Peer Effects in The Demand for Private Health Insurance

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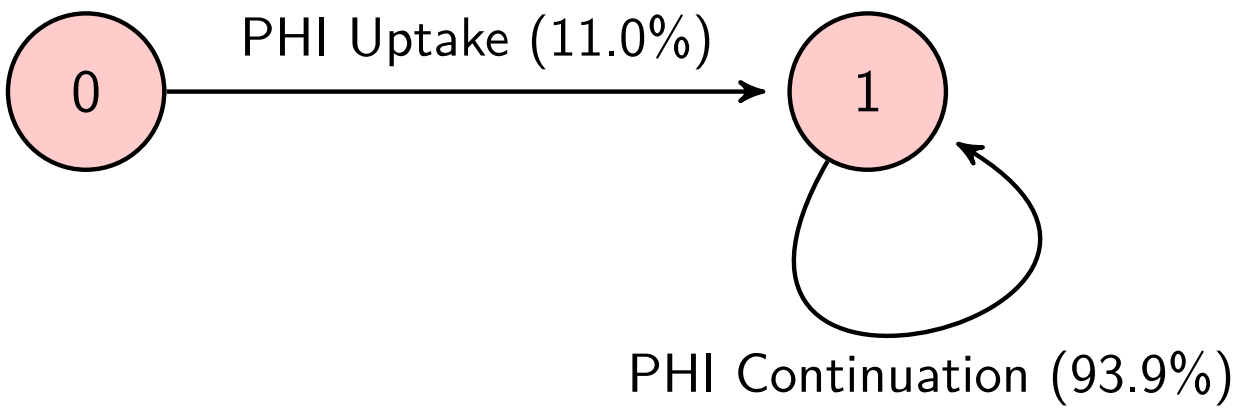
Motivation

1. How do peers' health shocks affect the PHI demand?
2. Why might peers affect this decision?

Introduction

- This study investigates the effects of **coworkers' health shocks** on the private health insurance (**PHI**) demand using Australian linked employee-employer data.
- Coworkers as **"free consultants"** in many decisions.
- Peer effects in transitional probabilities:



Data

- The newly available linked administrative data are of high quality, similar to those used in Scandinavian countries.
- Population-based administrative records.
  - Individual tax records + health records + *other*
- Australia is larger and culturally distinct from countries in which such data are typically available

Measuring Health Shocks

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  - "Expenditure and prescriptions twelve months to 30 june 2016" (Thomas & Marlton, 2016)

Measuring Health Shocks

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- **Pharmaceutical Benefits Scheme (PBS)**: The PBS is a government-funded program that provides subsidized prescription medicines to Medicare cardholders.
- **Filter:** Patients need a prescription from a physician to utilize the PBS benefits.
  - "Expenditure and prescriptions twelve months to 30 june 2016" (Thomas & Marlton, 2016)
- **Variable:** *The total number of PBS Transactions in the financial year 2015-2016 (PTC)*

