The CIE

Demand for housing in Victoria

Stated preference research

Prepared for
Infrastructure Victoria

21 December 2022

Contents

BOXES, CHARTS AND TABLES

1   Introduction

This document is the Technical Appendix to the Centre for International Economics (CIE) summary report for Infrastructure Victoria on its stated preference research conducted into demand for housing in Victoria in 2022.[1] Refer to the summary report for a discussion of the project background, objectives and key findings. This technical appendix provides further detail on the methodology and additional modelling results.

The study used a discrete choice experiment (DCE) survey to develop a detailed model of housing demand in Melbourne, Geelong, and Ballarat. DCE surveys involve presenting respondents with several choice questions. Each choice question presents two or more hypothetical options with specified cost and asks the respondent to indicate their preferred option. The scenarios are described by multiple attributes and the levels assigned to attributes vary (by design) over scenarios and over questions. Respondents' choices reveal the value they place on changes in each attribute and the marginal impact of each attribute on the likelihood of an option being chosen.

In this study, DCE is used to study how attributes of housing influence the choices people make about where to live. The output of the study is a rich model of consumer preferences that could be used to answer numerous research questions. A specific set of questions are addressed in this appendix.

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[1]   CIE 2022. Demand for housing in Victoria. Summary Report. Prepared for Infrastructure Victoria. December.

2   Methodology

This chapter describes the survey instrument and the process by which it was developed.

Structure of the questionnaire

The structure for the questionnaire is set out in table 2.1, along with brief comments on the purpose of each section of the questionnaire. A written version of the questionnaire, which was implemented online, is provided in Chapter 8.

2.1   Questionnaire structure and rationale

Component	Rationale
Introduction	
Assure respondents about genuineness of research and about anonymous nature of data and grouped reporting	The questionnaire deals with financial information and detailed demographics. We want to ensure respondents are confident answering truthfully.
Screening	
Age, role in household decision making, postcode, and suburb (allocate to zone using hidden question).	Terminate for respondents: ■ Aged under 18 ■ Not household decision maker or someone expecting to be in a position to choose a home within five years ■ Out of area
Questions about current dwelling	
Structure type, duration, number of bedrooms	To enable analysis of preferences of sub samples
Current household composition (including multi-generational as an option, number of children)	To enable analysis of preferences of sub samples
Tenure type	To enable analysis of preferences of sub samples and inform skip logic for later financial questions
Age of neighbourhood (<10 years included as an option)	To identify established homes in growth areas, like Melton and Sunbury
Locations (suburb) and type (industry and full/part-time) of employment of household members Willingness to change to a job in a different location Working-from-home arrangements	To be used in analysis of drivers for spatial preferences

Component	Rationale
Locations of family and friends and other important destinations: schools, beach, university, religious (use spatial categories from choice tasks)	
Question about the role of other factors in spatial preferences: access to education; access to transport; access to open space, parklands, water; access to community facilities; access to shopping, cafes and restaurants; access to sports and recreation facilities; street trees.	To provide qualitative data to support findings from quantitative analysis of the value of distance from various points of interest
Attitudes to moving	
Likely timing of next move	To enable data analysis of those most likely to move in the short-to-medium term
Intention to buy or rent	To inform the payment vehicle in the choice questions and skip logic for financial questions
Attention test	To monitor data quality
Instructions for choice tasks	
Explain we are going to ask you to imagine you are moving out of your current home. We will ask you to consider 16 sets of housing options. In each set you will choose your most preferred option. We will also ask whether any of the options is suitable.	
Number of bedrooms you would be looking for: 1-3, 2-4, 3-5	Used in calculation of choice task levels
Household income	Used in calculation of budget
If intending to buy, ask about net assets	Used in calculation of budget
Put budget rent or price and mortgage repayment to respondent and allow them to adjust	To guide respondent choices and to be used in data analysis to remove questions where respondent chose an option above their budget
If buying, the lowest price you'd expect to pay for the homes you would genuinely consider buying.	To enable modelling to test whether there is a minimum amount respondents are looking to invest, with price causing negative utility only after it exceeds this threshold
Instruct respondents to assume unspecified attributes are included in all options and all options are in the same good condition	To limit respondents making choices on the basis of inferred attribute differences not shown in the question
Note that some options shown may not be available in current market, but they may be available in future, so please imagine they are available when answering. Provide further instructions about what to do if none of the options is suitable.	To limit plausibility concerns and enable analysis of both forced and unforced choice models
Choice tasks	
Choice tasks x 16 \n See further detail in this document	
Debriefing	

Component	Rationale
Ask about choice task difficulty	For testing robustness of results
Ask about choice task plausibility	For testing robustness of results
Attention test	To monitor data quality
Ask about knowledge of public transport availability across Melbourne	To understand the degree to which transport availability was factored into stated preferences
Attitudinal battery x 11	To understand the attitudes and motivation corresponding to different housing preferences
Demographics	
Country of birth	To enable analysis of preferences of sub samples
Language spoken at home	To enable analysis of preferences of sub samples
Highest level of education	To enable analysis of preferences of sub samples
Thanks and close	

Source: CIE

Discrete choice experiment

Framing

The intention of the survey was to observe the preferences of existing households over options for a home to live in. Preferences over investment property options are not measured in this study. The preferences of future households could be inferred from the preferences of existing households with similar characteristics.

The following high-level options were considered for framing the choice exercise:

- Imagine you need to move out of your current dwelling. If the following options are the only options available, which would you choose?

- Imagine you are at the point you will next be moving dwellings. If the following options were the only options available, which would you choose?

- Imagine you are at the point in time just before you chose your current dwelling. If the following options had been the only options available, which would you have chosen?

The first option listed above was chosen as the framing for the survey. The second option was not preferred, since demand would be measured at differing points in time across respondents, distorting the view of current preferences. The third option was not preferred, since choices would likely be significantly affected by confirmation bias and sentimental attachment to the current dwelling, which is not something the study is looking to measure.

Attributes

Considerations when selecting attributes

Housing choices are influenced by many attributes of dwellings and neighbourhoods. The choice tasks included in the survey needed to vary only a limited set of attributes across options to keep the survey from being too cognitively demanding for a self-administered online survey containing repeated choice tasks. The selected attributes needed to:

- cover the most important attributes to decision makers (if not directly in the choice task, then indirectly by explicitly being held constant or by separate questions, e.g. in relation to location of family, friends, and social support)
- cover the attributes that would be influenced by the potential government policy decisions or interventions most likely to be evaluated
- cover attributes (or changes in attributes) that are difficult to measure in the hedonic price study being conducted by Infrastructure Victoria, and
- be expressed in terms that are meaningful to respondents.

The attributes used in this study were informed by an extensive literature review, several workshops with Infrastructure Victoria, a workshop with external stakeholders, and qualitative focus group research conducted for Infrastructure Victoria by Wallis Social Research.

Attributes most important and meaningful to respondents

A literature review conducted by Infrastructure Victoria assessed key housing attributes that are most important to households. Table 2.2 shows the top three housing preferences identified in several studies. These preferences can be grouped into location attributes (safety, access to services, near family and friends, etc), size (number of bedrooms), type of dwelling, and affordability. Preferences for attributes associated with location appear to be most commonly identified as top preferences.

2.2   Housing preferences summarised findings

Study	Top 3 housing preferences
Grattan Institute – Melbourne and Sydney Housing Preferences (2011)	Number of bedrooms	safety for people and property	Near family and friends
Perth and Peel Region – Housing Preferences (2014)	A safe neighbourhood	Easy access to main income earner's work	Easy access to a preferred school
Auckland Housing preferences (2015)	A safe neighbourhood	Standalone dwelling	Freehold title
Australian housing aspirations survey (2021)	Safety and security	number of bedrooms	local shopping

Study	Top 3 housing preferences
RMIT – Early delivery of transport in new suburbs (2021)	Safety from crime | Affordability of land, housing, or rent | Access to freeways or main roads
Whittlesea Community Survey (2019)	Purchasing a home | Upgrading | To be closer to family and friends
Research on housing and transport stress in outer ring suburbs (2021)	Aspiration to own a house (affordability) | Features of the estate | Transport to city
ABS Data – reasons for moving (2008)	To live near family / friends | Attractive neighbourhood | Central location and services

Source: Infrastructure Victoria 2022, Housing Preferences Literature Review Summary Report

Infrastructure Victoria's findings on the types of trade-offs faced by households is summarised in table 2.3. This shows the six primary variables that a household must make a choice between when selecting where to live.

2.3   Trade-offs

Trade-off variable	Variation
Price (affordability)	High to low
Dwelling size	Number of bedrooms (1 to 4+)
Dwelling type	House, semi-detached, apartments
Location	Inner city, middle ring, outer, growth areas
Tenure	Rent or owner occupier
Connectivity / accessibility to transport and services	High to low

Source: Infrastructure Victoria

The most recent study of this nature conducted in Australia was the trade-off survey undertaken as part of the Grattan Institute's *The Housing We'd Choose* study[2] in 2011. That survey used four attributes in the choice tasks — location (four zones), dwelling type (four types), dwelling size, and rent/mortgage repayment.

Attributes likely to be influenced by policy solutions

On 10 May 2022, Infrastructure Victoria and The CIE held a workshop with other Victorian Government organisations. In addition to the attributes covered by *The Housing We'd Choose* trade-off survey (dwelling type, size, location, and price), the following attributes were suggested as being potentially useful for future policy analysis:

- Changes in relative prices of dwelling type by zone (not only the current market price)
- A wide range of spatial options for each respondent (to test reluctance to move long distances from existing home/networks)

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2   Kelly, J.F., Weidmann, B., and Walsh, M., 2011. *The Housing We'd Choose*, Grattan Institute, Melbourne.

- Number of bedrooms, which is critical for families
- Car parking spaces
- Access to activity centres, public transport and jobs (e.g. to test the value of '20-minute neighbourhoods')
- Walkability
- Stamp duty and exemptions (State, not Federal)
- Shared spaces (apartments have many shared features in addition to the internal features)

It was also noted there are a range of respondent characteristics that should be collected, including:

- whether they are a first-home buyer
- working-from-home arrangements
- whether they are buying for future life stages as well as current life stage.

Spatial attributes used in the study

In the Grattan Institute 2011 study, *The Housing We'd Choose,* Melbourne was spilt into four zones based on land prices (chart 2.4).

2.4 Zones used by the Grattan Institute in 2011 (based on SLA2011)
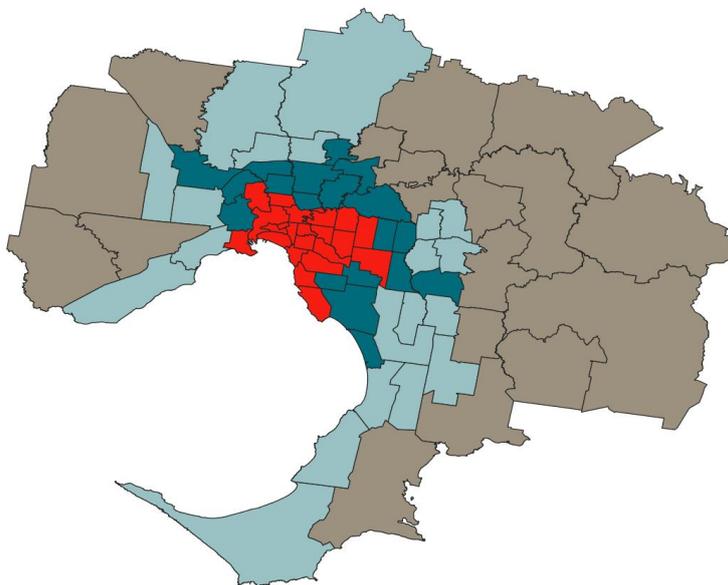
Data source: Grattan 2011

For this project, the spatial attribute has been designed to capture the trade-offs respondents make with regard to corridors and price rings across Melbourne. Thirteen spatial zones are defined for the Melbourne area based on the intersection of three spatial categorisations:

- Plan Melbourne Regions — which indicate the corridors of movement across Greater Melbourne
- The Department of Environment, Land, Water and Planning (DELWP) categorisation of Inner, Middle, Outer and Growth areas[3]
- Melbourne's urban growth boundary (UGB) — which indicates the long-term limits of urban development. Small

Plan Melbourne Regions

Plan Melbourne is Melbourne's 35-year plan for managing population growth, growing the economy, creating affordable and accessible housing, improving transport, responding to climate change and connecting communities.[4] Plan Melbourne specifies six regions: Eastern, Inner, Inner South East, Northern, Southern and Western (chart 2.5).

2.5   Plan Melbourne Regions
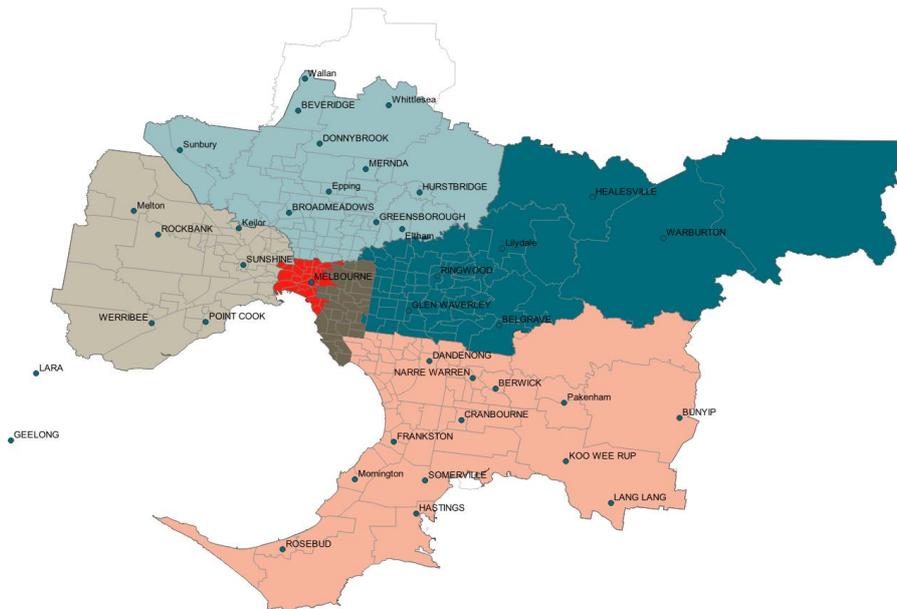
Data source: Data provided by Infrastructure Victoria.

Inner, middle, outer, and growth areas

Chart 2.6 shows the inner, middle, outer, and growth areas categorised by DELWP.

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3   Category used for descriptive purposes and is primarily based on the location of the LGA the SA2 is within. Growth category relates to SA2s that contain recent greenfield development identified by the Urban Development Program.

4   Victorian Government, 2016, *Plan Melbourne 2017-2050: A Global City of Opportunity and Choice.*

2.6   Inner, middle, outer, and growth areas
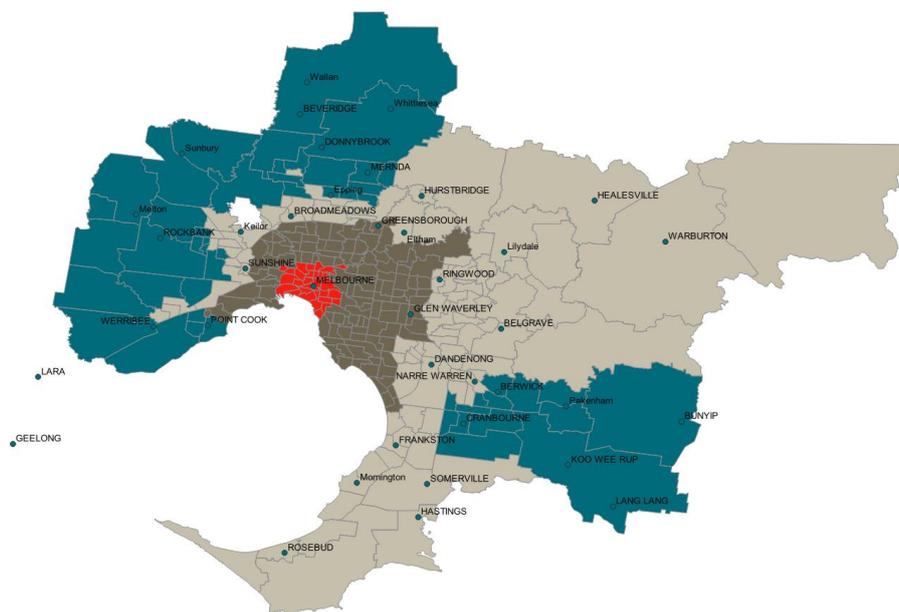
Data source: Data provided by Infrastructure Victoria.

Urban Growth Boundary

Chart 2.7 outlines the urban growth boundary (UGB). The purpose of intersecting the spatial areas with the UGB is to exclude areas that are not available for development such as agricultural land, bushland and protected environments. Further refinements to the spatial areas incorporating the urban growth boundary are:

■   the main section of the UGB is included in the spatial areas

■   small urban centres of the urban growth boundary located within the Eastern region (Plan Melbourne Region) have been excluded

■   the Yarra Valley, Dandenong Ranges, areas along the Mornington Peninsula south of Frankston and the Bellarine Peninsula were excluded. These areas of environmental significance are not an option for significant future residential growth.

2.7   Urban Growth Boundary

Data source: Data provided by Infrastructure Victoria.

Spatial zones for discrete choice task

The intersection of the three spatial categories above provides 13 spatial zones for the Melbourne area (table 2.8). The Growth West spatial zone includes Bacchus Marsh. In addition, there are four spatial zones for the established and growth areas of Geelong and Ballarat. In total 17 spatial zones were included in the DCE. These are referred to in this report as the CIE spatial zones.

2.8   CIE spatial zones

Number	CIE spatial zones	Plan Melbourne Region	Inner, Middle, Outer, Growth areas (IMOG)
1	Inner metro	Inner Metro Region	Inner
2	Inner South East	Inner South East Region	Middle
3	Middle West	Western Region	Middle
4	Outer West	Western Region	Outer
5	Growth West (incl. Bacchus Marsh)	Western Region	Growth
6	Middle North	Northern Region	Middle
7	Outer North	Northern Region	Outer
8	Growth North	Northern Region	Growth
9	Middle East	Eastern Region	Middle
10	Outer East	Eastern Region	Outer
11	Middle South	Southern Region	Middle
12	Outer South	Southern Region	Outer
13	Growth South	Southern Region	Growth
14	Established Geelong	NA	NA

Number	CIE spatial zones	Plan Melbourne Region	Inner, Middle, Outer, Growth areas (IMOG)
15	Growth Geelong	NA	NA
16	Established Ballarat	NA	NA
17	Growth Ballarat	NA	NA

Source: CIE.

The CIE spatial zones are shown in figure 2.9.

2.9 CIE spatial zones (map)
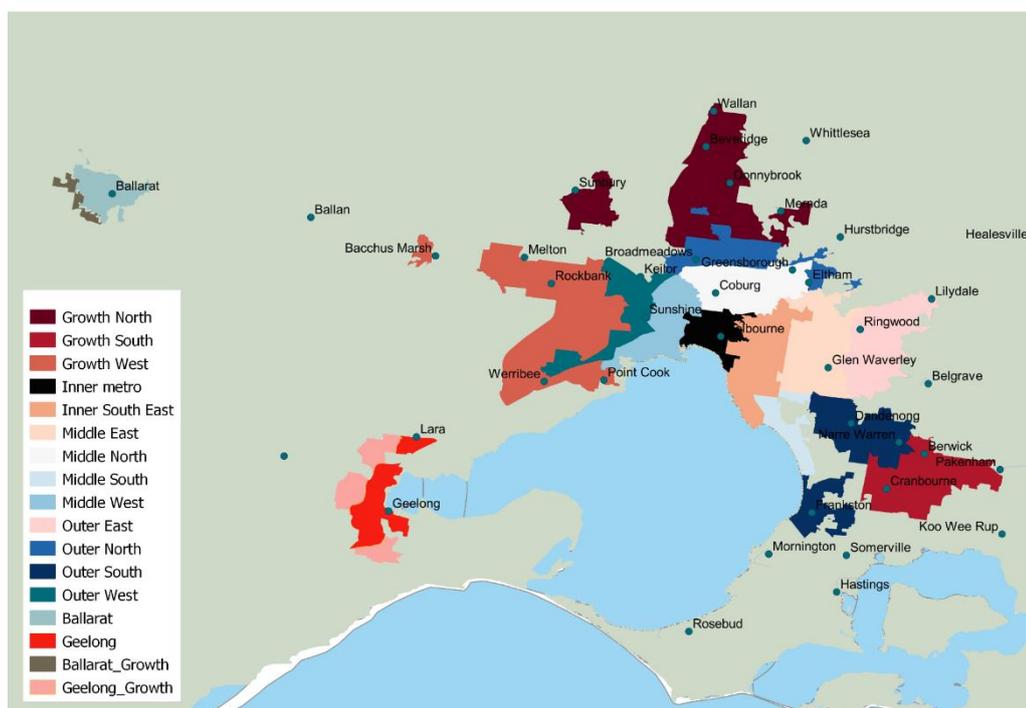
Data source: CIE and IV.

Dwelling attributes used in the study

Dwelling structure type

The literature review and focus groups confirmed that dwelling structure type is one of the most important drivers of housing choice. Many households have a preference for a detached house, though some households concerned about maintaining a garden or disability access have a preference for semi-detached dwellings or apartments.

We used five dwelling type levels — House, Townhouse/Villa/Unit, Apartment in 2-3 storey complex, Apartment in 4-10 storey complex, and Apartment in 11+ storey complex. These levels approximately align with ABS dwelling categories, with the added distinction between apartments in 4-10 storey complexes and 11+ storey complexes. To make the descriptions more meaningful to respondents, the wording of the levels favours

the language used in real estate advertisements, rather than the more-technical language used in ABS and other data categorisations.

Number of bedrooms

The number of bedrooms that a household prefers can be influenced by factors such as:

- the number of people in the household currently or predicted in the future
- a desire for a guest bedroom, spare 'storage' room, or enclosed office
- a desire for a larger house in general (living areas tend to be larger in houses with additional bedrooms).

Preferences over number of bedrooms are likely to be non-linear. A family household with children may not even consider living in a home with one bedroom. Two bedrooms may be the minimum they would consider. The addition of a third bedroom may be highly valued. A fourth bedroom for use as a working-from-home office may be valued, but less so than the third bedroom. A single-person household, in contrast, may place a low value on a third bedroom.

To limit the degree to which we offer options with a number of bedrooms the respondent would not even consider choosing, we filtered respondents into three streams — one being offered options with between one and three bedrooms, a second stream offering options with between two and four bedrooms, and a third stream offering options with between three and five bedrooms.

We used the number of bedrooms as a proxy for the overall size of the home by instructing respondents, "Living areas are also larger in homes with more bedrooms."

Office nook

Following the increase in working-from-home arrangements following the COVID-19 pandemic, households may prefer to purchase a home with a dedicated office space. As discussed above, households have the option of choosing a home with an additional bedroom for this purpose, but some homes offer study nooks or small rooms that could serve as a study without being classified as a bedroom. We offered respondents choices between homes which include either one or no office nooks, described as "The number of study nooks in the home. An area smaller than a bedroom."

Car parking

Many households own cars and have preferences over car parking options. These options vary by type — secure garage with internal access, off-street (driveway, carport, or dedicated parking lot), on-street (unreliable, particularly in denser development), or secure multi-storey parking on a different site (for which distance is a key attribute) — and by the number of spaces available. The reliability of on-street parking could be inferred by respondents from the spatial attribute. Multi-storey parking on another site is essentially a worst-case scenario, though the degree varies with distance. We therefore used a single parking attribute — "The number of spaces of reserved, on-site parking (e.g.

garage, carport, reserved space in lot). Additional parking may be available via permits for on street parking or in nearby lots."

Monetary attribute

When deciding to change homes, households have to decide between purchasing or renting a home. This choice is not made fully prior to the choice of the home itself. Some households may choose to rent a home in a set of relatively expensive options, but purchase a home when offered a lower-cost option. We asked a filtering question prior to commencing the choice experiment about whether the respondent would be looking to:

▪ buy

▪ rent, or

▪ rent but would buy if a home they like is affordable.

Respondents indicating they would prefer to purchase were shown a purchase price and monthly mortgage repayments for each option. Purchase prices were calculated as percentage changes (the levels in the DCE design) relative to an estimated market price. The market prices were predicted values from a regression estimated on PropTrack sales data purchased by Infrastructure Victoria. The model coefficients are set out in table 2.10. Note that different models were used to estimate market prices in the housing market share model discussed later in this report. Mortgage repayments were calculated using an interest rate of 5 per cent[5] and an estimate of net assets provided by the respondent, which will be assumed as a deposit.

2.10 Model for estimating market prices for the purpose of the DCE

Dependent var ln(price)	Coef.
(Intercept)	12.33
Location dummy variables:	
▪ Inner.metro	0.87
▪ Middle.West	0.63
▪ Ballarat	-0.11
▪ Growth.West	-0.07
▪ Outer.West	0.05
▪ Middle.North	0.65
▪ Geelong	0.16
▪ Inner.South.East	1.02
▪ Outer.North	0.25

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5 At the time the survey fieldwork commenced, the average of 2-year fixed rates offered by the big four banks was around 4.6 per cent (CBA 4.5 per cent, ANZ 4.6 per cent, NAB 4.6 per cent, and Westpac 4.6 per cent). This figure increased over the fieldwork period.

Dependent var ln(price)	Coef.
▪ Middle.East	0.73
▪ Middle.South	0.68
▪ Outer.South	0.24
▪ Outer.East	0.42
▪ Growth.South	0.05
▪ Growth.North	0.00
Number of bedrooms	0.27
Number of car spaces[a]	0.00
Structure dummy variables:	
▪ Apartment	-0.25
▪ House	0.10

[a] *Coefficients were not rounded to two decimal places when conducting the calculations.*
Source: CIE

Respondents indicating they would prefer to rent were shown a weekly rent, calculated using the price that would have been shown had the respondent indicated a preference for purchasing and a rental yield, which varied with the location of the option. The factors (or rental yields) for converting prices to rent (table 2.11) were calibrated for each spatial zone using average rents by LGA by dwelling type published in the Rental Report by the Department of Families, Fairness and Housing.

2.11   Factors for converting prices to rent

	Houses/Townhouses	Apartments
	per cent	per cent
Inner metro	2.0	3.6
Inner South East	1.9	2.8
Middle West	2.5	3.3
Outer West	3.0	3.5
Growth West	3.4	4.1
Middle North	2.4	3.2
Outer North	3.2	4.0
Growth North	3.5	4.3
Middle East	2.2	2.8
Outer East	2.8	3.3
Middle South	2.7	3.1
Outer South	3.1	3.5
Growth South	3.3	4.0
Established Geelong	3.4	4.1
Growth Geelong	3.4	4.1
Established Ballarat	3.4	4.1

	Houses/Townhouses	Apartments
	per cent	per cent
Growth Ballarat	3.4	4.1

Source: CIE analysis

The price shown in each option was varied by ±20 per cent around the estimated market price for the option. This approach was needed to ensure the option pricing is close enough to market pricing to be plausible, but different enough from market pricing to enable analysis of the impacts of changes in relative prices (e.g. Community housing organisations typically set discounted rents at 75 per cent of market rent).[6]

Attributes not separately valued in choice experiment

There are many attributes that have a good case for inclusion in the choice experiment, but to ensure good data quality, we limited the size of the choice task to one that would fit within a web browser on a typical desktop computer monitor without the need for scrolling. To ensure accurate estimation of the marginal impacts of the attributes that are included in the choice task, we needed respondents to either assume excluded attributes are constant across options or tell us how they assumed they would vary across options. Respondents were instructed to "Please assume all homes are in the same condition, with similar finish quality, air conditioning/heating, double-glazed windows, built-in wardrobes, and energy rating." A discussion of some of the attributes that were excluded from the experiment is set out below.

Condition/age

The trade-off between new houses in growth areas and older dwellings in poorer condition in established suburbs was not analysed, since government policy is focused on the supply of new housing, rather than the existing stock. Excluding homes in poor condition could potentially have resulted in underestimation of the price elasticity of demand for the types that were included. The attitudinal battery includes a question about whether the respondent is likely to choose a newer or older building in the current market. This enables qualitative assessment of the potential underestimation and also subsample analysis on respondents most likely to be buying or renting newer homes.

Access to key destinations

The location attribute included in the experiment contains information about numerous factors for which households may have a preference, including amenity and access to employment, universities, hospitals, family and friends, beaches, and so on. We measured the importance of distance to employment and other important locations by including approximate distances to these destinations as variables in the choice analysis. Distances were calculated using a suburb-to-suburb travel time matrix provided by

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6   Community Housing Industry Association Victoria 2020. Affordable Housing Agreements Toolkit. March. p. 7.

Infrastructure Victoria. The indirect utility function estimated for each housing option i for each respondent j is similar to:

$$V_{ij} = \boldsymbol{\beta X}_i + \delta jobdist_{ij} + \theta job2dist_{ij} + \gamma socialdist_{ij}$$

where X is a vector of the attributes displayed in the choice tasks, and *jobdist*, *job2dist* and *socialdist*, are the distances from a central suburb of the spatial zone in option i to the suburb containing respondent j's main employment location, the suburb containing respondent j's secondary employment location (if relevant), and the spatial zone containing the majority of respondent j's family and friends and other destinations that are important to the respondent. We also asked about the willingness to and ease with which a respondent would move jobs when moving homes. People least likely to move jobs are those most likely to place a high value on access to their current job location.

We did not include travel time as an attribute *varying separately* from the location attribute in the choice task. That is, we did not introduce scenarios in which government investment *changes* the travel times between spatial zones or *changes* the ease with which respondents could move jobs (e.g. by creating a new employment cluster). First, because these scenarios were not central to the main research questions. Travel time and access to job markets tend to be less favourable in greenfield areas. It would not be surprising if investments in transport projects or employment clusters would *increase* rather than decrease demand for housing in greenfield areas. Second, it would have required a fundamentally different choice framing. The choices of home and employment locations are not independent. Each is made with reference to the other. Modelling simultaneous choice of housing and job location would have made the choice tasks unmanageable, given the number of other housing attributes included in the experiment.

Other potential destinations to which households may value access include:

- health facilities such as community health centres, hospitals etc
- buses, tram and/or trains
- major community facilities like libraries, aquatic, sports, and cultural centres
- shopping centres, strips, cafés, and restaurants
- open space, parklands, water (eg wetland, lake or coast) or amenity.

Households may also care about amenity, including trees that shade walk and cycling paths. We included a separate (non-DCE) question about the role of these various factors in spatial preferences, which enable a qualitative, but not quantitative decomposition of spatial preferences.

Outdoor space

The amount of private or shared space outside of the dwelling itself is an important feature of a property. For houses, this feature is generally advertised in terms of lot size. Townhouses typically include a small courtyard. Some townhouses also include a private rooftop terrace. Apartments may offer a shared rooftop terrace. High-rise apartments also offer other shared amenities, such as gyms and swimming pools. Not many properties on the market at the time of the study were advertising shared gardens or parks. Distance to public green space is another relevant attribute, but one that could be valued in the

hedonic price study. We decided to include lot size as part of the description for houses in the DCE. It varied with CIE spatial zone, but was not varied independently of structure and location in the DCE design.

Summary of attributes and levels used in the DCE

The attributes used in the DCE and their levels are set out in table 2.12 along with some comments about the ways in which options were constrained to omit irrelevant options for some respondents.

2.12 Attributes and levels used in the DCE

Attribute	Levels	Comments and design considerations
Tenure	For sale For rent	Most respondents selected into seeing only one of these, but some respondents saw both.
Dwelling type	House Townhouse/Villa/Unit Apartment in 2-3 storey complex Apartment in 4-10 storey complex Apartment in 11+ storey complex	House options also showed land size: ■ 200 m² for inner zones ■ 400 m² for middle zones ■ 600 m² for outer zones ■ 400 m² for growth zones ■ 600 m² for established regional zones 500 m² for growth regional zones
Bedrooms	1 2 3 4 5	Cursor hover text: "The number of bedrooms. Living areas are also larger in homes with more bedrooms." Each respondent saw three different levels across the options offered to them: 1-3, 2-4, or 3-5 depending on response to prerequisite question. The lowest level was not offered with House. The highest level was not offered with Apartment.
Location	Inner metro Inner South East Middle West Outer West Growth West Middle North Outer North Growth North Middle East Outer East Middle South Outer South Growth South Established Geelong Growth Geelong Established Ballarat	Each location was described using a map, a list of key employment destinations within the zone, and distance to CBD. The only Melbourne zones offered to respondents in Geelong and Ballarat were Growth West and Outer West.

Attribute	Levels	Comments and design considerations
	Growth Ballarat	
Price	Price model estimate – 20% Price model estimate – 12% Price model estimate – 4% Price model estimate + 4% Price model estimate + 12% Price model estimate + 20%	The price model was estimated on PropTrack 2021 sales data purchased by Infrastructure Victoria. Rent levels were calculated using average rents by LGA by dwelling type published in the Rental Report by the Department of Families, Fairness and Housing. Mortgage payments were shown for respondents looking to buy, calculated using an interest rate of 5 per cent and the respondent's estimated net assets. Six levels were evenly spaced between ±20 per cent, inclusive.
Car parking spaces	0 1 2	Defined as "The number of spaces of reserved, on-site parking (e.g. garage, carport, reserved space in lot). Additional parking may be available via permits for on street parking or in nearby lots." '0' was not offered for houses '2' was not offered for townhouses or apartments
Office	0 1	Cursor hover text: "The number of study nooks in the home. An area smaller than a bedroom."

Source: CIE

The descriptions of each location level are as follows.

2.13   Image and text displayed for each location level

Location level	Image	Description
Inner metro		Includes St Kilda, Melbourne, Carlton, Richmond
Inner South East		Includes South Yarra, Brighton, Caulfield, Kew Approx. 15 km from Melbourne CBD
Middle West		Includes Footscray, Moonee Ponds, Highpoint, Altona Approx. 10 km from Melbourne CBD

Location level	Image	Description
Outer West		Includes St Albans, Werribee, Sunshine, Hoppers Crossing Approx. 15 km from Melbourne CBD
Growth West		Includes Bacchus Marsh, Werribee, Point Cook, Melton Approx. 30 km from Melbourne CBD
Middle North		Includes Coburg, Preston, Bundoora, Heidelberg Approx. 15 km from Melbourne CBD
Outer North		Includes, Broadmeadows, Epping, Melbourne Airport, Eltham Approx. 20 km from Melbourne CBD
Growth North		Includes Sunbury, Wallan, Craigieburn, Mernda Approx. 40 km from Melbourne CBD
Middle East		Includes Box Hill, Glen Waverley, Clayton, Doncaster Approx. 20 km from Melbourne CBD

Location level	Image	Description
Outer East		Includes Ringwood, Bayswater, Lilydale, Ferntree Gully Approx. 30 km from Melbourne CBD
Middle South		Includes Cheltenham, Mentone, Mordialloc, Moorabin Approx. 25 km from Melbourne CBD
Outer South		Includes Dandenong, Frankston, Fountain Gate, Springvale Approx. 35 km from Melbourne CBD
Growth South		Includes Cranbourne, Berwick, Officer, Pakenham Approx. 50 km from Melbourne CBD
Established Geelong		Established area in Geelong Approx. 70 km from Melbourne CBD
Growth Geelong		Growth area in Geelong (including Armstrong Creek, Charlemont, Lara) Approx. 70 km from Melbourne CBD

Location level	Image	Description
Established Ballarat		Established area in Ballarat Approx. 115 km from Melbourne CBD
Growth Ballarat		Growth area in Ballarat (including Lucas) Approx. 125 km from Melbourne CBD
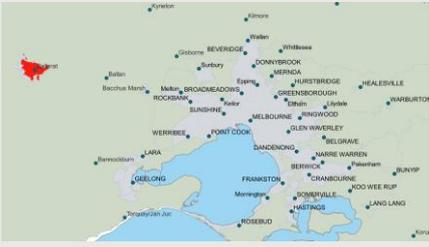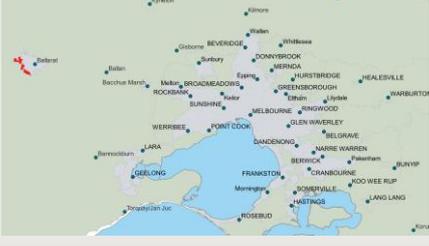
Source: The CIE

An example of a DCE question from the survey is provided in figure 2.14.

2.14 Example of a choice task

Source: CIE

Experimental design

Experimental design is the combination of attribute levels in each option in each question. From housing market data, we have a very solid basis for prior expectations of average preferences. The main challenge for the experimental design is to efficiently capture *variation* in preferences around that average. For this reason, we chose to generate an efficient random-parameter design based on priors from the pricing model (using the *rdraws* command in the Ngene software package). The coefficient on the price parameter was set to a similar level to that obtained in Grattan Institute in 2011. The coefficients for the other attributes were drawn from normal distributions around the marginal price in the price model multiplied by the price coefficient, with standard deviations set at one third of the mean. This standard deviation was high enough to reflect significant heterogeneity in preferences, but not so high that a significant number of draws would have the opposite sign to our expectation. The price attribute is split into two parts – a price model estimate and the variation introduced by the levels in the design. Since the price model is a function of prior coefficients, when we group terms, the price model component subtracts from the housing attribute coefficients, so that they become normal distributions with mean zero and standard deviation equal to one third of the pre-adjustment coefficients. This design worked well in the pilot fieldwork and was retained for the main phase of fieldwork.

