“The Demand for Private Health Insurance: Do Waiting Lists Matter?” – Revisited

by

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Abstract

Besley, Hall and Preston (**JPubEc**, 1999) investigate how waiting for medical treatment in public hospitals influences the decision to buy private health insurance, which covers faster private treatment. They find sizable positive impacts which have subsequently been influential on waiting lists management policies. This paper re-examines this result, in particular the sensitivity to the use of waiting lists as a proxy for waiting times. It is found that waiting lists do not predict private health insurance demand, and that the impact of waiting time in motivating the purchase of insurance has been overstated.

Keywords: health insurance, waiting time, waiting lists

JEL Codes: I11, I13

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1. INTRODUCTION

Admission via a waiting list is commonly used as a rationing device for non-emergency procedures in the healthcare sector when public services are free. In OECD countries where waiting lists are used (e.g. Australia, Europe, New Zealand, Canada), waiting time rather than price rations access to treatment. The average waiting times for non-emergency procedures often exceed six months (Siciliani and Hurst, 2003). Delays in medical treatment can prolong suffering, decrease earning capacity, and cause deterioration in quality of life, and some individuals are willing to pay non-trivial amounts to avoid waiting for medical treatement (Leung et al., 2004; Propper, 1990, 1995; Johannesson *et al*., 1998; Buckley *et al*., 2012). Individuals may buy private health insurance (PHI) covering private inpatient care in order to obtain the option of receiving treatment as a private patient, thus avoiding potentially long delays associated with free treatment (Colombo and Tapay, 2004; Harmon and Nolan, 2001).[2] A seminal paper that supports this hypothesis is Besley, Hall, and Preston (1999), henceforth BHP.

BHP estimated a model of demand for PHI using a sample of British individuals over the period 1986–1991. Lacking direct information on waiting times, they used the length of waiting lists for treatment as a proxy (see below).[3] They modelled private insurance demand as a function of individual characteristics and regional waiting list variables: the total inpatient waiting list and the long term list. They defined the long term waiting list as the number of individuals (per thousand of the population) who had been on the waiting list for at least 12 months. On average the long term waiting list accounted for 20% of the total waiting list. Controlling for household income and other demographics and the size of the total waiting list, BHP predicted the insurance rate to increase by 2% per additional long-term patient (per thousand population).

BHP's conclusion of a large impact on insurance purchase from reducing the long term list has been highly influential on public policy. It has resulted in recommendations to encourage private insurance as a means to reduce public hospital

[2] Other benefits of private treatment may include choice of doctor and quality of accommodation during an inpatient stay.
[3] Other proxies that have been used in the literature are measures of perceived quality of public hospitals such as expressed satisfaction (Costa-Font and Font-Vilalta, 2004; Costa and Garcia, 2003).We are aware of only one study using waiting times but it is based only on patients who took part in the national health survey (Jofre-Bonet, 2000)

waiting times by inducing the substitution to private health care. For example, the Australian government introduced a 30% premium subsidy in 1999 with the stated purpose of reducing public hospitals' waiting times (Willcox et al., 2007). There have been recommendations for similar policies in the UK (Siciliani and Hurst, 2003).

An important limitation/concern with the BHP analysis is that it is potentially misleading to use waiting lists and waiting times interchangeably. Cullis and Jones (2000) state that "(m)any have examined numbers on lists rather than average time (or the distribution of time) spent on lists. But it is the latter factor which affects the behaviour of demanders or their agents" [p.1229]. While the two measures may be correlated (Sobolev *et al.* 2006), they can also move in different directions (Siciliani, 2008), or be independent of each other (Newton et al., 1995). There are plausible reasons why the size of the waiting list may not relate to access to treatment. Waiting lists may reflect advances in technology that permit more procedures to be done in a given time; obviously, a long list does not translate to a long wait if patients are processed quickly. In addition, political pressure may focus on reducing the number of individuals waiting beyond a specified time without reducing overall waiting times.