Descriptive Plots: Age & Gender

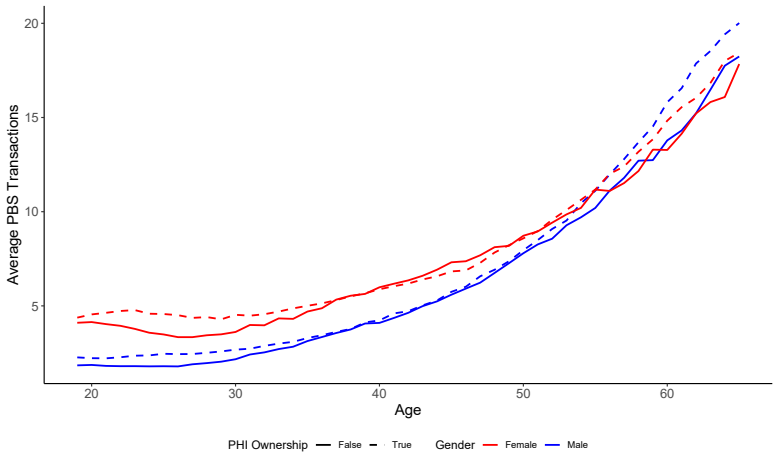

Figure: PTC by Age, Gender and PHI Ownersip

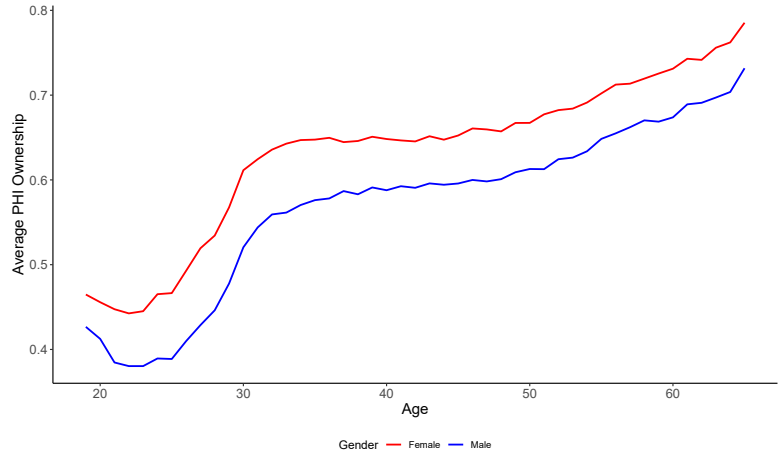

Figure: PHI Ownership by Age and Gender

Econometric Specification

- Linear probability model (Boucher & Bramoullé, 2020).
- Transition probabilities are conditioned on $y_{i,t-1} = Y \in \{0, 1\}$

$$P(y_{i,t} = 1 | y_{i,t-1} = Y, c_{j,Y}, H_i, \overline{H}_{-i}, \boldsymbol{X}_i) \tag{1}$$

where

- $c_{j,Y}$: The firm j fixed effects conditional on Y at time $t-1$.

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where

- $c_{j,Y}$: The firm j fixed effects conditional on Y at time $t-1$.
- H_i: The health shock variable at time $t-1$.
- $\overline{H}_{-i}$: Co-workers' average health condition, excluding i at time $t-1$.
  - ***Main interest!!***

Identification Strategy

$$P(y_{i,t} = 1 | y_{i,t-1} = Y, \dots) = c_{j,Y} + \alpha_Y H_{i,t-1} + \beta_Y \overline{H}_{-i} + \boldsymbol{X}'_{i,t} \delta_Y$$

- **Firm fixed effects** ($c_{j,Y}$): Allowed to vary with the transitional direction, i.e., $y_{i,t-1}$.

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  1. Sample Sorting: Firm-level correlated effects.

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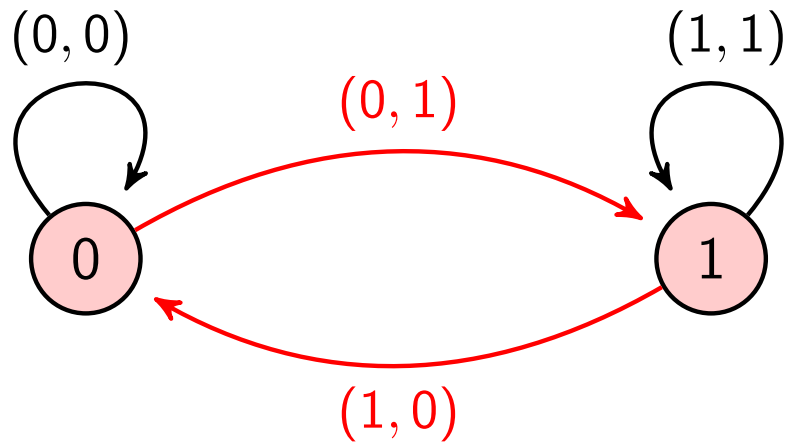
- **Firm fixed effects** ($c_{j,Y}$): Allowed to vary with the transitional direction, i.e., $y_{i,t-1}$.
  1. Sample Sorting: Firm-level correlated effects.
  2. Endogenous Peer Effects: Co-workers average PHI ownership excluding i in the firm.
     - Main identification challenge in peer effects estimations (Manski, 1993; Bramoullé et al., 2009).
     - We exploit the fact that the outcome variable is binary and $\overline{y}_{-i}$ can only take two values within the firm conditional on $y_{i,t-1} \in \{0, 1\}$.

Identification & Heterogeneity

- Causal directions by outcome-groups, $y = \{0, 1\}$: Coefficients and fixed effects vary by previous PHI ownership indicator.



