 0.7\text{P})/0.7\text{P} \cong -7.14$.
Age 70-74: The rebate rate increased from 30 percent to 40 percent, so the percent change in premium price (P) was $(0.6\text{P} - 0.7\text{P})/0.7\text{P} \cong -14.29$.

Table A2. Effects of Higher Rebates on Take-up of Private Health Insurance
(Varying Age Windows for Treatment and Control Groups)

Age and year interactions	Elder: 65-69 Control: 60-64 (1)	Elder: 65-68 Control: 61-64 (2)	Elder: 65-67 Control: 62-64 (3)
Elder*FY2001	0.0000 (0.0049)	0.0049 (0.0055)	0.0057 (0.0065)
Elder*FY2002	-0.0045 (0.0039)	-0.0026 (0.0044)	-0.0022 (0.0051)
Elder*FY2003	-0.0031 (0.0033)	-0.0011 (0.0037)	-0.0021 (0.0045)
Elder*FY2004	-0.0023 (0.0026)	-0.0011 (0.0030)	-0.0017 (0.0036)
Elder*FY2005	–	–	–
Elder*FY2006	0.0063** (0.0025)	0.0058** (0.0028)	0.0036 (0.0034)
Elder*FY2007	0.0102*** (0.0030)	0.0105*** (0.0034)	0.0067* (0.0040)
Elder*FY2008	-0.0001 (0.0036)	-0.0001 (0.0041)	-0.0014 (0.0049)
Observations	657,132	517,259	382,567

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.

Table A3. Effects of Higher Rebates on Take-up of Private Health Insurance
(Placebo Test within the Same Age Group)

Age and year interactions	Treatment: 63-64 Control: 60-62 (1)	Treatment: 68-69 Control: 66-67 (2)	Treatment: 73-74 Control: 70-72 (3)
Treatment*FY2001	-0.0066 (0.0073)	-0.0011 (0.0101)	-0.0140 (0.0114)
Treatment*FY2002	-0.0015 (0.0056)	0.0004 (0.0084)	-0.0095 (0.0087)
Treatment*FY2003	-0.0061 (0.0049)	0.0070 (0.0075)	-0.0049 (0.0076)
Treatment*FY2004	-0.0007 (0.0039)	-0.0023 (0.0059)	-0.0053 (0.0062)
Treatment*FY2005	–	–	–
Treatment*FY2006	0.0063* (0.0036)	0.0004 (0.0055)	-0.0086 (0.0058)
Treatment*FY2007	0.0014 (0.0041)	0.0033 (0.0067)	0.0002 (0.0066)
Treatment*FY2008	-0.0047 (0.0045)	0.0030 (0.0080)	-0.0002 (0.0077)
Observations	414,710	182,367	159,981

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.

Table A4. Effects of Higher Rebates on Take-up of Private Health Insurance (With versus Without Covariates)

Age and year interactions	With Covariates (1)	Without Covariates (2)
Age 65-69*FY2001	0.0021 (0.0048)	0.0037 (0.0036)
Age 65-69*FY2002	-0.0023 (0.0039)	-0.0014 (0.0031)
Age 65-69*FY2003	-0.0010 (0.0032)	-0.0015 (0.0027)
Age 65-69*FY2004	-0.0016 (0.0026)	-0.0032 (0.0023)
Age 65-69*FY2005	–	–
Age 65-69*FY2006	0.0055** (0.0024)	0.0037* (0.0022)
Age 65-69*FY2007	0.0085*** (0.0029)	0.0060** (0.0025)
Age 65-69*FY2008	-0.0030 (0.0034)	-0.0042 (0.0028)
Age 70-74*FY2001	0.0108 (0.0067)	0.0098** (0.0044)
Age 70-74*FY2002	-0.0032 (0.0053)	-0.0042 (0.0038)
Age 70-74*FY2003	-0.0007 (0.0042)	-0.0018 (0.0032)
Age 70-74*FY2004	-0.0001 (0.0031)	-0.0011 (0.0027)
Age 70-74*FY2005	–	–
Age 70-74*FY2006	0.0086*** (0.0030)	0.0061** (0.0026)
Age 70-74*FY2007	0.0155*** (0.0039)	0.0119*** (0.0029)
Age 70-74*FY2008	-0.0008 (0.0051)	-0.0042 (0.0034)
Observations	817,113	971,411

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.