Some of the constraints placed on the design were noted in table 2.12. In addition, households have a borrowing (or rent affordability) constraint outside of which they cannot realistically consider housing options. To minimise the number of irrelevant options shown to respondents, the choice questions did not include options that were clearly outside a price/rent constraint nominated by the respondent. Each respondent was offered three budget constraint options, which varied, for practical design reasons, with the minimum number of bedrooms the respondent had nominated (figure 2.15). To inform the choice of budget constraint, respondents looking to buy were shown an estimate of their borrowing power. The borrowing power calculation was built into the online survey and used the income and net asset (expected home deposit) values reported by the respondent.[7]

2.15 Filtering respondents by price constraint

Selected bedroom range	Group 1	Group 2	Group 3
1-3	Unconstrained	$0 — $1 000 000 *$0 — $800 per week*	$0 — $600 000 *$0 — $460 per week*
2-4	Unconstrained	$0 — $1 200 000 *$0 — $920 per week*	$0 — $700 000 *$0 — $540 per week*
3-5	Unconstrained	$0 — $1 400 000 *$0 — $1070 per week*	$0 — $800 000 *$0 — $620 per week*

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7   The borrowing power calculation was based on averages of the results from online calculators provided by Commonwealth Bank, Aussie Home Loans, ANZ Bank, and Westpac.

The options presented to Groups 2 and 3 were constrained as described in table 2.16. Apartment options and homes in growth or regional zones were affordable for all three groups, so these combinations have been excluded from the table.

2.16 Combinations of attributes excluded from options for each price group

Type	Location	Group 2	Group 3
House	Inner metro	Max. bedroom level excluded	Excluded
House	Inner South East	Excluded	Excluded
House	Middle West		Excluded
House	Middle North		Excluded
House	Middle East	Max. bedroom level excluded	Excluded
House	Middle South	Max. bedroom level excluded	Excluded
House	Outer West		
House	Outer North		
House	Outer East		Max. bedroom level excluded
House	Outer South		
Townhouse	Inner metro	Max. bedroom level offered only below market price	Excluded
Townhouse	Inner South East	Max. bedroom level offered only below market price	Excluded
Townhouse	Middle West		Max. bedroom level offered only below market price
Townhouse	Middle North		Max. bedroom level offered only below market price
Townhouse	Middle East		Max. and mid. bedroom levels offered only below market price
Townhouse	Middle South		Max. and mid bedroom levels offered only below market price
Townhouse	Outer West		
Townhouse	Outer North		
Townhouse	Outer East		Max. bedroom level offered only below market price
Townhouse	Outer South		

Respondents were also filtered into separate designs showing a mixture of spatial options weighted towards their current location (Melbourne, Geelong, or Ballarat) (see figure 2.17). Melbourne respondents were offered a wide range of locations to enable estimation of willingness to substitute to housing on the other side of the city from where they currently live (which was one of the policy questions identified in the workshop with stakeholders).

2.17   Location attribute levels by respondent's current location

		Design for Q1-8	Design for Q9-16
Ballarat		Ballarat Established	
		Ballarat Growth	
		Western Growth	
		Western Outer	
Geelong		Geelong Established	
		Geelong Growth	
		Western Growth	
		Western Outer	
Melbourne	~<$700k	Melbourne zones	All zones
		Options < ~$700k	Options < ~$700k
	~<$1m	Melbourne zones	All zones
		Options < ~$1m	Options < ~$1m
	Any	All Melbourne zones	All zones

Where is respondent living now? → *How much are you looking to spend?*

Data source: CIE

Alternatives per task

We offered four home options in each choice task. A relatively large number of options was needed to ensure each Melbourne respondent was offered each of the 17 spatial attribute levels at least a few times over the course of their block of DCE questions. Five or more options per task was considered too large for respondents who may be completing the survey on a small tablet or phone.

Number of questions per respondent

We asked 16 choice questions of each respondent. Each question asked respondents to identify the most preferred option and also allowed respondents to indicate (non-compulsory) whether none of the options are suitable. This is at the high end of the number of DCE questions typically given to respondents in self-administered surveys. A large number of tasks was needed to ensure each respondent saw a few of each of the spatial attribute levels (housing location options). The in-depth interviews and/or focus groups found that this number of tasks was concerning for some respondents. However, in pilot survey testing, median interview length was around 15 minutes and data quality from the DCE questions was good, so 16-question blocks were retained for the main fieldwork.

Testing the survey instrument

The survey instrument was refined over multiple stages of testing and review between April and August 2022, including:

- Several workshops with Infrastructure Victoria
- feedback on a draft questionnaire from stakeholders in Victorian government agencies
- cognitive testing interviews with 10 Infrastructure Victoria and CIE staff members
- online cognitive testing interviews with 14 individuals sampled from households in established and growth areas of Melbourne, conducted by Woolcott Research and Engagement (see chapter 7 for the discussion guide and findings), and
- a pilot survey of 607 households.

The refinements made to the questionnaire in response to the feedback received from the testing and review included:

- expanding options for the question about intended tenure and expanding the DCE design to allow respondents to select into a design involving both 'For sale' and "For rent' options
- removing photographs from the DCE tasks, since the design and aesthetics of the homes in the photographs were influencing choice
- including lot size in the DCE for houses
- adding a question about the minimum amount households intending to buy would be looking to invest in the home in which they live
- reducing questionnaire length by removing preambles and questions not critical to the choice and market share modelling
- including an interactive map for selecting important destinations
- clarifying definitions of bedrooms and car spaces
- explaining in the DCE task example what is meant by the bedrooms, car spaces, and office icons
- changing the wording of the question about gender to align with inclusive language guidelines, and
- clarifying wording in various questions.

3   Sample

This chapter outlines the approach used to sample households for the survey, the characteristics of the sample, methods used to correct for under- and over-sampling relative to the population, and survey responses to debriefing questions and questions about attitudes to housing choice.

Sampling approach

The survey fieldwork was conducted during August to October 2022. All respondents were recruited through Pureprofile's online panel and partner panels. Sample selection via online panels is relatively free of bias, with survey topics not advertised in the survey invitation feed. Respondents were screened out early in the questionnaire if they were:

- Under 18 years of age
- Neither:
  - a decision maker or joint decision maker in their household, nor
  - a non-decision maker expecting to be in a position to choose a home within five years
- Out of area; that is, not living in the postcodes shown in figure 3.1. The sampling area is slightly larger than the location zones offered in the choice tasks because the sampling area needed to be postcode-based for survey screening. It included a rural area near Lake Bolac which shares a postcode with part of Ballarat.

3.1   Postcodes included in sampling
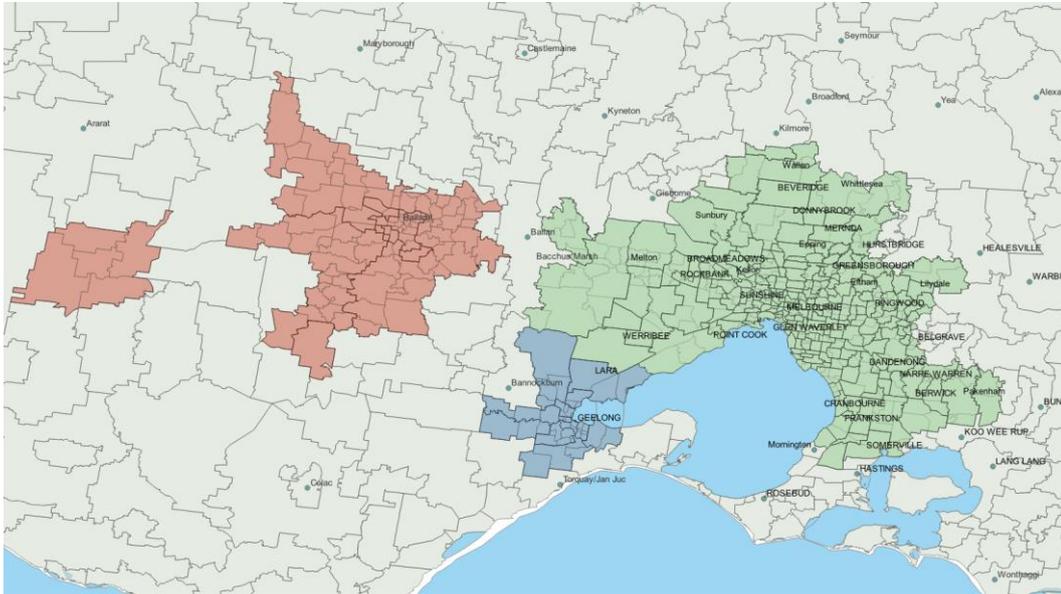
Data source: CIE

We conducted the fieldwork over three waves to limit risks and enable improvements to the survey design. Each wave included a soft launch to ensure data were being collected accurately. Samples for Ballarat and Geelong were oversampled relative to Melbourne to ensure inferences could be drawn about preferences of regional households.

3.2   Survey sample by region and wave of fieldwork

	Wave 1	Wave 2	Wave 3	Grand Total
	Respondents	Respondents	Respondents	Respondents
Ballarat	26	154	122	302
Geelong	39	185	172	396
Greater Melbourne	542	886	3946	5374
Grand Total	**607**	**1225**	**4240**	**6072**

Source: CIE

Representativeness

The sample was close to representative of most household characteristics. Households speaking a language other than English at home were under-represented, which was expected since the survey was conducted in English. Sampling weights were constructed using iterative proportional fitting on dwelling structure, tenure type, household income and language spoken at home to ensure analysis can be generalised to the population (see table 3.3).

3.3 Key household and dwelling characteristics

	Sample	Sample	Weighted sample	Population (households)
	No.	per cent	per cent	per cent
Dwelling structure				
Apartment in complex with 11 storeys or more	115	1.9	3.9	3.9
Apartment in complex with between 4 and 10 storeys	199	3.3	4.0	4.0
Apartment in complex with up to 3 storeys	430	7.1	8.9	8.9
Detached house	3947	65.0	66.4	66.4
Townhouse, terrace, villa, unit or other semi-detached	1381	22.7	16.8	16.8
Tenure type				
None of the above	18	0.3	1.0	1.0
Occupied rent-free	28	0.5	0.8	0.8
Owned outright	1575	25.9	30.0	30.0
Owned with a mortgage	2435	40.1	37.3	37.3
Rented	2016	33.2	30.9	30.9
Household income				
Less than $41,600 per year (less than $800 per week)	690	12.4	20.3	20.3
$41,600 - $77,999 per year ($800 - $1,499 per week)	1076	19.3	20.1	20.1
$78,000 - $103,999 per year ($1,500 - $1,999 per week)	1029	18.4	12.1	12.1
$104,000 - $155,999 per year ($2,000 - $2,999 per week)	1378	24.7	20.7	20.7
$156,000 - $207,999 per year ($3,000 - $3,999 per week)	812	14.6	11.8	11.8
$208,000 - $259,999 per year ($4,000 - $4,999 per week)	340	6.1	7.4	7.4
$260,000 per year or more ($5,000 per week or more)	254	4.6	7.5	7.5
Do not wish to answer	396			0.0
(blank)	97			0.0
Language spoken at home				
English only	4970	81.9	64.0	64.0
Language other than English	1102	18.1	36.0	36.0

Note: Sample percentages for household income are based on the subset of respondents who were willing to answer the question
Source: CIE

The sampling weights were generated using the *ipfraking* package in Stata, with weights trimmed at an upper bound of 4. The distribution of weights over respondents is illustrated in figure 3.4.

3.4   Distribution of sampling weights
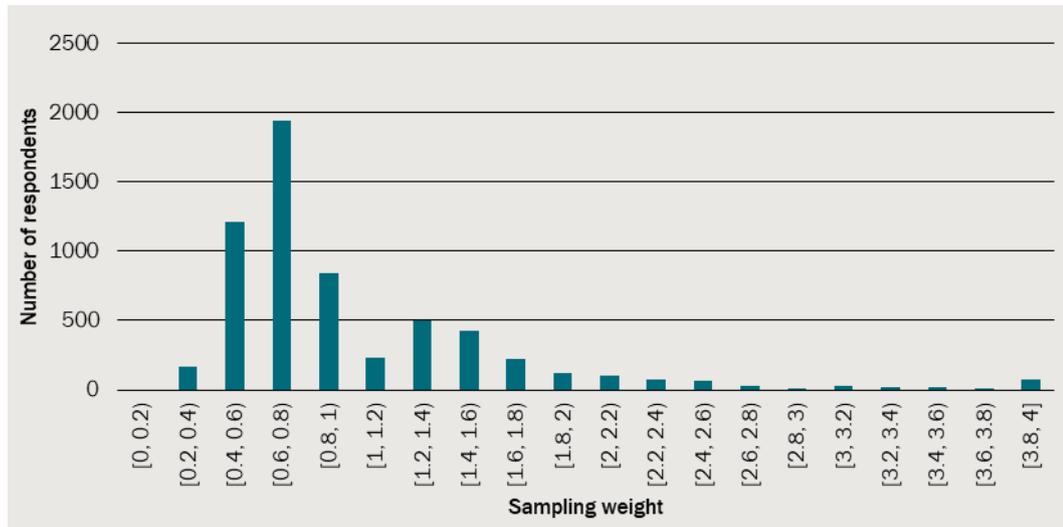
Data source: CIE

Other characteristics of households in the sample are set out in table 3.5.

3.5   Other household characteristics of the sample

	Sample	Sample	Weighted sample
	No.	per cent	per cent
Current home: Length of current tenure			
Less than one year	864	14.2	13.1
1-2 years	1183	19.5	18.8
3-5 years	1255	20.7	20.4
6-10 years	956	15.7	15.2
11-20 years	955	15.7	16.7
21-40 years	690	11.4	12.5
More than 40 years	169	2.8	3.2
Current home: Number of bedrooms			
1 bedroom	312	5.1	6.1
2 bedrooms	1132	18.6	19.1
3 bedrooms	2455	40.4	38.5
4 bedrooms	1796	29.6	29.4
5 or more bedrooms	377	6.2	6.9
Current home: age of neighbourhood			
Less than 10 years ago	931	15.3	15.4
Between 10 and 25 years ago	1418	23.4	23.7
More than 25 years ago	3030	49.9	48.6
Don't know	693	11.4	12.3

	Sample	Sample	Weighted sample
	No.	per cent	per cent
CIE spatial zone			
Ballarat	302	5.0	4.1
Geelong	396	6.5	5.4
Growth North	342	5.6	5.4
Growth South	314	5.2	5.0
Growth West	406	6.7	7.0
Inner metro	578	9.5	11.5
Inner South East	644	10.6	10.9
Middle East	495	8.2	8.9
Middle North	522	8.6	8.4
Middle South	206	3.4	3.1
Middle West	365	6.0	6.0
Outer East	493	8.1	7.2
Outer North	204	3.4	3.6
Outer South	533	8.8	8.8
Outer West	272	4.5	4.6
Household type			
Couple with one or more children at home	2009	33.1	31.8
Couple without children at home	1848	30.4	29.6
Multiple family household with one or more children at home	267	4.4	5.3
Multiple family household without children at home	227	3.7	4.1
Single parent with one or more children at home	421	6.9	6.7
Single person household	852	14.0	14.9
Group or shared household (no couple or family relationships)	339	5.6	5.6
None of the above	109	1.8	1.9

Source: CIE

Characteristics of the respondent who answered the questionnaire on behalf of their household are set out in table 3.6.

3.6   Characteristics of the respondents answering on behalf of their household

	Sample	Sample	Weighted sample
	No.	per cent	per cent
Gender			
Man	2496	41.1	43.0
Woman	3551	58.5	56.5
Other	17	0.3	0.3

	Sample	Sample	Weighted sample
	No.	per cent	per cent
Prefer not to say	8	0.1	0.2
Age			
18-29 years	1746	28.8	28.3
30-39 years	1745	28.7	27.3
40-49 years	1032	17.0	17.4
50-59 years	658	10.8	10.4
60-69 years	550	9.1	9.9
70-79 years	297	4.9	6.0
80+ years	44	0.7	0.7
Place of birth			
Australia	4715	77.7	69.6
China (mainland)	56	0.9	1.7
Greece	18	0.3	0.4
Hong Kong	29	0.5	1.0
India	139	2.3	3.5
Italy	33	0.5	0.9
Malaysia	103	1.7	2.6
New Zealand	127	2.1	1.8
Other (please specify)	462	7.6	11.0
Philippines	54	0.9	1.3
South Africa	29	0.5	0.5
Sri Lanka	43	0.7	1.1
United Kingdom	230	3.8	3.6
Vietnam	34	0.6	1.0
Highest level of educational attainment			
Postgraduate degree	941	15.5	16.6
Graduate diploma or graduate certificate	422	6.9	6.9
Bachelor degree	1868	30.8	31.1
Advanced diploma or diploma	682	11.2	11.1
Certificate III or IV	838	13.8	12.5
Secondary education to Year 12	911	15.0	15.1
Secondary education to Year 10	270	4.4	4.3
Certificate I or II	61	1.0	0.9
Secondary education to Year 9 or below	79	1.3	1.4
Time spent living in Australia			
Less than one year	48	0.8	1.5

	Sample	Sample	Weighted sample
	No.	per cent	per cent
1-2 years	20	0.3	0.5
3-5 years	152	2.5	3.6
6-10 years	160	2.6	3.5
11 years or more	554	9.1	11.7
(blank)	5138	84.6	79.2

Source: CIE

Debriefing

The DCE component of the survey was relatively complex. Many respondents indicated they found the choice tasks somewhat difficult, but only one in ten respondents rated the difficulty above eight out of ten (chart 3.7).

3.7   Choice task difficulty
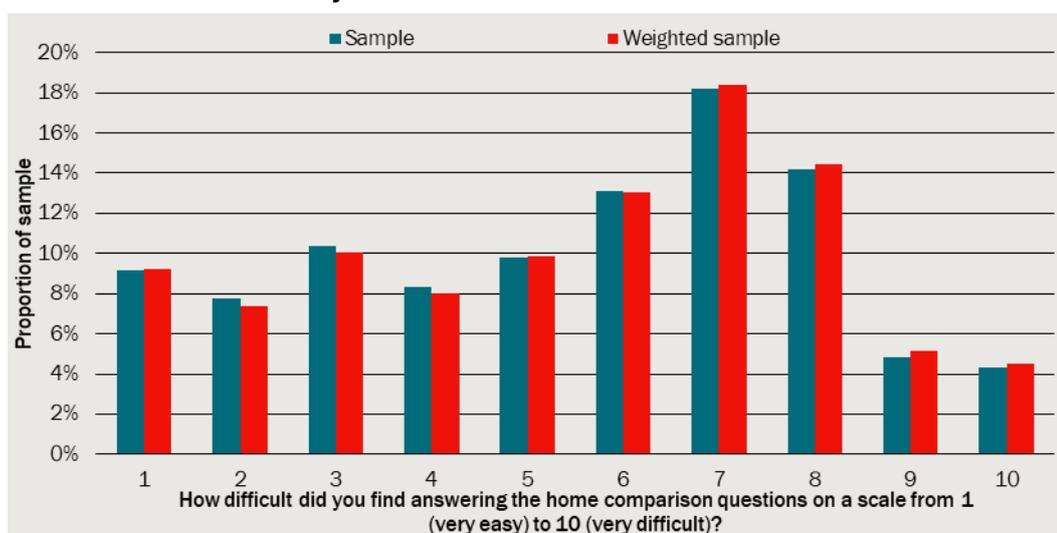
Data source: CIE

Two-thirds of respondents indicated that at least one of the home options was unrealistic (table 3.8). This result is not surprising. Although some constraints were placed on the combinations of attribute levels that could be offered respondents (such as excluding houses with one bedroom or no car spaces), the choice options included a very wide range of housing types, some of which are not available in the existing stock, such as high-rise apartments in growth suburbs and Ballarat. Around one third of these respondents answered the questions containing an unrealistic option as though the unrealistic option would be available.

3.8   Respondent process for dealing with unrealistic options

	Sample	Sample	Weighted sample
	No.	per cent	per cent
Were any of the home options obviously unrealistic?			
Don't know	628	10.3	11.6
No	1346	22.2	23.3
Yes	4098	67.5	65.1
When you saw unrealistic home options, how did you go about answering the question(s)?			
I ignored the unrealistic option	1545	25.4	24.0
I imagined the unrealistic option would be available	1274	21.0	20.2
I treated the unrealistic option as though it had different, more realistic features and/or price	1279	21.1	20.9

Source: CIE

Attitudes

Around one fifth of respondents indicated they were very likely to move homes within the next five years. Another fifth of respondents indicated they were very *unlikely* to move homes.

3.9   How likely are you to move to a different property within the next five years?

Label	Sample	Sample	Weighted sample
	No.	per cent	per cent
Very likely	1158	19.1	19.2
Likely	1608	26.5	25.8
Neither likely nor unlikely	1198	19.7	20.0
Unlikely	928	15.3	15.3
Very unlikely	1180	19.4	19.7

Source: CIE

The attitudes with the strongest agreement across the sample related to neighbourhood infrastructure needing to be in place, a preference for houses because they are a better investment, the need for a spare bedroom, and the need to be able to walk easily to most things (chart 3.10). Respondents were close to evenly split on whether they would always choose a newer home over an older home. While this focuses on the age of the home, rather than condition, it suggests the estimates of demand elasticity in this study may be conservative because they are based on a choice set of homes limited to those in a similar condition (whereas in reality households have an even wider choice set capturing a diversity of condition).

3.10 Please tell us how much you agree with the following statements on a scale from 1 (strongly disagree) to 5 (strongly agree)
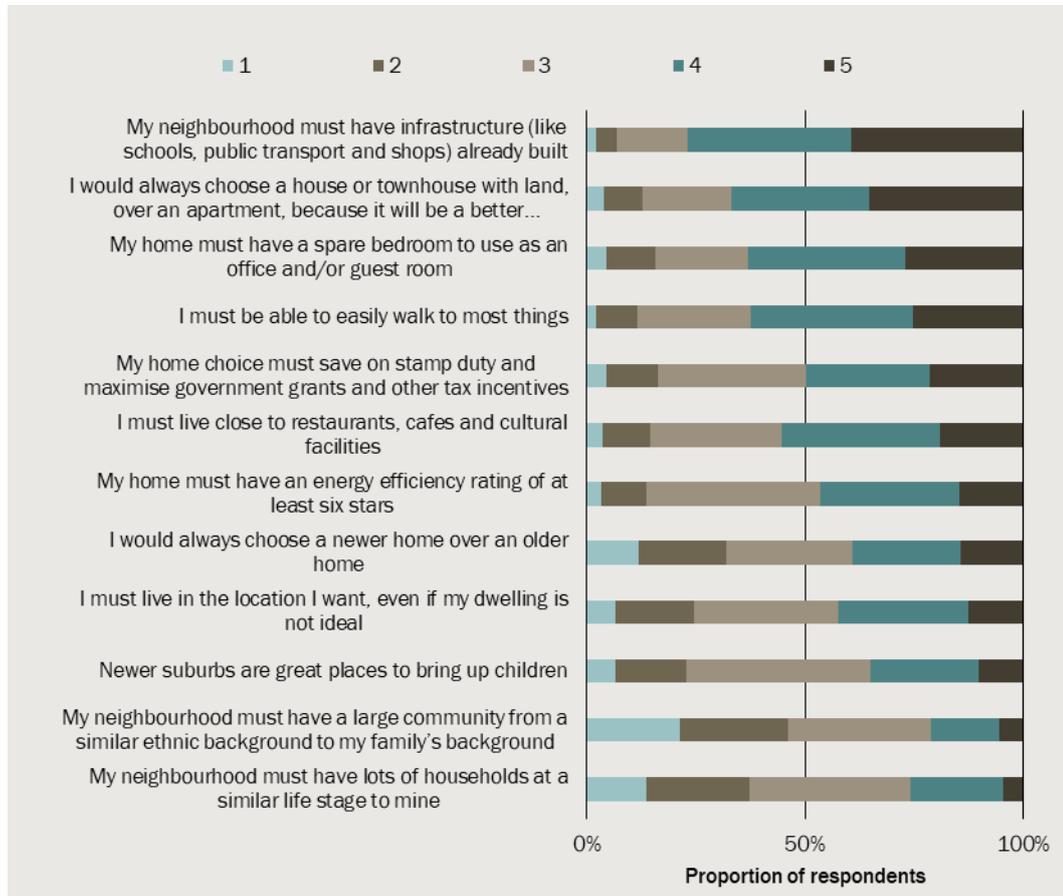
Data source: CIE

Respondents were asked to indicate the most important access-related attributes of their current home. From the set of attributes included in the question, the most frequently chosen in respondents' top three attributes were access to open space/parklands, access to public transport, and access to shops, cafes, and restaurants (figure 3.11).

3.11   What are the three most important features in the area where you live?
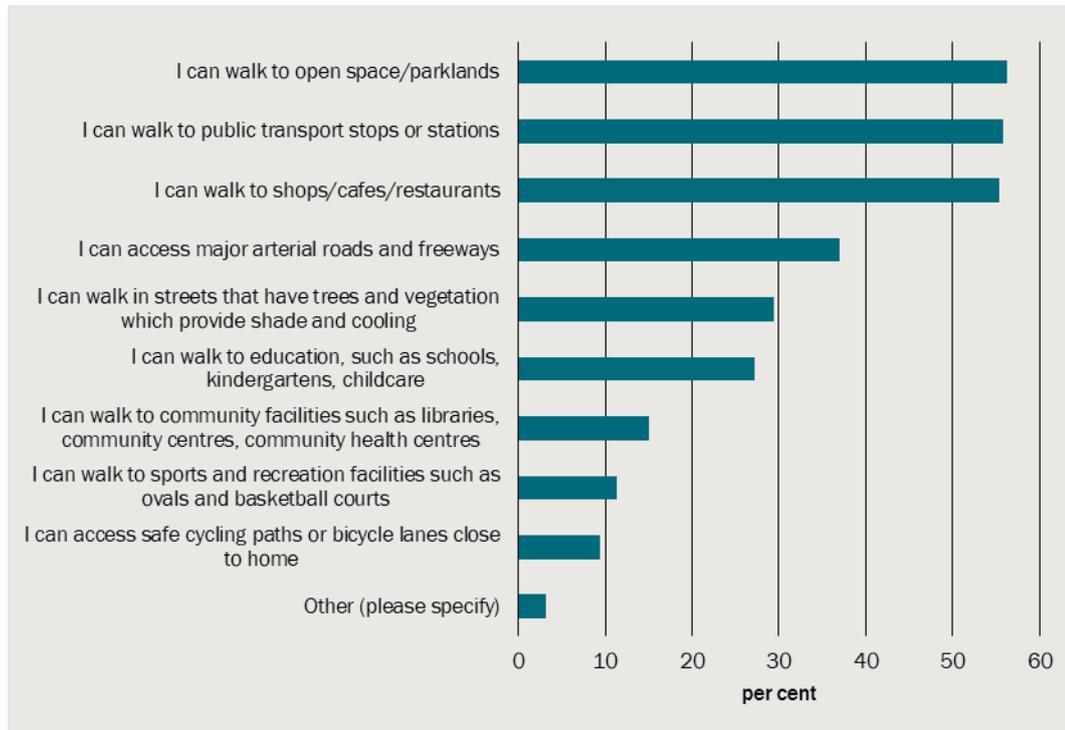
Data source: CIE

Households with a main income earner who works from home regularly were more likely to strongly agree that their home must have a spare bedroom (figure 3.12) and more likely to need a minimum of three bedrooms (figure 3.13 and, for the second income earner, figure 3.14).

3.12   "My home must have a spare bedroom to use as an office and/or guest room" on a scale from 1 (strongly disagree) to 5 (strongly agree), by working from home
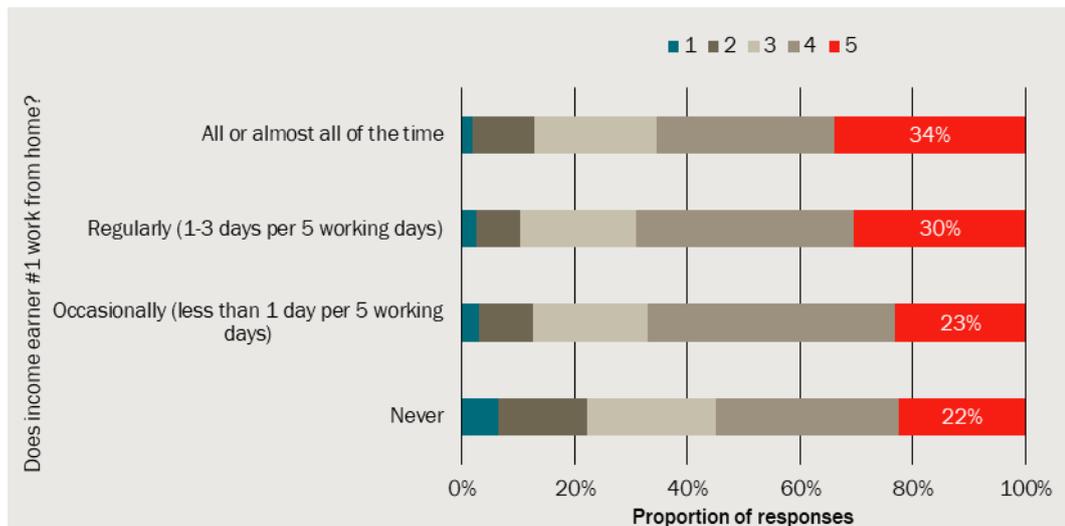
Data source: CIE

3.13 Minimum number of bedrooms, by working from home status of earner #1
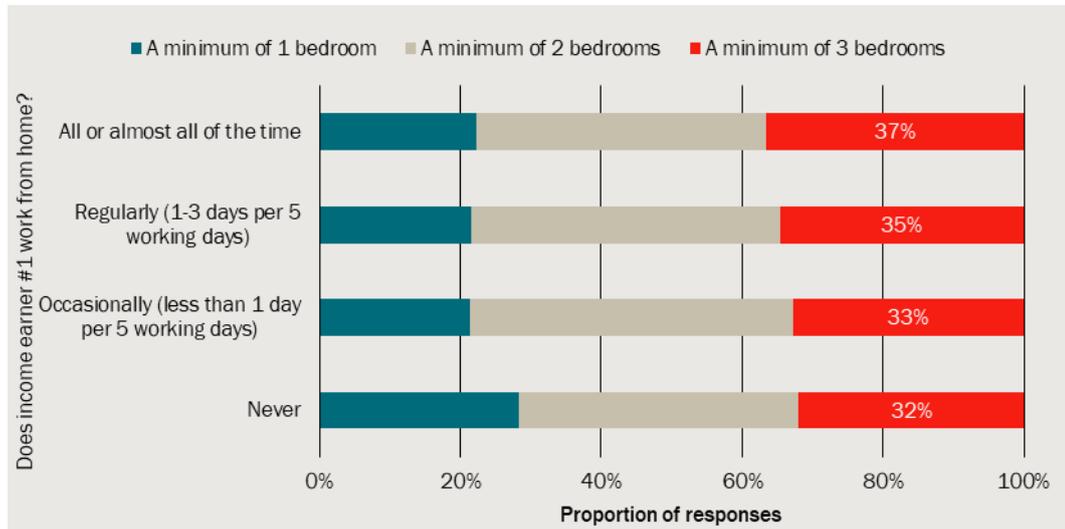
Data source: CIE

3.14 Minimum number of bedrooms, by working from home status of earner #2
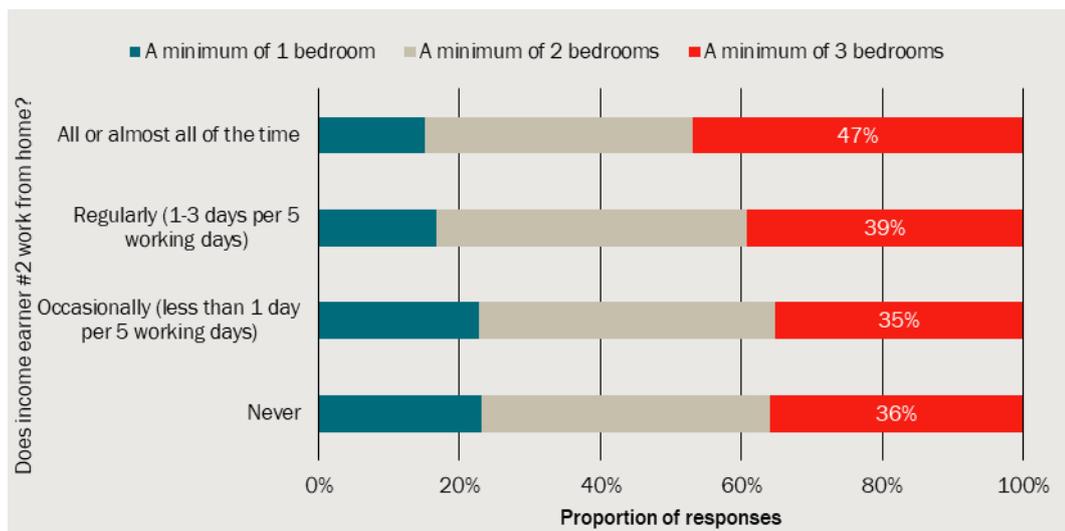
Data source: CIE

4 Models of housing demand

This chapter details the methods applied to the survey data to make predictions about housing choice at an individual respondent level and at a whole-of-housing-market level.

Models of household choice

We estimated statistical models on the survey choice data for the purpose of predicting household choice from any user-specified choice set. The challenge when specifying these models is to capture heterogeneity in preferences across households, constrain the range of values estimated for individual respondents to have the correct sign, and keep computation manageable. After testing a range of models and specifications, we decided to estimate conditional latent-class multinomial logit models on seven separate subsets of the data set shown in table 4.1. These subsets aligned with key variations in the experimental designs used for different respondents, including intended tenure (buying or renting) and regional locations. Since a major focus of this study is on the preferences of households that have already chosen a greenfield product, a separate model is estimated on responses from those households to maximise our ability to capture differences in preferences between this group and the rest of the sample.

4.1 Separate models estimated on survey data

Current tenure	Tenure type for next home		
	Buy	**Rent**	**Rent, or buy...**
Melbourne (established), Owner	Model 1 (40%)		
Melbourne (greenfield), Owner	Model 2 (6%)	Model 4 (20%)	Model 5 (16%)
Melbourne, Renter	Model 3 (7%)		
Geelong		Model 6 (7%)	
Ballarat		Model 7 (5%)	

Note: Figures in parentheses are the unweighted sample falling into each category
Source: CIE

Conditional latent class multinomial logit models also capture some heterogeneity in preferences within each of these groups. In particular, random parameters were estimated for dwelling structure and location attributes, since qualitative research had shown these two attributes were central to household choice between houses in greenfield locations and medium-density homes in established areas. The estimation results for Model 1 are

provided here as an example (table 4.2). Estimation results for all models are included at chapter 9.

The dependent variable in the models is utility, *U*, where the probability, *P*, that a home option, *j*, is chosen from a set of *n* homes by respondent *i* is equal to:

$$P_{ij} = \frac{e^{U_{ij}}}{\sum_{j=1}^{n} e^{U_{ij}}}$$

The model estimates two latent classes of preferences. Class probabilities are estimated for each respondent based on their choices and responses to the attitudinal battery, which was informed by recommendations from the qualitative research conducted for Infrastructure Victoria by Wallis Social Research. So, the utility for an individual respondent is a weighted average of the Class 1 and Class 2 random parameters. Broadly speaking, in Model 1, Class 1 preferences are structure-focused and Class 2 preferences are location-focused. Respondents are placed on a spectrum between the two classes. The class probability model shows that respondents have a higher weight on Class 1 (structure-focused) preferences if they more strongly agree with:

- My home choice must save on stamp duty and maximise government grants and other tax incentives
- I would always choose a house or townhouse with land, over an apartment, because it will be a better investment
- Newer suburbs are great places to bring up children

Respondents have a higher weight on Class 2 (location-focused) preferences if they more strongly agree with:

- I must live close to restaurants, cafes and cultural facilities
- I must live in the location I want, even if my dwelling is not ideal

The signs and ordering of coefficients are as expected and the large Z-scores (a Z-score of around 2 indicates the parameter is statistically different from zero at the 95 per cent confidence level) indicate that respondents carefully considered the housing attributes when making their choices and provide confidence in the accuracy of choice predictions from the perspective of sampling uncertainty.

The price attribute was defined as the excess of the price of the home option over the minimum amount the respondent would expect to pay for a home they would realistically consider buying. This attribute is zero if the price of the home is below the respondent's minimum price. It was very clear from the choice analysis that many respondents had in mind an amount they wanted to invest in the home in which they live, which is understandable given tax advantages relative to other investments. In models 4-7, the rent attribute is not treated this way, but rather defined simply as the rent in dollars per week, shown in the choice task. As expected, the coefficients on these attributes are negative and statistically significant.

