Supplementary Material for “The Price Elasticity of Demand for Pharmaceuticals amongst High Income Older Australians: A Natural Experiment”

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I. Introduction
This document includes additional details of relevance to readers of ‘The Price Elasticity of Demand for Pharmaceuticals amongst High Income Older Australians: A Natural Experiment’.

II. Selection of Treatment & Comparison Groups
As noted in the main paper, the treatment and comparison groups are selected with error. Income recorded in each NHS is derived from the amounts received in the previous financial year from business and property and the current amount usually received from wages and salaries, government benefits and other income (ABS, 1996). In contrast, income for the purpose of CSHC eligibility is annual income in the previous year, or an estimate of annual income for the current year if a change in circumstances can be demonstrated (Australian Government, 2007b: Section 3.9.3.30). In 2004-05, income of couples was not distinguishable from that of other household members. Thus couples who lived with anyone else were excluded from all years. Income is provided in ranges. By using all available income variables (income ranges; income deciles and equivalised income deciles), it was possible to utilise what appear to be reasonably successful approximations to the income thresholds.
Figure 1 shows the ideal income range for selecting the treatment group amongst single and coupled respondents and the approximations that were used. The boxes with lighter coloured shading denote partial coverage for couples in 1995. This results from two factors. One is the addition of two incomes presented as ranges (one for each member of
the couple). The other is due to the conversion of equivalised income decile cut-offs into raw dollar amounts. The equivalence scale used by ABS in 1995 is a simplified version of the Henderson Scale, which differs according to labour force status. The white box for couples in 2001 represents an income range that was not used in the main analysis, but the results are not sensitive to its inclusion.

III. High Income People with Health Care Cards in 1995

As noted in the main paper, 43.2% of the treatment group had a health care card in 1995. This implies that a large proportion of the treatment group ‘received treatment’ prior to the intervention and are hence misclassified. This is not a problem for the IV approach under the assumption that the factors causing misclassification in 1995 affect the same proportion of the treatment group in other years. Thus the reasons for misclassification require scrutiny. The majority (82.2%) of this misclassified subgroup received a public pension and were hence eligible for a pensioner concession card or a veterans’ treatment entitlement card.¹ The definition of income for the purpose of pension eligibility is different to the definition in the NHS.² Given that the number of pensioners dominates the number of higher income older people, it is not surprising that a large proportion of the higher income group consists of pensioners affected by this definitional issue. It is also possible that income is misreported for some of these pensioners. The remaining 17.8% of this subgroup (7.7% of the total 1995 treatment group) can be explained by a combination of other factors. Some may be CSHC holders, affected by similar income definition issues as the age pensioners discussed above. For others, pension receipt or

¹ The health card identifiers provided on the files do not distinguish between the CSHC and the Pensioner Concession Card, which provides an identical pharmaceutical concession for pensioners. It would seem natural to exclude pensioners from the treatment group in all years. However, much of the treatment group samples in 2001 and 2004-05 are (legitimately) pensioners. This is because the income eligibility threshold for a partial age pension was increased in July 2000. Thus it is impossible to apply such an exclusion rule across samples to address this issue. Again, this is not an issue for the analysis under the assumption that the misclassification is consistent across years.

² Eligibility for the age pension is based on annual income, though income over shorter periods (such as 13 weeks) may be assessed (Australian Government, 2007: Section 4.3.1.20).
card status may be misrecorded. All of these explanations are likely to affect the treatment group in each of the three surveys. There is one other factor, however, which affects only the treatment group in 1995. The health care card flag includes safety net concession cards in NHS 1995, but not in other years (ABS, 1996: 92). This may result in the proportion of people affected by the CSHC reform to be underestimated and hence the magnitude of IV elasticity estimates to be overestimated. A number of factors suggest that this is unlikely to be major factor. As discussed above, this issue is one of several competing explanations for the misclassification of just 7.7% of the treatment group. Since the survey was conducted throughout the calendar year, the number of people to have reached the safety net threshold before the time of interview is likely to be small, though data are not available to establish this. Further, the ABS states that ‘there was significant underreporting of safety net cards’ (ABS, 1996: 92). Finally, safety net card holders, by definition, have had high drug consumption in the calendar year prior to interview. But there is no evidence of a greater difference in pharmaceutical consumption between card holders and non-card holders in 1995 than in other years.