Table A5. Effects of Higher Rebates on Take-up of Private Health Insurance

(Triple Difference Estimates)

Variables	Elder: 65-69 Control: 60-64		Elder: 65-74 Control: 60-64	
	DD	DDD	DD	DDD
	(1)	(2)	(3)	(4)
Elder*Post	-0.0039 (0.0030)	-0.0049 (0.0037)	-0.0011 (0.0026)	0.0009 (0.0032)
Elder*Post*Pension		0.0022 (0.0055)		-0.0063 (0.0051)
Demographic controls	Y	Y	Y	Y
Individual fixed effects	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y
Observations	573,701	573,701	713,853	713,853

Notes: This table estimate the effects of higher rebates on PHI take-up using data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Columns 1 and 3 estimate a simple difference-in-differences model: $PHI_{ijt} = \beta_1 Elder_j \cdot Post_t + \alpha Elder_j + \lambda Post_t + \mu_i + \gamma X_{ijt} + \varepsilon_{ijt}$. Columns 2 and 4 estimate a triple difference model: $PHI_{ijt} = \beta_1 Elder_j \cdot Post_t \cdot Pension_i + \beta_2 Elder_j \cdot Post_t + \beta_3 Post_t \cdot Pension_i + \beta_4 Elder_j \cdot Pension_i + \gamma X_{ijt} + \mu_i + \alpha Elder_j + \lambda Post_t + \varepsilon_{ijt}$. PHI_{ijt} is an indicator that takes on a value of one if the individual had private health insurance coverage and zero otherwise. All models estimated with a linear probability model and control for age, age squared gender, spouse, state and remoteness of residence, as well as individual fixed effects and year fixed effects. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level.

Table A6. Heterogenous Effects by Income Quartile (based on 2003-2004 income)

	Income Quartile[a]			
	Q1	Q2	Q3	Q4
Age and year interactions	$Income_{2003-04}$ < A$13,261	A$13,261 ≤ $Income_{2003-04}$ < A$24,284	A$24,284 ≤ $Income_{2003-04}$ < A$41,516	$Income_{2003-04}$ ≥ A$41,516
	(1)	(2)	(3)	(4)
Age 65-69*FY2001	0.0397*** (0.0118)	-0.0073 (0.0097)	-0.0158* (0.0094)	-0.0118 (0.0092)
Age 65-69*FY2002	0.0140 (0.0095)	-0.0062 (0.0080)	-0.0122 (0.0075)	-0.0049 (0.0073)
Age 65-69*FY2003	0.0058 (0.0075)	-0.0008 (0.0067)	-0.0036 (0.0061)	-0.0038 (0.0059)
Age 65-69*FY2004	-0.0067 (0.0058)	-0.0053 (0.0054)	0.0026 (0.0049)	0.0008 (0.0046)
Age 65-69*FY2005	–	–	–	
Age 65-69*FY2006	0.0125** (0.0056)	-0.0017 (0.0053)	0.0057 (0.0047)	0.0058 (0.0041)
Age 65-69*FY2007	0.0195*** (0.0068)	0.0112* (0.0064)	0.0078 (0.0055)	0.0020 (0.0048)
Age 65-69*FY2008	0.0053 (0.0082)	0.0004 (0.0077)	-0.0051 (0.0066)	-0.0066 (0.0056)
Age 70-74*FY2001	0.0458*** (0.0161)	0.0028 (0.0133)	-0.0097 (0.0134)	-0.0029 (0.0129)
Age 70-74*FY2002	0.0022 (0.0125)	-0.0012 (0.0106)	-0.0122 (0.0105)	-0.0075 (0.0103)
Age 70-74*FY2003	0.0059 (0.0095)	0.0059 (0.0081)	-0.0110 (0.0081)	-0.0028 (0.0081)
Age 70-74*FY2004	-0.0051 (0.0068)	0.0077 (0.0061)	-0.0080 (0.0060)	0.0012 (0.0061)
Age 70-74*FY2005	–	–	–	
Age 70-74*FY2006	0.0113* (0.0067)	-0.0001 (0.0061)	0.0098* (0.0059)	0.0119** (0.0058)
Age 70-74*FY2007	0.0180** (0.0091)	0.0069 (0.0082)	0.0208*** (0.0076)	0.0200*** (0.0072)
Age 70-74*FY2008	0.0123 (0.0120)	-0.0128 (0.0108)	-0.0027 (0.0099)	0.0082 (0.0091)
Observations	161,511	178,664	203,557	224,041

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.