4.2   Estimation results: Model 1

	Class 1		Class 2	
	Coef.	z	Coef.	z
Random parameters				
Established Ballarat	1.2174	12.8	-0.4335	-3.2
Established Geelong	0.9035	9.7	-0.7593	-7.1
Growth Ballarat	1.2220	13.8	-0.1947	-1.4
Growth Geelong	0.9695	10.4	-1.0650	-9.4
Growth West	0.8132	11.6	-1.8851	-20.2
Middle East	0.4929	6.5	-0.0425	-0.6
Middle South	0.2690	3.3	-0.1249	-1.6
Middle North	0.2753	3.5	-0.4558	-5.9
Growth South	0.7517	9.9	-1.5387	-20.2
Outer South	0.7038	9.1	-1.2496	-15.9
Middle West	0.3307	3.5	-0.4921	-5.5
Outer East	0.7150	9.6	-0.5806	-7.7
Inner South East	0.1714	1.8	0.3461	4.4
Outer West	0.5181	7.0	-2.2369	-27.9
Growth North	0.7019	9.5	-1.7736	-21.2
Outer North	0.4854	6.6	-1.4107	-17.9
Travel time to current home (min)	-0.0084	-18.9	-0.0245	-31.7
House	1.4556	12.9	0.5618	5.5
Townhouse	0.6657	5.8	0.5842	5.8
Apartment 2-3 storey	0.3970	2.9	0.1905	1.6
Apartment 4-10 storey	0.0419	0.3	0.2387	1.9
Fixed parameters				
Price in excess of minimum expected price ($'000s)	-0.0007	-20.9		
One additional bedroom (above minimum bedrooms)	0.4805	27.4		
Two additional bedrooms (above minimum bedrooms)	0.6720	31.8		
One car space	0.4793	23.2		
Two car spaces	0.5708	31.6		
Office nook	0.0426	3.3		
Travel time to place of work for earner #1 (min)	-0.0003	-0.4		
Travel time to place of work for earner #2 (min)	-0.0023	-2.4		
Sum of travel times to respondent-specified destinations (min)	-0.0020	-11.0		
Class probability model				
My neighbourhood must have a large community from a similar ethnic background to my family's background	-0.0408	-0.8		
My neighbourhood must have lots of households at a similar life stage to mine	0.1066	1.7		

	Class 1		Class 2	
	Coef.	z	Coef.	z
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	-0.0570	-1.0		
My home choice must save on stamp duty and maximise government grants and other tax incentives	0.2630	4.8		
Newer suburbs are great places to bring up children	0.1949	3.4		
I must live close to restaurants, cafes and cultural facilities	-0.2897	-4.6		
I must be able to easily walk to most things	-0.1474	-2.2		
I must live in the location I want, even if my dwelling is not ideal	-0.2428	-4.5		
My home must have a spare bedroom to use as an office and/or guest room	-0.1122	-2.0		
I would always choose a newer home over an older home	-0.0196	-0.4		
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	0.2495	4.8		
My home must have an energy efficiency rating of at least six stars	0.0146	0.2		
(Constant)	0.7111	1.8		

Note: Omitted dummies are 'Inner Metro', 'Apartment 11+ storey', 'Zero car spaces'
Source: CIE

As expected, houses are the preferred structure type, followed by townhouses, low-rise apartments and high-rise apartments.

Location preferences are difficult to interpret directly from the coefficients, because there are several attributes related to location included in the model. Distance from the respondent's current home was a strong driver of choice across all respondents. Distance to employment was not highly significant holding constant the other location attributes included in the model. We would not conclude from this result that households do not place a value on living closer to their place of employment. There are significant correlations between the various location variables, which may cause this value to be explained by the model as a preference for inner zones or a preference to remain in the current spatial zone. Distance to the place of employment of earner #2 was a more significant driver of choice than distance to place of employment of earner #1, potentially because earner #2 is more likely to be involved in school pick-ups and other errands close to home during the day. Distance to other important destinations specified by each respondent was also a significant driver of choice.

The bedroom attributes were defined relative to the minimum number of bedrooms each respondent would consider to remain consistent with the experimental design.

Class probabilities are estimated for each respondent, based on their responses to the attitudinal battery. To illustrate the model output, consider two selected respondents — one with very location-focused preferences (respondent 8591) and one with very structure-focused preferences (respondent 8130).

4.3   Characteristics of two selected respondents

Respondent ID	8130	8591
Minimum bedrooms	2	2
Current home location	Outer South	Inner South East
Current employment location #1	Growth South	Inner metro
Current employment location #2	Outer South	Inner metro

Source: CIE survey

Consider these two respondents choosing between a 2-bedroom townhouse in Middle South and a 3-bedroom house in Growth South. The change in utility when shifting from the latter home to the former home is illustrated in figure 4.4. Respondent 8591 would obtain higher utility from the townhouse relative to the house (the 'total' item is positive), but respondent 8130 would obtain lower utility from the townhouse relative to the house (the 'total' item is negative).

4.4   Utility from a 2-bed townhouse in Middle South relative to a 3-bed house in Growth South for two selected respondents

Data source: CIE

Model of housing market share

Having estimated models of choice, we then needed to specify the choices we want to predict. Preliminary analysis confirmed that the predicted market share for various types of homes was sensitive to the composition of the choice set. The choice sets used in market share analysis are often influenced by the taxonomy adopted by the DCE analyst. For example, a choice set comprising equal parts houses, townhouses, apartments in 2-3 storey complexes, apartments in 4-10 storey complexes, and apartments in 11+ storey complexes would find a greater market share for apartments than a choice set comprising equal parts houses, townhouses and apartments. Decisions about the composition of the choice set are unavoidable. The question is, what is the choice set that will enable us to

most clearly address a specific thought experiment? We developed a market share model to answer the thought experiment: *if every household had to move out of its current home and choose another home in Melbourne, Geelong or Ballarat at current market prices, which home would they choose?* We concluded the choice set that would most clearly answer this question would be the choice set comprising all of the existing stock of homes in Melbourne, Geelong and Ballarat. This choice set comprised around 1.7 million homes.[8]

Tenure type, location, structure, and bedrooms were taken from the 2021 Census. Car spaces were estimated using PropTrack home sales data purchased by Infrastructure Victoria. Overall, there were 1004 different home types included in the choice set, each weighted by its prevalence in the stock. A current market price was estimated for each home (each combination of the attributes discussed above) using hedonic price equations estimated on the PropTrack sales data. The purchase price models are based on the hedonic price equations estimated by Infrastructure Victoria, but modified to align with DCE attributes. The rent model was estimated by the CIE directly on PropTrack rent data (see chapter 11).

The choice probabilities across these homes were calculated for each survey respondent, based on their utility function and aggregated using sampling weights to enable generalisation to the population. Housing options outside the viable choice set for each respondent (based on budget constraint, number of bedrooms, and, for respondents in Geelong and Ballarat, location) were assigned a choice probability of zero. These aggregated choice probabilities represent the baseline demand for each home in the existing stock.

Table 4.5 lists the top 20 combinations of spatial zone and structure type by estimated market share at current prices. Three of the top four are houses in growth areas of Melbourne. This confirms the issue with which Infrastructure Victoria's research is grappling – that under current market conditions a large share of future housing supply will be demanded in growth areas.

4.5   There is strong demand for houses in growth areas

Location	Structure	Market share
		per cent
Growth West	House	12.0
Outer South	House	8.9

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[8]   The composition of the choice set is one of the key methodological differences between this study and the 2011 Grattan Institute study. Grattan Institute used a choice set of 48 homes comprising each combination of the attribute levels used in the DCE. Half of the homes in the choice set were apartments. Apartments make up around 16 per cent of our choice set.

As a check on our approach, we considered a situation in which all consumers have average preferences (there is no variation) and homes are priced such that consumers are indifferent between all of the homes (they like them all equally). Then, the market share for each home in the choice set would be equal to 1/n, where n is the number of homes in the choice set. The CIE model will indicate that demand for each home type exactly equals the stock of each home type. This is the result we want from the model given the assumptions we have made about preferences.

Location	Structure	Market share
		per cent
Growth South	House	6.8
Growth North	House	6.6
Established Geelong	House	5.7
Outer East	House	5.0
Established Ballarat	House	4.9
Inner South East	Apartment	4.8
Outer West	House	4.7
Inner Metro	Apartment	4.3
Outer North	House	3.7
Middle West	Apartment	2.4
Outer South	Townhouse	2.4
Middle North	House	2.1
Middle East	House	2.0
Middle North	Apartment	1.8
Middle North	Townhouse	1.6
Growth West	Townhouse	1.6
Growth Geelong	House	1.4
Middle East	Apartment	1.3

Source: CIE market share model

The model was used to address the research questions by applying shocks to relative prices and observing the impact on demand for various types of homes (see figure 4.6), with a focus on the impact on demand for homes in growth zones.

4.6 The CIE housing market share model and inputs
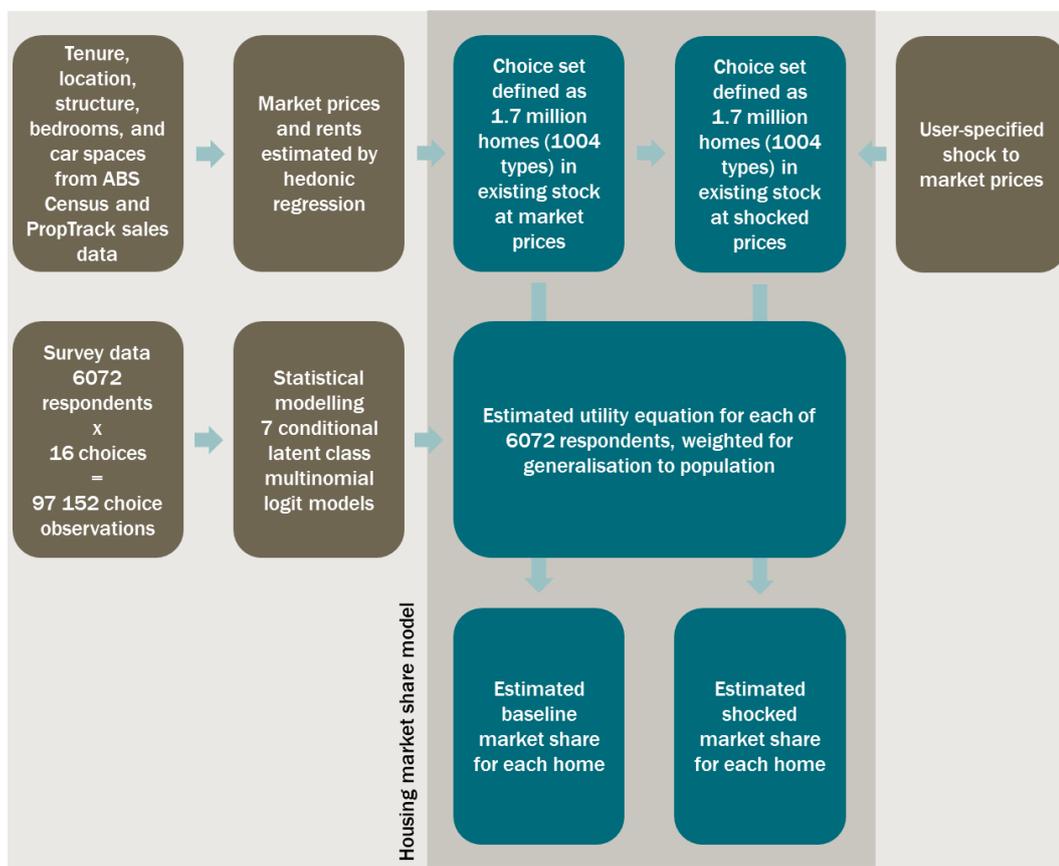
Data source: CIE

The two main types of relative price shocks used in the analysis are:

- decreases in prices for townhouses and apartments in established areas, and
- increases in prices for homes in growth areas.

Price shocks of 10, 20 and 30 per cent were conducted for each of these types of shock separately and combined to cover the range of impacts that could potentially arise from the suite of policy options being considered by Infrastructure Victoria. Additionally, price shocks were applied to homes in regional areas. Summary results and, for selected shocks, maps are provided in chapter 10. The implications of the results from the modelling for the key research questions are discussed in the next chapter.

5   Analysis

This chapter highlights modelling results that address the following key research questions:

- To which housing attributes are consumer decisions most sensitive?
- What are the necessary pre-conditions for a proportion of households living in (or likely to live in) new suburbs to have chosen a different residential location?
- What are the characteristics of households with a greater propensity to shift their housing decision from greenfield to established locations?

Demand for housing attributes

Which housing attributes are most important?

Dwelling structure type is the most important housing attribute, on average. Consumers generally have a strong preference for detached houses. Location, the number of bedrooms, and the number of car spaces also factor into housing decisions, but tend to be less important than structure type. The chart below shows the amount of utility households gain from each housing attribute.[9]

5.1   Marginal utility from specified changes in housing attributes
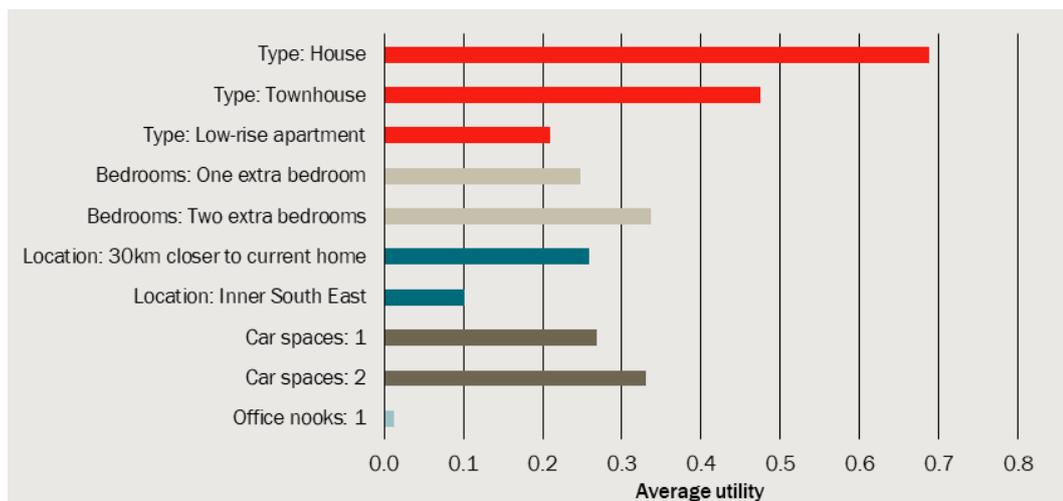
Note: Relative to a high-rise apartment in Growth West, minimum number of bedrooms, zero car spaces, zero office nooks.
Data source: CIE

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[9]   Utility, U, increases with choice probability, P, which, for home i in a choice set of j homes, is:
      $P_i = exp(U_i)/\sum_j exp(U_i)$

Behind the averages in the chart above lie a distribution of preferences over households. Figure 5.2 highlights the 25th and 75th percentiles of these distributions. Location is an attribute with a large range in importance across households. The trade-off between structure and location is an important consideration in this research, since structure is the most important attribute, on average, and the key research questions are concerned with influencing location.

5.2   Variation in marginal utility across households
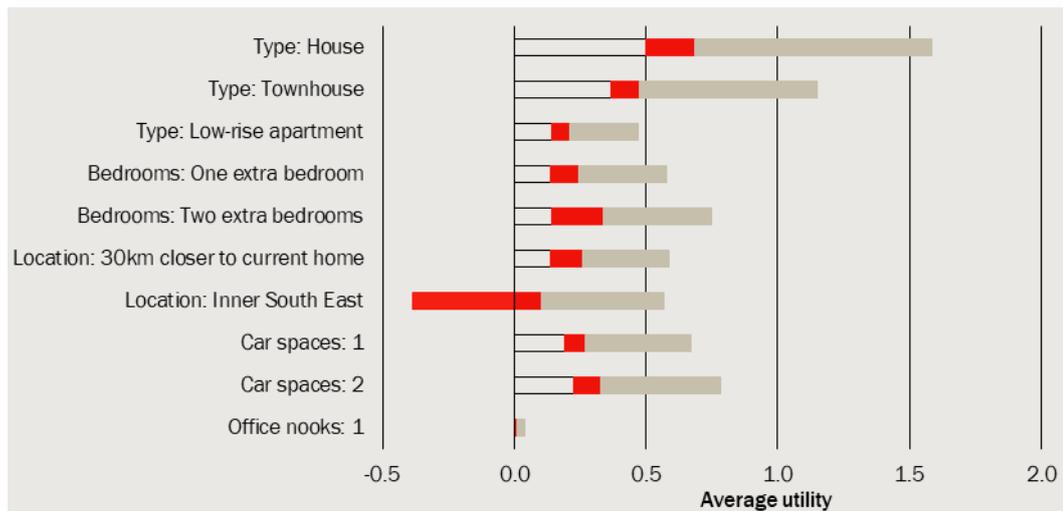
Note: The red bars range between the 25th percentile and the mean. The tan bars range between the mean and the 75th percentile.
Data source: CIE

How does the trade-off between location and structure vary across households?

To give a sense of how households are distributed along the spectrum from location-focused to structure-focused preferences, ,chart 5.3 below shows how preferences vary across households with respect to a choice between the most-preferred structure type (house) in one of the least-preferred locations (Growth West) and the least-preferred structure type (apartment) in one of the most-preferred locations (Inner Metro). Other attributes, including price and distance to current home, are assumed to be equal across the two options for the purpose of this exercise. Most households who are looking to buy favour structure over location when faced with this choice, with a total expected market share of 61 per cent in favour of the house.

5.3   Most, but not all, buyers favour structure over location
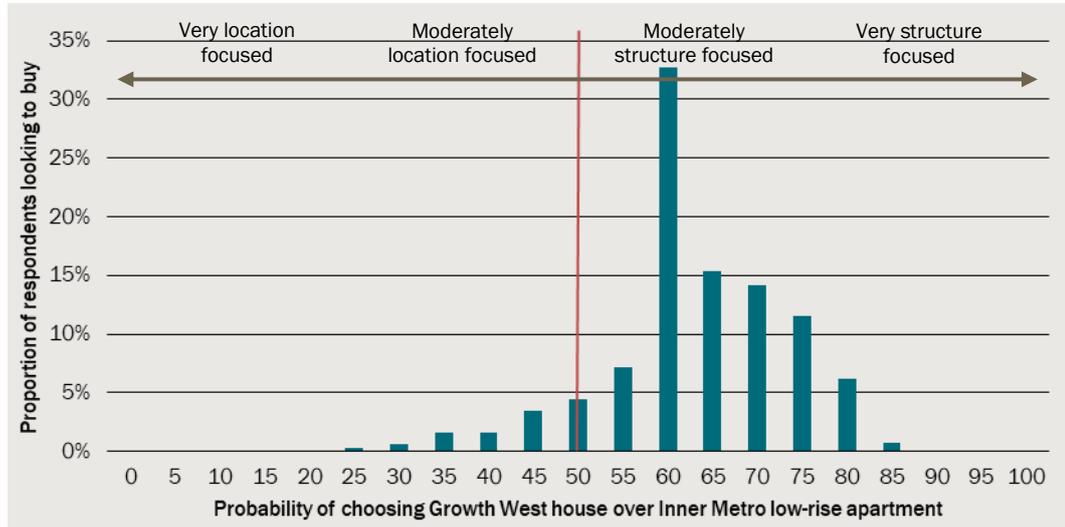
Note: Assumes all attributes other than zone and structure are the same across both options
Data source: CIE

When faced with the same choice, households looking to rent are a mix of both types of preference. Around half of those households favour location over structure type, with a 50-50 expected market share across the two homes.

5.4   Households looking to rent are a mix of structure and location-focused
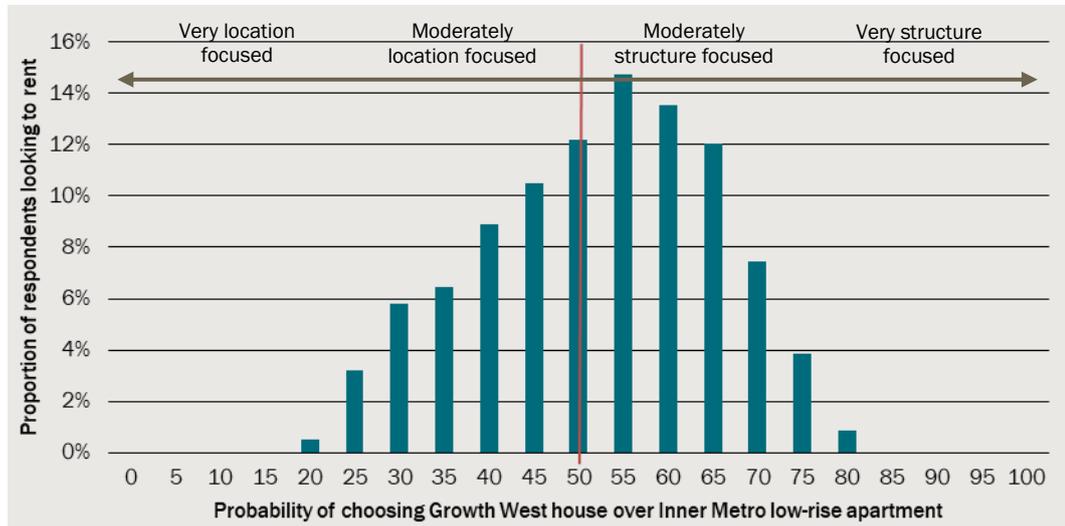
Note: Assumes all attributes other than zone and structure are the same across both options
Data source: CIE

What are the characteristics of households demanding homes in growth areas?

Unsurprisingly, the characteristic with by far the strongest relationship with demand for homes in growth areas is 'currently living in a growth area' (table 5.5). The households most likely to move to growth areas in the future are couples with children and/or with households income between $104 000 and $156 000 per year. Households with decision

makers who are aged 30-49 and/or have lived in Australia between 6-10 years are also more likely to choose a growth area product.

5.5   Characteristics associated with demand for homes in growth areas

	Increase in likelihood of choosing a home in a growth area relative to the average respondent
	per cent
Currently living in growth area	52
Couple with children	16
Respondents who have lived in Australia between 6-10 years	15
Household income $104k-$156k per year	15
Aged 30-49 years	8
Currently living in a house	8

Source: CIE market share model

Shifting demand away from growth areas

Which types of policy are most effective?

The impact on demand for homes in growth areas from reducing the price of apartments in established areas is relatively modest (figure 5.6). A 10 per cent decrease in prices of apartments in established areas would reduce demand for homes in growth areas by just 2.6 per cent. A 20 per cent decrease in apartment prices would reduce demand for homes in growth areas by 4.8 per cent.

Reducing the price of townhouses would be more effective, with a 10 per cent price decrease leading to a 3.9 per cent decrease in demand for homes in growth areas. A 20 per cent decrease in prices for townhouses would reduce demand in growth areas by 7.9 per cent. This confirms the finding of the qualitative research undertaken by Wallis Social Research for Infrastructure Victoria in June-July 2022 that townhouses are a closer substitute for houses than are apartments.

Reducing the price of both townhouses and apartments in established areas by 10 per cent would result in a decrease in demand for homes in growth areas by 6.2 per cent. Reducing the prices further to 20 per cent would decrease demand in growth areas by 11.2 per cent in total.

Increasing the price of homes in growth areas would have a much larger effect. An increase of 10 per cent would have a similar impact on demand for homes in growth areas as would a 20 per cent price decrease for apartments and townhouses in established areas. A 20 per cent price increase would be expected to decrease demand by 33 per cent.

A mix of policy initiatives achieving a 10 per cent price decrease for apartments and townhouses in established areas, combined with a 10 per cent price increase for homes in growth areas, would decrease demand for homes in growth areas by almost 17 per cent.

5.6   Impact on demand for homes in growth areas from changes in relative prices
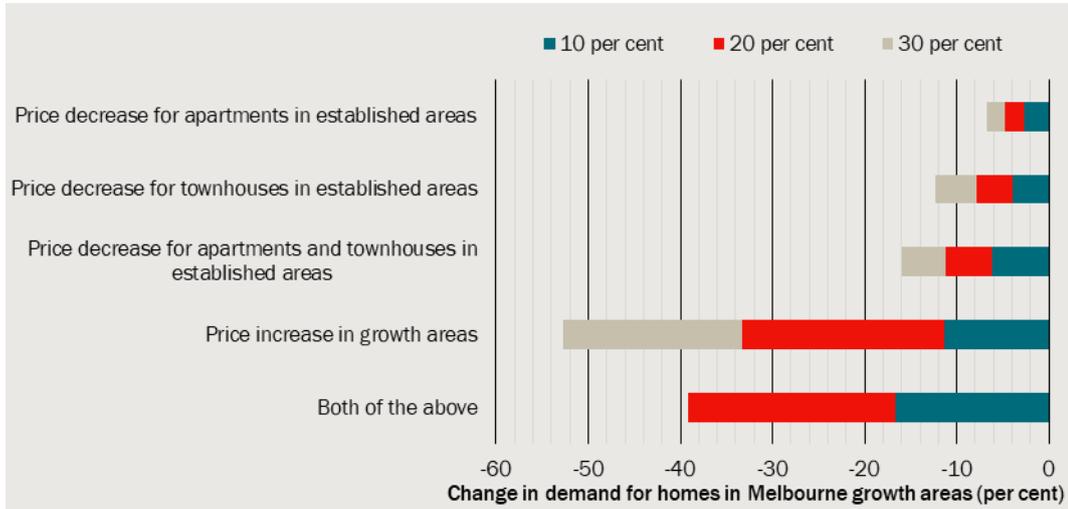
Data source: CIE

Decreasing prices for apartments and townhouses in established areas would be more effective at preventing households currently living in established areas from moving to growth areas than it would be at shifting households who already live in growth areas (figure 5.7). Increasing the prices of homes in growth areas, in contrast, would be more effective at shifting households who already live there than preventing households moving to growth areas.

5.7   Impact on demand for homes in growth areas by current location
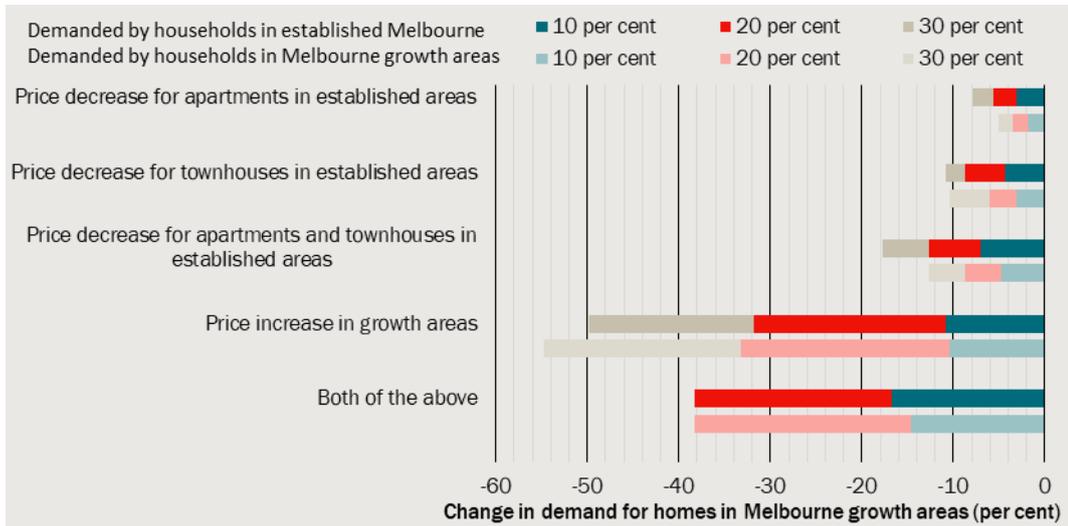
Data source: CIE

To which homes will households substitute?

In terms of spatial substitution, the price decrease for townhouses and apartments in established areas results in a concentrated densification in middle and inner suburbs (figure 5.8), whereas the price increase for homes in growth areas results in demand increases in outer suburbs and regional areas as well (figure 5.9).

5.8 Change in demand due to 10 per cent price decrease for townhouses and apartments in established areas
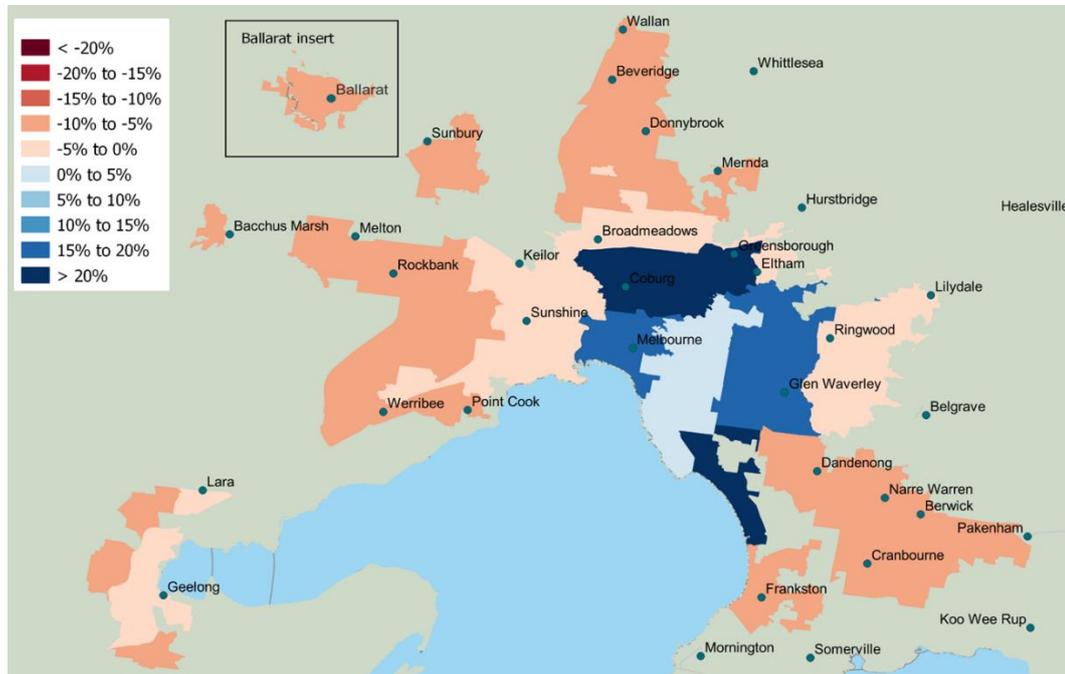
Data source: CIE market share model

5.9 Change in demand due to 10 per cent price increase for homes in growth areas
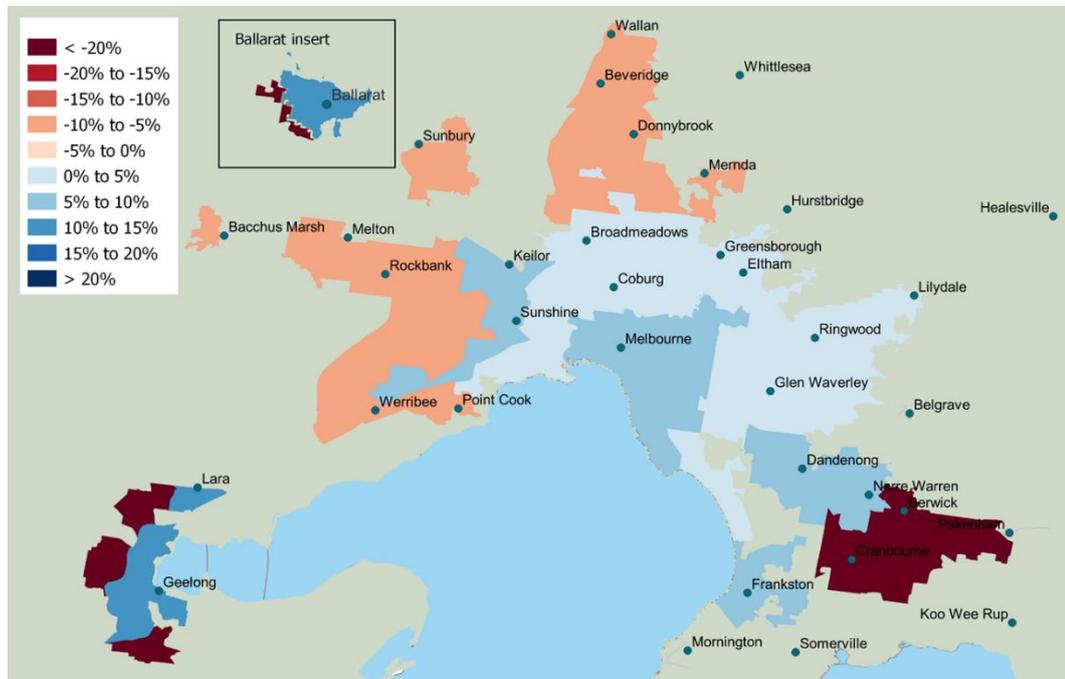
Data source: CIE market share model

The spatial impacts of the two price shocks combined would see significant substitution towards homes in the inner metropolitan area and middle suburbs to the north, east, and south (figure 9.7).

5.10 Change in demand due to a 10 per cent price decrease for townhouses and apartments in established areas and a 10 per cent price increase for homes in growth areas
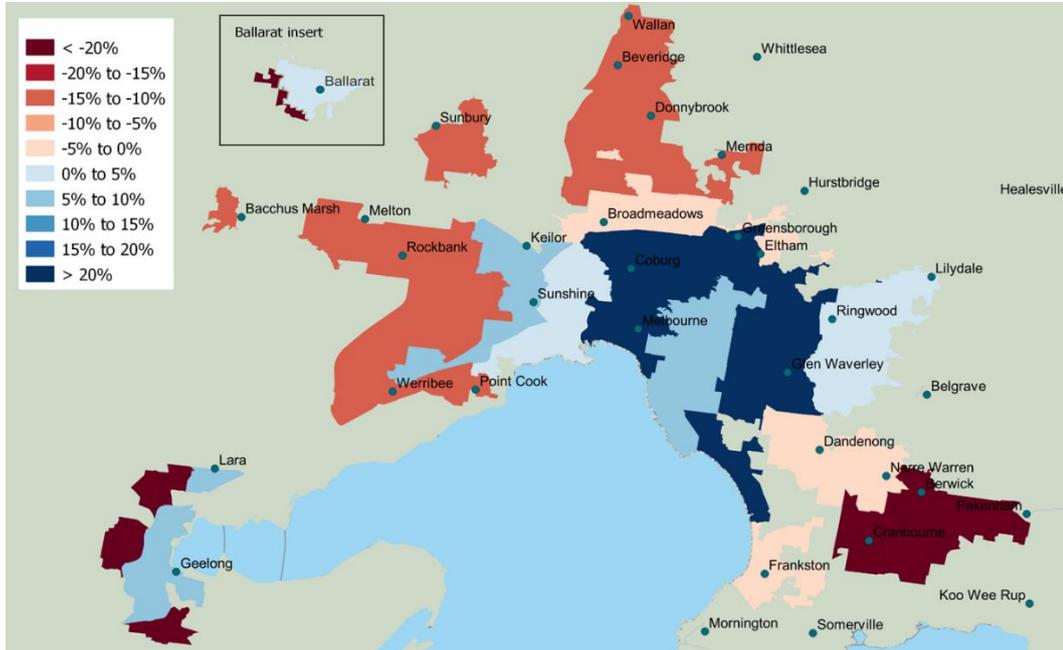
Data source: CIE market share model

Analysis of the change in demand for households who favour houses in growth areas in the baseline market share model, suggests they will substitute to townhouses (figure 5.11). They may also substitute to apartments with three bedrooms in good locations. They will not, however, substitute to apartments with fewer than three bedrooms.

5.11 Home types with largest increase in quantity demanded by households favouring houses in growth areas when prices for townhouses and apartments in established areas are reduced by 10 per cent
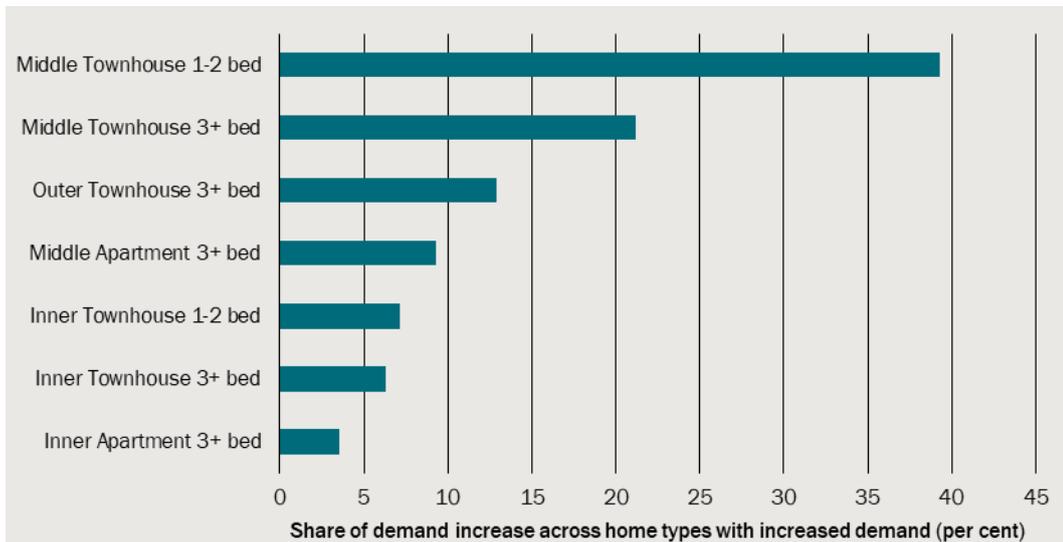
Data source: CIE market share model

When homes in growth areas become more expensive, some households will shift demand to regional areas (particularly the established areas, since regional growth areas were subject to the price increase) (see the red bars in figure 5.12). Those who can afford it may shift to a house in the outer suburbs. Others, who would choose a four- or five-bedroom house in a growth area under current market prices, will still choose a home in a growth area but forgo a bedroom, as evidenced by the *increase* in demand for three-bedroom homes in growth areas when prices for all homes in growth areas are increased.