A number of studies support a disconnect between waiting list and waiting times movements. In Canada, DeCoster *et al.* (1999) find that while the waiting lists for a range of procedures increased, waiting times for these procedures remained stable, or were reduced. In England, the NHS waiting list declined steadily (from more than 1.2 million in 1997 to 1 million in 2002 and to just 800,000 patients in 2004) while the average waiting time remained relatively stable (NHS, 2009; Appleby, 2005). Waiting times fell only when the British government introduced policies on maximum waiting times (Willcox et al., 2007). In Australia, exits from waiting lists (admission per thousand population) have been largely stable while the median waiting time has increased steadily (AIHW, 2002; AIHW, 2009; AIHW, 2012). There are two other concerns about the robustness of BHP's findings. Firstly, their area fixed-effect model captures how individuals' insurance decisions depend on *relative changes* in long-term waiting lists, that is, the extent to which individuals drop their PHI when their area's long-term waiting list decreases by more than in other areas. This co-variation is potentially quite different from the relationship between the long term average level of the waiting list and PHI coverage, which they intend to measure. Secondly, BHP's sample period included 1991. In that year there was a large fall in the long-term waiting list from the stable level that had existed since 1986 and also a drop in the insurance rate, which had been trending upwards. It is possible that some omitted factor reduced both the long-term waiting list and insurance coverage in 1991, generating a spurious positive relationship between the long-term waiting list and the insurance rate.

In this paper, we revisit BHP's results using Australian data where direct observation of waiting times is possible. Our data also allow us to construct waiting list measures similar to those used by BHP, enabling us to compare results using the two measures, and to test the usefulness of using waiting lists as a proxy for waiting times.

2. DATA AND METHODOLOGY

This study uses two sets of data: (i) hospital administrative data and (ii) a national household survey containing insurance information and socio-demographic controls. For (i) we use hospital data from public hospitals in New South Wales (NSW), the most populous Australian state with about 7 million residents. It consists of all planned inpatient episodes for those who completed their hospital stay between 1/07/2004 and 30/06/2005. For (ii), we use the Household, Income and Labour Dynamics in Australia (HILDA) survey. Because individuals form an expectation of waiting times ex ante to insurance purchase, we use HILDA for the year following the administrative data, 2005/2006. We focus on adult individuals residing in NSW, which gives a sample size of 2,315 individuals. Data (i) and (ii) are linked through postcode of residence. Postcodes are then mapped to Area Health Services (AHS) which are comparable to the regional health authorities used by BHP.

The patient waiting time is defined as the duration between listing and removal dates. Listing date is the date the patient was placed on the hospital's waiting list by the specialist and removal date is the date the patient was admitted to hospital. Using all observations in the hospital data we construct the average waiting time (*Mean wait*) for each AHS. We also construct two measures of long waiting time: (i) the percentage of patients waiting more than 12 months in the AHS (*Long wait*); and (ii) the minimum waiting time of the 10% of patients in the AHS with the longest waiting time (*P90th wait*).

Waiting lists are counts of patients at a census date. We specify 1/07/2004 as our census date. Assuming that the distribution of patients on the list does not change over time, to account for listed patients who complete their hospital stay after our data period, who we do not observe, we use historical patterns to augment our waiting list. Following BHP, the long term list is the count of patients on the total list waiting for more than 12 months.

Table 1 shows the pairwise correlation between waiting time and waiting list variables. Long term waiting list is significantly correlated with waiting time measures, especially *Long wait* but there is no significant pairwise relationship between total list variable and any of the waiting time variables.

[Insert Table 1]

Table 2 provides definition and summary statistics of all variables used in estimation. The socio-demographic variables follow those used by BHP. We control for differences in supply-side determinants of waiting times and waiting lists by including dummy variables for area remoteness. The waiting list variables are normalised by local population. The average *Total list* and *Long term list* are 10 and 2 patients (per 1000 population), respectively. On average, individuals wait 83 days, 5% of individuals wait more than 12 months and the 90^{th} percentile of waiting time is 145 days. The standard deviations suggest quite wide variations in waiting list and waiting time variables.

[Insert Table 2]

3. RESULTS

Table 3 presents probit models of insurance choice. The results from Model 1 are consistent with those of BHP: insurance demand is negatively related to total size of the waiting list and positively related to long term lists. Neither of these two variables however is statistically significant; BHP find that the effect of long term waiting list is marginally significant (t-statistic of 1.84). In Model 2 we add *Mean wait* and *Long wait*. The marginal effect of *Long wait* is positive and significant at 5% level, indicating that the probability of PHI purchase increases with the upper tail of the waiting time distribution. The waiting list variables remain insignificant. This suggests that long waiting times, and not long waiting lists, matter for insurance demand. In Model 3, we use *$P90^{th}$ wait* as an alternative measure of the upper tail of the waiting time distribution and find that its impact on PHI is still positive and is more precisely estimated.