Results

Specifications	**PHI Uptake**	**PHI Continuation**
PBS Transaction Count (PTC)	0.0061***	0.0021***
	(0.0003)	(0.0002)
Co-workers' Average PTC	0.0107**	0.0065***
	(0.0043)	(0.0023)
Co-workers' Average Age	-0.0063***	-0.0015***
	(0.0004)	(0.0003)
Num.Obs.	1,554,856	1,992,527
R2	0.102	0.045

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Conclusion

- We estimate contextual peer effects (Manski, 1993) without instrumental variables by exploiting the availability of consumers' decisions in two consecutive periods.
- Heterogeneity in PHI peer effects:
  - Peer effects are stronger for PHI uptake than PHI continuation.
  - One Std.Dev. increase in co-workers' PTC, increases females' PHI uptake probability by 0.54 percentage points.
  - Single and young people are more susceptible to peer effects.
    - *Financial experience*

Thank You!

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Additional Slides

- Graphs
- Why People Purchase PHI?
- Other Estimations
- Structural Model

Firm Sizes

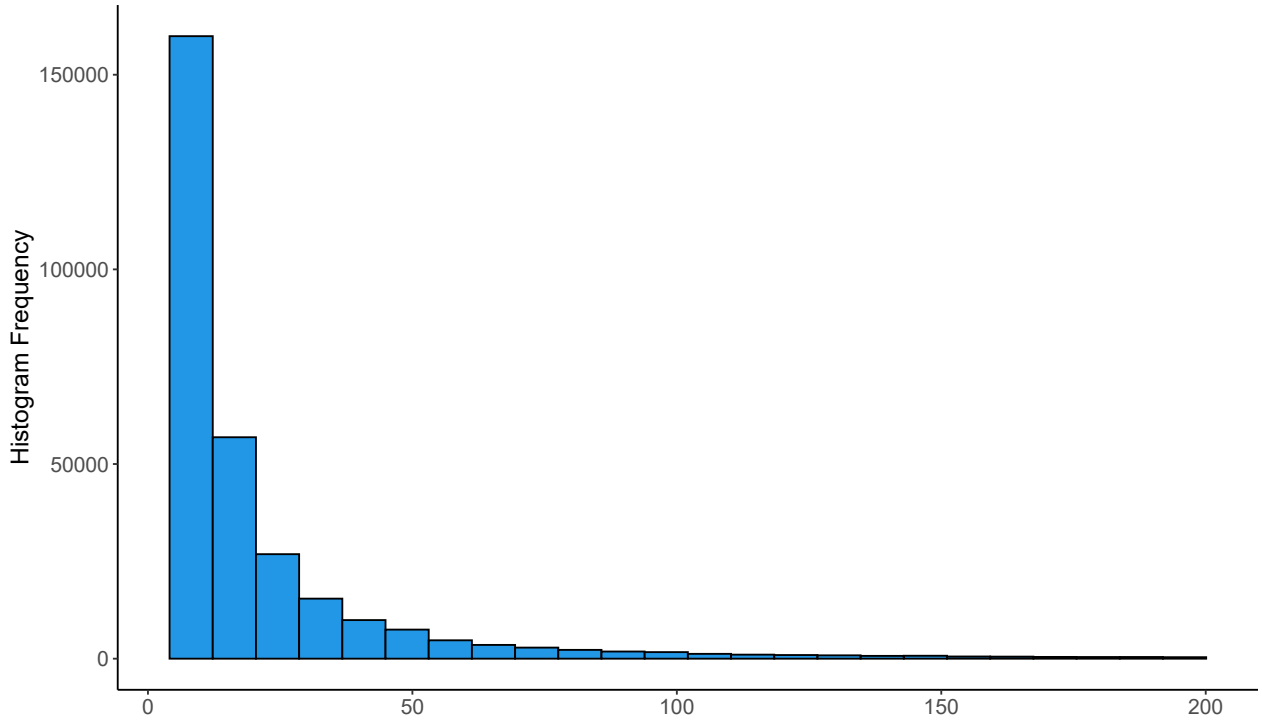
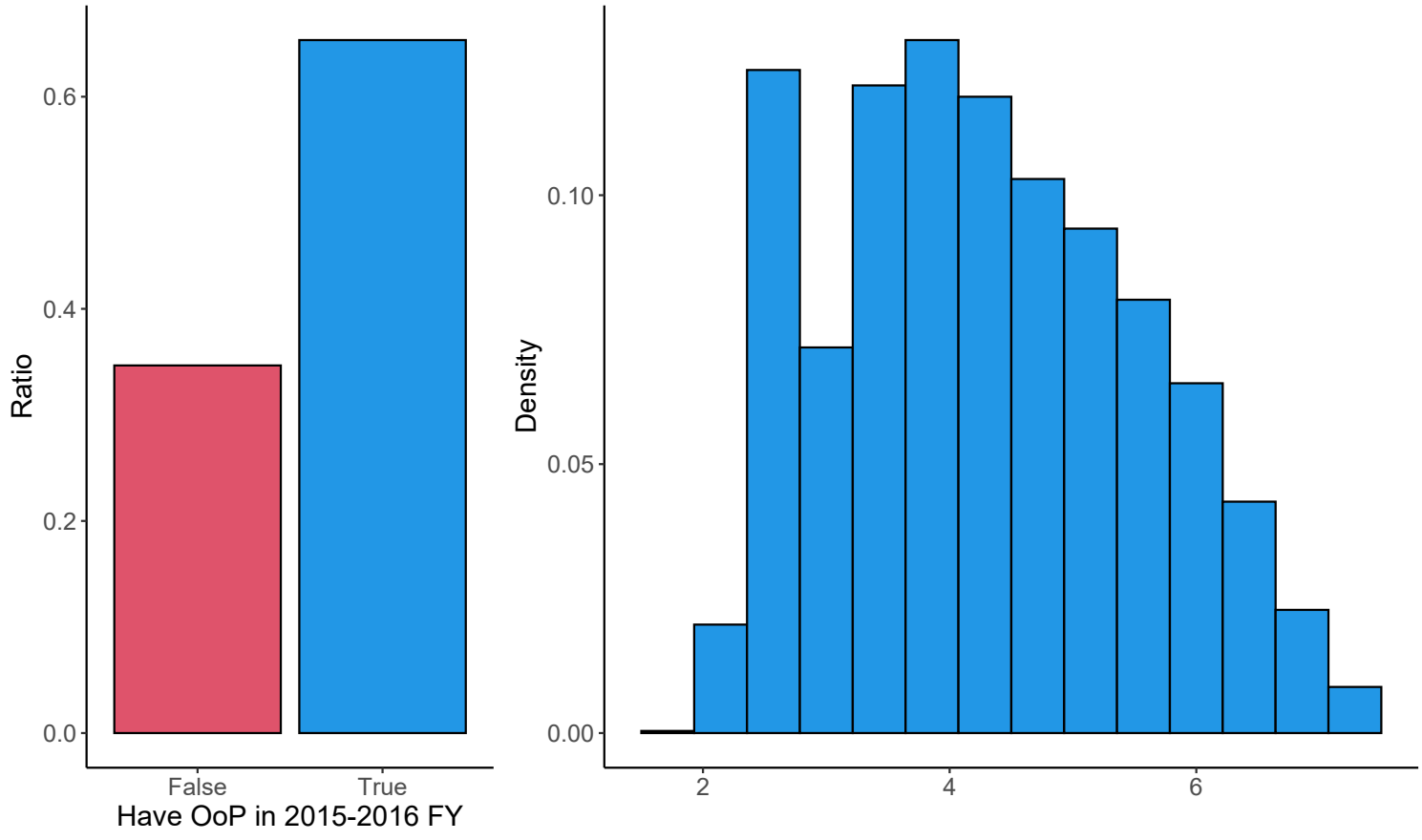