5.12 Home types with largest increase in quantity demanded by households favouring houses in growth areas when prices for homes in growth areas are increased by 10 per cent
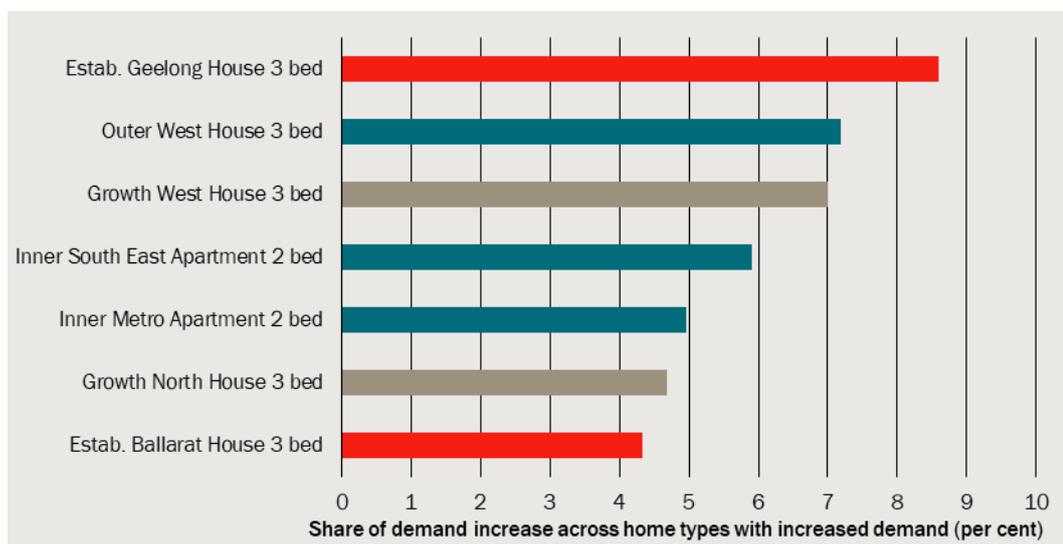
Data source: CIE market share model

Which types of household would most readily substitute to established areas?

The characteristics associated with the largest shifts in demand away from growth areas in response to the price reduction for townhouses and apartments in established areas are shown in figure 5.13. These include characteristics associated with having shorter tenure (aged under 30 years, currently renting, lived in Australia for five years or less, group household) and willingness to live in smaller dwellings (currently living in an apartment, single-person household). They also include a range of characteristics associated with lower wealth (single parent, no full-time employees, income less than $80 000 per year).

5.13 Characteristics of households most readily shifting demand away from growth areas
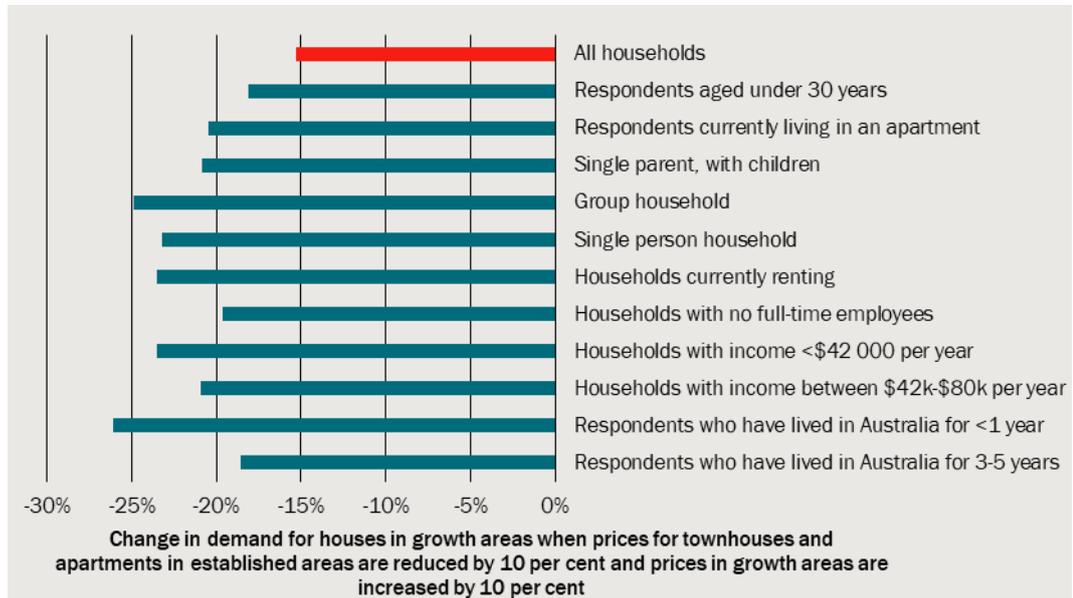
Data source: CIE market share model

The hardest households to shift away from growth areas are couples with children and households with higher incomes (figure 5.14).

5.14 Characteristics of households that are difficult to shift away from growth areas
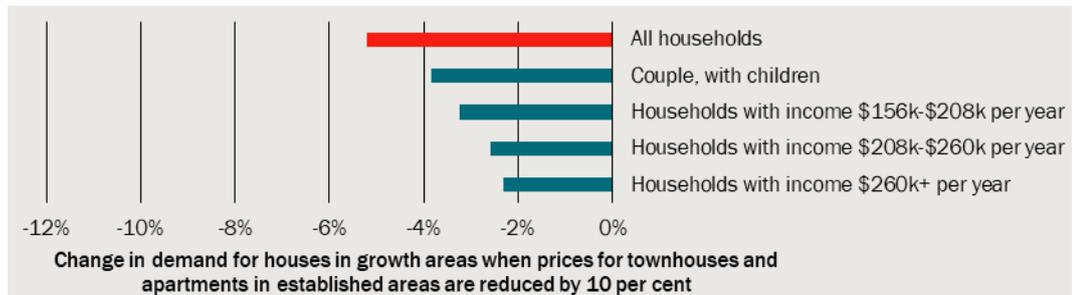
Data source: CIE market share model

Differences in attitudes between those demanding homes in growth areas in the baseline and those shifting away from growth areas in response to shocks are small, but the sign is consistent with expectations. The households who most readily shift demand away from growth areas in response to reduced prices for townhouses and apartments in established areas tend to agree more strongly with:

- I must live in the location I want, even if my dwelling is not ideal
- I must be able to easily walk to most things (table 5.15)

The households who most readily shift demand away from growth areas in response to increased prices for homes in growth areas tend to agree more strongly with:

- My home choice must save on stamp duty and maximise government grants and other tax incentives (table 5.16)

Households whose demand is most difficult to shift away from growth areas tend to agree more strongly with:

- I would always choose a house or townhouse with land, over an apartment, because it will be a better investment

- My home must have a spare bedroom to use as an office and/or guest room

- My neighbourhood must have a large community from a similar ethnic background to my family's background

- My neighbourhood must have lots of households at a similar life stage to mine

5.15 Attitudes of households shifting demand away from growth areas in response to a 10 per cent price reduction for townhouses and apartments in established areas

Statement	Baseline demand for growth areas	Demand shifted away from growth areas	Difference	Difference
	Average rating	Average rating	Average rating	per cent
My neighbourhood must have a large community from a similar ethnic background to my family's background	2.71	2.63	-0.08	-2.9
My neighbourhood must have lots of households at a similar life stage to mine	2.87	2.80	-0.08	-2.7
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	4.09	4.05	-0.04	-1.0
My home choice must save on stamp duty and maximise government grants and other tax incentives	3.63	3.63	0.00	0.0
Newer suburbs are great places to bring up children	3.29	3.20	-0.09	-2.8
I must live close to restaurants, cafes and cultural facilities	3.48	3.56	0.07	2.1
I must be able to easily walk to most things	3.69	3.82	0.13	3.6
I must live in the location I want, even if my dwelling is not ideal	3.15	3.27	0.12	3.7
My home must have a spare bedroom to use as an office and/or guest room	3.77	3.66	-0.11	-3.0
I would always choose a newer home over an older home	3.27	3.18	-0.09	-2.8
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	4.03	3.79	-0.24	-5.9
My home must have an energy efficiency rating of at least six stars	3.55	3.51	-0.03	-0.9

Source: CIE market share model

5.16 Attitudes of households shifting demand away from growth areas in response to a 10 per cent price increase for homes in growth areas

Statement	Baseline demand for growth areas	Demand shifted away from growth areas	Difference	Difference
	Average rating	Average rating	Average rating	per cent
My neighbourhood must have a large community from a similar ethnic background to my family's background	2.71	2.61	-0.10	-3.5
My neighbourhood must have lots of households at a similar life stage to mine	2.87	2.76	-0.11	-4.0
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	4.09	4.00	-0.09	-2.1
My home choice must save on stamp duty and maximise government grants and other tax incentives	3.63	3.68	0.04	1.2
Newer suburbs are great places to bring up children	3.29	3.26	-0.03	-0.8
I must live close to restaurants, cafes and cultural facilities	3.48	3.41	-0.07	-2.1
I must be able to easily walk to most things	3.69	3.70	0.01	0.2
I must live in the location I want, even if my dwelling is not ideal	3.15	3.15	0.00	0.0
My home must have a spare bedroom to use as an office and/or guest room	3.77	3.67	-0.10	-2.8
I would always choose a newer home over an older home	3.27	3.21	-0.06	-1.9
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	4.03	3.87	-0.16	-3.9
My home must have an energy efficiency rating of at least six stars	3.55	3.52	-0.03	-0.8

Source: CIE market share model

6   Addressing other research questions

This chapter provides results and discussion addressing specific research questions raised by Infrastructure Victoria which are not covered by the analysis in the preceding chapter.

Of households currently renting, how many are looking to buy and what is their demand for homes in growth areas?

Renters make up around one third of the households in Melbourne, Geelong and Ballarat. Some 22 per cent of households currently renting would look to buy a home if they needed to find a new home (table 6.1). Another 26 per cent expect to continue renting but would buy if a home they liked was affordable.

6.1   Proportion of households currently renting who are looking to buy

Intended tenure	Count of respondents currently renting	Proportion of respondents currently renting
	Respondents	per cent
Buy a home	446	22
Rent a home	1050	52
Rent a home, but would buy if a home I liked was affordable	520	26

Source: CIE

Households intending to continue renting have relatively low demand for homes in growth areas (figure 6.2). Households currently renting and looking to buy a home are, in contrast, a key source of future demand for homes in growth areas. Budget constraints and a strong preference for detached houses sees around half of the market share for this group allocated to growth and regional areas.

6.2   Locations demanded by households currently renting
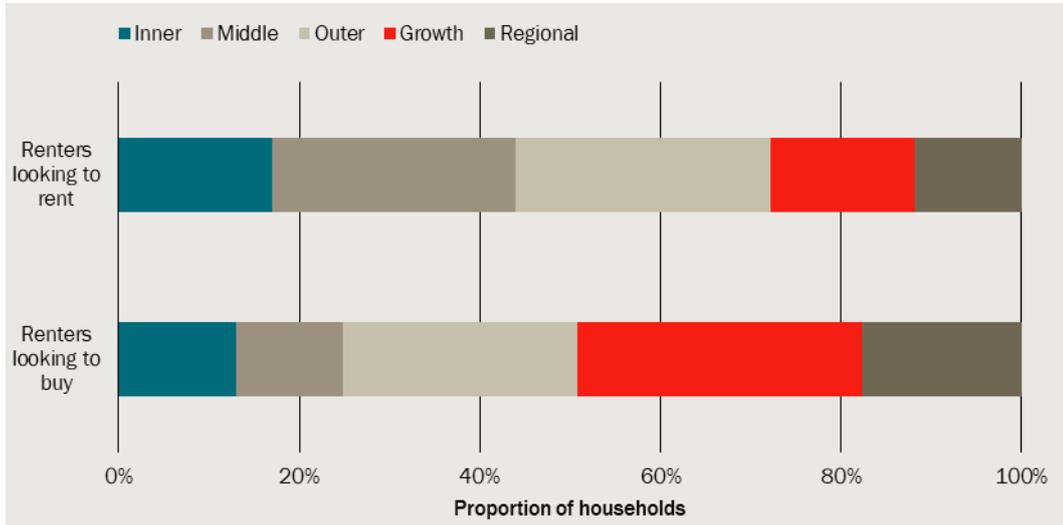
Note: *Both categories include the 26 per cent of renters who indicated they would 'rent a home, but would buy if a home I liked was affordable'*

Data source: CIE

Compared to renters looking to continue renting, renters who are looking to buy are tend to:

- be younger (figure 6.3)
- be couples (figure 6.4), and
- have higher income (figure 6.5).

6.3   Age profile for households currently renting, by intended tenure
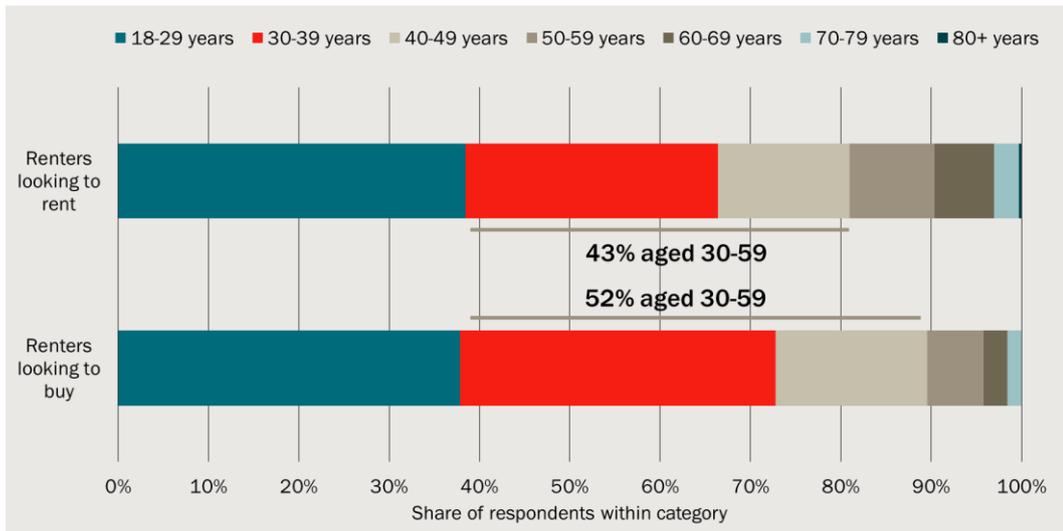
Note: *Both categories include the 26 per cent of renters who indicated they would 'rent a home, but would buy if a home I liked was affordable'*

Data source: CIE

6.4 Types of households currently renting, by intended tenure
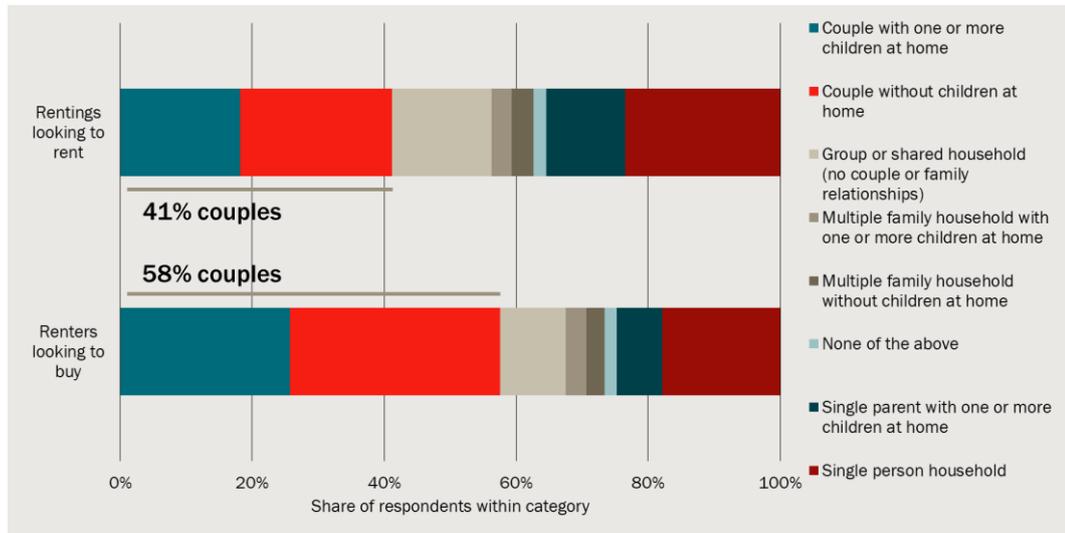
Note: Both categories include the 26 per cent of renters who indicated they would 'rent a home, but would buy if a home I liked was affordable'
Data source: CIE

6.5 Income profile for households currently renting, by intended tenure
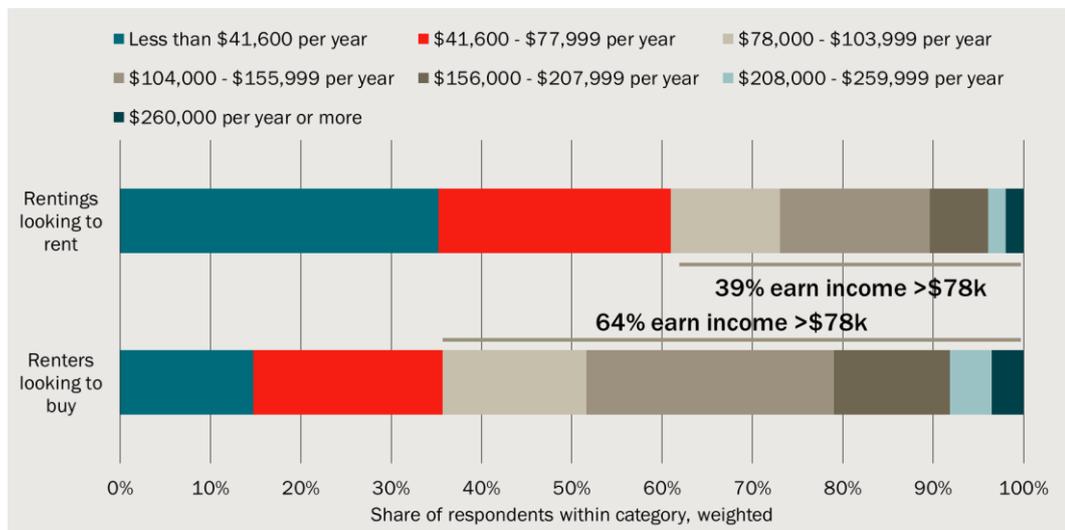
Note: Both categories include the 26 per cent of renters who indicated they would 'rent a home, but would buy if a home I liked was affordable'
Data source: CIE

What proportion of households in growth areas would give up one car space to live in medium density housing in an established area?

If prices for townhouses and apartments in established areas were reduced by 10 per cent and prices for homes in growth areas were increased by 10 per cent, demand for homes with two car spaces would fall by 7.0 per cent and the total number of car spaces demanded would fall by 2.8 per cent (table 6.6). This reduction in demand for car spaces corresponds to demand shifting from growth areas towards established areas. However, it is important to bear in mind the choice set in the market share model did not include

townhouses and apartments with more than one car space. Shifting demand from houses with two car spaces to townhouses and apartments necessarily involved giving up a car space. The demand shifts reported in the previous chapter account for the fact that, for most households, the shift involves giving up a car space.

6.6   Impact on demand for parking from a 10 per cent decrease in prices for townhouses and apartments in established areas and a 10 per cent increase in prices for homes in growth areas

Location	Type	Parking	Baseline demand	Shocked demand	Difference	Difference
			#	#	#	per cent
Inner	House	1	4 908	4 866	-41	-1
Inner	House	2	11 969	11 907	-62	-1
Inner	Townhouse	1	9 463	18 075	8 612	91
Inner	Townhouse	0	3 184	4 971	1 787	56
Inner	Apartment	1	118 028	127 340	9 312	8
Inner	Apartment	0	36 569	41 109	4 540	12
Middle	House	1	43 452	42 383	-1 069	-2
Middle	House	2	60 585	59 586	-999	-2
Middle	Townhouse	1	59 662	89 402	29 740	50
Middle	Townhouse	0	7 880	12 494	4 615	59
Middle	Apartment	1	94 131	120 410	26 279	28
Middle	Apartment	0	9 267	8 005	-1 262	-14
Outer	House	1	132 651	130 193	-2 458	-2
Outer	House	2	247 771	245 380	-2 391	-1
Outer	Townhouse	1	81 399	90 441	9 042	11
Outer	Townhouse	0	6 861	8 477	1 615	24
Outer	Apartment	1	29 430	28 594	-836	-3
Outer	Apartment	0	2 147	1 987	-160	-7
Growth	House	1	92 071	75 207	-16 864	-18
Growth	House	2	341 502	291 876	-49 625	-15
Growth	Townhouse	1	46 894	34 178	-12 716	-27
Growth	Townhouse	0	3 298	2 257	-1 042	-32
Growth	Apartment	1	5 293	4 048	-1 245	-24
Growth	Apartment	0	369	301	-68	-18
Regional	House	1	75 942	72 785	-3 157	-4
Regional	House	2	149 693	145 571	-4 122	-3
Regional	Townhouse	1	25 478	27 253	1 775	7
Regional	Townhouse	0	2 571	2 755	184	7
Regional	Apartment	1	3 352	3 948	597	18
Regional	Apartment	0	602	622	21	3
Other categories						
Car spaces			2 445 194	2 377 763	-67 431	-3

Location	Type	Parking	Baseline demand	Shocked demand	Difference	Difference
			#	#	#	per cent
Homes with 2 spaces			811 520	754 319	-57 201	-7

Source: CIE market share model

If the trade-off were between car spaces and location only (i.e. if structure and price are held constant across options), then households would strongly favour location over car spaces. Nevertheless, the least-location-focused respondents who live in growth areas may turn down moving more centrally if it involved giving up a parking space. We estimate 7 per cent of households in growth areas intending to buy a home would prefer to live in a growth area with two parking spaces than to move 10 km to an outer suburb with one parking space (assuming all other housing attributes including price are the same) (figure 6.7).

6.7   Moving from growth to outer zone and forgoing second parking space
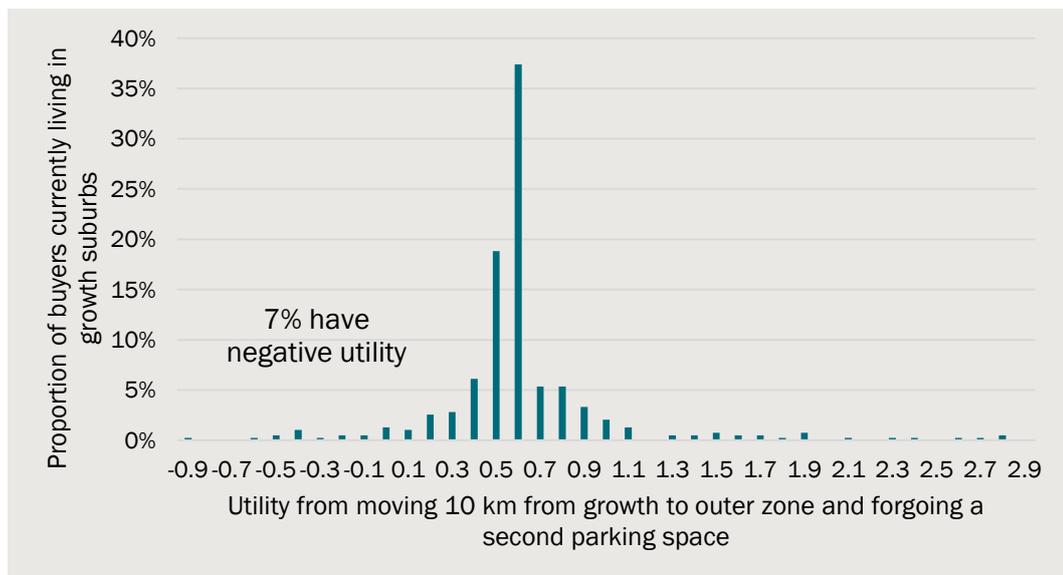
Data source: CIE

What proportion and what types of households in new suburbs would trade off house and land size to live in an established suburb in a medium density dwelling if they could afford it (at a similar price to a new suburb)?

The proportion and types of households that would shift demand from homes in growth areas (which are predominantly houses) to medium density dwellings in established areas are quantified in the market share model shocks involving decreases in prices for townhouses and apartments in established areas discussed in Chapter 5. In this section we provide some further details.

Impacts on changes in relative prices on demand in each growth corridor

Relatively few households currently living in growth areas would choose a different
residential location if townhouses and apartments in established areas became less
expensive — only around 9 per cent of households when prices are reduced by 20 per
cent (figure 6.8). The demand response is similar across growth corridors.

**6.8   Reduction in demand for homes in growth areas when prices for townhouses
and apartments in established areas are reduced, by households' current location**
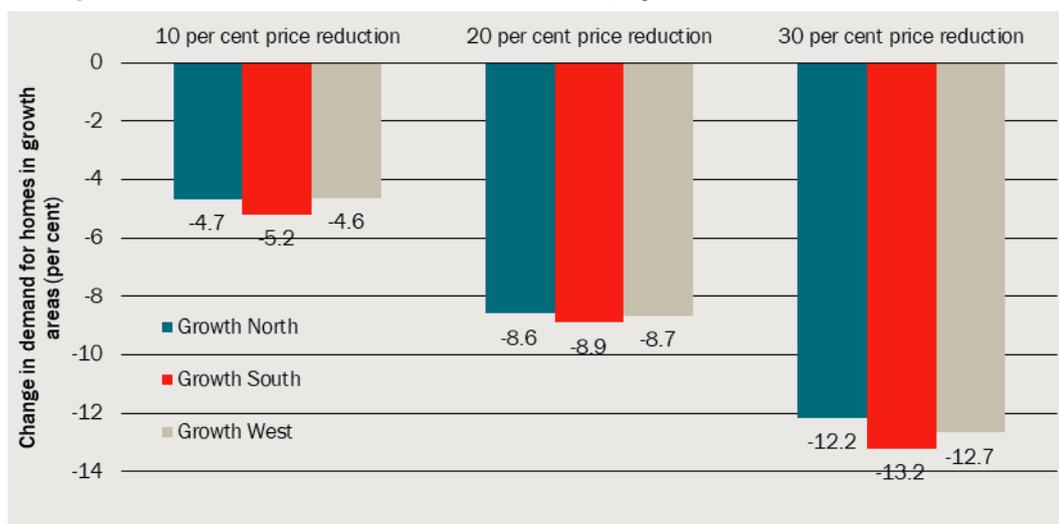
Data source: CIE market share model

Many more households living in growth areas would choose a different residential
location if all homes in growth areas became relatively more expensive — between 8 and
16 per cent of households when prices are increased by 10 per cent (figure 6.9). The
demand response is strongest in the southern growth corridor, due at least in part to the
higher prices for homes in that corridor (and therefore a larger increase in dollar terms
when each shock is applied).

6.9 Reduction in demand for homes in growth areas when prices for homes in growth areas are increased, by households' current location
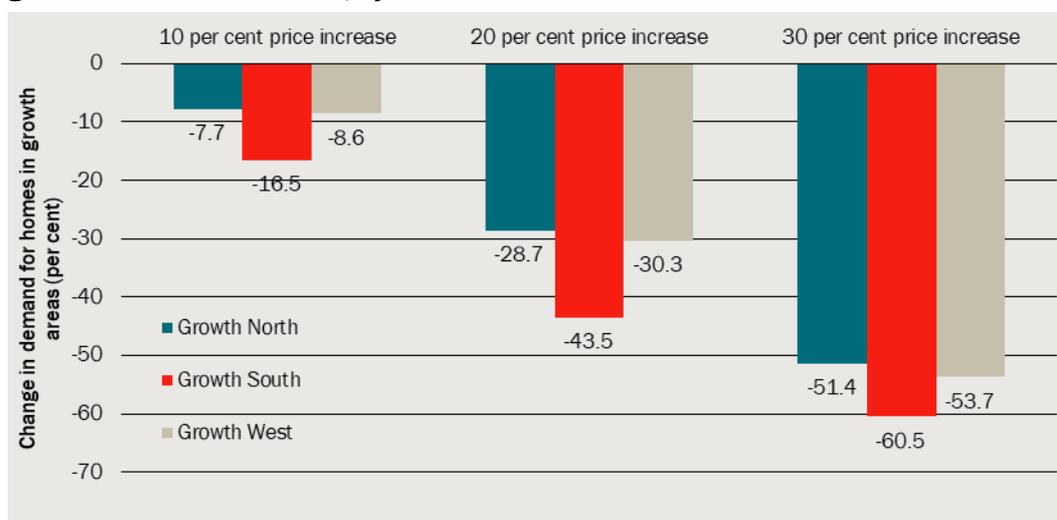
Data source: CIE market share model

The homes that reach price parity under various price shocks

In this section we highlight the medium density products that reach price parity with houses in growth areas under different levels of price shock. Table 6.10 shows the price of three-bedroom apartments and townhouses in established Melbourne as a proportion of the average price of three-bedroom houses in growth areas. While there is some variation in the price of houses between the western (lowest-cost), northern, and southern (highest-cost) growth corridors, these ratios provide an indication of the types of homes that come close to price parity when prices of townhouses and apartments are reduced by 10, 20, and 30 per cent.

It shows that medium density homes in the outer suburbs are available at a similar or lower price than houses in growth areas in the current market. Medium density housing in middle and inner areas is currently more expensive, but all products other than townhouses in inner or eastern suburbs reach price parity within the range of price shocks conducted in the analysis (table 6.11).

6.10 Price of 3-bedroom medium density homes as a proportion of price of 3-bedroom houses in growth areas

Location	Type	Current	10% price reduction	20% price reduction	30% price reduction
		ratio	ratio	ratio	ratio
Outer West	Apartment	0.81	0.73	0.65	0.57
Outer South	Apartment	0.84	0.76	0.67	0.59
Outer North	Apartment	0.88	0.79	0.71	0.62
Outer West	Townhouse	0.90	0.81	0.72	0.63
Outer South	Townhouse	0.96	0.87	0.77	0.68

Location	Type	Current	10% price reduction	20% price reduction	30% price reduction
		ratio	ratio	ratio	ratio
Outer North	Townhouse	0.99	0.89	0.79	0.69
Outer East	Apartment	1.07	0.96	0.86	0.75
Middle West	Apartment	1.08	0.97	0.86	0.75
Outer East	Townhouse	1.17	1.05	0.93	0.82
Middle North	Apartment	1.17	1.06	0.94	0.82
Middle South	Apartment	1.20	1.08	0.96	0.84
Middle East	Apartment	1.22	1.10	0.98	0.85
Inner Metro	Apartment	1.34	1.21	1.07	0.94
Middle North	Townhouse	1.37	1.23	1.10	0.96
Middle West	Townhouse	1.39	1.25	1.11	0.97
Inner South East	Apartment	1.39	1.25	1.11	0.97
Middle South	Townhouse	1.46	1.31	1.17	1.02
Middle East	Townhouse	1.53	1.38	1.22	1.07
Inner South East	Townhouse	2.11	1.90	1.69	1.48
Inner Metro	Townhouse	2.28	2.05	1.82	1.60

Note: Assumes all homes have three bedrooms; houses have two parking spaces. Townhouses and apartments have one parking space.
Source: CIE market share model

6.11   Homes that become a similar price to houses in growth areas under various price shocks

Price shock to apartments and townhouses in established Melbourne	Homes with similar price to houses in growth zones
Current	Townhouses in Outer South and Outer North
10% shock	Apartments in Outer East and Middle West
20% shock	Apartments in Middle South and Middle East
30% shock	Townhouses in all Middle North, West and South Apartments in Inner South East

Note: Assumes all homes have three bedrooms; houses have two parking spaces. Townhouses and apartments have one parking space.
Source: CIE market share model

To which homes will households substitute?

Demand is more likely to shift to townhouses than to apartments. When prices are reduced only for townhouses, the demand shifted away from houses in growth areas is greater than when prices are reduced only for apartments (figure 6.12).

6.12 Demand is more likely to shift to townhouses than to apartments
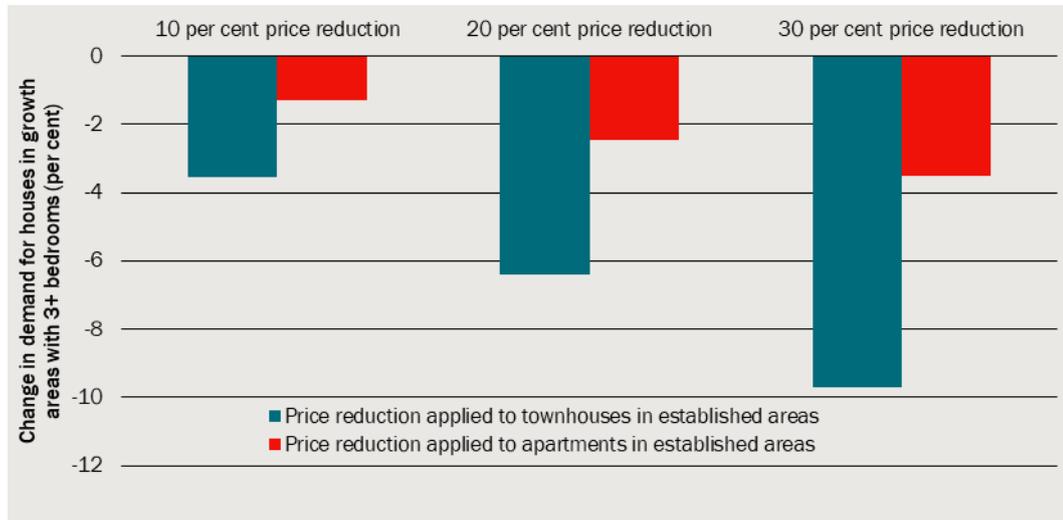
Note: This chart shows the demand only from households whose maximum choice probability is on a house in a growth area under current prices

Data source: CIE market share model

The largest proportional increases in demand are for townhouses in inner Melbourne and 1-2 bedroom townhouses in middle suburbs. The next largest increase is for three-bedroom apartments in middle suburbs (see table 6.13). Percentage increase in demand provides an indication of preferences for new housing supply, since it is not influenced by the number of homes available in the existing stock.

6.13   Impacts on the demand of households who currently favour houses in growth areas when prices are reduced for townhouses and apartments in established areas

Location	Type	Size	Baseline demand	Change in demand under 10% price shock		Change in demand under 20% price shock		Change in demand under 30% price shock	
			homes	homes	per cent	homes	per cent	homes	per cent
Middle	Townhouse	1-2 bed	9511	11540	121.3	15277	160.6	14722	154.8
Middle	Townhouse	3+ bed	17579	6211	35.3	18391	104.6	35766	203.5
Outer	Townhouse	3+ bed	19602	3793	19.3	4104	20.9	3961	20.2
Middle	Apartment	3+ bed	4007	2727	68.1	2851	71.1	2832	70.7
Inner	Townhouse	1-2 bed	509	2103	413.4	3474	683.1	3892	765.1
Inner	Townhouse	3+ bed	1821	1845	101.3	2886	158.5	8587	471.5
Inner	Apartment	3+ bed	4776	1029	21.6	3811	79.8	6674	139.7
Regional	Townhouse	3+ bed	2520	75	3	72	2.9	44	1.7
Regional	Apartment	3+ bed	153	26	16.8	32	21.3	41	26.6
Inner	House	1-2 bed	179	-3	-1.9	-7	-3.6	-10	-5.3
Inner	House	3+ bed	3384	-18	-0.5	-34	-1	-49	-1.4
Regional	Apartment	1-2 bed	372	-25	-6.8	-46	-12.5	-65	-17.4
Growth	Apartment	3+ bed	537	-36	-6.7	-62	-11.6	-92	-17.1
Outer	Apartment	3+ bed	2266	-37	-1.6	-50	-2.2	-101	-4.4
Growth	Apartment	1-2 bed	891	-90	-10.1	-159	-17.9	-225	-25.3
Regional	Townhouse	1-2 bed	1983	-129	-6.5	-226	-11.4	-329	-16.6

Location	Type	Size	Baseline demand	Change in demand under 10% price shock		Change in demand under 20% price shock		Change in demand under 30% price shock	
			homes	homes	per cent	homes	per cent	homes	per cent
Middle	House	1-2 bed	5610	-224	-4	-395	-7	-608	-10.8
Outer	Apartment	1-2 bed	3575	-238	-6.7	-397	-11.1	-589	-16.5
Inner	Apartment	1-2 bed	32527	-406	-1.2	-540	-1.7	-1400	-4.3
Growth	Townhouse	1-2 bed	4200	-420	-10	-732	-17.4	-1048	-24.9
Regional	House	1-2 bed	5550	-465	-8.4	-828	-14.9	-1206	-21.7
Middle	Apartment	1-2 bed	17698	-519	-2.9	-1099	-6.2	-1837	-10.4
Middle	House	3+ bed	31291	-585	-1.9	-973	-3.1	-1335	-4.3
Growth	House	1-2 bed	6536	-586	-9	-1021	-15.6	-1491	-22.8
Outer	Townhouse	1-2 bed	11936	-645	-5.4	-1034	-8.7	-1673	-14
Outer	House	1-2 bed	13038	-1079	-8.3	-1885	-14.5	-2773	-21.3
Growth	Townhouse	3+ bed	16256	-1101	-6.8	-1882	-11.6	-2789	-17.2
Regional	House	3+ bed	82676	-4123	-5	-7185	-8.7	-10817	-13.1
Outer	House	3+ bed	198622	-5387	-2.7	-9556	-4.8	-14122	-7.1
Growth	House	3+ bed	302179	-13232	-4.4	-22787	-7.5	-33962	-11.2

Note: This table shows the demand only from households whose maximum choice probability is on a house in a growth area under current prices

Source: CIE market share model

We observe in the table above that for households currently favouring houses in growth zones, demand for some of the more-expensive medium density homes would increase non-linearly as prices decrease. For example, demand for townhouses in inner Melbourne with three or more bedrooms would increase by 101, 158 and 472 per cent as prices decrease by 10, 20 and 30 per cent (figure 6.14). This reflects the fact that these townhouses were previously outside of the budget constraint (maximum price) for many households, but would enter the choice set of an increasing number of households as prices decrease.