In the last two models, Models 4 and 5, we omit both waiting list variables. *Long wait* is no longer significant but *P90th wait* is still highly significant. An explanation for this change of result is correlation of *Long wait* with *Long term list*. One needs to control for the size of the long term waiting list to isolate the effect of *Long wait*. The pseudo R-squared across models is about 0.26. The marginal effects of individual characteristics are stable across models and have expected signs. Using the Bayesian Information Criterion (BIC), the preferred model is Model 5. In this model, a 7-day increase in the *P90th wait* increases the probability of buying insurance by 2 percentage points (4% of the mean insurance rate).

[Insert Table 3]

While measures of long waiting time have a positive relationship with private insurance demand, *Mean wait* – holding long waiting time fixed – tends to lower demand. A policy that lowers *Long wait* at the expense of *Mean wait* will shrink PHI demand, whilst a policy that targets long waits and also lowers *Mean wait* will have a small impact on PHI demand. In fact, if we reduce both variables by one standard deviation (which is a 21 days for *Mean wait* and 52 days reduction for *Long wait*) the effects roughly offset each other, leaving PHI demand unchanged. Only in the less likely case where *Long wait* increases but *Mean wait* falls will the demand for PHI increase. We leave it to future research to understand why *Mean wait* has a negative effect on PHI (e.g., perhaps it proxies for quality of some other aspect of care we don’t measure).

4. CONCLUSION

Unlike BHP, we do not find that the long list is a significant determinant of demand for PHI. However we find that long waiting time is a determinant, confirming that the relationship between waiting times and waiting lists is not as straightforward as is commonly assumed. This positive effect however tends to be offset by the negative impact of average waiting times. The main theme in policy circles and in the current literature that people are driven to the private health insurance pool because of long public hospital waits appears to be overstated. Indeed, the justification for providing a PHI subsidy to lower waiting times requires additional information such as evidence of people's willingness to switch from private to public treatment, and the extent of induced demand in the public system, when waiting time falls.

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Table 1: Pairwise correlation waiting list and waiting time variables

	Total list	Long term list	*Mean wait*	*Long wait*	*P90th wait*
Total list	1				
Long term list	0.908	1			
	(0.000)				
Mean wait	0.354	0.511	1		
	(0.179)	(0.043)			
Long wait	0.417	0.671	0.889	1	
	(0.108)	(0.004)	(0.000)		
P90th wait	0.394	0.522	0.959	0.846	1
	(0.131)	(0.038)	(0.000)	(0.000)	

Note: p-value in parentheses. There are 16 AHSs in the data.

Table 2: Variable descriptions and summary statistics

Variable	Definition	Mean	Std.Dev
Waiting			
Total List	Count of patients on the public hospitals waiting list per '000 population on 1/7/2004	10.277	4.575
Long-term List	Count of patients listed for 12 months or more per '000 population on 1/7/2004	1.976	1.394
Mean wait	Mean waiting time of all patients	82.601	21.377
P 90th wait	90th percentile of waiting time	145.277	52.453
Long wait	% of patients waiting more than 12 months	0.053	0.025
Insurance			
Insurance	=1 if have PHI	0.527	0.499
Demographic			
Male	=1 if male	0.418	0.493
Income	Household annual gross income ($'000)	81.654	70.016
Nm children	Number of children	0.492	0.924
MLS	=1 if affected by the Medicare Levy Surcharge	0.326	0.469
Nm adults	Number of persons aged 15+	2.129	1.003
Owner-occupier	=1 if owned house/currently paying off mortgage	0.690	0.462
Education			
Postgrad	=1 if education is postgraduate level	0.049	0.216
Grad	=1 if education is graduate diploma	0.065	0.247
Undergrad	=1 if education is undergraduate	0.146	0.353
Dip	=1 if education is diploma/certificate III-IV	0.321	0.467
HS	=1 if education is high school	0.108	0.311
Incomplete	=1 if education is less than high school (base)	0.310	0.462
Age			
Age <30	=1 if age 18-29 years (base)	0.130	0.336
Age 30s	=1 if age 30-39 years	0.179	0.384
Age 40s	=1 if age 40-49 years	0.216	0.412
Age 50-65	=1 if age 50-65 years	0.273	0.446
Age 65+	=1 if age >65 years	0.201	0.401
Area			
City	=1 if live in city (base)	0.496	0.500
Inner region	=1 if live in inner NSW postcodes	0.362	0.481
Outer region	=1 if live in outer NSW/ remote NSW postcodes	0.143	0.350