Figure: Firm Size Distribution

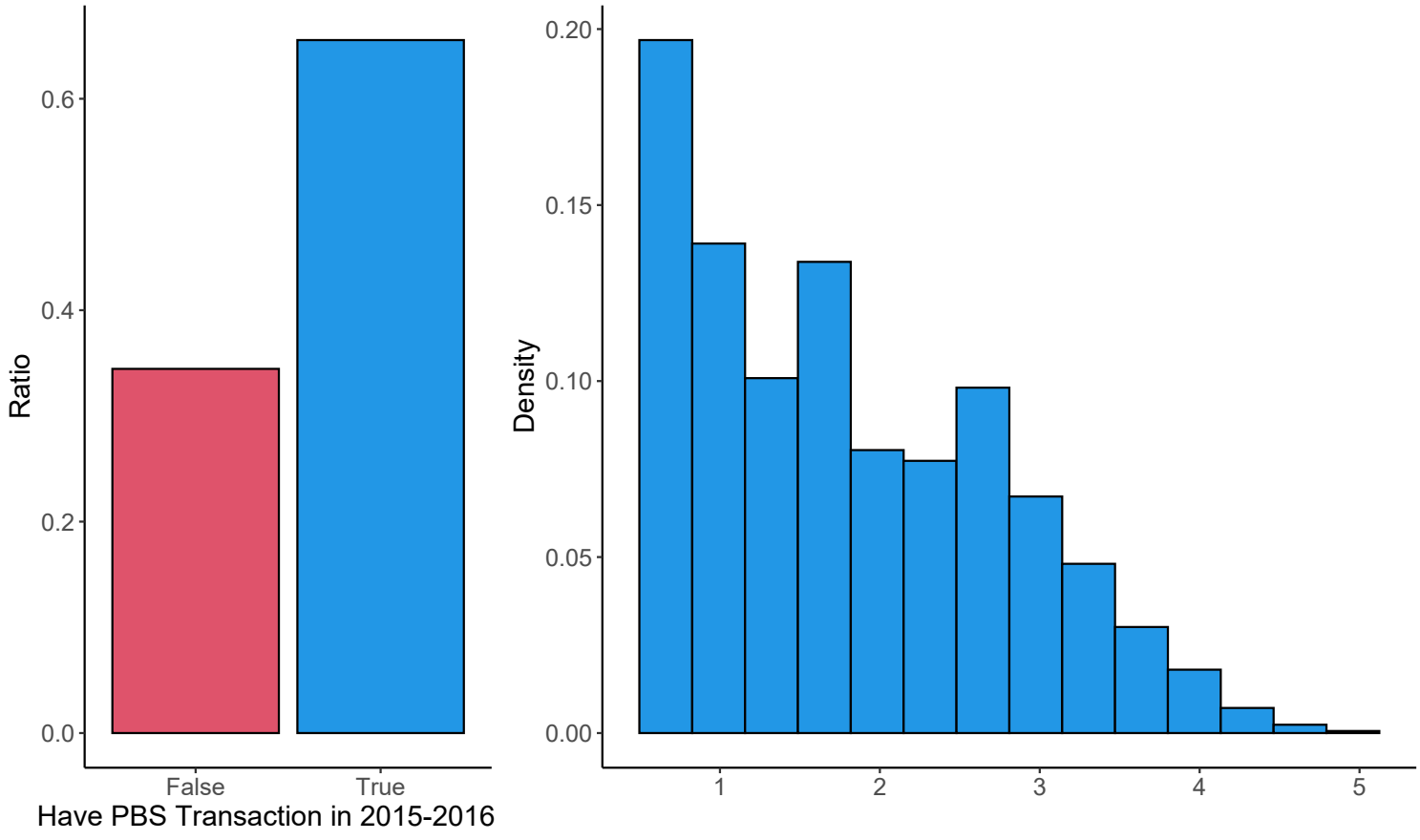
Appendix

Patient Contribution Distribution



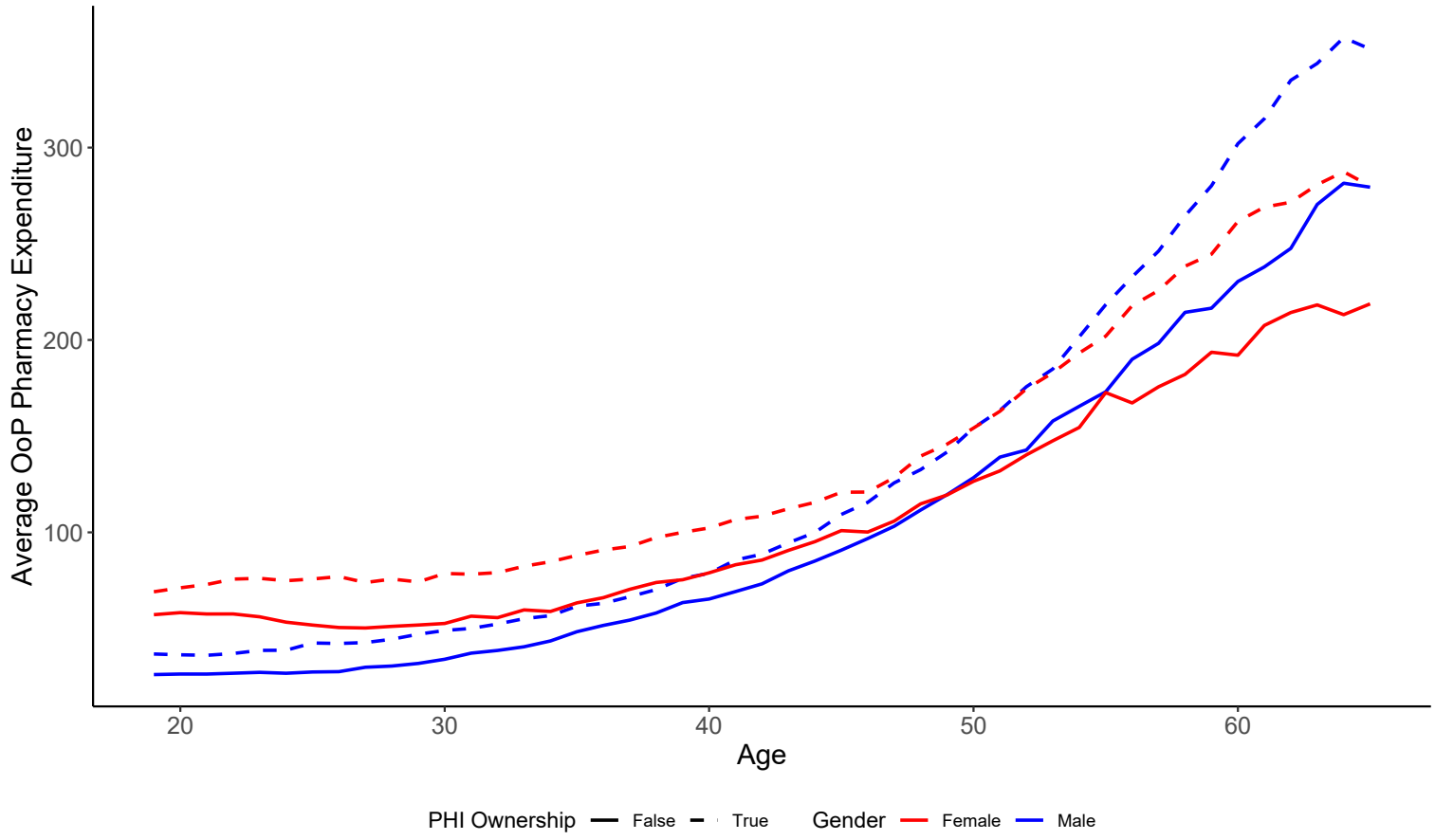
PTC Distribution Appendix

Distribution PBS Transaction Count



PPC Distribution Appendix

Patient Contribution by Age



PTC by Age Appendix

Why do People Purchase PHI in Australia?

1. Financial Reasons
   - Reduced tax liabilities
   - Lifetime health cover
2. Health Reasons
   - Access to private hospitals
   - Choice of doctor and flexibility in selecting treatment options
   - Coverage for extras such as dental and physiotherapy
   - Shorter waiting times for elective surgeries

Appendix

Results: Same-Gender Co-workers

	PHI Uptake		PHI Continuation	
Gender	*Female*	*Male*	*Female*	*Male*
PBS Transaction Count (PTC)	0.0073***	0.0041***	0.0019***	0.0018***
	(0.0005)	(0.0004)	(0.0003)	(0.0003)
Co-workers' Average PTC	0.0110***	0.0012	0.0009	0.0023
	(0.0040)	(0.0035)	(0.0015)	(0.0016)
Co-workers' Average Age	-0.0023***	-0.0025***	0.0000	0.0000
	(0.0004)	(0.0003)	(0.0002)	(0.0002)