Demand for less-expensive homes follows a different pattern. For example, three-bedroom apartments in middle suburbs would see demand increases of 68, 71 and 71 per cent over the three price shocks.

6.14   The demand response differs across home types
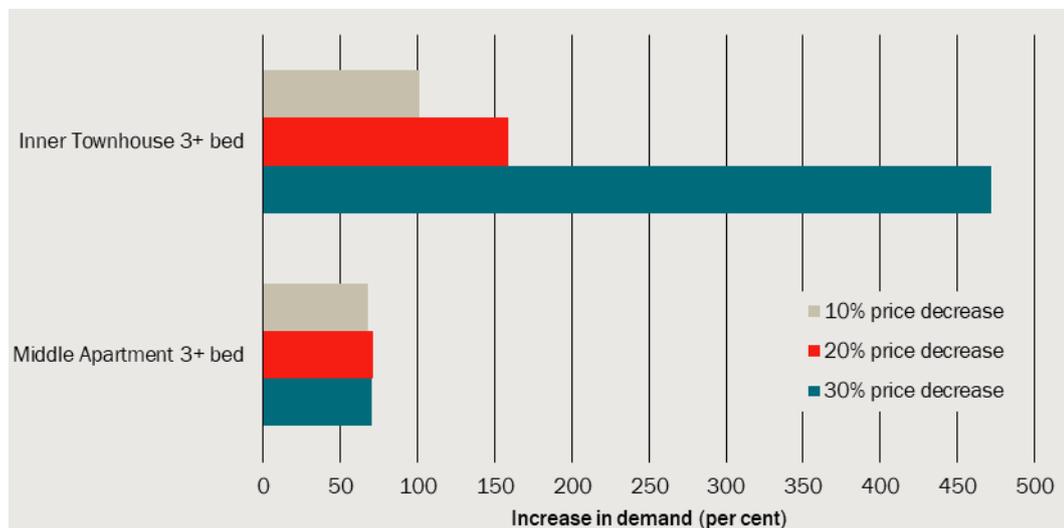
Note: These demand impacts are for households who have a baseline preference for houses in growth zones
Data source: CIE market share model

Measure the relative size of different housing preferences (ranking of attributes) to various household types (e.g. submarket/demographic group) and assign a value to each housing preference

The importance of housing attributes was discussed in terms of utility (a measure of perceived benefit used in the choice models) in the early part of chapter 5. In this section, we assign a value to these preferences by estimating average willingness to pay (WTP) for each specific change in attributes. This is not straightforward, since the price variable used in the choice models was a function of the minimum amount each household would expect to spend on a home. Further, each household indicated a maximum price they could afford and homes with prices above that level were assumed to have a choice probability of zero. WTP estimates have therefore been limited at a respondent level to be no more than the difference between the minimum amount a respondent would expect to spend on their home and the maximum amount they could afford.

The values shown in figure 6.15 relate to specific *changes* in housing attributes. For example, the item 'Type: House' shows the average value placed by households on choosing a house rather than an apartment in a high-rise complex is around $430 000. If houses are more than $430 000 more expensive than high-rise apartments, holding all other attributes equal across the two options, then the average respondent would prefer the apartment. If houses are less than $430 000 more expensive than high-rise apartments, holding all other attributes equal across the two options, then the average respondent would prefer the house. The other items are defined in a similar way. The larger-than-expected values for car spaces could in part be due to the correlation in the design between structure type and car spaces. Houses were never shown with zero car spaces and townhouses and apartments were never shown with two car spaces.

6.15   Relative importance of housing attributes: average willingness to pay
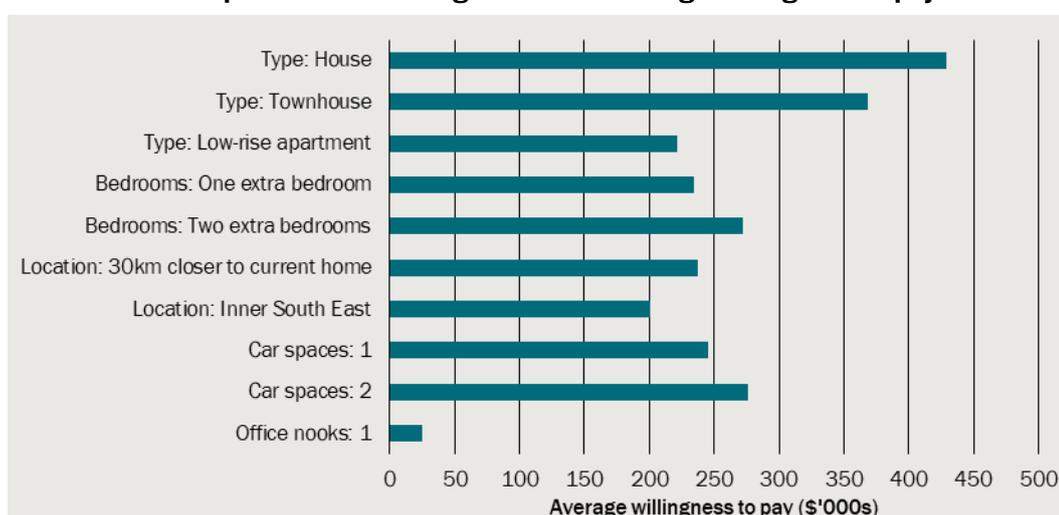
Note: Relative to a hypothetical high-rise apartment in Growth West, minimum number of bedrooms, zero car spaces, zero office nooks.
Data source: CIE housing choice models

Identify the housing and locational features (attributes/preferences) and price point that most strongly influence household decisions to make trade-offs to move to or remain in established areas, for different consumer groups (e.g. demographic or cultural groups)

The answers to this question can largely be found by observing the reverse of the results in the analysis in this report considering households' propensity to shift demand away from growth areas, since the shift away from growth areas is the negative of the shift in demand towards established areas (these are the only two types of area in the choice set).

The features that most strongly influence choice are relatively similar across households, regardless of whether they have chosen (in the real market) to live in growth or established suburbs of Melbourne, except for one feature — location (figure 6.16). Households living in established Melbourne place a much higher value on being located near inner Melbourne, as evidenced by the 'Location: Inner South East' item in the figure

(as well as inner suburbs being a shorter distance from current home than they are for households in growth areas).

6.16   Relative importance of attributes by location of current home
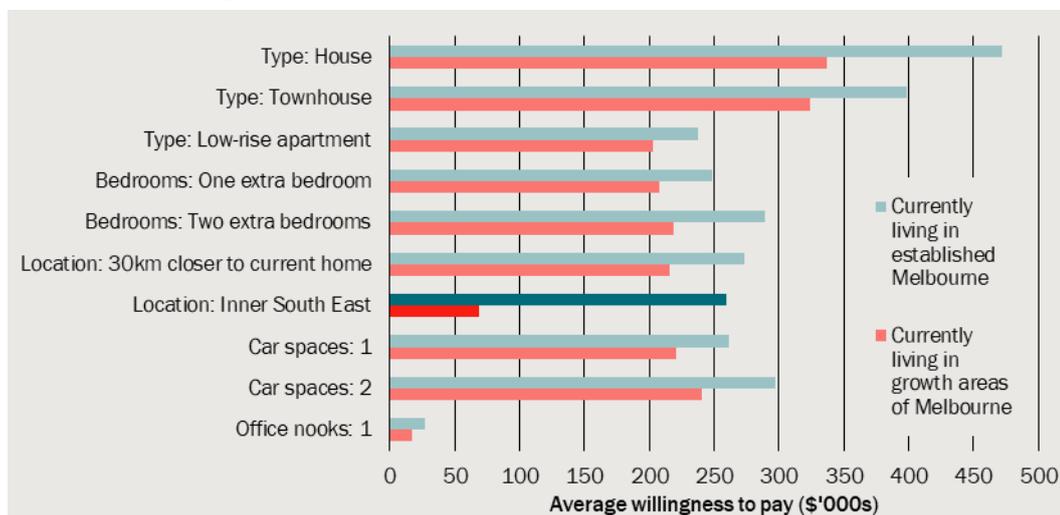
Data source: CIE housing choice models

In terms of stated preferences, we saw in Chapter 5 that increased prices for homes in growth areas was the most effective price shock for shifting demand to established areas (figure 5.7 and discussion from page 49). Decreases in prices for townhouses and apartments in established areas were less effective at shifting demand, but households already living in established areas were more responsive than those living in growth areas.

The different consumer groups with the highest and lowest propensity to shift demand from growth areas to established areas in response to changes in relative prices are identified in figures 5.13 (highest propensity) and 5.14 (lowest propensity) and in the discussion from page 53.

Do attitudes correlate with whether preferences are location- or structure-type-focused?

We discussed the correlation between attitudes and location- and structure-focused preferences in relation to one of the seven housing choice models in the section beginning on page 38. Here, we provide the Z-scores for the three choice models with the largest sample sizes — model 1 (owners in established Melbourne looking to buy), model 4 (households looking to rent) and model 5 (households looking to rent or buy). Z-scores with an absolute value of more than 1.96 indicate statistical difference from zero at the 95 per cent confidence level. We show Z-scores with the sign of their corresponding coefficient to indicate whether correlation with structure-focused preferences is positive. Table 6.17 shows that the following attitudes are consistently correlated with location-focused preferences:

- I must live close to restaurants, cafes and cultural facilities
- I must live in the location I want, even if my dwelling is not ideal

Structure-focused preferences are consistently correlated with the attitudes:

- Newer suburbs are great places to bring up children
- I would always choose a house or townhouse with land, over an apartment, because it will be a better investment
- My home choice must save on stamp duty and maximise government grants and other tax incentives

6.17 Statistical significance of attitudes as drivers of preference class probability in three housing choice models

Statement	Model 1	Model 4	Model 5
	Z-score	Z-score	Z-score
My neighbourhood must have a large community from a similar ethnic background to my family's background	-0.8	2.9	1.4
My neighbourhood must have lots of households at a similar life stage to mine	1.7	-0.4	-1.1
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	-1.0	-3.5	-1.1
My home choice must save on stamp duty and maximise government grants and other tax incentives	4.8	2.2	2.5
Newer suburbs are great places to bring up children	3.4	2.5	4.7
I must live close to restaurants, cafes and cultural facilities	-4.6	-5.6	-3.1
I must be able to easily walk to most things	-2.2	0.4	-1.8
I must live in the location I want, even if my dwelling is not ideal	-4.5	-2.8	-3.0
My home must have a spare bedroom to use as an office and/or guest room	-2.0	1.1	0.2
I would always choose a newer home over an older home	-0.4	-1.7	1.3
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	4.8	3.8	1.4
My home must have an energy efficiency rating of at least six stars	0.2	1.0	0.7

Source: CIE

7   Cognitive testing interviews

Questions for prompting discussion

- How long did the questionnaire take to complete?
- Were there any parts of the survey that were confusing or unclear?
- Which questions other than the housing choice questions did you need to stop and think most about?
- Were the housing choice questions difficult to answer?
- Was it hard to imagine needing to buy/rent another home?
- How did you feel towards the end of the 16 questions? e.g. were you bored of the repetition? Without an interviewer present, would you have dropped out of the survey?
- How did you go about answering the housing choice questions? e.g. which features did you look at first? Were there any features you ignored?
- Did any of the options look strange to you? Which ones, and why?
- Did you find you were always picking the same dwelling type (e.g. always house or always apartment)?
- Did you find you were always picking a home in a similar location?
- In how many of the questions were none of the options suitable?
- When no options were suitable, were you able to identify which option would be closest to being suitable?
- What role did the photos play in your choices? Were there aspects of the photos that put you off or attracted you to the option? Did the design or style of the home in the photo affect your choices?
- Did any of the prices look very unrealistic? If so, how did you treat that option when answering the question?
- Did the questionnaire seem neutral and factual (i.e. not biased or leading)?

Woolcott Research and Engagement findings

The following text is taken directly from Woolcott Research and Engagement reporting on the interviews.

Methodology

A series of n=14 in-depth interviews amongst residents in Melbourne suburbs (n=7 from 'established Melbourne suburbs; n=7 from 'greenfield suburbs').

All participants were required to:

- live in a home built within the last 10 years
- be over 18 years
- be a decision maker in the household when it comes to purchasing or renting a home
- or saving for a deposit for a home loan

Each respondent was emailed a copy of the proposed questionnaire, with a tailored choice set block that was determined by their answers to a series of questions

They were requested to complete the study as though they would do normally and take a note of the time taken to complete it

Respondents were also asked to make a note of any questions they found difficult, confusing or time consuming

Findings from the Cognitive Test Interviews

Time taken to complete

Participants took between 20 and 40 minutes to complete the questionnaire, however in the online format, it is likely to be much faster.

We predict the questionnaire will take between 15-35 minutes (with an average of completion time of around 25 minutes) online.

Questionnaire Section: (Q1 – Q34)

Overall this section was seen to be quite straight forward

However there are several questions that have very long code frames that took people a long time to read through and caused some frustration (Q20, Q25, Q29, Q31, Q32)

- Respondents commented that there were long sentences that added to the complexity and slowed them down

The introduction on page 5 seemed unnecessary and didn't reflect the sections presented in the questionnaire.

- The survey in paper form did not seem to specify which section you are in so the instructions seemed superfluous

Q10 – there is an overlap in code frames D,E and F. e.g. 6-10, 10-20 years

Q11 – some were unsure if they should include their study as a bedroom. Perhaps consider a disclaimer to define bedrooms (excluding those used as a study?) or display Q11 and Q12 on the same screen

Q13 – some were unsure if this included space outside (e.g. on the driveway) the garage that could accommodate more cars

Q14 – there are a lot of code frames. There was a question if these could be condensed.

Q15 – same response as above in Q14

Q20 – this is a very long list of industry codes and one comment was that 'Marketing' was not there or they did not where it would go. Having said that, it would be difficult to reduce these down.

Q29/31 – this is a very long list with lots to read and was overwhelming for some. The regions were not necessarily familiar to everyone. Some suggested including a map, others felt that being able to simply write in the suburbs may be easier and faster.

Q32 – again the descriptions were felt to be too long. Some questioned if these codes could be condensed.

Q34/79 – This was an annoying question for many as they felt that it was adding an additional question to a very long questionnaire and they felt they weren't being trusted. Conceptually, others understood the need for some kind of 'check' on people's attention given the length. However more importantly, a few actually got the answer wrong – answering 'A - strongly agree' as they felt people should be paying attention. This could be solved by altering the wording to 'Please choose 'Moderately disagree' below to indicate you are reading instructions and paying attention'.

- Q79 added to the frustration and was then even more annoying. Many disliked that it slowed them down/ made them have to read it twice.
- If this style of question was reduced to one, perhaps keep Q79 and delete Q34.

Questionnaire Section: (Q34 – Q45)

Q35-45 some people were having difficulty with the skips at this point however, this should be resolved in the online survey.

Q36 - see comments regarding Q14

Q39 - there was some confusion with the code frames overlapping. For example, if you were preferred a 4 bedroom house, which answer do you select

Q40 – again there is overlap between the code frames

Specific Reactions to the Housing Options (Q46-77)

Overall there were seen to be a lot of options – 16 choice questions, with what they saw as presenting similar options, was felt to be far too many. It was felt to be very repetitious and some felt they were starting to rush through it at this stage and were not considering all the variables being presented in each of the options.

Having the 'none' option in a separate question felt that it was forcing respondents to select one of the four options. It was difficult to work out/confusing to know if you had to choose one of the four before you could select 'none' or if 'none' was a fifth option.

Ideally they wanted 'none' to be presented as a fifth option.

Having said that, participants were selecting none between 2 and 7 times.

There was some confusion regarding the extent to which the house was intended to be just a generic example of a house or if it was a true reflection of the style of house for that option (e.g. a two story house versus a one story house, which did influence some respondent's choice.)

- A few appeared to be influenced by the aesthetics/architectural look of the image e.g. it might not be a style of house that appeals to them
- A couple of participants initially assumed that the one visual for a house, for example, had the same set of variable throughout all the options.

Many were making their initial decisions/eliminating house options based on a couple of key criteria:

- Property type i.e. a house or apartment
- Location
- Price, and to a lesser extent
- Number of bedrooms
- Car spaces and/or garage capacity

Very few were paying attention to the inclusion of a study, the monthly mortgage amount or the distance to the city

Most of the options looked reasonable, however a few did stand out as being potentially unrealistic e.g. having an 11+ story complex in an outer suburb of Melbourne, and Ballarat.

Also a couple of the prices appeared to be quite cheap/very good value e.g. a 4 bed apartment in Outer West Melbourne for $464,000; a 4 bed apartment in Growth – West Melbourne for $325,000.

The maps were useful, however they were a bit small/unclear so the listing of suburbs was of assistance.

For houses, a couple of participants wanted to know the block size – and felt that this would be key information they would want to know.

Questionnaire Section: (Q78 onwards)

Some questioned the need for the preamble prior to Q78 – it just meant more reading time.

Q 80-82, 'When choosing options' caused a little bit of confusion/uncertainty for some – suggesting that it should say 'when choosing housing options'

Many appreciated that there were only a few questions left following the complex choice questions.

Overall whilst some indicated that they felt quite fatigued/tired after completing the questionnaire, the majority commented that the subject matter i.e. housing and the property market, was quite interesting and this would help alleviate the fatigue to some extent.

Conclusions/Recommendations

Q29, Q31, Q32: Ideally reduce the number of code fames by combining some and/or reduce the sentence length/descriptions OR perhaps use an interactive map where respondents can click on an area.

Introductions before Q9 and Q78 – remove these preambles

Q10/Q39/Q40 – amend the overlap in codes

Q12. Consider a disclaimer to define bedrooms (excluding those used as a study?) or display Q11 and Q12 on the same screen

Q13 – Consider tightening the definition of off street parking –i.e. does it include space outside the garage that could accommodate more cars

Q14/Q15/Q36 – Consider consolidating the code frames in this question

Q34 – Remove the quality check question – retain Q79 only

Housing choice questions

Obviously if the number of choice options could be reduced that would be ideal.

Assuming that the house style/architectural design is not a key variable, to reduce the impact/influence of the house style on the decision making process perhaps consider using illustrations/icons to depict the property type.

Consider deleting some of the variables e.g. study, distance from the city and monthly mortgage repayments.

Try to eliminate unrealistic combinations e.g. High rise apartments in Ballarat/Outer Melbourne; and some of the unrealistic prices.

The estimated length of the questionnaire at 25 minutes seems to be realistic, particularly if some of the suggested changes are implemented.

8   Questionnaire

Welcome

Thank you for participating in this survey, which is being run by Pureprofile and The Centre for International Economics on behalf of Infrastructure Victoria. This survey is about housing. Your input is very important and will help the Victorian Government to plan for future growth in Melbourne and surrounding regional centres.

This questionnaire will take around 15-20 minutes to complete.

We wish to reassure you that this is genuine market research and, as always, your individual survey responses will remain confidential and anonymous at all times.

In the unlikely event of any technical difficulties please click on the technical support e-mail link.

Please keep in mind…

Do not use your Back or Forward browser buttons while you are taking this survey. If you wish to go back, use the back button on the bottom of each page within the survey. **PLEASE INCLUDE BACK BUTTON THROUGHOUT**

Before we go through to the main study, we would like to ask you some questions to make sure we are interviewing a good cross section of people.

1. What type of device are you using to answer this survey? **AUTOMATIC NEXT QUESTION**

    (THIS QUESTION WAS REMOVED DURING THE FIELDWORK TO ENSURE TARGET COMPLETIONS WERE MET)

    a. Desktop computer

    b. Laptop computer

    c. Standard-sized tablet (larger than 9-inch screen)

    d. Mini tablet (screen 9-inch or smaller) **RAISE ERROR**

    e. Mobile phone **RAISE ERROR**

ERROR PAGE

The device you are using is too small for this survey. Please resume the survey on a desktop computer, laptop computer or standard-sized tablet.

2. What is the postcode of your home address?

    _____ **ALLOW FOUR DIGITS. TERMINATE IF OUT OF AREA. SET HQREGION.**

3. What is the suburb or locality of your home address? *If your suburb is not on the list, please select a nearby suburb from the list.* **SHOW SUBURBS CORRESPONDING TO POSTCODE SELECTED IN Q2**

4. Are you a…

    a. Woman

    b. Man

    c. Self-described (please specify) _____

    d. Prefer not to say

5. What is your age? **AUTOMATIC NEXT QUESTION**

    a. Less than 18 years **TERMINATE**

    b. 18-29 years

    c. 30-39 years

    d. 40-49 years

    e. 50-59 years

    f. 60-69 years

    g. 70-79 years

    h. 80 years or over

6. Would you be part of the decision-making process if your household was choosing a home? **AUTOMATIC NEXT QUESTION**

    a. Yes

    b. No

7. **IF b ABOVE** Are you planning to be in a position to choose a home within the next five years? **AUTOMATIC NEXT QUESTION**

    a. Yes

    b. No **TERMINATE**

TERMINATE PAGE

Thank you for your patience in answering these questions. Unfortunately, we do not need you to participate in our research this time, but we sincerely appreciate your time and assistance today.

This questionnaire is about housing in Victoria. We want to understand your preferences so we can make better plans for future growth in Melbourne and regional centres.

First, we want to ask some questions about your household and the places you go.

8. Is the home you live in a… **AUTOMATIC NEXT QUESTION**

    a. Detached house

    b. Townhouse, terrace, villa, unit or other semi-detached

    c. Apartment in complex with up to 3 storeys

    d. Apartment in complex with between 4 and 10 storeys

    e. Apartment in complex with 11 storeys or more

9. How long have you been living at this home? **AUTOMATIC NEXT QUESTION**

    a. Less than one year

    b. 1-2 years

    c. 3-5 years

    d. 6-10 years

    e. 11-20 years

    f. 21-40 years

    g. More than 40 years *[Show if Q5 (age) = d-h (40 years and above)]*

10. Does the home you live in have… (*please include all rooms that could be classed as bedrooms even if they are not currently used as bedrooms*) **AUTOMATIC NEXT QUESTION**

    a. 1 bedroom

    b. 2 bedrooms

    c. 3 bedrooms

    d. 4 bedrooms

e.   5 or more bedrooms

11. Which of the following best describes your household? **AUTOMATIC NEXT QUESTION**

a.   Couple without children at home

b.   Couple with one or more children at home

c.   Multiple family household without children at home

d.   Multiple family household with one or more children at home

e.   Single parent with one or more children at home

f.   Group or shared household (no couple or family relationships)

g.   Single person household

h.   None of the above

12. Is your home… **AUTOMATIC NEXT QUESTION**

a.   Owned outright

b.   Owned with a mortgage

c.   Rented

d.   Occupied rent-free

e.   None of the above

13. Was your neighbourhood first built… **AUTOMATIC NEXT QUESTION**

a.   Less than 10 years ago *[Do Not Show if Q9=e/f/g]*

b.   Between 10 and 25 years ago *[Do Not Show if Q9=g]*

c.   More than 25 years ago

d.   Don't know

14. How many people in your household are employed?

IF Q11=c,d OR f, show text: *Please answer for your family only.*

AUTOMATIC NEXT QUESTION

a.   None **SKIP TO Q25**

b.   1

c.   2 or more

IF b ABOVE We will refer to this person as income earner #1.

IF c ABOVE Think of the two highest income earners in the household. In the next few questions, we will refer to them as income earner #1 and income earner #2.

15. Is income earner #1 employed… **AUTOMATIC NEXT QUESTION**

a.   Full-time

b.   Part-time

c.   Casual

16. In which industry is income earner #1 working?

a.   Agriculture, Forestry and Fishing

b.   Mining

c.   Manufacturing

d.   Electricity, Gas, Water and Waste Service

e.   Construction

f.   Wholesale Trade

g.   Retail Trade

h.   Accommodation and Food Services

i.   Transport, Postal and Warehousing

j.   Information Media and Telecommunications

k.   Financial and Insurance Services

l.   Rental, Hiring and Real Estate Services

m.   Professional, Scientific and Technical Services

n.   Administrative and Support Services

o.   Public Administration and Safety

p.   Education and Training

q.   Health Care and Social Assistance

r.   Arts and Recreation Services

s.   Other/don't know (please specify) _____

17. Does income earner #1 work from home? **AUTOMATIC NEXT QUESTION**

    a. Never

    b. Occasionally (less than 1 day per 5 working days)

    c. Regularly (1-3 days per 5 working days)

    d. All or almost all of the time **SKIP Q18 and Q19**

18. **IF a-c ABOVE** In which suburb/locality does income earner #1 usually work (when not working from home)? *If your suburb is not on the list, please select a nearby suburb from the list.*

    a. **SELECT FROM LIST OF IN-AREA SUBURBS/LOCALITIES**

        or

    b. A location outside of Melbourne, Geelong and Ballarat

        or

    c. No fixed location (e.g. working on client premises)

19. If your household moved 45 minutes further away from income earner #1's place of employment, would that income earner change jobs to work closer to home? *If you are not income earner #1, please give your impression.*

    a. Likely to change jobs

    b. Neither likely nor unlikely to change jobs

    c. Unlikely to change jobs

IF Q14=c Now we want to ask the same questions about income earner #2.

20. **IF Q14=c** Is income earner #2 employed… **AUTOMATIC NEXT QUESTION**

    a. Full-time

    b. Part-time

    c. Casual

21. **IF Q14=c** In which industry is income earner #2 working?

    a. Agriculture, Forestry and Fishing

    b. Mining

    c.   Manufacturing

    d.   Electricity, Gas, Water and Waste Service

    e.   Construction

    f.   Wholesale Trade

    g.   Retail Trade

    h.   Accommodation and Food Services

    i.   Transport, Postal and Warehousing

    j.   Information Media and Telecommunications

    k.   Financial and Insurance Services

    l.   Rental, Hiring and Real Estate Services

    m. Professional, Scientific and Technical Services

    n.   Administrative and Support Services

    o.   Public Administration and Safety

    p.   Education and Training

    q.   Health Care and Social Assistance

    r.   Arts and Recreation Services

    s.   Other/don't know (please specify) _____

22. **IF Q14=c** Does income earner #2 work from home? **AUTOMATIC NEXT QUESTION**

    a.   Never

    b.   Occasionally (less than 1 day per 5 working days)

    c.   Regularly (1-3 days per 5 working days)

    d.   All or almost all of the time **SKIP Q23 and Q24**

23. **IF a-c ABOVE** In which suburb/locality does income earner #2 usually work (when not working from home)? *If your suburb is not on the list, please select a nearby suburb from the list.*

    a.   **SELECT FROM LIST OF IN-AREA SUBURBS/LOCALITIES**

        or

    b.   A location outside of Melbourne, Geelong and Ballarat

        or

    c.   No fixed location (e.g. working on client premises)

24. **IF Q14=c** If your household moved 45 minutes further away from income earner #2's place of employment, would that income earner change jobs to work closer to home? *If you are not income earner #2, please give your impression.* **AUTOMATIC NEXT QUESTION**

    a.   Likely to change jobs

    b.   Neither likely nor unlikely to change jobs

    c.   Unlikely to change jobs

25. Are there specific places (other than workplaces) you want your home to be close to? *Please select only if you have a specific place in mind (e.g. McKinnon Secondary College, rather than schools in general). Select up to three items* **REQUIRE SELECTION OF BETWEEN 1 AND 3 ITEMS**

    a.   Homes of family and friends

    b.   A child-care centre

    c.   A school

    d.   A university

    e.   A place of worship

    f.   A sporting club/fitness centre

    g.   A social group or community group

    h.   A cafe, restaurant or bar

    i.   A health facility (e.g. GP, dentist)

    j.   An arts or cultural facility

    k.   A beach

    l.   A walking track or parkland

    m. Other (please specify) _____

        or

    n.   None [Exclusive *Position Fixed]

26. **SKIP IF N ABOVE** Where are those specific places you want your home to be close to? **MULTIPLE SELECTION ON CLICKABLE MAP**
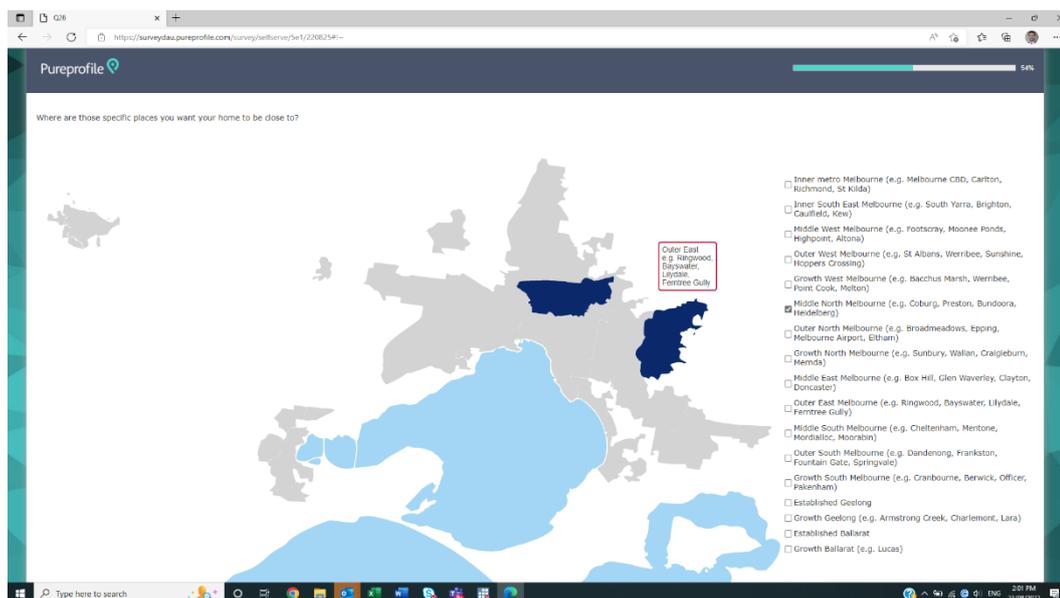
a. Inner metro Melbourne (e.g. Melbourne CBD, Carlton, Richmond, St Kilda)

b. Inner South East Melbourne (e.g. South Yarra, Brighton, Caulfield, Kew)

c. Middle West Melbourne (e.g. Footscray, Moonee Ponds, Highpoint, Altona)

d. Outer West Melbourne (e.g. St Albans, Werribee, Sunshine, Hoppers Crossing)

e. Growth West Melbourne (e.g. Bacchus Marsh, Werribee, Point Cook, Melton)

f. Middle North Melbourne (e.g. Coburg, Preston, Bundoora, Heidelberg)

g. Outer North Melbourne (e.g. Broadmeadows, Epping, Melbourne Airport, Eltham)

h. Growth North Melbourne (e.g. Sunbury, Wallan, Craigieburn, Mernda)

i. Middle East Melbourne (e.g. Box Hill, Glen Waverley, Clayton, Doncaster)

j. Outer East Melbourne (e.g. Ringwood, Bayswater, Lilydale, Ferntree Gully)

k. Middle South Melbourne (e.g. Cheltenham, Mentone, Mordialloc, Moorabin)

l. Outer South Melbourne (e.g. Dandenong, Frankston, Fountain Gate, Springvale)

m. Growth South Melbourne (e.g. Cranbourne, Berwick, Officer, Pakenham)

    n.   Established Geelong

    o.   Growth Geelong (e.g. Armstrong Creek, Charlemont, Lara)

    p.   Established Ballarat

    q.   Growth Ballarat (e.g. Lucas)

    r.   None of the above

27. What are the three most important features in the area where you live?
REQUIRE SELECTION OF THREE ITEMS

    a.   I can walk to education, such as schools, kindergartens, childcare

    b.   I can walk to public transport stops or stations

    c.   I can walk to open space/parklands

    d.   I can walk to shops/cafes/restaurants

    e.   I can walk to sports and recreation facilities such as ovals and basketball courts

    f.   I can walk to community facilities such as libraries, community centres, community health centres

    g.   I can walk in streets that have trees and vegetation which provide shade and cooling

    h.   I can access safe cycling paths or bicycle lanes close to home

    i.   I can access major arterial roads and freeways

    j.   Other (please specify) _____

28. How likely are you to move to a different property within the next five years?
AUTOMATIC NEXT QUESTION

    a.   Very unlikely

    b.   Unlikely

    c.   Neither likely nor unlikely

    d.   Likely

    e.   Very likely

29. Reading instructions carefully and paying attention are important in this survey. Please choose 'Moderately disagree' below to show you are paying attention.

    a.   Strongly agree

    b.   Moderately agree

    c.   Somewhat agree

    d.   Neither agree nor disagree

    e.   Somewhat disagree

    f.   Moderately disagree

    g.   Strongly disagree

    h.   Don't know

Thank you for your answers so far. Now we want you to imagine you need to move out of your home in the next few months and find another home.

We are going to ask some questions about housing options. First, we need to ask some questions that will help us give you suitable options. We want to reassure you that your responses will remain confidential and anonymous at all times.

30. Would you be more likely to… **AUTOMATIC NEXT QUESTION**

    a.   buy a home

    b.   rent a home

    c.   rent a home, but would buy if a home I liked was affordable

31. **IF Q12=c or d AND Q30=a or c** Would this be your first home purchase? **AUTOMATIC NEXT QUESTION**

    a.   Yes

    b.   No

32. **IF Q30=b or c** After finding a home to rent, is your household most likely to be a… **AUTOMATIC NEXT QUESTION**

    a.   Couple without children at home

    b.   Couple with one or more children at home

    c.   Multiple family household without children at home

    d.   Multiple family household with one or more children at home

    e.   Single parent with one or more children at home

    f.   Group or shared household

    g.   Single person household

    h.   None of the above

33. **IF Q30=a or c** After buying a home, is your household most likely to be a…
    AUTOMATIC NEXT QUESTION

    a.   Couple without children at home

    b.   Couple with one or more children at home

    c.   Multiple family household without children at home

    d.   Multiple family household with one or more children at home

    e.   Single parent with one or more children at home

    f.   Group or shared household

    g.   Single person household

    h.   None of the above

34. Which of the following best describes the number of bedrooms you would be looking for? **AUTOMATIC NEXT QUESTION.**

    a.   A minimum of 1 and a maximum of 3 bedrooms

    b.   A minimum of 2 and a maximum of 4 bedrooms

    c.   A minimum of 3 and a maximum of 5 bedrooms

35. What would be the annual household income before tax? *Please include all salary/wages and investment income.* **AUTOMATIC NEXT QUESTION**

    IF Q30=c AND Q32 ≠ Q33 ADD THE TEXT: *Please answer for the household you would form if you bought a home.*

    a.   Less than $41,600 per year (less than $800 per week)

    b. $41,600 - $79,999 per year ($800 - $1,499 per week)

    c. $78,000 - $103,999 per year ($1,500 - $1,999 per week)

    d. $104,000 - $155,999 per year ($2,000 - $2,999 per week)

    e. $156,000 - $207,999 per year ($3,000 - $3,999 per week)

    f. $208,000 - $259,999 per year ($4,000 - $4,999 per week)

    g. $260,000 per year or more ($5,000 per week or more)

    h.   Do not wish to answer

36. **IF Q30=a or c** Approximately how much would the household be able to put towards a deposit for a home loan? *Please include cash, any equity in property (the difference between the value of the home and the amount you owe on the home loan), and any shares you could sell. Please input numbers only. Do not include '$' or ',' characters.*

    a. $_____ **ALLOW INPUT BETWEEN 10 000 and 9 999 999**

    b. Do not wish to answer

37. **IF Q30=a or c** What is the maximum price you would be looking to spend on a home?

    IF Q35=a-f AND Q36=a Based on the information you've provided, our rough approximation is that you could borrow for a home worth between $ **INSERT CALCULATION** and $ **INSERT CALCULATION (SEE SHEET 'Q41 Q42 calcs' IN EXCEL FILE FOR CALCULATION BASED ON ANSWERS TO Q35 and Q36).** Please disregard this figure if you have reason to believe it is incorrect.

