

Housing price as a determining factor of aged care accommodation payment choices

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Background

- Payment for accommodation when entering aged care facilities in Australia, three options:
 - Refundable accommodation deposit (RAD)
 - One-off, lump sum payment of the ‘room price’ on entry
 - Daily accommodation payment (DAP)
 - Daily ‘rental-style’ payment over the stay
 - Any combination of RAD and DAP
 - A proportion of the room price (0% - 100%)

Background

- Daily payments are priced on the date of entry
 - Room price, P
 - Lump sum payment, RAD
 - Maximum permissible interest rate, $MPIR$
 - $DAP = [(P - RAD) \times MPIR]/365$
- Means tests based on assets and income
 - Full or partial government subsidy
 - Not supported by government subsidy

Background

- Implications of consumers' choice
 - For aged care facilities
 - RAD to finance capital expenditure
 - Remain solvent
 - For individual consumers
 - Consumption, wealth, bequest values
 - Means-tested pension income, aged care service fees

Background

- Residents' available funds at entry affect their payment choice
- Housing equity represents a substantial portion of the net assets
 - Sell residential property
- 'The use of RADs was directly related to the state of the housing market' (ACFA, 2020)

Research question

The relationship between changes in housing prices and residents' payment choice

Data

- Annual Survey of Aged Care Homes (SACH)
 - Payment information
 - Characteristics of aged care facilities
- Information collected by Services Australia
 - Characteristics of the residents
- Sample
 - 1 July 2016 to 30 June 2019
 - Non-supported residents

Data

- CoreLogic RP Data on housing price
- Measuring housing price change for residents who entered an aged care facility in month t
 - Percentage change in the median house price from the year before last year (months $t-24$ to $t-13$) to the last year (months $t-12$ to $t-1$)
 - Separately for each postcode area

Estimation strategy

- Probit regression
 - $\Pr(\text{choice} = \text{DAP}), \Pr(\text{choice} = \text{RAD})$
- Multinomial probit regression
 - Discrete choice between DAP, Combination, and RAD
 - Independence of irrelevant alternatives (IIA) assumption
- Fractional probit
 - Proportion of lump sum payment
 - For a $[0, 1]$ dependent variable