Table 3: Probit marginal effects

	Model 1	Model 2	Model 3	Model 4	Model 5
Waiting					
Total List	-0.003	0.018	-0.017*		
	(-0.33)	(1.50)	(-1.69)		
Long-term List	0.013	-0.069	0.030		
	(0.50)	(-1.48)	(1.10)		
Mean wait		-0.007**	-0.010***	-0.003	-0.008***
		(-2.28)	(-3.53)	(-1.46)	(-2.91)
Long wait		6.769**		2.363	
		(2.20)		(1.37)	
P 90th wait			0.005***		0.003***
			(3.40)		(2.86)
Individual					
Income	0.003***	0.003***	0.003***	0.003***	0.003***
	(5.46)	(5.34)	(5.40)	(5.31)	(5.54)
MLS	0.106**	0.110**	0.108**	0.108**	0.104**
	(2.11)	(2.20)	(2.19)	(2.17)	(2.10)
Postgraduate	0.189***	0.184***	0.186***	0.185***	0.190***
	(3.14)	(3.03)	(3.05)	(3.07)	(3.15)
Graduate	0.178***	0.177***	0.177***	0.177***	0.183***
	(3.22)	(3.18)	(3.19)	(3.20)	(3.30)
Undergraduate	0.260***	0.257***	0.260***	0.258***	0.263***
	(6.75)	(6.62)	(6.72)	(6.66)	(6.83)
Diploma	0.051*	0.053*	0.051*	0.052*	0.053*
	(1.80)	(1.87)	(1.82)	(1.82)	(1.89)
High School	0.035	0.038	0.037	0.036	0.039
	(0.75)	(0.82)	(0.80)	(0.77)	(0.85)
Owner-occupier	0.237***	0.244***	0.242***	0.241***	0.237***
	(7.27)	(7.44)	(7.42)	(7.32)	(7.18)
Male	-0.026	-0.025	-0.026	-0.025	-0.027
	(-1.46)	(-1.39)	(-1.45)	(-1.41)	(-1.49)
Age 30s	0.098**	0.097**	0.100**	0.098**	0.102**
	(2.25)	(2.23)	(2.27)	(2.23)	(2.32)
Age 40s	0.116**	0.119***	0.115**	0.117**	0.118**
	(2.49)	(2.57)	(2.47)	(2.51)	(2.54)
Age 50-65	0.245***	0.243***	0.245***	0.245***	0.246***
	(5.38)	(5.38)	(5.43)	(5.38)	(5.41)
Age 65+	0.235***	0.232***	0.231***	0.233***	0.237***
	(4.62)	(4.59)	(4.54)	(4.57)	(4.63)
Nm children	-0.047**	-0.044**	-0.048**	-0.045**	-0.048**
	(-2.30)	(-2.20)	(-2.35)	(2.24)	(2.36)
Nm adults	-0.055***	-0.055***	-0.054***	-0.054***	-0.055***
	(-3.26)	(-3.26)	(-3.29)	(3.17)	(3.37)
Inner region	-0.135***	-0.124***	-0.102***	-0.126***	-0.117***
	(-3.68)	(-3.42)	(-2.66)	(-3.55)	(-3.33)
Outer region	-0.117**	-0.116**	-0.052	-0.100**	-0.108**
	(-2.36)	(-2.31)	(-0.99)	(-2.30)	(-2.53)
Log L	-1227.6	-1224.5	-1218.9	-1226.1	-1221.8
BIC	2610.1	2619.5	2607.8	2607.2	2598.5

Note: *t* statistics in parenthesis based on standard errors corrected for clustering by postcodes. The sample size is 2315. *, ** and *** indicates significance at 10%, 5% and 1% respectively.