IV. Pharmaceutical Consumption Counts

In NHS 2001 and 2004-05, data were only collected for medications taken for specific conditions. The conditions common to both years are asthma, heart and circulatory conditions, diabetes and high sugar levels. These medications account for approximately 41% of all PBS prescriptions and 53% of the corresponding benefits in 2001 (Australian Government, 2006). A maximum of three drugs were recorded for each condition. Up to three heart and circulatory conditions were recorded. In NHS 1995, data were collected on all medications taken (to a maximum of twelve). These were classified by the ABS into types commonly used for specific conditions, based on the WHO Anatomical Therapeutic Chemical Classification (ABS, 1996: Appendix B). Medications commonly taken for the conditions listed above were included in the corresponding variable for 1995. This method does not ensure that the same drugs are included in each year. This is justified on

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3 The corresponding proportion for the population of interest is not available. Given the set of conditions covered, it is likely to be considerably higher than the proportion across all age groups.
the basis that treatments for these conditions change over time. For the estimates to be unaffected by the methodological differences between years, it is sufficient to assume that they affect the treatment group and comparison groups equally.

V. The Distribution of Pharmaceutical Consumption

To estimate the average marginal price change amongst the treatment group, it is necessary to estimate the proportions of respondents who fall into each of three components of the schedule (30 or less previous prescriptions; 31-52; 53 or more) at the time of interview. This distribution is not known, but can be bounded under plausible assumptions. Consider first the average number of prescriptions purchased by people in the treatment group in a calendar year. This is estimated using two methods. In the first method, the average number or prescriptions purchased per year by age pensioners was estimated using the 1998-99 Household Expenditure Survey. The ratio of the average number of prescriptions taken in a fortnight by age pensioners to people in the treatment group purchased. In the second method, the average annual number of prescriptions purchased per concession card holder was calculated using published data on the number of prescriptions (Australian Government, 2006) and the number of concession card holders (in NHS). Similarly to the first method, the ratio of the average number of prescriptions taken in a fortnight by all card-holders to people in the treatment group was calculated in NHS and assumed to also apply in the annual figures. For 1995, the two resulting estimates were 33.7 and 32.5 prescriptions per person. For 2001, the estimates were 36.5 and 28.9 and for 2004-05 they were 39.1 and 27.7. To estimate the exogenous effect of the CSHC on price, it is necessary to consider a common level of consumption across the three years. Taking the average of all six estimates, I assume that people in the treatment group purchased an average of 33.1 PBS prescriptions per year.
I further assume that individual annual consumption is distributed as a count variable with unknown dispersion. Figure 2 shows two such distributions. The first is a Poisson distribution, the second is a Negative Binomial distribution with $\alpha = 0.18$ (see Cameron and Trivedi, 1998: equation (3.26) for the density function). These correspond to the distribution of interest for respondents interviewed at the end of the calendar year. Related distributions can be shown which correspond to any point of time in the calendar year. For example, the mean of the distributions is halved for those interviewed at the middle of the year. The average of all such distributions across the year results in the estimated distribution of individual PBS pharmaceutical consumption in the calendar year prior to the time of interview (shown in Figure 3 with the thresholds that correspond to the thresholds in Figure 3 in the main paper).

For coupled people, there is the added complication that safety net eligibility is based on combined pharmaceutical consumption. In estimating their combined consumption, it is assumed that each member’s consumption independently follows a negative binomial distribution. For couples, the above process was repeated, replacing the negative binomial distribution with a distribution of combined consumption, where each member’s consumption independently follows a negative binomial distribution.
Across all values of $\alpha$, the maximum proportion of the distribution that falls in the critical range of 31 to 52 prescriptions is 25%.

References