Covariates

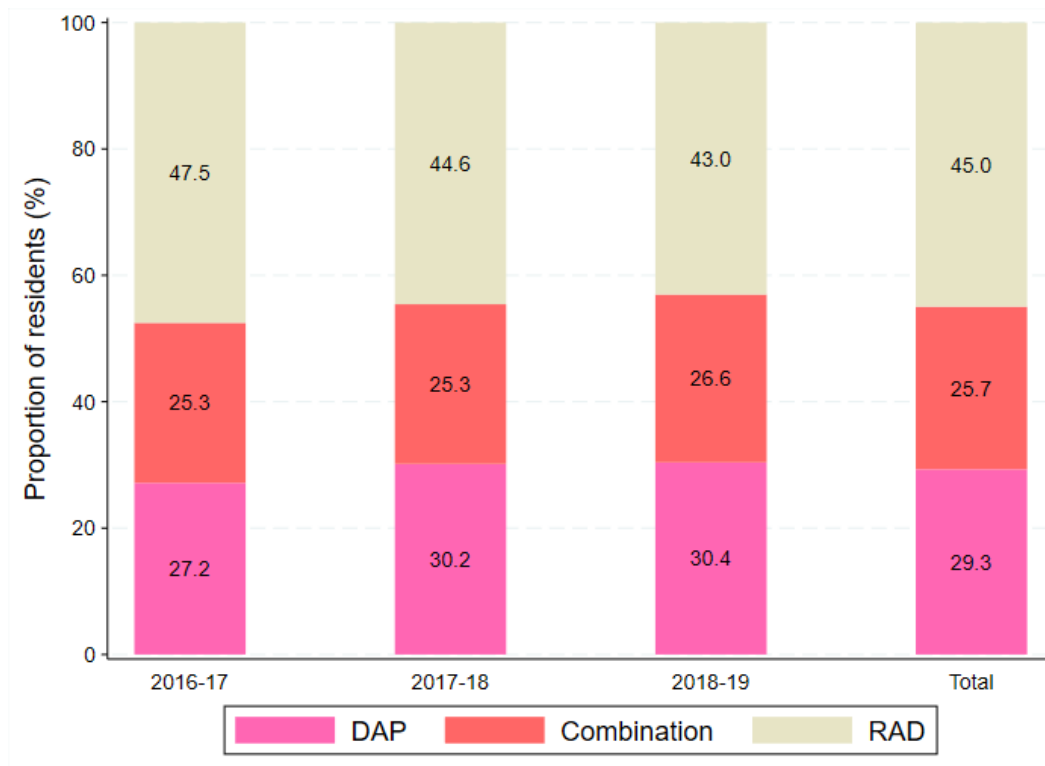
Variable	Definition
Price (1,000 AUD)	Accommodation price agreed upon entry to an aged care facility in Australia, categorised into five quintiles.
Asset (1,000 AUD)	Value of deemed assets upon entry, categorised into five quintiles, along with an additional category for observations with missing values.
Income (AUD)	Total income (pension and ordinary income) per fortnight averaged across all income tests for individual residents, categorised into five quintiles, along with an additional category for observations with missing values.
MPIR (%)	Maximum permissible interest rate.
Length of stay (years)	Duration of time a resident had spent at the aged care facility. The latest recorded exit date was 18 Sep 2020. In cases where residents remained at the facility on that specific date, the exit date was set as 31 Dec 2020, creating a 'right censoring' issue.
Length of stay censored	Binary variable with 1 indicating that a resident was still at the aged care facility on 18 Sep 2020 and 0 indicating otherwise. Both the censored dummy and its interaction with length of stay were included as controls.
ACFI-ADL score (0-100)	Aged Care Funding Instrument: activities of daily living. A score ranging from 0 to 100, measuring residents' activities of daily living, including nutrition, mobility, personal hygiene, toileting, and continence. Higher scores indicated a greater need for assistance. The score was categorised into five quintiles, along with an additional category for observations with missing values.

Covariates

ACFI-BEH score (0-100)	Aged Care Funding Instrument: behaviour. A score ranging from 0 to 100, measuring residents' behaviour, including cognitive skills, wandering, verbal behaviour, physical behaviour, and depression. Higher scores indicated a higher level of impairment. The score was categorised into five quintiles, along with an additional category for observations with missing values.
ACFI-CHC score (0-4)	Aged Care Funding Instrument: complex health care. A score ranging from 0 to 4, measuring residents' complex health care needs, including medication and complex health care. Higher scores indicated a greater need for assistance in health care management. The score was treated as a categorical variable, along with an additional category for observations with missing values.
Age (years)	Age of the resident at the time of entering the aged care facility. Both age and its square were included as controls.
Male	Binary variable with 1 representing males and 0 representing females.
Married	Binary variable with 1 indicating being married (registered or de facto) and 0 indicating otherwise.
Facility location	Categorisation of facility location into eight states and territories of Australia: NSW, VIC, QLD, SA, WA, TAS, ACT, and NT.
Facility remoteness	Categorisation of facility remoteness into major cities, inner regional, outer regional, and remote or very remote.
Facility ownership	Categorisation of facility ownership type into for profit, not for profit, and government.
Admission year	Financial year of admission: 2016-17, 2017-18, and 2018-19.