    AUTOMATIC NEXT QUESTION.

    IF Q34=a

    a. Between $0 and $530,000

    b. Between $530,000 and $760,000

    c. An amount greater than $760,000

    IF Q34=b

    a. Between $0 and $700,000

    b. Between $700,000 and $1 million

    c. An amount greater than $1 million

    IF Q34=c

    a. Between $0 and $920,000

    b. Between $920,000 and $1.3 million

    c. An amount greater than $1.3 million

37a. **IF Q30=a or c** Thinking about the homes you would genuinely consider buying, what is the lowest price you would expect to pay in the current market?

    a. $200,000

    b. $300,000

    c. $400,000

    d. $500,000

    e. $600,000 **(omit if Q37=1)**

    f. $700,000 **(omit if Q37=1, 4)**

    g. $800,000 **(omit if Q37=1, 2, 4)**

    h. $900,000 **(omit if Q37=1, 2, 4)**

    i. $1 million **(omit if Q37=1, 2, 4, 5, 7)**

    j. $1.1 million **(omit if Q37=1, 2, 4, 5, 7)**

    k. $1.2 million **(omit if Q37=1, 2, 4, 5, 7)**

    l. $1.3 million **(omit if Q37=1, 2, 4, 5, 7, 8)**

    m. $1.4 million **(omit if Q37=1, 2, 4, 5, 7, 8)**

    n. $1.5 million **(omit if Q37=1, 2, 4, 5, 7, 8)**

    o.   Other _____ **(require whole number between 0 and 10 000 000)**

38. **IF Q30=b** What is the maximum weekly rent you would be looking to pay for the home?

    AUTOMATIC NEXT QUESTION.

    IF Q34=a

        a.   Between $0 and $380 per week

        b.   Between $380 and $540 per week

        c.   An amount greater than $540 per week

    IF Q34=b

        a.   Between $0 and $500 per week

        b.   Between $500 and $710 per week

        c.   An amount greater than $710 per week

    IF Q34=c

        a.   Between $0 and $650 per week

        b.   Between $650 and $940 per week

        c.   An amount greater than $940 per week

You will now be asked 16 questions about housing options.

Each question has 4 homes. You will be asked to consider the features of each home and select the home you would be <u>most likely</u> to choose, with your current financial position in mind.

If none of the homes are suitable, please pick the one that is closest to being suitable <u>and also</u> check the box next to 'none of the homes are suitable'.

An example of the question layout is shown below. You will be able to get further information and enlarged maps by clicking**/hovering** on the features.

For sale	For sale	For sale	For sale
$840 000	$590 000	$730 000	$470 000
House		Apartment in complex with 2-3 storeys	Apartment in complex with 11+ storeys
4		3	2
0	1	0	0
1		1	1

The number of bedrooms

The number of study nooks

The number of reserved, on-site car parking spaces

Includes Dandenong, Frankston, Fountain Gate, Springvale	Includes Cranbourne, Berwick, Officer, Pakenham	Includes Ringwood, Bayswater, Lilydale, Ferntree Gully	Includes, Broadmeadows, Epping, Melbourne Airport, Eltham
Approx. 35 km from Melbourne CBD	Approx. 50 km from Melbourne CBD	Approx. 30 km from Melbourne CBD	Approx. 20 km from Melbourne CBD
Mortgage repayments on a loan of $740 000 $3 960 per month for 30 years	Mortgage repayments on a loan of $400 000 $2 140 per month for 30 years	Mortgage repayments on a loan of $630 000 $3 380 per month for 30 years	Mortgage repayments on a loan of $370 000 $1 980 per month for 30 years

Please assume that:

- each option has flexible aesthetics and design

- homes with more bedrooms have larger living areas, and

- all of the homes are in the same condition, with similar finish quality, kitchen appliances, air conditioning/heating, double-glazed windows, built-in wardrobes, and energy rating. These features will not be described in the questions.

Some of the options shown may not be widely available in the current housing market, but they could be made available in the future, so please imagine they are available.

IF HQREGION=1 (MELBOURNE) AND Q37/Q38=c, ASSIGN BY LEAST FILL TO BLOCKS 1-8

IF HQREGION=1 (MELBOURNE) AND Q37/Q38=b, ASSIGN BY LEAST FILL TO BLOCKS 9-16

IF HQREGION=1 (MELBOURNE) AND Q37/Q38=a, ASSIGN BY LEAST FILL TO BLOCKS 17-24

IF HQREGION=2 (GEELONG), ASSIGN BY LEAST FILL TO BLOCKS 25-32

IF HQREGION=3 (BALLARAT), ASSIGN BY LEAST FILL TO BLOCKS 33-40

39. Choice question 1 – If these were the only four homes available, which one would you choose?

40. Choice question 1 – none of the homes are suitable **NOT MANDATORY**

41. Choice question 2 – If these were the only four homes available, which one would you choose?

42. Choice question 2 – none of the homes are suitable **NOT MANDATORY**

43. Choice question 3 – If these were the only four homes available, which one would you choose?

44. Choice question 3 – none of the homes are suitable **NOT MANDATORY**

45. Choice question 4 – If these were the only four homes available, which one would you choose?

46. Choice question 4 – none of the homes are suitable **NOT MANDATORY**

47. Choice question 5 – If these were the only four homes available, which one would you choose?

48. Choice question 5 – none of the homes are suitable **NOT MANDATORY**

49. Choice question 6 – If these were the only four homes available, which one would you choose?

50. Choice question 6 – none of the homes are suitable **NOT MANDATORY**

51. Choice question 7 – If these were the only four homes available, which one would you choose?

52. Choice question 7 – none of the homes are suitable **NOT MANDATORY**

53. Choice question 8 – If these were the only four homes available, which one would you choose?

54. Choice question 8 – none of the homes are suitable **NOT MANDATORY**

55. Choice question 9 – If these were the only four homes available, which one would you choose?

56. Choice question 9 – none of the homes are suitable **NOT MANDATORY**

57. Choice question 10 – If these were the only four homes available, which one would you choose?

58. Choice question 10 – none of the homes are suitable **NOT MANDATORY**

59. Choice question 11 – If these were the only four homes available, which one would you choose?

60. Choice question 11 – none of the homes are suitable **NOT MANDATORY**

61. Choice question 12 – If these were the only four homes available, which one would you choose?

62. Choice question 12 – none of the homes are suitable **NOT MANDATORY**

63. Choice question 13 – If these were the only four homes available, which one would you choose?

64. Choice question 13 – none of the homes are suitable **NOT MANDATORY**

65. Choice question 14 – If these were the only four homes available, which one would you choose?

66. Choice question 14 – none of the homes are suitable **NOT MANDATORY**

67. Choice question 15 – If these were the only four homes available, which one would you choose?

68. Choice question 15 – none of the homes are suitable **NOT MANDATORY**

69. Choice question 16 – If these were the only four homes available, which one would you choose?

70. Choice question 16 – none of the homes are suitable **NOT MANDATORY**

71. How difficult did you find answering the home comparison questions on a scale from 1 (very easy) to 10 (very difficult)?

    1__2__3__4__5__6__7__8__9__10

72. Reading instructions carefully and paying attention are important in this survey. Please choose 'Somewhat agree' below to show you are paying attention. **TERMINATE IF RESPONDENT FAIL BOTH ATTENTION TESTS AT Q29 AND Q72**

    a. Strongly agree

    b. Moderately agree

    c. Somewhat agree

    d. Neither agree nor disagree

    e. Somewhat disagree

    f. Moderately disagree

    g. Strongly disagree

    h. Don't know

73. Were any of the home options obviously unrealistic? **AUTOMATIC NEXT QUESTION**

      a.   Yes

      b.   No **SKIP TO Q77**

      c.   Don't know **SKIP TO Q77**

74. When you saw unrealistic home options, how did you go about answering the question(s)? **AUTOMATIC NEXT QUESTION**

      a.   I imagined the unrealistic option would be available

      b.   I treated the unrealistic option as though it had different, more realistic features and/or price

      c.   I ignored the unrealistic option

77. Do you know which types of public transport are available in the different locations that were shown in the home comparison questions?

      a.   Yes, for all locations

      b.   Yes, for most locations

      c.   Yes, for some locations

      d.   Yes, for a few locations

      e.   No

Please tell us how much you agree with the following statements on a scale from 1 (strongly disagree) to 5 (strongly agree) **CAROSEL WITH FIVE-POINT SCALE**

79. My neighbourhood must have a large community from a similar ethnic background to my family's background

80. My neighbourhood must have lots of households at a similar life stage to mine

81. My neighbourhood must have infrastructure (like schools, public transport and shops) already built

82. My home choice must save on stamp duty and maximise government grants and other tax incentives

83. Newer suburbs are great places to bring up children

84. I must live close to restaurants, cafes and cultural facilities

85. I must be able to easily walk to most things

86. I must live in the location I want, even if my dwelling is not ideal

87. My home must have a spare bedroom to use as an office and/or guest room

88. I would always choose a newer home over an older home

89. I would always choose a house or townhouse with land, over an apartment, because it will be a better investment

90. My home must have an energy efficiency rating of at least six stars

91. In which country were you born?

   a. Australia

   b. China (mainland)

   c. Greece

   d. Hong Kong

   e. India

   f. Italy

   g. Malaysia

   h. New Zealand

   i. Philippines

   j. South Africa

   k. Sri Lanka

   l. United Kingdom

   m. Vietnam

   n. Other (please specify) _____

91a. **[IF Q91 DOES NOT EQUAL a ("Australia")]**

   Roughly, how many years have you lived in Australia?

   a. Less than one year

   b. 1-2 years

   c. 3-5 years

   d. 6-10 years

   e. 11 years or more

92. Do you speak a language other than English at home?

   a. No, English only

   b. Yes

93. **IF YES ABOVE** Which language other than English do you speak at home?

     a. Arabic

     b. Cantonese

     c. Greek

     d. Hindi

     e. Italian

     f. Macedonian

     g. Mandarin

     h. Punjabi

     i. Sinhalese

     j. Spanish

     k. Tagalog

     l. Tamil

     m. Turkish

     n. Urdu

     o. Vietnamese

     p. Other (please specify) _____

94. What is the highest level of education you have attained? **AUTOMATIC NEXT QUESTION**

     a. Postgraduate degree

     b. Graduate diploma or graduate certificate

     c. Bachelor degree

     d. Advanced diploma or diploma

     e. Certificate III or IV

     f. Secondary education to Year 12

     g. Secondary education to Year 10

     h. Certificate I or II

     i. Secondary education to Year 9 or below

95. Thank you for your responses to this survey. Finally, is there any feedback you would like to provide on this survey? **NOT MANDATORY**

_____
_____
_____
_____

9   Estimation results

The estimation results for Model 1 are provided in Chapter 4. Results for other models are provided in this chapter.

9.1   Estimation results: Model 2

	Class 1		Class 2	
	Coef.	z	Coef.	z
Random parameters				
Established Ballarat	-1.8676	-2.5	0.8671	4.7
Established Geelong	-0.2292	-0.5	0.3735	2.0
Growth Ballarat	-0.6259	-0.9	0.7314	4.2
Growth Geelong	-0.8615	-1.7	0.6824	3.8
Growth West	-2.6276	-5.6	0.6199	4.4
Middle East	0.2865	1.0	0.3438	2.3
Middle South	-0.1361	-0.4	0.1971	1.2
Middle North	-0.2362	-0.8	0.3448	2.2
Growth South	-1.5437	-5.0	0.6600	4.3
Outer South	-1.0372	-3.1	0.5200	3.4
Middle West	-0.2655	-0.6	0.3393	1.9
Outer East	-0.9196	-2.9	0.7900	5.4
Inner South East	0.5393	1.5	0.3713	2.0
Outer West	-2.5004	-7.1	0.4645	3.2
Growth North	-2.2451	-5.4	0.4996	3.4
Outer North	-1.6409	-5.0	0.2992	2.0
Travel time to current home (min)	-0.0304	-9.7	-0.0072	-9.1
House	0.7887	2.4	0.8418	4.3
Townhouse	0.8986	2.7	0.4046	1.9
Apartment 2-3 storey	0.0315	0.1	0.1120	0.5
Apartment 4-10 storey	-0.3917	-0.9	-0.1746	-0.6
Fixed parameters				
Price in excess of minimum expected price ($'000s)	-0.0012	-13.6		
One additional bedroom (above minimum bedrooms)	0.3875	9.4		
Two additional bedrooms (above minimum bedrooms)	0.5025	9.7		
One car space	0.4265	8.6		

	Class 1		Class 2	
	Coef.	z	Coef.	z
Two car spaces	0.4705	10.9		
Office nook	-0.0354	-1.1		
Travel time to place of work for earner #1 (min)	0.0015	0.9		
Travel time to place of work for earner #2 (min)	-0.0019	-1.0		
Sum of travel times to respondent-specified destinations (min)	-0.0014	-4.0		
Class probability model				
My neighbourhood must have a large community from a similar ethnic background to my family's background	0.2822	1.5		
My neighbourhood must have lots of households at a similar life stage to mine	-0.2109	-1.1		
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	0.3705	1.8		
My home choice must save on stamp duty and maximise government grants and other tax incentives	-0.6090	-3.1		
Newer suburbs are great places to bring up children	-0.1662	-0.9		
I must live close to restaurants, cafes and cultural facilities	0.1730	0.9		
I must be able to easily walk to most things	0.2705	1.2		
I must live in the location I want, even if my dwelling is not ideal	-0.0645	-0.4		
My home must have a spare bedroom to use as an office and/or guest room	-0.0124	-0.1		
I would always choose a newer home over an older home	0.2791	1.6		
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	-0.3193	-1.8		
My home must have an energy efficiency rating of at least six stars	0.0489	0.3		
(Constant)	-1.9487	-1.6		

Source: CIE

9.2   Estimation results: Model 3

	Class 1		Class 2	
	Coef.	z	Coef.	z
Random parameters				
Established Ballarat	1.1698	4.8	-0.5462	-1.8
Established Geelong	0.7673	3.0	-0.3667	-1.5
Growth Ballarat	1.3454	5.6	-0.4116	-1.4
Growth Geelong	1.3229	5.4	-0.6856	-2.6
Growth West	1.1647	5.7	-1.3020	-6.8
Middle East	0.3322	1.4	0.2527	1.5
Middle South	0.0079	0.0	-0.2644	-1.4
Middle North	0.2770	1.2	-0.1396	-0.8
Growth South	0.9177	4.3	-0.7897	-4.5

	Class 1		Class 2	
	Coef.	z	Coef.	z
Outer South	1.0086	4.7	-0.8319	-4.5
Middle West	0.4704	1.9	-0.4565	-2.2
Outer East	0.5756	2.7	-0.2987	-1.7
Inner South East	-0.2430	-0.8	0.5112	3.0
Outer West	0.9726	4.6	-1.4311	-8.6
Growth North	1.1136	5.2	-1.0857	-6.3
Outer North	0.8572	4.1	-0.8671	-5.0
Travel time to current home (min)	-0.0043	-3.9	-0.0187	-12.2
House	0.4389	1.4	1.3147	4.0
Townhouse	0.3520	1.1	0.9512	2.9
Apartment 2-3 storey	0.5695	1.7	0.3061	0.8
Apartment 4-10 storey	0.2552	0.7	0.3601	0.9
Fixed parameters				
Price in excess of minimum expected price ($'000s)	-0.0011	-12.2		
One additional bedroom (above minimum bedrooms)	0.2668	6.8		
Two additional bedrooms (above minimum bedrooms)	0.2661	5.1		
One car space	0.4441	9.2		
Two car spaces	0.5227	12.4		
Office nook	-0.0673	-2.2		
Travel time to place of work for earner #1 (min)	-0.0054	-3.3		
Travel time to place of work for earner #2 (min)	0.0008	0.4		
Sum of travel times to respondent-specified destinations (min)	-0.0016	-4.1		
Class probability model				
My neighbourhood must have a large community from a similar ethnic background to my family's background	0.1460	1.0		
My neighbourhood must have lots of households at a similar life stage to mine	-0.3888	-2.4		
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	-0.2972	-1.8		
My home choice must save on stamp duty and maximise government grants and other tax incentives	0.2560	1.8		
Newer suburbs are great places to bring up children	0.5573	3.4		
I must live close to restaurants, cafes and cultural facilities	-0.5702	-3.3		
I must be able to easily walk to most things	-0.0343	-0.2		
I must live in the location I want, even if my dwelling is not ideal	-0.0006	0.0		
My home must have a spare bedroom to use as an office and/or guest room	-0.2657	-1.8		
I would always choose a newer home over an older home	0.0751	0.6		
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	0.2991	2.2		

	Class 1		Class 2	
	Coef.	z	Coef.	z
My home must have an energy efficiency rating of at least six stars	0.1801	1.2		
(Constant)	0.7569	0.7		

Source: CIE

9.3   Estimation results: Model 4

	Class 1		Class 2	
	Coef.	z	Coef.	z
Random parameters				
Established Ballarat	1.0193	7.5	-2.6894	-5.3
Established Geelong	0.9956	7.5	-1.7415	-8.9
Growth Ballarat	1.1945	9.2	-1.8006	-4.8
Growth Geelong	0.9991	7.5	-2.1556	-10.9
Growth West	0.7317	6.8	-1.8406	-14.3
Middle East	0.6904	6.2	-0.2391	-2.0
Middle South	0.4516	3.8	-0.1185	-0.9
Middle North	0.4812	4.1	0.0902	0.7
Growth South	0.7792	6.9	-1.6460	-12.5
Outer South	0.9598	8.3	-1.1247	-8.8
Middle West	0.5876	4.8	-0.4314	-3.0
Outer East	0.7961	7.1	-0.7268	-5.9
Inner South East	0.4893	3.8	0.0697	0.5
Outer West	0.3753	3.6	-1.7468	-16.4
Growth North	0.5202	4.7	-2.1761	-15.3
Outer North	0.4857	4.5	-1.1315	-9.3
Travel time to current home (min)	-0.0067	-10.9	-0.0275	-22.0
House	0.2396	1.9	0.2435	1.0
Townhouse	0.1110	0.9	0.3342	1.5
Apartment 2-3 storey	0.1364	1.0	0.2222	0.9
Apartment 4-10 storey	-0.1591	-0.9	-0.1935	-0.6
Fixed parameters				
Price in excess of minimum expected price ($'000s)	-0.0030	-26.9		
One additional bedroom (above minimum bedrooms)	0.1985	7.8		
Two additional bedrooms (above minimum bedrooms)	-0.0030	-0.1		
One car space	0.2959	10.5		
Two car spaces	0.4345	18.0		
Office nook	-0.0523	-2.7		
Travel time to place of work for earner #1 (min)	-0.0033	-2.7		

	Class 1		Class 2	
	Coef.	z	Coef.	z
Travel time to place of work for earner #2 (min)	-0.0084	-5.1		
Sum of travel times to respondent-specified destinations (min)	-0.0022	-9.2		
Class probability model				
My neighbourhood must have a large community from a similar ethnic background to my family's background	0.2377	2.9		
My neighbourhood must have lots of households at a similar life stage to mine	-0.0313	-0.4		
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	-0.3022	-3.5		
My home choice must save on stamp duty and maximise government grants and other tax incentives	0.1670	2.2		
Newer suburbs are great places to bring up children	0.2142	2.5		
I must live close to restaurants, cafes and cultural facilities	-0.4870	-5.6		
I must be able to easily walk to most things	0.0372	0.4		
I must live in the location I want, even if my dwelling is not ideal	-0.2127	-2.8		
My home must have a spare bedroom to use as an office and/or guest room	0.0749	1.1		
I would always choose a newer home over an older home	-0.1140	-1.7		
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	0.2633	3.8		
My home must have an energy efficiency rating of at least six stars	0.0910	1.0		
(Constant)	1.1478	2.1		

Source: CIE

9.4   Estimation results: Model 5

Variable	Class 1		Class 2	
	Coef.	z	Coef.	z
Random parameters				
Established Ballarat	-0.7674	-2.9	0.8766	4.9
Established Geelong	-1.1433	-5.4	0.2788	1.6
Growth Ballarat	-0.6999	-2.6	0.8031	4.6
Growth Geelong	-1.4998	-6.6	0.4625	2.5
Growth West	-1.5103	-9.7	0.6523	4.9
Middle East	-0.0233	-0.2	1.0230	7.1
Middle South	-0.3618	-2.4	0.4475	3.0
Middle North	-0.1590	-1.1	0.6196	4.4
Growth South	-1.4927	-10.1	0.6079	4.3
Outer South	-0.9918	-6.9	0.7518	5.5
Middle West	-0.4550	-2.7	0.3346	2.1
Outer East	-0.6843	-4.9	0.6572	4.8

Variable	Class 1		Class 2	
	Coef.	z	Coef.	z
Inner South East	0.6070	3.8	0.8534	5.3
Outer West	-1.5872	-12.2	0.3734	2.9
Growth North	-1.8006	-12.1	0.4639	3.4
Outer North	-1.0776	-7.6	0.6336	4.7
Travel time to current home (min)	-0.0254	-16.6	-0.0049	-5.5
House	-0.0693	-0.3	0.8158	3.3
Townhouse	-0.2153	-1.0	0.4739	1.9
Apartment 2-3 storey	-0.2469	-1.0	0.1152	0.4
Apartment 4-10 storey	-0.2426	-0.9	-0.1039	-0.3
Fixed parameters				
Buy (=1 if 'For sale', =0 if 'For rent')	-0.3586	-4.5		
Price in excess of minimum expected price ($'000s)	-0.0013	-16.4		
Rent ($ per week)	-0.0017	-13.2		
One additional bedroom (above minimum bedrooms)	0.1715	4.4		
Two additional bedrooms (above minimum bedrooms)	0.1673	3.0		
One car space	0.3549	8.3		
Two car spaces	0.4110	10.1		
Office nook	0.0087	0.3		
Travel time to place of work for earner #1 (min)	-0.0053	-4.1		
Travel time to place of work for earner #2 (min)	-0.0079	-4.8		
Sum of travel times to respondent-specified destinations (min)	-0.0018	-5.8		
Interaction with 'Buy':				
▪ Office nook	0.0027	0.1		
▪ One car space	-0.0561	-1.0		
▪ Two car spaces	0.0111	0.2		
▪ One additional bedroom (above minimum bedrooms)	-0.0843	-1.6		
▪ Two additional bedrooms (above minimum bedrooms)	-0.1055	-1.4		
▪ Established Ballarat	0.1827	1.1		
▪ Established Geelong	0.6231	3.9		
▪ Growth Ballarat	0.4728	2.8		
▪ Growth Geelong	0.4147	2.6		
▪ Growth West	0.2463	2.6		

Variable	Class 1		Class 2	
	Coef.	z	Coef.	z
▪ Middle East	-0.5257	-5.0		
▪ Middle South	-0.1759	-1.6		
▪ Middle North	-0.3400	-3.3		
▪ Growth South	0.2394	2.4		
▪ Outer South	0.0086	0.1		
▪ Middle West	-0.2630	-1.9		
▪ Outer East	-0.0719	-0.7		
▪ Inner South East	-0.7608	-5.1		
▪ Outer West	0.2487	2.8		
▪ Growth North	0.3603	3.7		
▪ Outer North	-0.2925	-3.1		
▪ Inner Metro	0.1474	1.3		
▪ Travel time to current home (min)	-0.0011	-1.3		
▪ Travel time to place of work for earner #1 (min)	0.0004	0.4		
▪ Travel time to place of work for earner #2 (min)	0.0034	3.0		
▪ Sum of travel times to respondent-specified destinations (min)	0.0000	0.0		
▪ House	0.2595	2.1		
▪ Townhouse	0.4126	2.7		
▪ Apartment 2-3 storey	-0.0307	-0.1		
▪ Apartment 4-10 storey	-0.1017	-0.4		
▪ Apartment 11+ storey	-0.1918	-0.8		
Class probability model				
My neighbourhood must have a large community from a similar ethnic background to my family's background	-0.1301	-1.4		
My neighbourhood must have lots of households at a similar life stage to mine	0.1086	1.1		
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	0.1203	1.1		
My home choice must save on stamp duty and maximise government grants and other tax incentives	-0.2318	-2.5		
Newer suburbs are great places to bring up children	-0.4823	-4.7		
I must live close to restaurants, cafes and cultural facilities	0.3527	3.1		

Variable	Class 1		Class 2	
	Coef.	z	Coef.	z
I must be able to easily walk to most things	0.1949	1.8		
I must live in the location I want, even if my dwelling is not ideal	0.2706	3.0		
My home must have a spare bedroom to use as an office and/or guest room	-0.0191	-0.2		
I would always choose a newer home over an older home	-0.1143	-1.3		
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	-0.1279	-1.4		
My home must have an energy efficiency rating of at least six stars	-0.0730	-0.7		
(Constant)	-0.2402	-0.4		

Source: CIE

9.5   Estimation results: Model 6

Variable	Class1		Class2	
	Coef.	z	Coef.	z
Random parameters				
Established Geelong	0.4110	3.3	3.4153	17.5
Growth Geelong	0.4455	4.2	3.1939	18.9
Growth West	-0.1051	-0.8	-0.0902	-0.4
House	0.2335	0.6	1.2013	2.4
Townhouse	0.3169	0.8	0.9841	1.9
Apartment 2-3 storey	0.9464	1.8	-1.1271	-1.4
Apartment 4-10 storey	-1.0010	-1.8	-0.8981	-1.3
Fixed parameters				
Buy (=1 if 'For sale', =0 if 'For rent')	-2.2367	-13.1		
Price in excess of minimum expected price ($'000s)	-0.0017	-11.4		
Rent ($ per week)	-0.0037	-12.5		
One additional bedroom (above minimum bedrooms)	0.4277	5.9		
Two additional bedrooms (above minimum bedrooms)	0.0086	0.1		
One car space	0.1498	1.7		
Two car spaces	0.3732	5.1		
Office nook	0.0053	0.1		
Interaction with 'Buy'				
▪ Office nook	0.0539	0.8		
▪ One car space	0.4492	3.9		
▪ Two car spaces	0.4510	4.5		

Variable	Class1		Class2	
	Coef.	z	Coef.	z
▪ One additional bedroom (above minimum bedrooms)	0.3317	3.5		
▪ Two additional bedrooms (above minimum bedrooms)	0.5762	4.3		
▪ Established Geelong	0.1569	1.0		
▪ Growth Geelong	0.0782	0.5		
▪ Growth West	0.0960	0.6		
▪ Outer West	0.1020	0.6		
▪ House	0.7957	2.8		
▪ Townhouse	0.3596	1.1		
▪ Apartment 2-3 storey	0.0796	0.2		
▪ Apartment 4-10 storey	0.9849	1.9		
▪ Apartment 11+ storey	0.0104	0.0		
Class probability model				
My neighbourhood must have a large community from a similar ethnic background to my family's background	0.2318	1.6		
My neighbourhood must have lots of households at a similar life stage to mine	-0.1812	-1.1		
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	-0.1005	-0.7		
My home choice must save on stamp duty and maximise government grants and other tax incentives	0.2869	2.2		
Newer suburbs are great places to bring up children	0.3018	2.0		
I must live close to restaurants, cafes and cultural facilities	-0.1047	-0.6		
I must be able to easily walk to most things	0.1071	0.7		
I must live in the location I want, even if my dwelling is not ideal	-0.2025	-1.5		
My home must have a spare bedroom to use as an office and/or guest room	-0.2870	-2.3		
I would always choose a newer home over an older home	-0.0499	-0.4		
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	0.0259	0.2		
My home must have an energy efficiency rating of at least six stars	-0.1778	-1.2		
(Constant)	0.6986	0.8		

Source: CIE

9.6   Estimation results: Model 7

Variable	Class 1		Class 2	
	Coef.	z	Coef.	z
Random parameters				

Variable	Class 1		Class 2	
	Coef.	z	Coef.	z
Established Ballarat	0.5416	3.3	2.9541	11.8
Growth Ballarat	0.3376	2.1	2.9905	13.0
Growth West	-0.0435	-0.3	-0.0530	-0.2
House	16.5626	24.4	-0.9875	-1.9
Townhouse	16.4124	23.6	-0.3239	-0.6
Apartment 2-3 storey	14.9847	12.5	0.9156	1.3
Apartment 4-10 storey	15.4015	.	-0.8804	-1.2
Fixed parameters				
Buy (=1 if 'For sale', =0 if 'For rent')	-2.7393	-14.4		
Price in excess of minimum expected price ($'000s)	-0.0032	-15.4		
Rent ($ per week)	-0.0050	-12.8		
One additional bedroom (above minimum bedrooms)	0.5089	5.6		
Two additional bedrooms (above minimum bedrooms)	0.3463	2.6		
One car space	0.3105	2.8		
Two car spaces	0.4341	4.6		
Office nook	0.1603	2.3		
Interaction with 'Buy'				
▪ Office nook	0.0198	0.2		
▪ One car space	0.3594	2.6		
▪ Two car spaces	0.4983	4.2		
▪ One additional bedroom (above minimum bedrooms)	0.6511	5.7		
▪ Two additional bedrooms (above minimum bedrooms)	0.8170	5.2		
▪ Established Ballarat	0.1265	0.8		
▪ Growth Ballarat	0.1412	0.8		
▪ Growth West	-0.1185	-0.6		
▪ Outer West	-0.0387	-0.2		
▪ House	3.2928	5.3		
▪ Townhouse	2.0520	3.2		
▪ Apartment 2-3 storey	1.4183	1.8		
▪ Apartment 4-10 storey	2.4013	2.9		
▪ Apartment 11+ storey	0.2782	0.3		
Class probability model				
My neighbourhood must have a large community from a similar ethnic background to my family's background	-0.0208	-0.1		

Variable	Class 1		Class 2	
	Coef.	z	Coef.	z
My neighbourhood must have lots of households at a similar life stage to mine	-0.1804	-0.9		
My neighbourhood must have infrastructure (like schools, public transport and shops) already built	-0.0282	-0.2		
My home choice must save on stamp duty and maximise government grants and other tax incentives	0.0192	0.1		
Newer suburbs are great places to bring up children	0.2714	1.6		
I must live close to restaurants, cafes and cultural facilities	-0.0757	-0.5		
I must be able to easily walk to most things	0.0298	0.2		
I must live in the location I want, even if my dwelling is not ideal	0.0292	0.2		
My home must have a spare bedroom to use as an office and/or guest room	-0.1698	-1.1		
I would always choose a newer home over an older home	-0.0132	-0.1		
I would always choose a house or townhouse with land, over an apartment, because it will be a better investment	-0.2540	-1.6		
My home must have an energy efficiency rating of at least six stars	0.1097	0.6		
(Constant)	0.9100	0.8		

Source: CIE

The following models are simple conditional logit models. The simplicity of these models make it easier to draw conclusions directly from the estimated coefficients, for example:

- Owners in established Melbourne are less price sensitive than other households

- Households looking to rent get less value from additional bedrooms than do other households

- Households looking to rent care more about distance to employment, especially for the second income earner

- Households in greenfield areas don't have the same aversion to outer and growth suburbs that other households have, even after accounting for distance from current home

- Households looking to rent are much less concerned about dwelling structure type

- Regional households care more about additional bedrooms when buying than renting

- Regional households care more about parking when buying than renting

- Distance to employment matters to households thinking about whether to rent or buy

- When buying, people are less averse to growth areas and more averse to middle suburbs, than when they are renting

- People aren't very concerned about dwelling structure type when renting, but prefer houses and townhouses when buying

- Regional households do not have a strong preference between established and greenfield suburbs in Geelong and Ballarat

9.7 Conditional logit models 1-4

	Model 1		Model 2		Model 3		Model 4	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Price in excess of minimum expected price ($'000s)	-0.0007	-22.3	-0.0011	-12.9	-0.0010	-12.0		
Rent ($ per week)							-0.0028	-26.2
One additional bedroom (above minimum bedrooms)	0.4789	28.4	0.3759	9.4	0.2809	7.4	0.2052	8.4
Two additional bedrooms (above minimum bedrooms)	0.6959	34.3	0.4919	9.8	0.2896	5.8	-0.0120	-0.3
One car space	0.4689	23.6	0.4193	8.8	0.4397	9.4	0.2678	9.9
Two car spaces	0.5501	31.6	0.4570	10.9	0.5075	12.5	0.4049	17.4
Office nook	0.0401	3.2	-0.0351	-1.1	-0.0554	-1.8	-0.0576	-3.1
Travel time to place of work for earner #1 (min)	0.0005	0.8	-0.0010	-0.7	-0.0049	-3.5	-0.0041	-4.1
Travel time to place of work for earner #2 (min)	-0.0009	-1.1	-0.0018	-1.0	0.0017	1.0	-0.0108	-7.7
Sum of travel times to respondent-specified destinations (min)	-0.0021	-12.4	-0.0013	-3.7	-0.0015	-4.3	-0.0023	-10.6
Established Ballarat	0.3497	5.4	0.4584	3.0	0.2491	1.6	-0.1018	-1.1
Established Geelong	-0.1686	-2.8	-0.0203	-0.1	-0.2052	-1.3	-0.3736	-4.2
Growth Ballarat	0.4478	7.3	0.4242	2.9	0.3978	2.6	0.2045	2.3
Growth Geelong	-0.2464	-4.0	0.1622	1.1	0.0091	0.1	-0.4780	-5.4
Growth West	-0.3576	-8.3	0.0857	0.8	-0.0724	-0.7	-0.4474	-7.0
Middle East	0.0584	1.3	0.2236	1.9	0.0798	0.7	0.0756	1.1
Middle South	-0.1497	-3.1	-0.0377	-0.3	-0.3644	-2.9	-0.1283	-1.7
Middle North	-0.2754	-5.8	0.0454	0.4	-0.1619	-1.3	0.0915	1.3

	Model 1		Model 2		Model 3		Model 4	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Growth South	-0.4890	-11.1	0.1058	0.9	-0.2556	-2.2	-0.4572	-6.8
Outer South	-0.4164	-9.1	0.0418	0.3	-0.2030	-1.8	-0.1624	-2.4
Middle West	-0.1821	-3.3	-0.0372	-0.3	-0.2641	-1.9	-0.1295	-1.7
Outer East	-0.0831	-1.9	0.3280	2.8	-0.1464	-1.3	-0.1083	-1.6
Inner South East	0.5475	12.0	0.5400	4.2	0.5553	4.6	0.3887	5.5
Outer West	-0.8536	-20.8	-0.1814	-1.7	-0.4619	-4.5	-0.7403	-12.7
Growth North	-0.5278	-12.2	-0.0578	-0.5	-0.1727	-1.6	-0.7087	-11.0
Outer North	-0.5883	-13.4	-0.2133	-1.8	-0.2608	-2.4	-0.4375	-6.8
Travel time to current home (min)	-0.0138	-43.1	-0.0098	-14.7	-0.0100	-12.9	-0.0114	-25.0
House	0.9938	15.6	0.7720	4.9	0.8312	4.2	0.3057	3.0
Townhouse	0.5660	8.5	0.5647	3.4	0.6376	3.0	0.1643	1.5
Apartment 2-3 storey	0.2863	3.6	0.2126	1.1	0.4448	1.9	0.0949	0.8
Apartment 4-10 storey	0.1755	2.1	-0.1626	-0.7	0.3249	1.2	-0.1569	-1.1

Source: CIE

9.8   Conditional logit models 5-7

choice	Model 5		Model 6		Model 7	
	Coef.	z	Coef.	z	Coef.	z
Buy (indicator option is for sale, rather than for rent)	-0.3255	-4.17	-2.0752	-12.44	-2.6981	-14.40
Price in excess of minimum expected price ($'000s)	-0.0012	-15.86	-0.0017	-11.57	-0.0031	-15.31

choice	Model 5		Model 6		Model 7	
	Coef.	z	Coef.	z	Coef.	z
Rent ($ per week)	-0.0016	-12.56	-0.0034	-11.78	-0.0048	-12.50
One additional bedroom (above minimum bedrooms)	0.1750	4.65	0.4000	5.62	0.4835	5.42
Two additional bedrooms (above minimum bedrooms)	0.1644	3.06	-0.0307	-0.29	0.3181	2.47
One car space	0.3436	8.30	0.1338	1.57	0.2952	2.74
Two car spaces	0.3806	9.61	0.3549	4.99	0.4021	4.42
Office nook	-0.0081	-0.27	-0.0085	-0.16	0.1469	2.15
Travel time to place of work for earner #1 (min)	-0.0050	-4.25				
Travel time to place of work for earner #2 (min)	-0.0059	-4.04				
Sum of travel times to respondent-specified destinations (min)	-0.0017	-6.09				
Buy * Office nook	0.0189	0.46	0.0840	1.23	0.0218	0.26
Buy * One car space	-0.0507	-0.92	0.4245	3.86	0.3781	2.83
Buy * Two car spaces	0.0239	0.42	0.4073	4.25	0.5214	4.47
Buy * One additional bedroom	-0.0911	-1.80	0.3409	3.70	0.6503	5.80
Buy * two additional bedrooms	-0.1025	-1.42	0.6359	4.94	0.8196	5.35
Buy * Established Ballarat	0.1081	0.65			0.1869	1.12
Buy * Established Geelong	0.5692	3.62	0.1947	1.29		
Buy * Growth Ballarat	0.4017	2.44			0.2302	1.42
Buy * Growth Geelong	0.3770	2.35	0.1508	1.04		
Buy * Growth West	0.2376	2.53	0.0167	0.10	-0.2936	-1.56
Buy * Middle East	-0.5126	-4.99				

choice	Model 5		Model 6		Model 7	
	Coef.	z	Coef.	z	Coef.	z
Buy * Middle South	-0.1882	-1.70				
Buy * Middle North	-0.3845	-3.84				
Buy * Growth South	0.2099	2.11				
Buy * Outer South	-0.0255	-0.28				
Buy * Middle West	-0.2164	-1.61				
Buy * Outer East	-0.0940	-0.99				
Buy * Inner South East	-0.5600	-4.44				
Buy * Outer West	0.2146	2.44	0.0268	0.17	-0.2196	-1.16
Buy * Growth North	0.3517	3.69				
Buy * Outer North	-0.2992	-3.22				
Buy * Inner Metro	0.0948	0.91				
Buy * Travel time to current home (min)	-0.0008	-0.93				
Buy * Travel time to place of work for earner #1 (min)	0.0005	0.50				
Buy * Travel time to place of work for earner #2 (min)	0.0037	3.28				
Buy * Sum of travel times to respondent-specified destinations (min)	0.0000	0.17				
Buy * House	0.2058	1.73	0.7271	2.60	2.5790	5.00
Buy * Townhouse	0.3482	2.41	0.3408	1.08	2.0493	3.76
Buy * Apartment 2-3 storey	-0.0779	-0.38	0.4913	1.02	2.1065	3.18
Buy * Apartment 4-10 storey	-0.1361	-0.63	0.9559	1.84	2.1615	3.06
Buy * Apartment 11+ storey	-0.1735	-0.80	0.0553	0.11	0.4287	0.60

choice	Model 5		Model 6		Model 7	
	Coef.	z	Coef.	z	Coef.	z
Established Ballarat	0.0434	0.32			1.2620	8.93
Established Geelong	-0.6509	-4.90	1.2679	12.15		
Growth Ballarat	0.0375	0.27			1.2301	10.01
Growth Geelong	-0.6674	-4.67	1.2963	14.63		
Growth West	-0.4404	-4.87	-0.1856	-1.65	0.0026	0.02
Middle East	0.3698	3.74				
Middle South	-0.1663	-1.64				
Middle North	0.0590	0.61				
Growth South	-0.5189	-5.45				
Outer South	-0.2279	-2.47				
Middle West	-0.2596	-2.35				
Outer East	-0.1547	-1.66				
Inner South East	0.7089	6.78				
Outer West	-0.6752	-8.02				
Growth North	-0.6806	-7.47				
Outer North	-0.3334	-3.68				
Travel time to current home (min)	-0.0117	-17.44				
House	0.3081	1.82	0.6377	1.90	-0.2395	-0.64
Townhouse	0.0783	0.45	0.6313	1.79	-0.2477	-0.60
Apartment 2-3 storey	-0.0549	-0.29	0.2987	0.65	-0.0391	-0.08

choice	Model 5		Model 6		Model 7	
	Coef.	z	Coef.	z	Coef.	z
Apartment 4-10 storey	-0.1377	-0.65	-0.7723	-1.54	-0.8572	-1.45

Source: CIE

10 Key results from market share model shocks

Table 10.1 lists the market share model shocks and specifies the regions and home types the shocks have been applied.