Num.Obs.	644,042	897,992	943,491	1,016,993
R2	0.103	0.105	0.040	0.046

Appendix

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Co-workers' Average PTC	0.0110***	0.0012	0.0009	0.0023
	(0.0040)	(0.0035)	(0.0015)	(0.0016)
Co-workers' Average Age	-0.0023***	-0.0025***	0.0000	0.0000
	(0.0004)	(0.0003)	(0.0002)	(0.0002)
Num.Obs.	644,042	897,992	943,491	1,016,993
R2	0.103	0.105	0.040	0.046

Appendix

Robustness Tests: Firm Sizes

	PHI Uptake			PHI Continuation		
Maximum Firm Size	*50*	*100*	*150*	*50*	*100*	*150*
PBS Transaction Count (PTC)	0.0070***	0.0065***	0.0064***	0.0018***	0.0021***	0.0022***
	(0.0005)	(0.0004)	(0.0003)	(0.0003)	(0.0002)	(0.0002)
Co-workers' Average PTC	0.0176***	0.0141***	0.0133***	0.0038	0.0061**	0.0068***
	(0.0053)	(0.0047)	(0.0044)	(0.0028)	(0.0025)	(0.0024)
Co-workers' Average Age	-0.0068***	-0.0065***	-0.0062***	-0.0013***	-0.0014***	-0.0014***
	(0.0005)	(0.0005)	(0.0004)	(0.0003)	(0.0003)	(0.0003)
Num.Obs.	936,449	1,259,493	1,433,477	1,225,944	1,615,313	1,830,161
R2	0.103	0.104	0.103	0.048	0.046	0.045