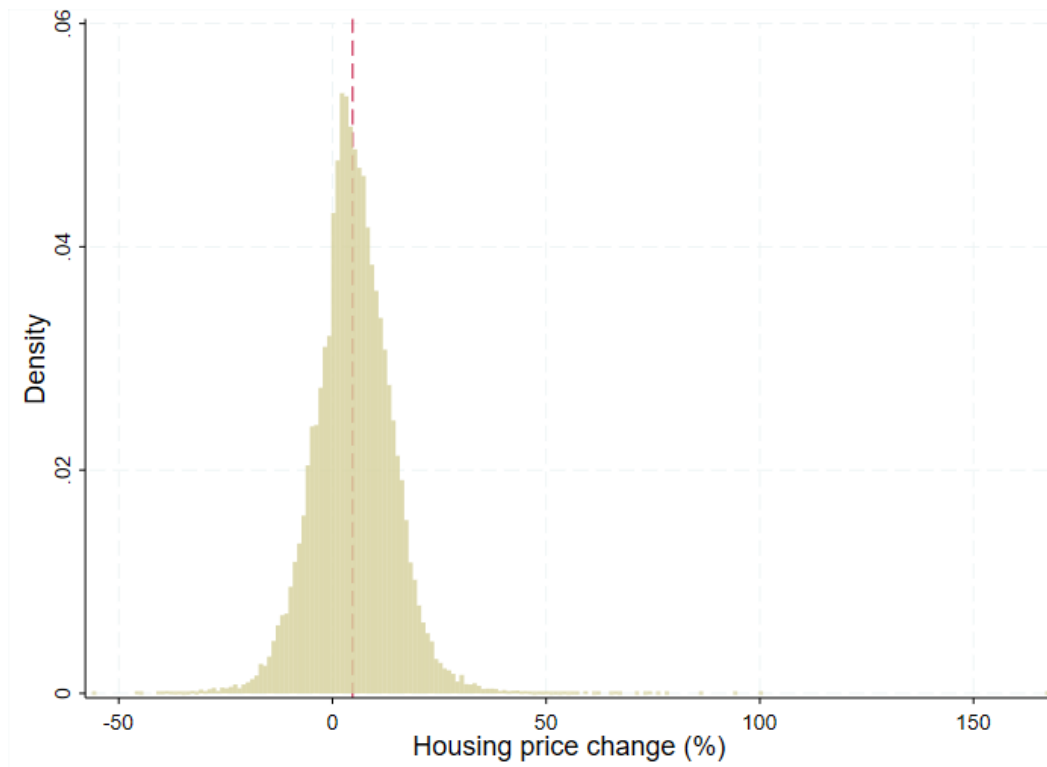
Consumer choice

Figure. Distribution of non-supported residents across alternative payment methods



Housing price change

Figure. Density distribution of housing price change



Hypotheses

- Housing price increase
 - More likely to sell residential property (loss aversion)
 - Afford more lump sum payment up-front

Results

Baseline

The average marginal effects of a one percentage point increase in housing price change on the percentage point change in the probability of choosing each alternative payment method or the proportion of lump sum payment.

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP)	Pr(Choice = RAD)	Pr(Choice = DAP)	Pr(Choice = Combination)	Pr(Choice = RAD)	Proportion of lump sum payment
	(1)	(2)	(3)	(4)	(5)	(6)
Housing price change	-0.1315*** (0.0243)	0.2137*** (0.0275)	-0.1303*** (0.0243)	-0.0847*** (0.0242)	0.2150*** (0.0276)	0.1813*** (0.0239)
Number of observations	74,650	74,650	74,650	74,650	74,650	74,650

Hypotheses

- Housing price increase
 - More likely to sell residential property (loss aversion)
 - Afford more lump sum payment up-front
- Investment decision when paying lump sum
 - Benefit: DAP as interest payment with MPIR as the interest rate
 - Cost: Housing price change as capital returns on the housing market