10.1 Market share model shocks

Region	Home types	Modelled price shocks
All growth areas in metropolitan Melbourne, Ballarat and Geelong	All home types	Price increase of 10%, 20% , 30%
Inner, Middle, Outer Melbourne, and established Ballarat/Geelong	Apartments and townhouses	Price decrease of 10%, 20%, 30%
Inner, Middle, Outer Melbourne, and established Ballarat/Geelong Plus, Growth zones of Melbourne, Ballarat and Geelong	Apartments/townhouses in IMO Melbourne, and established Ballarat/Geelong Plus All home types in growth areas	Price decrease of 10% and 20% for IMOE Price increase of 10% and 20% for growth areas
Established and growth areas of Ballarat /Geelong	All home types	Price increase of 10%, 20%, 30%
Inner, Middle, Outer Melbourne, and established Ballarat/Geelong	Apartments	Price decrease of 10%, 20%, 30%
Inner, Middle, Outer Melbourne, and established Ballarat/Geelong	Townhouses	Price decrease of 10%, 20%, 30%

Source: CIE.

The headline results are presented below for each model shock. For each location, home type and size of home type combination, the following results are reported:

- **baseline demand** — the demand for location and home type based on survey results
- **shocked demand** — the demand for location and home type after shock has been applied to baseline demand
- **shocked demand versus baseline demand** — comparison of the shocked demand to the baseline demand (presented in absolute and percentage terms)
- **shock impact as a proportion of stock (percentage)** — change in demand due to the shock as a proportion of the existing stock.

Price shock to all home types in growth areas in metropolitan Melbourne, Ballarat and Geelong

10.2   Headline results for 10 per cent price increase to all home types in growth areas

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,375	5	0.4	0.0
Inner	House	3+ bed	15,507	15,530	23	0.1	0.0
Inner	Townhouse	1-2 bed	4,842	4,898	56	1.2	0.2
Inner	Townhouse	3+ bed	7,804	7,860	55	0.7	0.1
Inner	Apartment	1-2 bed	145,858	156,154	10,296	7.1	6.7
Inner	Apartment	3+ bed	8,739	8,940	201	2.3	1.0
Middle	House	1-2 bed	17,095	17,616	521	3.1	1.5
Middle	House	3+ bed	86,942	87,549	607	0.7	0.2
Middle	Townhouse	1-2 bed	33,485	34,703	1,218	3.6	2.5
Middle	Townhouse	3+ bed	34,057	34,758	702	2.1	1.2
Middle	Apartment	1-2 bed	95,938	103,041	7,103	7.4	11.2
Middle	Apartment	3+ bed	7,460	7,804	344	4.6	3.7
Outer	House	1-2 bed	36,640	39,382	2,743	7.5	10.8
Outer	House	3+ bed	343,782	355,218	11,436	3.3	3.6
Outer	Townhouse	1-2 bed	55,116	60,632	5,517	10.0	23.1
Outer	Townhouse	3+ bed	33,145	35,930	2,786	8.4	10.7
Outer	Apartment	1-2 bed	27,233	29,558	2,325	8.5	17.8
Outer	Apartment	3+ bed	4,344	4,826	482	11.1	14.3

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Growth	House	1-2 bed	21,072	19,258	-1,814	-8.6		-20.6
Growth	House	3+ bed	412,500	367,201	-45,300	-11.0		-15.7
Growth	Townhouse	1-2 bed	18,574	19,369	795	4.3		9.1
Growth	Townhouse	3+ bed	31,618	22,762	-8,856	-28.0		-50.1
Growth	Apartment	1-2 bed	4,396	4,565	169	3.8		5.6
Growth	Apartment	3+ bed	1,266	841	-425	-33.6		-48.7
Regional	House	1-2 bed	23,486	25,420	1,935	8.2		16.5
Regional	House	3+ bed	202,150	207,092	4,942	2.4		5.4
Regional	Townhouse	1-2 bed	20,089	21,350	1,261	6.3		18.1
Regional	Townhouse	3+ bed	7,960	8,631	671	8.4		14.7
Regional	Apartment	1-2 bed	3,440	3,628	188	5.5		6.9
Regional	Apartment	3+ bed	514	527	13	2.6		2.5

Source: CIE.

10.3 10 per cent price increase for all home types in growth areas
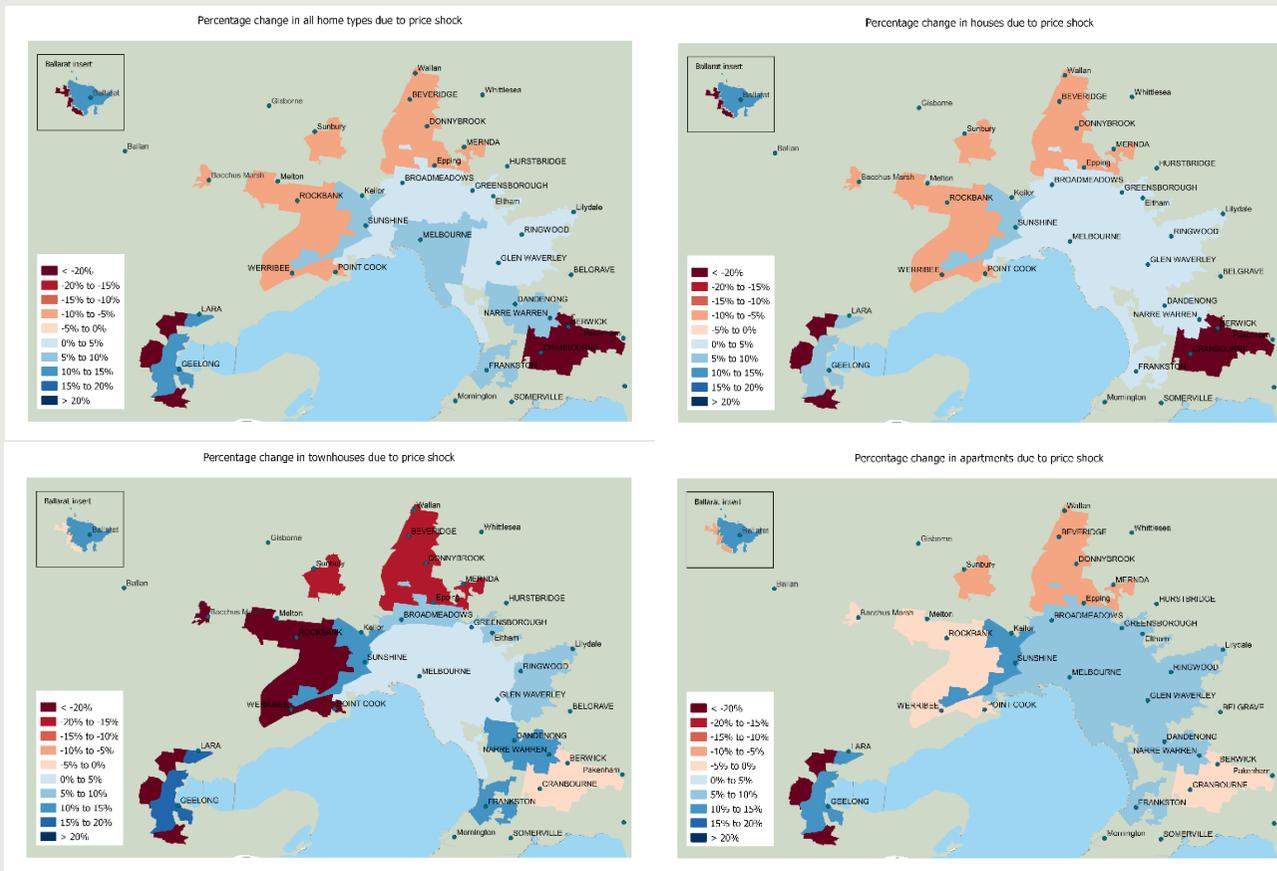
Source: CIE.

10.4   Headline results for 20 per cent price increase to all home types in growth areas

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Inner	House	1-2 bed	1,370	1,381	11	0.8		0.1
Inner	House	3+ bed	15,507	15,557	50	0.3		0.0
Inner	Townhouse	1-2 bed	4,842	4,933	91	1.9		0.3
Inner	Townhouse	3+ bed	7,804	7,919	114	1.5		0.3
Inner	Apartment	1-2 bed	145,858	172,361	26,503	18.2		17.2
Inner	Apartment	3+ bed	8,739	9,317	578	6.6		3.0
Middle	House	1-2 bed	17,095	17,850	755	4.4		2.2
Middle	House	3+ bed	86,942	88,246	1,304	1.5		0.5
Middle	Townhouse	1-2 bed	33,485	35,995	2,510	7.5		5.2
Middle	Townhouse	3+ bed	34,057	35,721	1,665	4.9		2.9
Middle	Apartment	1-2 bed	95,938	112,829	16,891	17.6		26.6
Middle	Apartment	3+ bed	7,460	8,615	1,155	15.5		12.4
Outer	House	1-2 bed	36,640	44,960	8,320	22.7		32.9
Outer	House	3+ bed	343,782	380,429	36,647	10.7		11.6
Outer	Townhouse	1-2 bed	55,116	67,907	12,792	23.2		53.5
Outer	Townhouse	3+ bed	33,145	42,320	9,175	27.7		35.2
Outer	Apartment	1-2 bed	27,233	32,166	4,932	18.1		37.7
Outer	Apartment	3+ bed	4,344	5,739	1,395	32.1		41.3
Growth	House	1-2 bed	21,072	12,766	-8,306	-39.4		-94.5
Growth	House	3+ bed	412,500	267,081	-145,420	-35.3		-50.5
Growth	Townhouse	1-2 bed	18,574	17,654	-920	-5.0		-10.5
Growth	Townhouse	3+ bed	31,618	23,599	-8,019	-25.4		-45.4
Growth	Apartment	1-2 bed	4,396	4,430	34	0.8		1.1
Growth	Apartment	3+ bed	1,266	911	-354	-28.0		-40.6

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Regional	House	1-2 bed	23,486	26,600	3,115	13.3	26.6
Regional	House	3+ bed	202,150	231,860	29,710	14.7	32.3
Regional	Townhouse	1-2 bed	20,089	23,337	3,248	16.2	46.5
Regional	Townhouse	3+ bed	7,960	9,439	1,479	18.6	32.4
Regional	Apartment	1-2 bed	3,440	3,936	497	14.4	18.3
Regional	Apartment	3+ bed	514	563	49	9.6	9.1

Source: CIE.

10.5   20 per cent price increase for all home types in growth areas
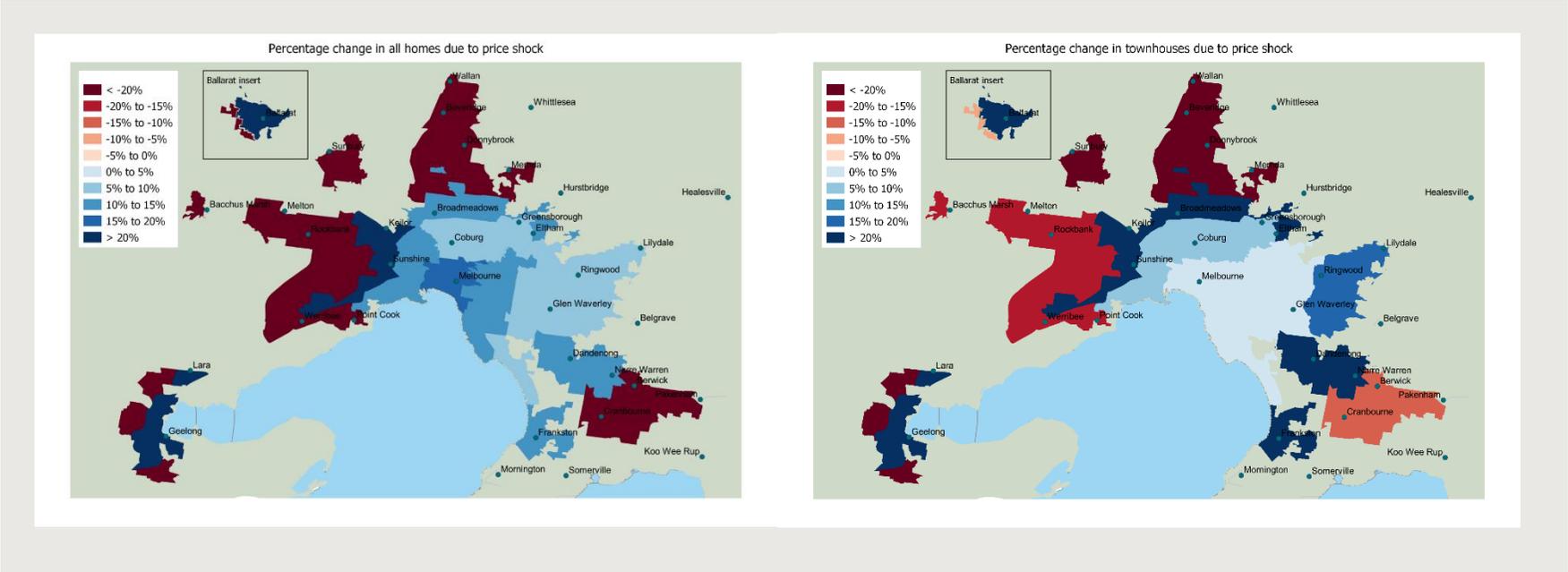
Source: CIE.

10.6   Headline results for 30 per cent price increase to all home types in growth areas

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Inner	House	1-2 bed	1,370	1,387	17	1.2		0.1
Inner	House	3+ bed	15,507	15,591	84	0.5		0.1
Inner	Townhouse	1-2 bed	4,842	4,990	148	3.1		0.5
Inner	Townhouse	3+ bed	7,804	7,974	170	2.2		0.4
Inner	Apartment	1-2 bed	145,858	180,039	34,181	23.4		22.1
Inner	Apartment	3+ bed	8,739	10,198	1,459	16.7		7.6
Middle	House	1-2 bed	17,095	18,709	1,615	9.4		4.7
Middle	House	3+ bed	86,942	88,964	2,022	2.3		0.7
Middle	Townhouse	1-2 bed	33,485	38,683	5,198	15.5		10.7
Middle	Townhouse	3+ bed	34,057	38,210	4,153	12.2		7.3
Middle	Apartment	1-2 bed	95,938	117,797	21,860	22.8		34.5
Middle	Apartment	3+ bed	7,460	9,340	1,880	25.2		20.1
Outer	House	1-2 bed	36,640	47,764	11,124	30.4		44.0
Outer	House	3+ bed	343,782	423,336	79,553	23.1		25.2
Outer	Townhouse	1-2 bed	55,116	71,142	16,026	29.1		67.1
Outer	Townhouse	3+ bed	33,145	45,901	12,756	38.5		48.9
Outer	Apartment	1-2 bed	27,233	33,589	6,356	23.3		48.6
Outer	Apartment	3+ bed	4,344	6,163	1,819	41.9		53.8
Growth	House	1-2 bed	21,072	12,325	-8,747	-41.5		-99.5
Growth	House	3+ bed	412,500	184,738	-227,762	-55.2		-79.1
Growth	Townhouse	1-2 bed	18,574	9,201	-9,373	-50.5		-107.0
Growth	Townhouse	3+ bed	31,618	20,521	-11,097	-35.1		-62.8
Growth	Apartment	1-2 bed	4,396	3,882	-514	-11.7		-17.2
Growth	Apartment	3+ bed	1,266	891	-375	-29.6		-42.9

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Regional	House	1-2 bed	23,486	27,512	4,027	17.1	34.4
Regional	House	3+ bed	202,150	248,482	46,332	22.9	50.4
Regional	Townhouse	1-2 bed	20,089	24,555	4,466	22.2	64.0
Regional	Townhouse	3+ bed	7,960	9,903	1,944	24.4	42.5
Regional	Apartment	1-2 bed	3,440	4,039	599	17.4	22.0
Regional	Apartment	3+ bed	514	593	79	15.4	14.6

Source: CIE.

10.7 30 per cent price increase for all home types in growth areas

Percentage change in all homes due to price shock

Percentage change in townhouses due to price shock

Source: CIE.

Price shock to townhouses/apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

10.8   Headline results for 10 per cent price decrease to townhouses/apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Inner	House	1-2 bed	1,370	1,337	-33	-2.4		-0.3
Inner	House	3+ bed	15,507	15,410	-97	-0.6		-0.1
Inner	Townhouse	1-2 bed	4,842	11,137	6,295	130.0		20.5
Inner	Townhouse	3+ bed	7,804	11,546	3,742	47.9		8.3
Inner	Apartment	1-2 bed	145,858	149,115	3,256	2.2		2.1
Inner	Apartment	3+ bed	8,739	10,572	1,833	21.0		9.5
Middle	House	1-2 bed	17,095	15,791	-1,303	-7.6		-3.8
Middle	House	3+ bed	86,942	85,225	-1,718	-2.0		-0.6
Middle	Townhouse	1-2 bed	33,485	51,111	17,626	52.6		36.3
Middle	Townhouse	3+ bed	34,057	46,450	12,393	36.4		21.7
Middle	Apartment	1-2 bed	95,938	108,899	12,961	13.5		20.4
Middle	Apartment	3+ bed	7,460	12,251	4,791	64.2		51.3
Outer	House	1-2 bed	36,640	31,540	-5,100	-13.9		-20.2
Outer	House	3+ bed	343,782	331,814	-11,968	-3.5		-3.8
Outer	Townhouse	1-2 bed	55,116	48,223	-6,892	-12.5		-28.8
Outer	Townhouse	3+ bed	33,145	42,751	9,606	29.0		36.8
Outer	Apartment	1-2 bed	27,233	22,741	-4,492	-16.5		-34.3
Outer	Apartment	3+ bed	4,344	5,722	1,378	31.7		40.8
Growth	House	1-2 bed	21,072	17,652	-3,420	-16.2		-38.9
Growth	House	3+ bed	412,500	393,258	-19,242	-4.7		-6.7

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Growth	Townhouse	1-2 bed	18,574	15,088	-3,486	-18.8		-39.8
Growth	Townhouse	3+ bed	31,618	28,253	-3,365	-10.6		-19.1
Growth	Apartment	1-2 bed	4,396	3,510	-887	-20.2		-29.6
Growth	Apartment	3+ bed	1,266	1,111	-155	-12.2		-17.7
Regional	House	1-2 bed	23,486	20,967	-2,518	-10.7		-21.5
Regional	House	3+ bed	202,150	192,320	-9,830	-4.9		-10.7
Regional	Townhouse	1-2 bed	20,089	19,410	-679	-3.4		-9.7
Regional	Townhouse	3+ bed	7,960	8,912	952	12.0		20.8
Regional	Apartment	1-2 bed	3,440	3,722	283	8.2		10.4
Regional	Apartment	3+ bed	514	585	71	13.8		13.0

10.9   10 per cent price decrease to townhouses/apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong
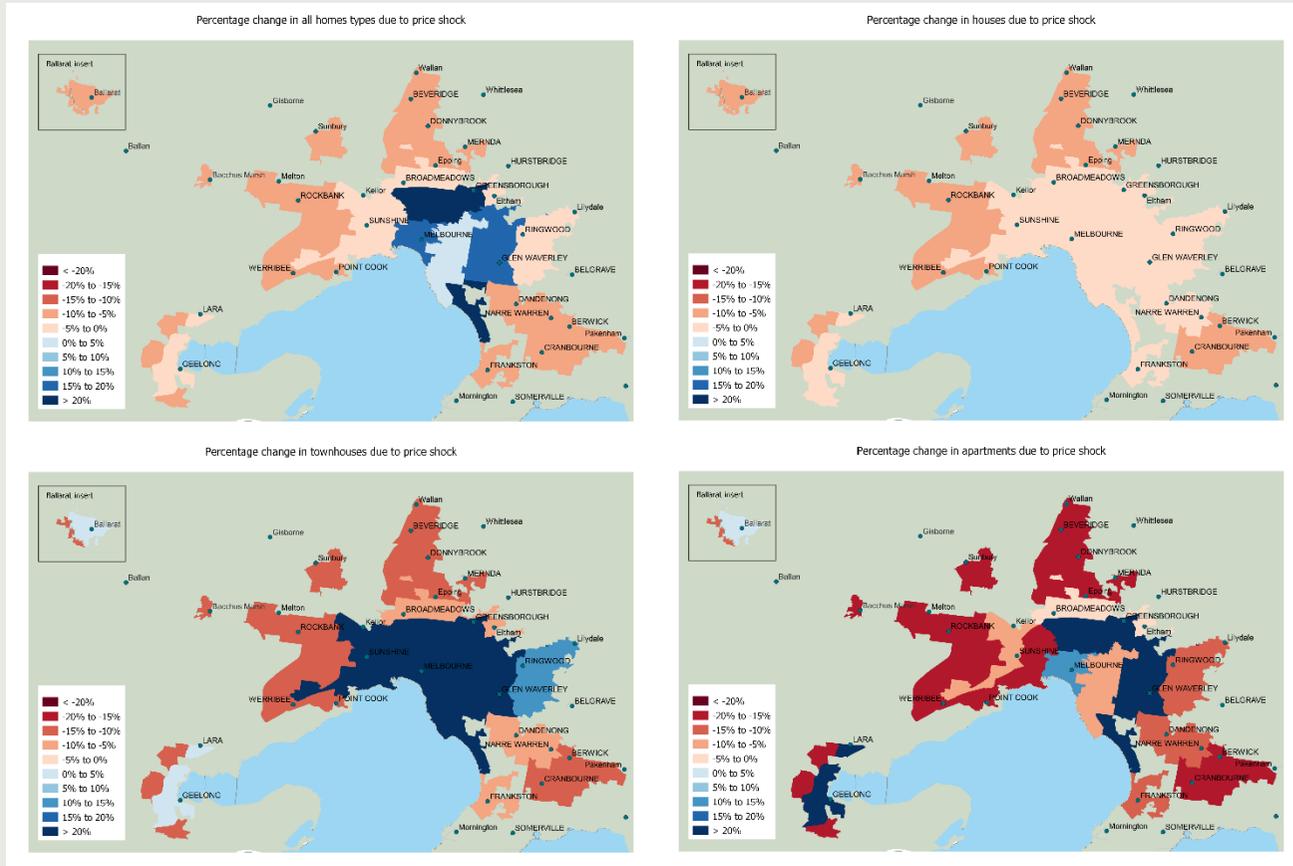
Source: CIE.

10.10 Headline results for 20 per cent price decrease to townhouses/apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Inner	House	1-2 bed	1,370	1,307	-63	-4.6		-0.5
Inner	House	3+ bed	15,507	15,327	-180	-1.2		-0.2
Inner	Townhouse	1-2 bed	4,842	14,096	9,254	191.1		30.1
Inner	Townhouse	3+ bed	7,804	14,598	6,794	87.0		15.1
Inner	Apartment	1-2 bed	145,858	161,406	15,548	10.7		10.1
Inner	Apartment	3+ bed	8,739	16,791	8,053	92.1		41.7
Middle	House	1-2 bed	17,095	14,889	-2,206	-12.9		-6.4
Middle	House	3+ bed	86,942	83,917	-3,025	-3.5		-1.1
Middle	Townhouse	1-2 bed	33,485	70,963	37,478	111.9		77.2
Middle	Townhouse	3+ bed	34,057	65,051	30,994	91.0		54.2
Middle	Apartment	1-2 bed	95,938	94,255	-1,682	-1.8		-2.7
Middle	Apartment	3+ bed	7,460	12,738	5,278	70.8		56.5
Outer	House	1-2 bed	36,640	27,632	-9,007	-24.6		-35.6
Outer	House	3+ bed	343,782	322,200	-21,582	-6.3		-6.8
Outer	Townhouse	1-2 bed	55,116	45,083	-10,033	-18.2		-42.0
Outer	Townhouse	3+ bed	33,145	51,523	18,379	55.4		70.4
Outer	Apartment	1-2 bed	27,233	18,615	-8,618	-31.6		-65.8
Outer	Apartment	3+ bed	4,344	5,427	1,083	24.9		32.1
Growth	House	1-2 bed	21,072	14,629	-6,443	-30.6		-73.3
Growth	House	3+ bed	412,500	378,821	-33,680	-8.2		-11.7
Growth	Townhouse	1-2 bed	18,574	12,043	-6,531	-35.2		-74.5
Growth	Townhouse	3+ bed	31,618	25,256	-6,362	-20.1		-36.0
Growth	Apartment	1-2 bed	4,396	2,759	-1,638	-37.2		-54.7

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Growth	Apartment	3+ bed	1,266	963	-302	-23.9	-34.6
Regional	House	1-2 bed	23,486	18,809	-4,677	-19.9	-40.0
Regional	House	3+ bed	202,150	183,247	-18,903	-9.4	-20.6
Regional	Townhouse	1-2 bed	20,089	18,782	-1,307	-6.5	-18.7
Regional	Townhouse	3+ bed	7,960	11,071	3,111	39.1	68.1
Regional	Apartment	1-2 bed	3,440	3,573	133	3.9	4.9
Regional	Apartment	3+ bed	514	649	135	26.2	24.9

10.11 20 per cent price decrease to townhouses/apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong
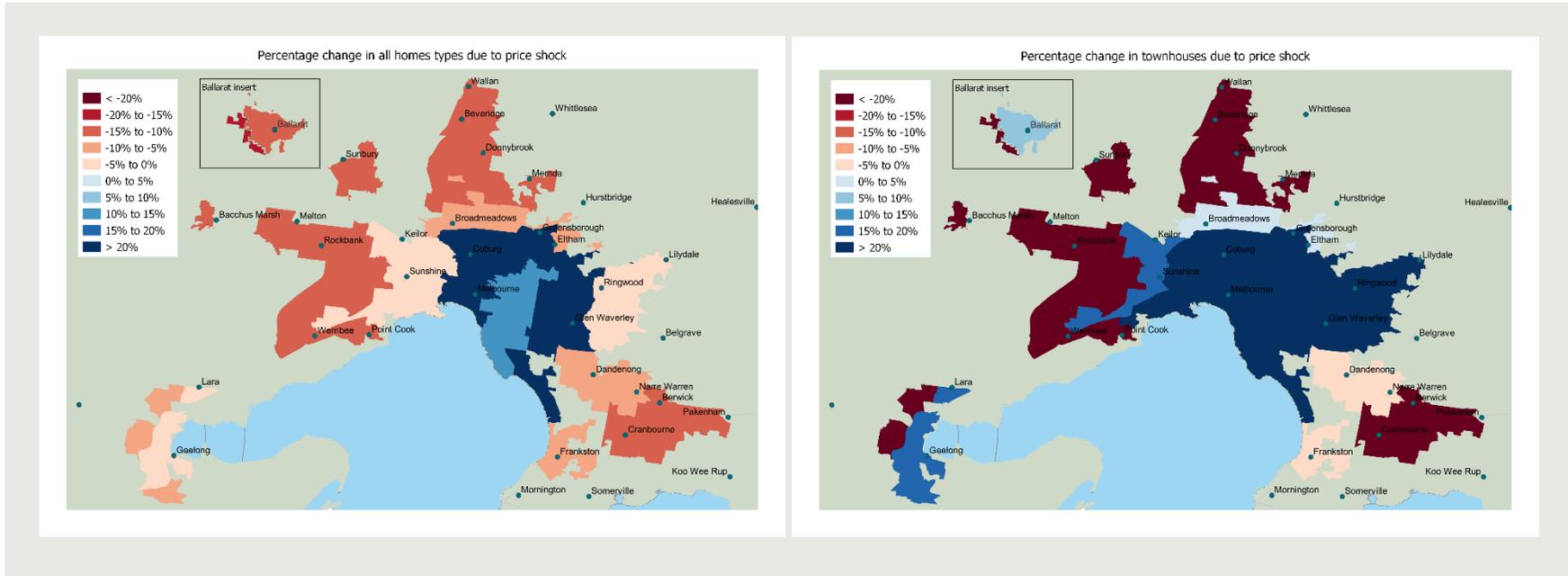
Source: CIE

10.12 Headline results for 30 per cent price decrease to townhouses/apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,279	-91	-6.6	-0.7
Inner	House	3+ bed	15,507	15,256	-251	-1.6	-0.2
Inner	Townhouse	1-2 bed	4,842	19,317	14,474	298.9	47.1
Inner	Townhouse	3+ bed	7,804	25,163	17,359	222.4	38.6
Inner	Apartment	1-2 bed	145,858	167,146	21,287	14.6	13.8
Inner	Apartment	3+ bed	8,739	21,950	13,211	151.2	68.5
Middle	House	1-2 bed	17,095	13,959	-3,135	-18.3	-9.1
Middle	House	3+ bed	86,942	82,724	-4,218	-4.9	-1.5
Middle	Townhouse	1-2 bed	33,485	79,337	45,851	136.9	94.5
Middle	Townhouse	3+ bed	34,057	94,345	60,288	177.0	105.4
Middle	Apartment	1-2 bed	95,938	81,736	-14,201	-14.8	-22.4
Middle	Apartment	3+ bed	7,460	15,339	7,879	105.6	84.3
Outer	House	1-2 bed	36,640	24,910	-11,730	-32.0	-46.4
Outer	House	3+ bed	343,782	312,649	-31,133	-9.1	-9.9
Outer	Townhouse	1-2 bed	55,116	39,663	-15,452	-28.0	-64.7
Outer	Townhouse	3+ bed	33,145	51,899	18,754	56.6	71.9
Outer	Apartment	1-2 bed	27,233	16,258	-10,976	-40.3	-83.8
Outer	Apartment	3+ bed	4,344	5,257	913	21.0	27.0
Growth	House	1-2 bed	21,072	12,429	-8,643	-41.0	-98.3
Growth	House	3+ bed	412,500	363,437	-49,063	-11.9	-17.0
Growth	Townhouse	1-2 bed	18,574	9,960	-8,614	-46.4	-98.3
Growth	Townhouse	3+ bed	31,618	22,643	-8,975	-28.4	-50.8
Growth	Apartment	1-2 bed	4,396	2,262	-2,134	-48.5	-71.3

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Growth	Apartment	3+ bed	1,266	842	-423	-33.4	-48.5
Regional	House	1-2 bed	23,486	17,040	-6,446	-27.4	-55.1
Regional	House	3+ bed	202,150	174,609	-27,541	-13.6	-30.0
Regional	Townhouse	1-2 bed	20,089	18,880	-1,210	-6.0	-17.3
Regional	Townhouse	3+ bed	7,960	11,746	3,787	47.6	82.9
Regional	Apartment	1-2 bed	3,440	3,566	126	3.7	4.6
Regional	Apartment	3+ bed	514	821	307	59.8	56.7

10.13 30 per cent price decrease to townhouses/apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong
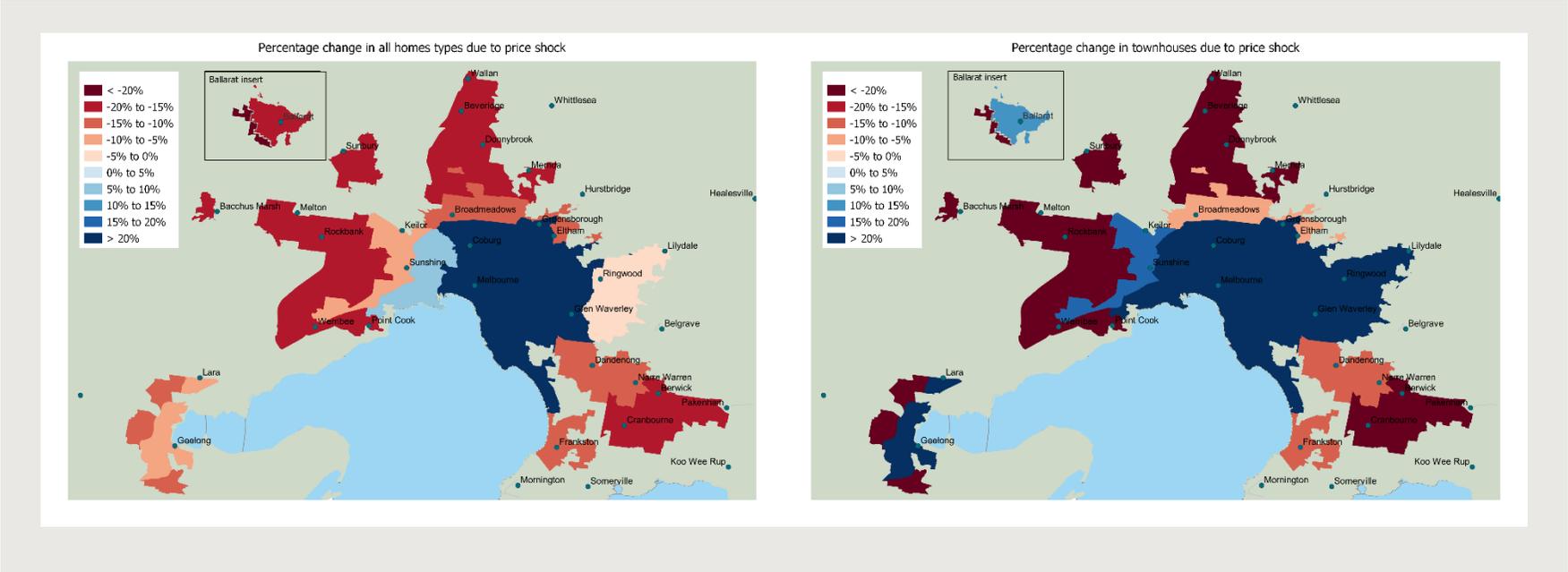
Source: CIE

Price decrease to townhouses / apartments in Inner, Middle and Outer Melbourne and established Ballarat / Geelong plus price increase to all homes in growth zones of Melbourne, Geelong and Ballarat

10.14 10 per cent price decrease townhouses/apartments in IMO Melbourne and established regions, plus 10 per cent price increase to all home types in growth areas

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,341	-29	-2.1	-0.2
Inner	House	3+ bed	15,507	15,432	-75	-0.5	-0.1
Inner	Townhouse	1-2 bed	4,842	11,404	6,561	135.5	21.3
Inner	Townhouse	3+ bed	7,804	11,642	3,838	49.2	8.5
Inner	Apartment	1-2 bed	145,858	157,547	11,689	8.0	7.6
Inner	Apartment	3+ bed	8,739	10,903	2,164	24.8	11.2
Middle	House	1-2 bed	17,095	16,192	-903	-5.3	-2.6
Middle	House	3+ bed	86,942	85,777	-1,166	-1.3	-0.4
Middle	Townhouse	1-2 bed	33,485	54,135	20,649	61.7	42.5
Middle	Townhouse	3+ bed	34,057	47,762	13,706	40.2	23.9
Middle	Apartment	1-2 bed	95,938	115,289	19,351	20.2	30.5
Middle	Apartment	3+ bed	7,460	13,126	5,666	76.0	60.6
Outer	House	1-2 bed	36,640	33,558	-3,082	-8.4	-12.2
Outer	House	3+ bed	343,782	342,014	-1,768	-0.5	-0.6
Outer	Townhouse	1-2 bed	55,116	52,187	-2,928	-5.3	-12.3
Outer	Townhouse	3+ bed	33,145	46,730	13,586	41.0	52.1
Outer	Apartment	1-2 bed	27,233	24,310	-2,923	-10.7	-22.3
Outer	Apartment	3+ bed	4,344	6,271	1,926	44.3	57.0
Growth	House	1-2 bed	21,072	16,004	-5,068	-24.1	-57.7

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Growth	House	3+ bed	412,500	351,079	-61,421	-14.9		-21.3
Growth	Townhouse	1-2 bed	18,574	15,434	-3,140	-16.9		-35.8
Growth	Townhouse	3+ bed	31,618	21,000	-10,618	-33.6		-60.1
Growth	Apartment	1-2 bed	4,396	3,581	-815	-18.5		-27.2
Growth	Apartment	3+ bed	1,266	768	-498	-39.4		-57.1
Regional	House	1-2 bed	23,486	22,415	-1,071	-4.6		-9.1
Regional	House	3+ bed	202,150	195,941	-6,209	-3.1		-6.8
Regional	Townhouse	1-2 bed	20,089	20,398	309	1.5		4.4
Regional	Townhouse	3+ bed	7,960	9,610	1,650	20.7		36.1
Regional	Apartment	1-2 bed	3,440	3,964	525	15.2		19.3
Regional	Apartment	3+ bed	514	607	93	18.1		17.1

Source: CIE.