Appendix

Results: By Age

	PHI Uptake					
Age	*Less than 30*			*30 or More*		
Gender	*All*	*Female*	*Male*	*All*	*Female*	*Male*
PBS Transaction Count (PTC)	0.0121***	0.0160***	0.0093***	0.0031***	0.0037***	0.0023***
	(0.0008)	(0.0013)	(0.0011)	(0.0004)	(0.0006)	(0.0005)
Co-workers' Average PTC	0.0105	0.0582***	-0.0012	-0.0002	0.0092	-0.0113
	(0.0120)	(0.0221)	(0.0170)	(0.0050)	(0.0101)	(0.0072)
Co-workers' Average Age	-0.0528***	-0.0389***	-0.0607***	-0.0046***	-0.0060***	-0.0042***
	(0.0034)	(0.0065)	(0.0046)	(0.0007)	(0.0014)	(0.0010)
Num.Obs.	623,670	274,104	349,566	931,186	377,461	553,725
R2	0.088	0.089	0.090	0.125	0.119	0.132

	PHI Continuation					
Age	*Less than 30*			*30 or More*		
Gender	*All*	*Female*	*Male*	*All*	*Female*	*Male*
PBS Transaction Count (PTC)	0.0090***	0.0092***	0.0086***	0.0007***	0.0006*	0.0009***
	(0.0009)	(0.0013)	(0.0014)	(0.0002)	(0.0003)	(0.0003)
Co-workers' Average PTC	0.0128	0.0238	0.0225	0.0056***	0.0034	0.0097**
	(0.0137)	(0.0224)	(0.0238)	(0.0022)	(0.0037)	(0.0039)
Co-workers' Average Age	-0.0267***	-0.0234***	-0.0370***	-0.0005	-0.0005	-0.0011**
	(0.0044)	(0.0075)	(0.0068)	(0.0003)	(0.0005)	(0.0005)
Num.Obs.	471,990	240,167	231,823	1,520,537	723,115	797,422
R2	0.025	0.023	0.025	0.025	0.023	0.026

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	(0.0120)	(0.0221)	(0.0170)	(0.0050)	(0.0101)	(0.0072)
Co-workers' Average Age	-0.0528***	-0.0389***	-0.0607***	-0.0046***	-0.0060***	-0.0042***
	(0.0034)	(0.0065)	(0.0046)	(0.0007)	(0.0014)	(0.0010)
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	(0.0137)	(0.0224)	(0.0238)	(0.0022)	(0.0037)	(0.0039)
Co-workers' Average Age	-0.0267***	-0.0234***	-0.0370***	-0.0005	-0.0005	-0.0011**
	(0.0044)	(0.0075)	(0.0068)	(0.0003)	(0.0005)	(0.0005)
Num.Obs.	471,990	240,167	231,823	1,520,537	723,115	797,422
R2	0.025	0.023	0.025	0.025	0.023	0.026

Appendix

Results: By Relationship

	PHI Uptake					
Have a Spouse	*TRUE*			*FALSE*		
Gender	*All*	*Female*	*Male*	*All*	*Female*	*Male*
PBS Transaction Count (PTC)	0.0024***	0.0039***	0.0009	0.0080***	0.0092***	0.0068***
	(0.0005)	(0.0009)	(0.0007)	(0.0004)	(0.0007)	(0.0006)
Co-workers' Average PTC	-0.0056	-0.0186	-0.0146	0.0156**	0.0289**	0.0136
	(0.0073)	(0.0161)	(0.0111)	(0.0066)	(0.0126)	(0.0091)
Co-workers' Average Age	-0.0020**	-0.0023	-0.0010	-0.0084***	-0.0083***	-0.0086***
	(0.0010)	(0.0018)	(0.0013)	(0.0006)	(0.0012)	(0.0008)
Num.Obs.	595,172	245,933	349239	959,684	405632	554,052
R2	0.011	0.011	0.011	0.176	0.171	0.185