[a] Income quartiles are based on individuals' total taxable income in financial year 2003-2004.

Table A7. Heterogenous Effects by Income Quartile (based on 2002-2004 income)

	Income Quartile[a]			
	Q1	Q2	Q3	Q4
Age and year interactions	$\text{Income}_{2002\text{-}04} < \text{A\$13,303}$	$\text{A\$13,303} \leq \text{Income}_{2002\text{-}04} < \text{A\$24,038}$	$\text{A\$24,038} \leq \text{Income}_{2002\text{-}04} < \text{A\$40,571}$	$\text{Income}_{2002\text{-}04} \geq \text{A\$40,571}$
	(1)	(2)	(3)	(4)
Age 65-69*FY2001	0.0394*** (0.0118)	-0.0145 (0.0099)	-0.0079 (0.0095)	-0.0102 (0.0089)
Age 65-69*FY2002	0.0077 (0.0095)	-0.0088 (0.0083)	-0.0034 (0.0075)	-0.0030 (0.0071)
Age 65-69*FY2003	0.0089 (0.0075)	-0.0030 (0.0068)	0.0006 (0.0062)	-0.0066 (0.0058)
Age 65-69*FY2004	-0.0053 (0.0057)	-0.0073 (0.0055)	0.0042 (0.0049)	0.0002 (0.0046)
Age 65-69*FY2005	–	–	–	–
Age 65-69*FY2006	0.0104* (0.0057)	0.0001 (0.0054)	0.0069 (0.0047)	0.0050 (0.0040)
Age 65-69*FY2007	0.0195*** (0.0070)	0.0128** (0.0064)	0.0055 (0.0056)	0.0030 (0.0047)
Age 65-69*FY2008	0.0080 (0.0083)	0.0010 (0.0078)	-0.0082 (0.0066)	-0.0063 (0.0055)
Age 70-74*FY2001	0.0451*** (0.0161)	-0.0020 (0.0135)	-0.0038 (0.0136)	-0.0032 (0.0126)
Age 70-74*FY2002	0.0013 (0.0126)	-0.0030 (0.0108)	-0.0056 (0.0106)	-0.0094 (0.0101)
Age 70-74*FY2003	0.0075 (0.0094)	0.0034 (0.0083)	-0.0043 (0.0083)	-0.0072 (0.0079)
Age 70-74*FY2004	-0.0060 (0.0068)	0.0072 (0.0062)	-0.0041 (0.0061)	-0.0011 (0.0060)
Age 70-74*FY2005	–	–	–	–
Age 70-74*FY2006	0.0059 (0.0067)	0.0079 (0.0062)	0.0071 (0.0060)	0.0105* (0.0056)
Age 70-74*FY2007	0.0132 (0.0092)	0.0197** (0.0083)	0.0105 (0.0076)	0.0195*** (0.0070)
Age 70-74*FY2008	0.0087 (0.0121)	0.0016 (0.0110)	-0.0155 (0.0100)	0.0068 (0.0089)
Observations	156,899	174,732	204,594	231,548

Notes: Data from 2001-2008 ALife. The sample includes Australian tax filers aged 60 to 74 years. Each column reports the estimated coefficients from a different regression using Equation (1), with controls for age, age squared gender, spousal status, state and remoteness of residence, individual fixed effects, year fixed effects, and leaving 2005 as a reference year. Standard errors account for within-individual clustering and are reported in parentheses. Observations are at the individual-year level. ***, **, * = statistically different from zero at the 1%, 5%, and 10% level, respectively. FY = financial year.
[a] Income quartiles are based on individuals' total taxable income in financial year 2002-2004.

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