Results

Heterogeneity by the level of housing price change

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP)	Pr(Choice = RAD)	Pr(Choice = DAP)	Pr(Choice = Combination)	Pr(Choice = RAD)	Proportion of lump sum payment
	(1)	(2)	(3)	(4)	(5)	(6)
Housing price change < 0	-0.2895*** (0.0741)	0.2441*** (0.0852)	-0.2866*** (0.0742)	0.0453 (0.0711)	0.2414*** (0.0860)	0.2464*** (0.0731)
Housing price change >= 0 & < MPIR	-0.2176 (0.1817)	0.4232** (0.2120)	-0.2280 (0.1823)	-0.1942 (0.1905)	0.4222** (0.2115)	0.3936** (0.1859)
Housing price change >= MPIR	0.0768 (0.0472)	-0.0161 (0.0544)	0.0795* (0.0472)	-0.0651 (0.0515)	-0.0144 (0.0546)	-0.0476 (0.0457)
Significant difference at 5%						
(1) vs (2)	No	No	No	No	No	No
(1) vs (3)	Yes	Yes	Yes	No	Yes	Yes
(2) vs (3)	No	Yes	No	No	Yes	Yes

Hypotheses

- Housing price increase
 - More likely to sell residential property (loss aversion)
 - Afford more lump sum payment up-front
- Investment decision when paying lump sum
 - Benefit: DAP as interest payment with MPIR as the interest rate
 - Cost: Housing price change as capital returns on the housing market
- Housing rent change
 - Generate cash flow from renting out properties to cover DAP

Results

Accounting for housing rent change

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP)	Pr(Choice = RAD)	Pr(Choice = DAP)	Pr(Choice = Combination)	Pr(Choice = RAD)	Proportion of lump sum payment
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Housing rent change						
Housing rent change	-0.0343 (0.0345)	0.0770* (0.0401)	-0.0309 (0.0345)	-0.0448 (0.0349)	0.0757* (0.0406)	0.0505 (0.0345)
Number of observations	74,035	74,035	74,035	74,035	74,035	74,035
Panel B. Separately account for housing price and rent changes						
Housing price change	-0.1459*** (0.0254)	0.2298*** (0.0289)	-0.1445*** (0.0254)	-0.0867*** (0.0252)	0.2311*** (0.0290)	0.1987*** (0.0251)
Housing rent change	0.0098 (0.0343)	0.0169 (0.0378)	0.0114 (0.0345)	-0.0264 (0.0348)	0.0150 (0.0381)	-0.0044 (0.0337)
Number of observations	73,869	73,869	73,869	73,869	73,869	73,869

Results

Increasing the number of underlying housing transactions

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP)	Pr(Choice = RAD)	Pr(Choice = DAP)	Pr(Choice = Combination)	Pr(Choice = RAD)	Proportion of lump sum payment
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Excluding observations with fewer than 50 house sales during either of the two 12-month periods						
Housing price change	-0.1732*** (0.0282)	0.2795*** (0.0322)	-0.1704*** (0.0282)	-0.1106*** (0.0278)	0.2809*** (0.0323)	0.2443*** (0.0280)
Number of observations	70,849	70,849	70,849	70,849	70,849	70,849
Panel B. Average over the last three years						
Housing price change	-0.1028* (0.0533)	0.5726*** (0.0580)	-0.0928* (0.0535)	-0.4899*** (0.0512)	0.5827*** (0.0573)	0.3527*** (0.0502)
Number of observations	74,444	74,444	74,444	74,444	74,444	74,444
Panel C. Measured at the Local Government Area level						
Housing price change	-0.2306*** (0.0332)	0.3492*** (0.0365)	-0.2292*** (0.0333)	-0.1199*** (0.0316)	0.3491*** (0.0366)	0.3049*** (0.0322)
Number of observations	75,491	75,491	75,491	75,491	75,491	75,491

Results

Two-stage selection modelling

	Multinomial probit			Fractional probit
	Pr(Choice = DAP) (1)	Pr(Choice = Combination) (2)	Pr(Choice = RAD) (3)	Proportion of lump sum payment (4)
Housing price change	-0.1304*** (0.0243)	-0.0847*** (0.0242)	0.2151*** (0.0276)	0.0224 (0.0336)
Correlations		0.1455 (0.1548)	-0.0824 (0.0987)	
Number of observations	74,650	74,650	74,650	19,213