	PHI Continuation					
Have a Spouse	*TRUE*			*FALSE*		
Gender	*All*	*Female*	*Male*	*All*	*Female*	*Male*
PBS Transaction Count (PTC)	0.0010***	0.0015***	0.0008***	0.0039***	0.0039***	0.0040***
	(0.0002)	(0.0003)	(0.0003)	(0.0004)	(0.0006)	(0.0007)
Co-workers' Average PTC	0.0036	0.0093**	0.0007	0.0121*	0.0104	0.0231**
	(0.0022)	(0.0041)	(0.0041)	(0.0066)	(0.0107)	(0.0117)
Co-workers' Average Age	0.0004	0.0009	0.0000	-0.0036***	-0.0030***	-0.0057***
	(0.0004)	(0.0006)	(0.0006)	(0.0006)	(0.0010)	(0.0011)
Num.Obs.	1,171,721	553,445	618276	820,806	409837	410,969
R2	0.026	0.026	0.025	0.043	0.038	0.045

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Gender	*All*	*Female*	*Male*	*All*	*Female*	*Male*
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	(0.0005)	(0.0009)	(0.0007)	(0.0004)	(0.0007)	(0.0006)
Co-workers' Average PTC	-0.0056	-0.0186	-0.0146	0.0156**	0.0289**	0.0136
	(0.0073)	(0.0161)	(0.0111)	(0.0066)	(0.0126)	(0.0091)
Co-workers' Average Age	-0.0020**	-0.0023	-0.0010	-0.0084***	-0.0083***	-0.0086***
	(0.0010)	(0.0018)	(0.0013)	(0.0006)	(0.0012)	(0.0008)
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	(0.0002)	(0.0003)	(0.0003)	(0.0004)	(0.0006)	(0.0007)
Co-workers' Average PTC	0.0036	0.0093**	0.0007	0.0121*	0.0104	0.0231**
	(0.0022)	(0.0041)	(0.0041)	(0.0066)	(0.0107)	(0.0117)
Co-workers' Average Age	0.0004	0.0009	0.0000	-0.0036***	-0.0030***	-0.0057***
	(0.0004)	(0.0006)	(0.0006)	(0.0006)	(0.0010)	(0.0011)
Num.Obs.	1,171,721	553,445	618276	820,806	409837	410,969
R2	0.026	0.026	0.025	0.043	0.038	0.045

Appendix

Results: By Income

	PHI Uptake			PHI Continuation		
Income Quantiles	*Below Q1*	*Between Q1 & Q3*	*Above Q3*	*Below Q1*	*Between Q1 & Q3*	*Above Q3*
PBS Transaction Count (PTC)	0.0073***	0.0067***	0.0054***	0.0035***	0.0030***	0.0011***
	(0.0007)	(0.0004)	(0.0007)	(0.0006)	(0.0003)	(0.0002)
Co-workers' Average PTC	0.0499***	0.0085	0.0209	0.0136**	0.0131***	0.0023
	(0.0100)	(0.0067)	(0.0139)	(0.0065)	(0.0035)	(0.0034)
Co-workers' Average Age	-0.0069***	-0.0045***	-0.0074***	-0.0028***	0.0003	0.0000
	(0.0011)	(0.0007)	(0.0016)	(0.0007)	(0.0004)	(0.0005)
Num.Obs.	388,705	777,414	388,737	498,110	996,260	498,157
R2	0.313	0.035	0.052	0.069	0.039	0.011

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	PHI Uptake			PHI Continuation		
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PBS Transaction Count (PTC)	0.0073***	0.0067***	0.0054***	0.0035***	0.0030***	0.0011***
	(0.0007)	(0.0004)	(0.0007)	(0.0006)	(0.0003)	(0.0002)
Co-workers' Average PTC	0.0499***	0.0085	0.0209	0.0136**	0.0131***	0.0023
	(0.0100)	(0.0067)	(0.0139)	(0.0065)	(0.0035)	(0.0034)
Co-workers' Average Age	-0.0069***	-0.0045***	-0.0074***	-0.0028***	0.0003	0.0000
	(0.0011)	(0.0007)	(0.0016)	(0.0007)	(0.0004)	(0.0005)
Num.Obs.	388,705	777,414	388,737	498,110	996,260	498,157
R2	0.313	0.035	0.052	0.069	0.039	0.011

Appendix

Main Equation

$$
\begin{aligned}
&P\left(y_{i,t}=1|y_{i,t-1}=Y, c_j, \overline{y}_{-i}, H_i, \overline{H}_{-i}, \boldsymbol{X}\right) \\
&= \rho Y + f(\overline{y}_{-i}; \theta_{j,Y}) + \alpha_Y H_i + \beta_Y \overline{H}_{-i} + \boldsymbol{X}'_{i,t}\gamma_Y, \qquad (2)
\end{aligned}
$$

Reduced Form Eqauation Appendix

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