Results

Partially supported residents

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP) (1)	Pr(Choice = RAD) (2)	Pr(Choice = DAP) (3)	Pr(Choice = Combination) (4)	Pr(Choice = RAD) (5)	Proportion of lump sum payment (6)
Housing price change	0.0090 (0.0355)	-0.0050 (0.0211)	-0.0066 (0.0349)	0.0121 (0.0292)	-0.0055 (0.0210)	-0.0159 (0.0251)
Number of observations	20,087	20,087	20,087	20,087	20,087	20,087

Heterogeneity analysis

By marital status

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP) (1)	Pr(Choice = RAD) (2)	Pr(Choice = DAP) (3)	Pr(Choice = Combination) (4)	Pr(Choice = RAD) (5)	Proportion of lump sum payment (6)
Not married	-0.1592*** (0.0273)	0.2531*** (0.0309)	-0.1595*** (0.0273)	-0.0940*** (0.0273)	0.2535*** (0.0310)	0.2175*** (0.0267)
Married	-0.0626 (0.0397)	0.1149*** (0.0414)	-0.0572 (0.0399)	-0.0612 (0.0391)	0.1183*** (0.0414)	0.0909** (0.0372)
Significant difference at 5%	Yes	Yes	Yes	No	Yes	Yes

Heterogeneity analysis

By average time on the market (TOM)

The average number of days it took to sell properties that were sold by private treaty during the last 12 months

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP) (1)	Pr(Choice = RAD) (2)	Pr(Choice = DAP) (3)	Pr(Choice = Combination) (4)	Pr(Choice = RAD) (5)	Proportion of lump sum payment (6)
0 to 60 days	-0.1872*** (0.0336)	0.3510*** (0.0371)	-0.1830*** (0.0336)	-0.1712*** (0.0314)	0.3541*** (0.0370)	0.2993*** (0.0327)
60 to 90 days	-0.1162*** (0.0385)	0.1687*** (0.0432)	-0.1136*** (0.0385)	-0.0544 (0.0391)	0.1680*** (0.0431)	0.1450*** (0.0383)
More than 90 days	-0.0908 (0.0572)	0.1066* (0.0566)	-0.0999* (0.0575)	-0.0063 (0.0530)	0.1062* (0.0569)	0.0718 (0.0508)
Significant difference at 5%						
(1) vs (2)	No	Yes	No	Yes	Yes	Yes
(1) vs (3)	No	Yes	No	Yes	Yes	Yes
(2) vs (3)	No	No	No	No	No	No

Heterogeneity analysis

By facility remoteness

	Probit		Multinomial probit			Fractional probit
	Pr(Choice = DAP) (1)	Pr(Choice = RAD) (2)	Pr(Choice = DAP) (3)	Pr(Choice = Combination) (4)	Pr(Choice = RAD) (5)	Proportion of lump sum payment (6)
Regional or remote areas	-0.1775*** (0.0438)	0.2672*** (0.0473)	-0.1880*** (0.0440)	-0.0798* (0.0433)	0.2678*** (0.0475)	0.2099*** (0.0411)
Major cities	-0.1109*** (0.0279)	0.1889*** (0.0319)	-0.1041*** (0.0279)	-0.0864*** (0.0280)	0.1906*** (0.0320)	0.1683*** (0.0281)
Significant difference at 5%	No	No	No	No	No	No

Contributions

- Studies analysing accommodation payment choices in Australia (Bilgrami et al., 2024; Cutler et al., 2024)
 - Interconnection between housing market and aged care industry
- Tap into housing equity to fund retirement years (French et al., 2018; Howe, 2020; Ong et al., 2015; Wood and Nygaard, 2010)
 - Buffer against cost outlays caused by adverse shocks (Costa-Font and Vilaplana-Prieto, 2022)
- Impact of housing prices on household consumption (Atalay et al., 2016)



The End

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