10.15 10 per cent price decrease townhouses/apartments in IMO Melbourne and established regions, plus 10 per cent price increase to all home types in growth areas

Source: CIE.

10.16 20 per cent price decrease townhouses/apartments in IMO Melbourne and established regions, plus 10 per cent price increase to all homes types in growth areas

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Inner	House	1-2 bed	1,370	1,315	-55	-4.0		-0.5
Inner	House	3+ bed	15,507	15,372	-135	-0.9		-0.1
Inner	Townhouse	1-2 bed	4,842	14,591	9,749	201.3		31.7
Inner	Townhouse	3+ bed	7,804	14,882	7,078	90.7		15.7
Inner	Apartment	1-2 bed	145,858	179,520	33,662	23.1		21.8
Inner	Apartment	3+ bed	8,739	19,137	10,399	119.0		53.9
Middle	House	1-2 bed	17,095	15,399	-1,695	-9.9		-4.9
Middle	House	3+ bed	86,942	85,021	-1,921	-2.2		-0.7
Middle	Townhouse	1-2 bed	33,485	81,960	48,475	144.8		99.9
Middle	Townhouse	3+ bed	34,057	72,792	38,735	113.7		67.7
Middle	Apartment	1-2 bed	95,938	104,635	8,697	9.1		13.7
Middle	Apartment	3+ bed	7,460	15,298	7,838	105.1		83.9
Outer	House	1-2 bed	36,640	32,538	-4,102	-11.2		-16.2
Outer	House	3+ bed	343,782	352,243	8,461	2.5		2.7
Outer	Townhouse	1-2 bed	55,116	52,336	-2,780	-5.0		-11.6
Outer	Townhouse	3+ bed	33,145	62,691	29,546	89.1		113.2
Outer	Apartment	1-2 bed	27,233	20,909	-6,324	-23.2		-48.3
Outer	Apartment	3+ bed	4,344	6,511	2,167	49.9		64.2
Growth	House	1-2 bed	21,072	10,069	-11,003	-52.2		-125.2
Growth	House	3+ bed	412,500	253,007	-159,493	-38.7		-55.4
Growth	Townhouse	1-2 bed	18,574	11,204	-7,370	-39.7		-84.1
Growth	Townhouse	3+ bed	31,618	19,757	-11,861	-37.5		-67.2
Growth	Apartment	1-2 bed	4,396	2,686	-1,711	-38.9		-57.1

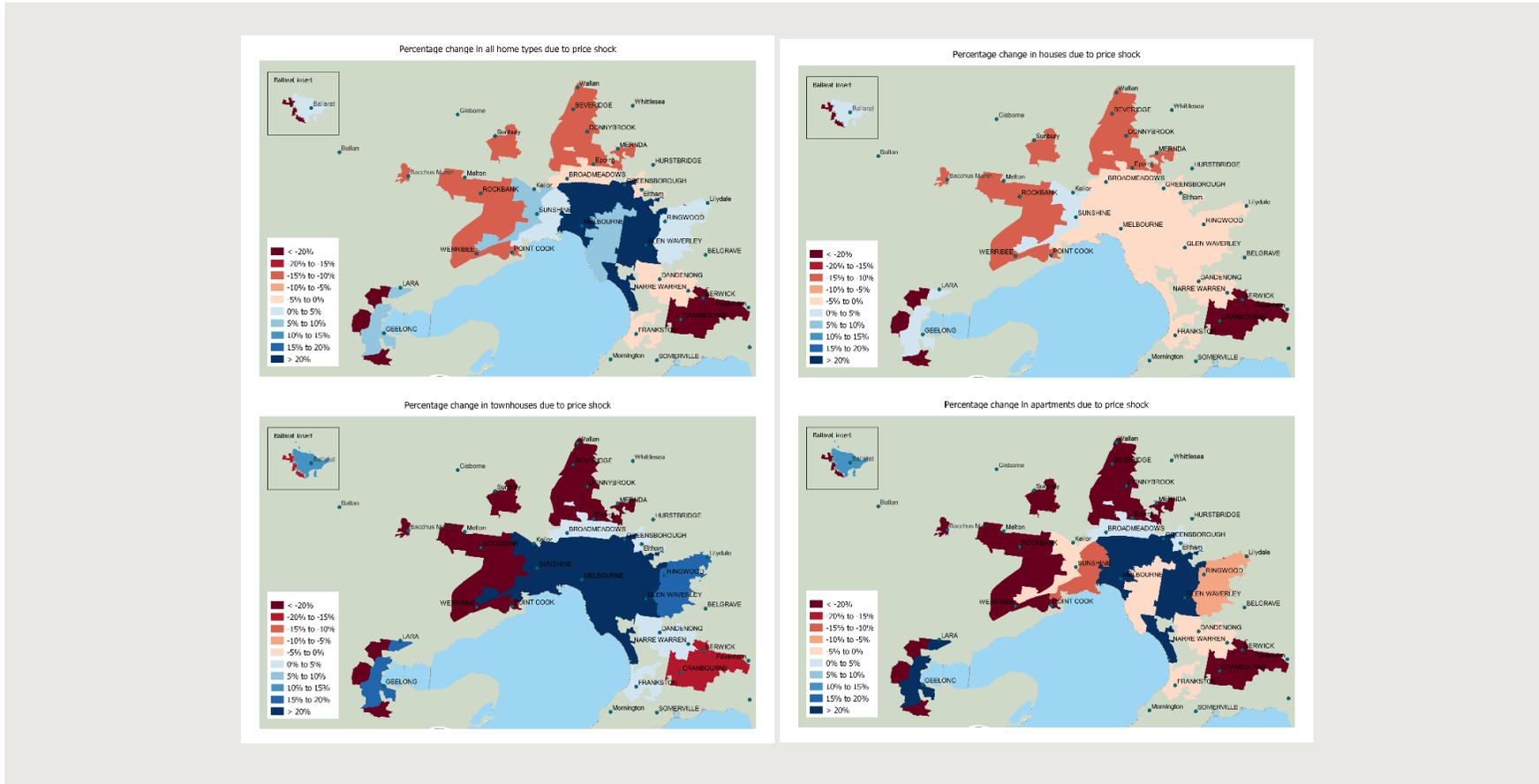| Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Growth	Apartment	3+ bed	1,266	742	-524	-41.4	-60.0
Regional	House	1-2 bed	23,486	20,462	-3,023	-12.9	-25.8
Regional	House	3+ bed	202,150	202,820	670	0.3	0.7
Regional	Townhouse	1-2 bed	20,089	20,787	698	3.5	10.0
Regional	Townhouse	3+ bed	7,960	12,994	5,034	63.2	110.2
Regional	Apartment	1-2 bed	3,440	4,012	573	16.6	21.0
Regional	Apartment	3+ bed	514	730	217	42.2	40.0

Source: CIE.

10.17 20 per cent price decrease townhouses/apartments in IMO Melbourne and established regions, plus 20 per cent price increase to all home types in growth areas
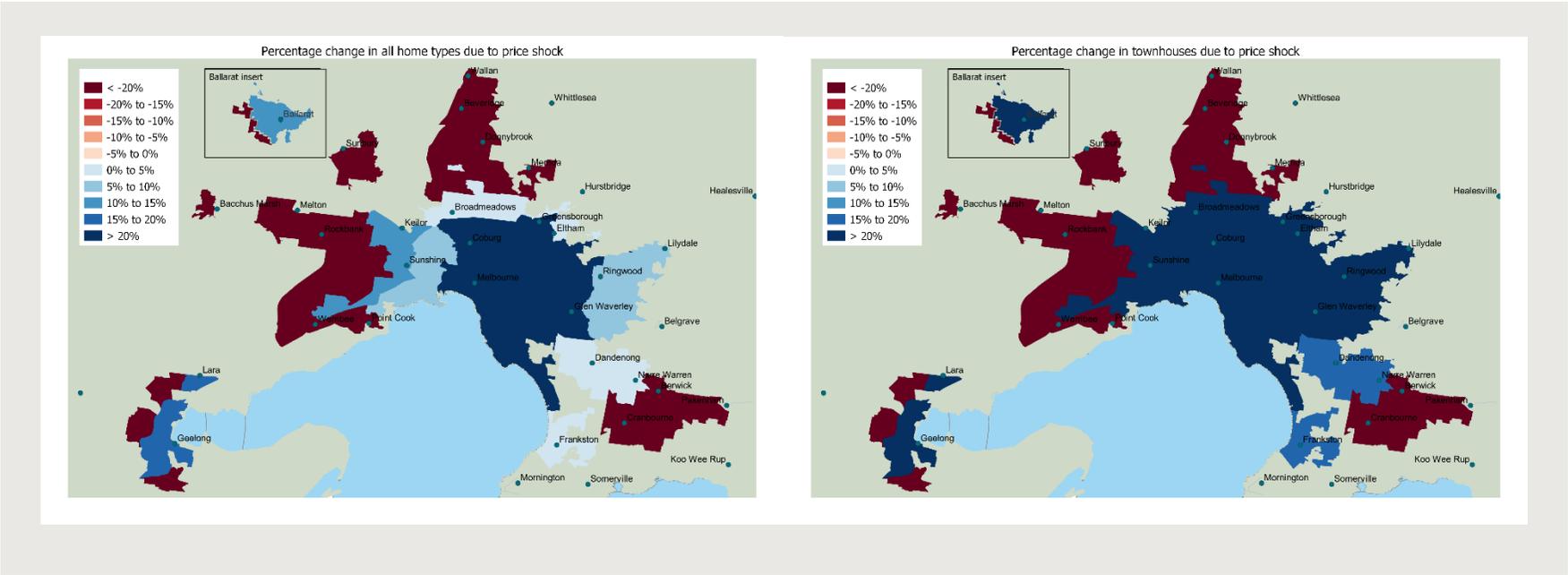
Source: CIE

Price shock to all home types in established and growth areas of Ballarat and Geelong

10.18 Headline results for 10 per cent price increase to all home types in Ballarat and Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Inner	House	1-2 bed	1,370	1,371	1	0.1		0.0
Inner	House	3+ bed	15,507	15,511	4	0.0		0.0
Inner	Townhouse	1-2 bed	4,842	4,851	9	0.2		0.0
Inner	Townhouse	3+ bed	7,804	7,813	9	0.1		0.0
Inner	Apartment	1-2 bed	145,858	152,010	6,152	4.2		4.0
Inner	Apartment	3+ bed	8,739	8,771	33	0.4		0.2
Middle	House	1-2 bed	17,095	17,157	63	0.4		0.2
Middle	House	3+ bed	86,942	87,043	101	0.1		0.0
Middle	Townhouse	1-2 bed	33,485	33,695	209	0.6		0.4
Middle	Townhouse	3+ bed	34,057	34,166	110	0.3		0.2
Middle	Apartment	1-2 bed	95,938	100,651	4,714	4.9		7.4
Middle	Apartment	3+ bed	7,460	7,573	113	1.5		1.2
Outer	House	1-2 bed	36,640	37,932	1,292	3.5		5.1
Outer	House	3+ bed	343,782	349,189	5,407	1.6		1.7
Outer	Townhouse	1-2 bed	55,116	60,307	5,191	9.4		21.7
Outer	Townhouse	3+ bed	33,145	34,545	1,400	4.2		5.4
Outer	Apartment	1-2 bed	27,233	29,575	2,342	8.6		17.9
Outer	Apartment	3+ bed	4,344	4,718	374	8.6		11.1
Growth	House	1-2 bed	21,072	25,525	4,453	21.1		50.7
Growth	House	3+ bed	412,500	432,195	19,695	4.8		6.8
Growth	Townhouse	1-2 bed	18,574	21,922	3,348	18.0		38.2

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Growth	Townhouse	3+ bed	31,618	36,376	4,758	15.0		26.9
Growth	Apartment	1-2 bed	4,396	5,015	618	14.1		20.7
Growth	Apartment	3+ bed	1,266	1,456	190	15.1		21.8
Regional	House	1-2 bed	23,486	27,482	3,996	17.0		34.1
Regional	House	3+ bed	202,150	141,058	-61,093	-30.2		-66.5
Regional	Townhouse	1-2 bed	20,089	15,838	-4,252	-21.2		-60.9
Regional	Townhouse	3+ bed	7,960	8,787	827	10.4		18.1
Regional	Apartment	1-2 bed	3,440	3,506	66	1.9		2.4
Regional	Apartment	3+ bed	514	384	-129	-25.2		-23.9

Source: CIE.

10.19 **10 per cent price increase to all home types in Ballarat and Geelong**

Percentage change in all homes types due to price shock

Percentage change in townhouses due to price shock

Source: CIE

10.20 Headline results for 20 per cent price increase to all home types in Ballarat and Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,373	2	0.2	0.0
Inner	House	3+ bed	15,507	15,516	9	0.1	0.0
Inner	Townhouse	1-2 bed	4,842	4,860	17	0.4	0.1
Inner	Townhouse	3+ bed	7,804	7,823	18	0.2	0.0
Inner	Apartment	1-2 bed	145,858	155,197	9,339	6.4	6.0
Inner	Apartment	3+ bed	8,739	8,850	111	1.3	0.6
Middle	House	1-2 bed	17,095	17,209	115	0.7	0.3
Middle	House	3+ bed	86,942	87,153	211	0.2	0.1
Middle	Townhouse	1-2 bed	33,485	34,084	599	1.8	1.2
Middle	Townhouse	3+ bed	34,057	34,361	304	0.9	0.5
Middle	Apartment	1-2 bed	95,938	103,011	7,073	7.4	11.2
Middle	Apartment	3+ bed	7,460	7,693	233	3.1	2.5
Outer	House	1-2 bed	36,640	39,746	3,106	8.5	12.3
Outer	House	3+ bed	343,782	357,709	13,927	4.1	4.4
Outer	Townhouse	1-2 bed	55,116	63,248	8,132	14.8	34.0
Outer	Townhouse	3+ bed	33,145	35,846	2,701	8.1	10.4
Outer	Apartment	1-2 bed	27,233	31,233	4,000	14.7	30.6
Outer	Apartment	3+ bed	4,344	4,920	576	13.3	17.0
Growth	House	1-2 bed	21,072	28,091	7,018	33.3	79.9
Growth	House	3+ bed	412,500	453,668	41,168	10.0	14.3
Growth	Townhouse	1-2 bed	18,574	24,038	5,464	29.4	62.4
Growth	Townhouse	3+ bed	31,618	38,611	6,993	22.1	39.6
Growth	Apartment	1-2 bed	4,396	5,424	1,027	23.4	34.3
Growth	Apartment	3+ bed	1,266	1,532	266	21.0	30.5

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Regional	House	1-2 bed	23,486	11,087	-12,398	-52.8	-105.9
Regional	House	3+ bed	202,150	107,827	-94,323	-46.7	-102.6
Regional	Townhouse	1-2 bed	20,089	14,418	-5,672	-28.2	-81.2
Regional	Townhouse	3+ bed	7,960	7,516	-444	-5.6	-9.7
Regional	Apartment	1-2 bed	3,440	4,078	638	18.6	23.4
Regional	Apartment	3+ bed	514	304	-210	-40.9	-38.8

Source: CIE.

10.21 20 per cent price increase to all home types in Ballarat and Geelong
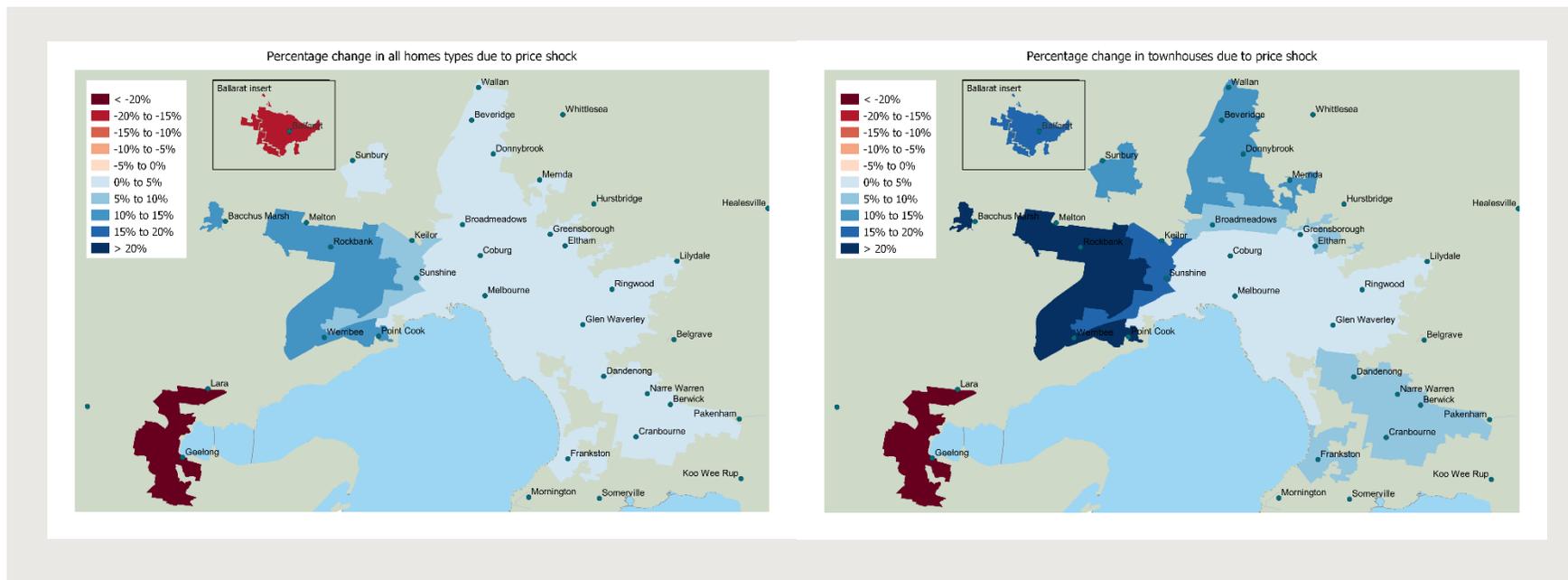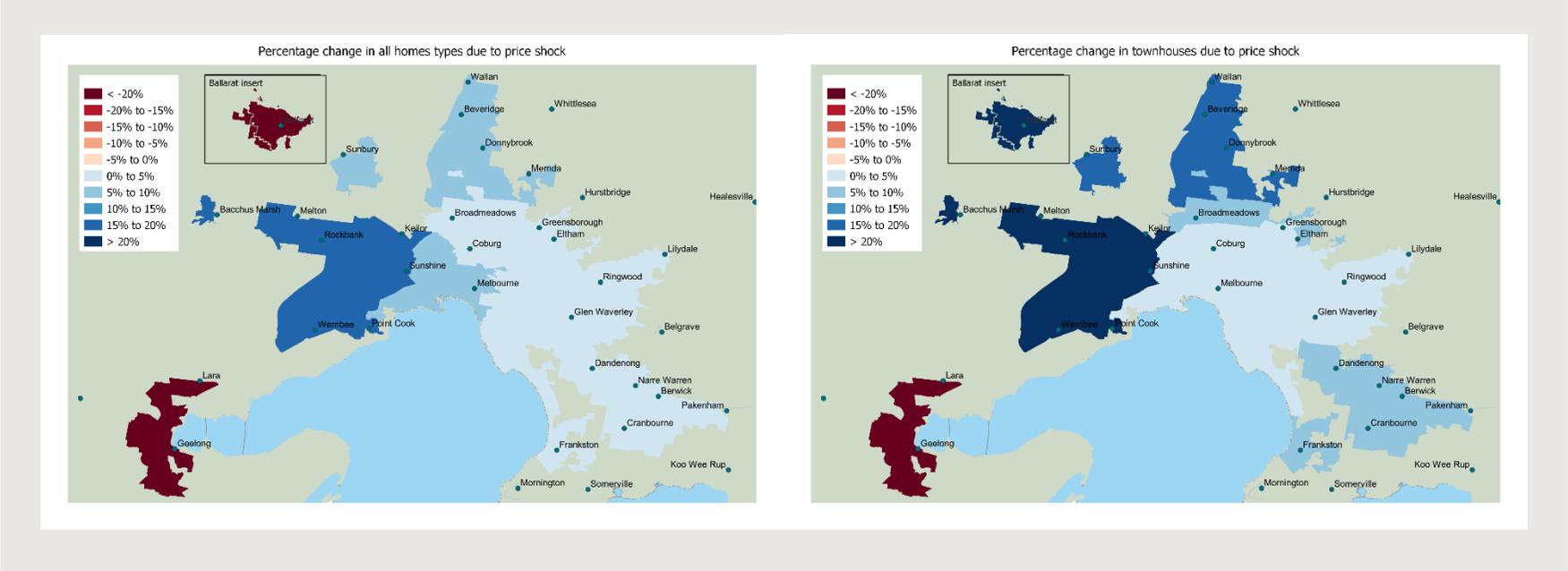

Source: CIE

10.22 Headline results for 30 per cent price increase to all home types in Ballarat and Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,374	4	0.3	0.0
Inner	House	3+ bed	15,507	15,523	16	0.1	0.0
Inner	Townhouse	1-2 bed	4,842	4,870	28	0.6	0.1
Inner	Townhouse	3+ bed	7,804	7,832	27	0.4	0.1
Inner	Apartment	1-2 bed	145,858	155,937	10,079	6.9	6.5
Inner	Apartment	3+ bed	8,739	8,918	180	2.1	0.9
Middle	House	1-2 bed	17,095	17,391	297	1.7	0.9
Middle	House	3+ bed	86,942	87,269	326	0.4	0.1
Middle	Townhouse	1-2 bed	33,485	34,409	924	2.8	1.9
Middle	Townhouse	3+ bed	34,057	34,613	556	1.6	1.0
Middle	Apartment	1-2 bed	95,938	103,457	7,520	7.8	11.9
Middle	Apartment	3+ bed	7,460	7,747	287	3.8	3.1
Outer	House	1-2 bed	36,640	40,324	3,684	10.1	14.6
Outer	House	3+ bed	343,782	363,159	19,377	5.6	6.1
Outer	Townhouse	1-2 bed	55,116	63,905	8,790	15.9	36.8
Outer	Townhouse	3+ bed	33,145	36,403	3,258	9.8	12.5
Outer	Apartment	1-2 bed	27,233	31,643	4,409	16.2	33.7
Outer	Apartment	3+ bed	4,344	4,985	641	14.8	19.0
Growth	House	1-2 bed	21,072	28,683	7,611	36.1	86.6
Growth	House	3+ bed	412,500	463,649	51,149	12.4	17.8
Growth	Townhouse	1-2 bed	18,574	24,581	6,007	32.3	68.5
Growth	Townhouse	3+ bed	31,618	39,305	7,687	24.3	43.5
Growth	Apartment	1-2 bed	4,396	5,528	1,131	25.7	37.8
Growth	Apartment	3+ bed	1,266	1,551	285	22.5	32.6

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Regional	House	1-2 bed	23,486	8,658	-14,828	-63.1		-126.7
Regional	House	3+ bed	202,150	91,231	-110,919	-54.9		-120.7
Regional	Townhouse	1-2 bed	20,089	13,269	-6,820	-33.9		-97.7
Regional	Townhouse	3+ bed	7,960	6,323	-1,637	-20.6		-35.8
Regional	Apartment	1-2 bed	3,440	3,642	203	5.9		7.4
Regional	Apartment	3+ bed	514	242	-272	-52.9		-50.2

Source: CIE.

10.23 30 per cent price increase to all home types in Ballarat and Geelong
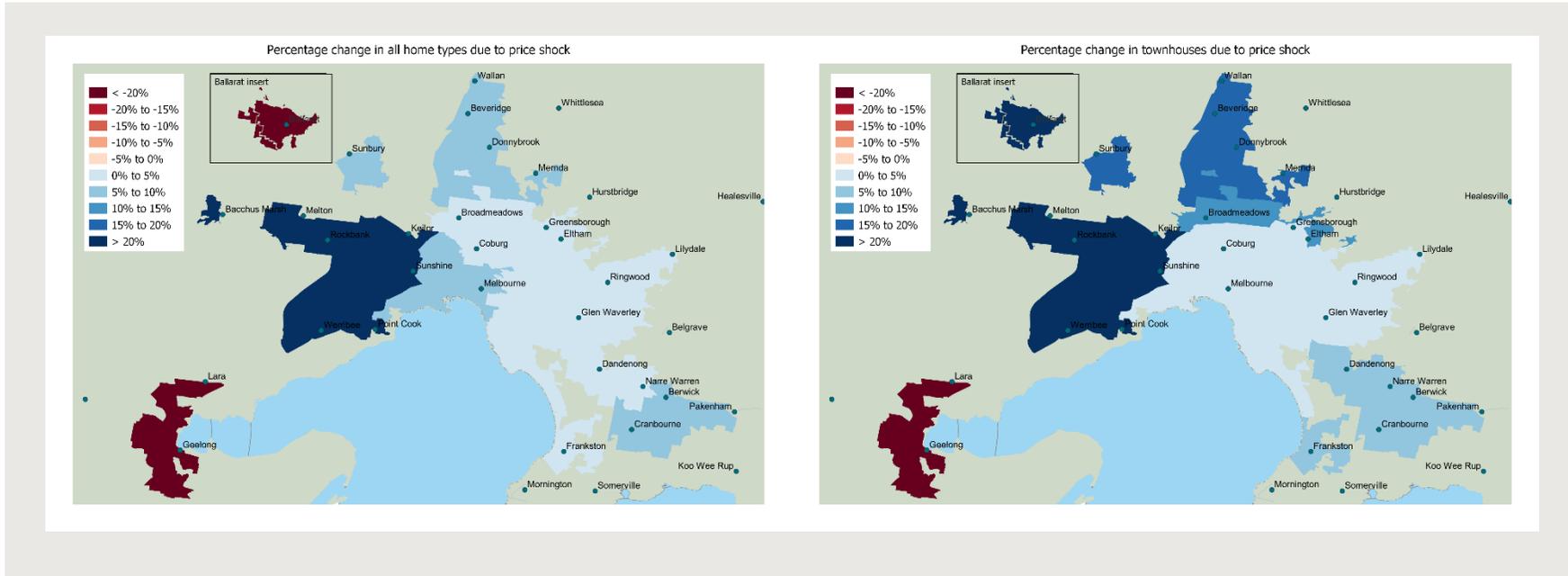
Source: CIE

Price shock to apartments in Inner, Middle, Outer Melbourne, and established Ballarat/Geelong

10.24 Headline results for 10 per cent price decrease to apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,356	-14	-1.0	-0.1
Inner	House	3+ bed	15,507	15,491	-16	-0.1	0.0
Inner	Townhouse	1-2 bed	4,842	4,690	-152	-3.1	-0.5
Inner	Townhouse	3+ bed	7,804	7,752	-53	-0.7	-0.1
Inner	Apartment	1-2 bed	145,858	158,063	12,205	8.4	7.9
Inner	Apartment	3+ bed	8,739	10,939	2,200	25.2	11.4
Middle	House	1-2 bed	17,095	16,604	-490	-2.9	-1.4
Middle	House	3+ bed	86,942	86,480	-462	-0.5	-0.2
Middle	Townhouse	1-2 bed	33,485	32,302	-1,183	-3.5	-2.4
Middle	Townhouse	3+ bed	34,057	33,698	-358	-1.1	-0.6
Middle	Apartment	1-2 bed	95,938	115,027	19,090	19.9	30.1
Middle	Apartment	3+ bed	7,460	12,992	5,532	74.2	59.2
Outer	House	1-2 bed	36,640	33,335	-3,305	-9.0	-13.1
Outer	House	3+ bed	343,782	340,839	-2,943	-0.9	-0.9
Outer	Townhouse	1-2 bed	55,116	46,809	-8,307	-15.1	-34.8
Outer	Townhouse	3+ bed	33,145	32,441	-704	-2.1	-2.7
Outer	Apartment	1-2 bed	27,233	24,069	-3,165	-11.6	-24.2
Outer	Apartment	3+ bed	4,344	6,032	1,688	38.9	50.0
Growth	House	1-2 bed	21,072	18,748	-2,324	-11.0	-26.4
Growth	House	3+ bed	412,500	407,126	-5,374	-1.3	-1.9
Growth	Townhouse	1-2 bed	18,574	16,031	-2,543	-13.7	-29.0

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Growth	Townhouse	3+ bed	31,618	29,759	-1,859	-5.9	-10.5
Growth	Apartment	1-2 bed	4,396	3,718	-678	-15.4	-22.7
Growth	Apartment	3+ bed	1,266	1,168	-97	-7.7	-11.2
Regional	House	1-2 bed	23,486	22,121	-1,364	-5.8	-11.7
Regional	House	3+ bed	202,150	197,777	-4,373	-2.2	-4.8
Regional	Townhouse	1-2 bed	20,089	18,706	-1,383	-6.9	-19.8
Regional	Townhouse	3+ bed	7,960	7,681	-279	-3.5	-6.1
Regional	Apartment	1-2 bed	3,440	4,054	614	17.9	22.6
Regional	Apartment	3+ bed	514	612	98	19.1	18.2

Source: CIE

10.25 10 per cent price decrease to apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Percentage change in all homes types due to price shock

Percentage change in townhouses due to price shock
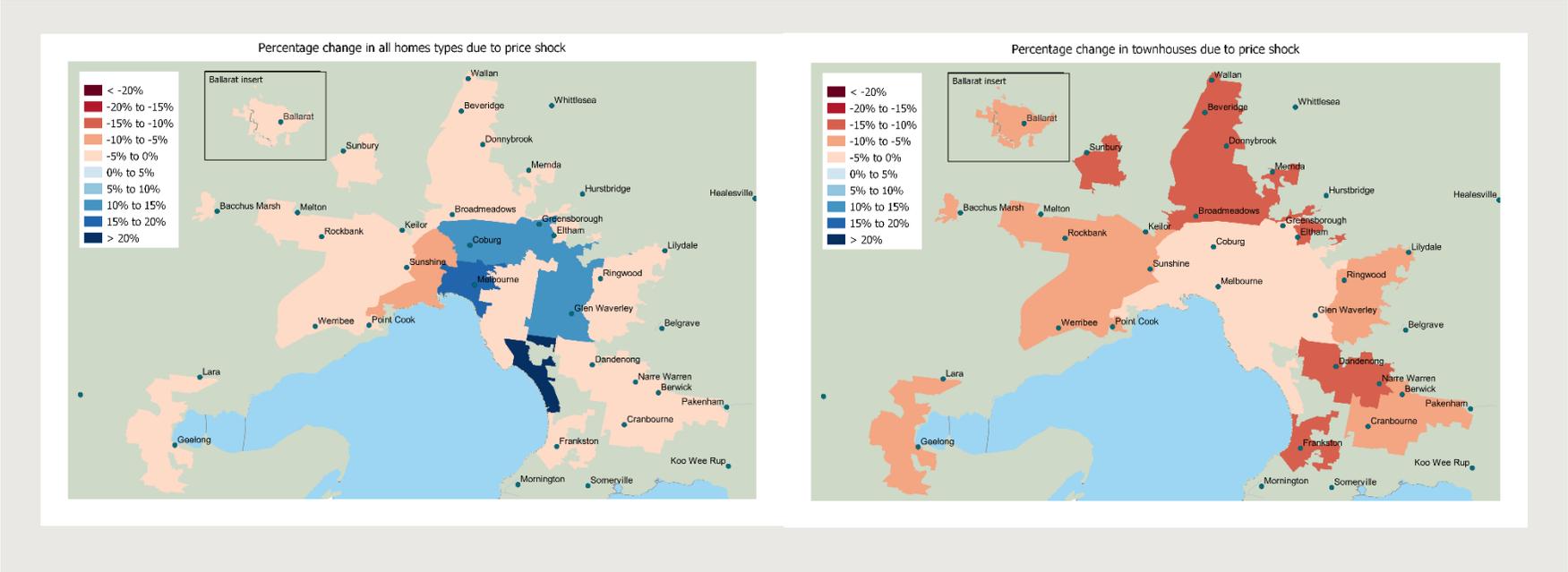
Source: CIE

10.26 Headline results for 20 per cent price decrease to apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Inner	House	1-2 bed	1,370	1,342	-28	-2.0		-0.2
Inner	House	3+ bed	15,507	15,476	-31	-0.2		0.0
Inner	Townhouse	1-2 bed	4,842	4,532	-310	-6.4		-1.0
Inner	Townhouse	3+ bed	7,804	7,704	-101	-1.3		-0.2
Inner	Apartment	1-2 bed	145,858	187,287	41,429	28.4		26.8
Inner	Apartment	3+ bed	8,739	18,304	9,565	109.5		49.6
Middle	House	1-2 bed	17,095	16,101	-994	-5.8		-2.9
Middle	House	3+ bed	86,942	86,062	-880	-1.0		-0.3
Middle	Townhouse	1-2 bed	33,485	31,036	-2,449	-7.3		-5.0
Middle	Townhouse	3+ bed	34,057	33,357	-700	-2.1		-1.2
Middle	Apartment	1-2 bed	95,938	110,773	14,836	15.5		23.4
Middle	Apartment	3+ bed	7,460	14,126	6,666	89.4		71.3
Outer	House	1-2 bed	36,640	31,106	-5,534	-15.1		-21.9
Outer	House	3+ bed	343,782	337,758	-6,024	-1.8		-1.9
Outer	Townhouse	1-2 bed	55,116	40,843	-14,273	-25.9		-59.7
Outer	Townhouse	3+ bed	33,145	31,786	-1,359	-4.1		-5.2
Outer	Apartment	1-2 bed	27,233	21,976	-5,257	-19.3		-40.2
Outer	Apartment	3+ bed	4,344	6,163	1,819	41.9		53.8
Growth	House	1-2 bed	21,072	16,920	-4,152	-19.7		-47.2
Growth	House	3+ bed	412,500	402,455	-10,046	-2.4		-3.5
Growth	Townhouse	1-2 bed	18,574	14,084	-4,490	-24.2		-51.2
Growth	Townhouse	3+ bed	31,618	28,059	-3,559	-11.3		-20.1
Growth	Apartment	1-2 bed	4,396	3,224	-1,173	-26.7		-39.2
Growth	Apartment	3+ bed	1,266	1,077	-188	-14.9		-21.6

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Regional	House	1-2 bed	23,486	21,013	-2,472	-10.5	-21.1
Regional	House	3+ bed	202,150	193,712	-8,438	-4.2	-9.2
Regional	Townhouse	1-2 bed	20,089	17,669	-2,420	-12.0	-34.7
Regional	Townhouse	3+ bed	7,960	7,427	-533	-6.7	-11.7
Regional	Apartment	1-2 bed	3,440	4,333	893	26.0	32.8
Regional	Apartment	3+ bed	514	716	203	39.4	37.4

Source: CIE.

10.27 20 per cent price decrease to apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Percentage change in all homes types due to price shock

Percentage change in townhouses due to price shock
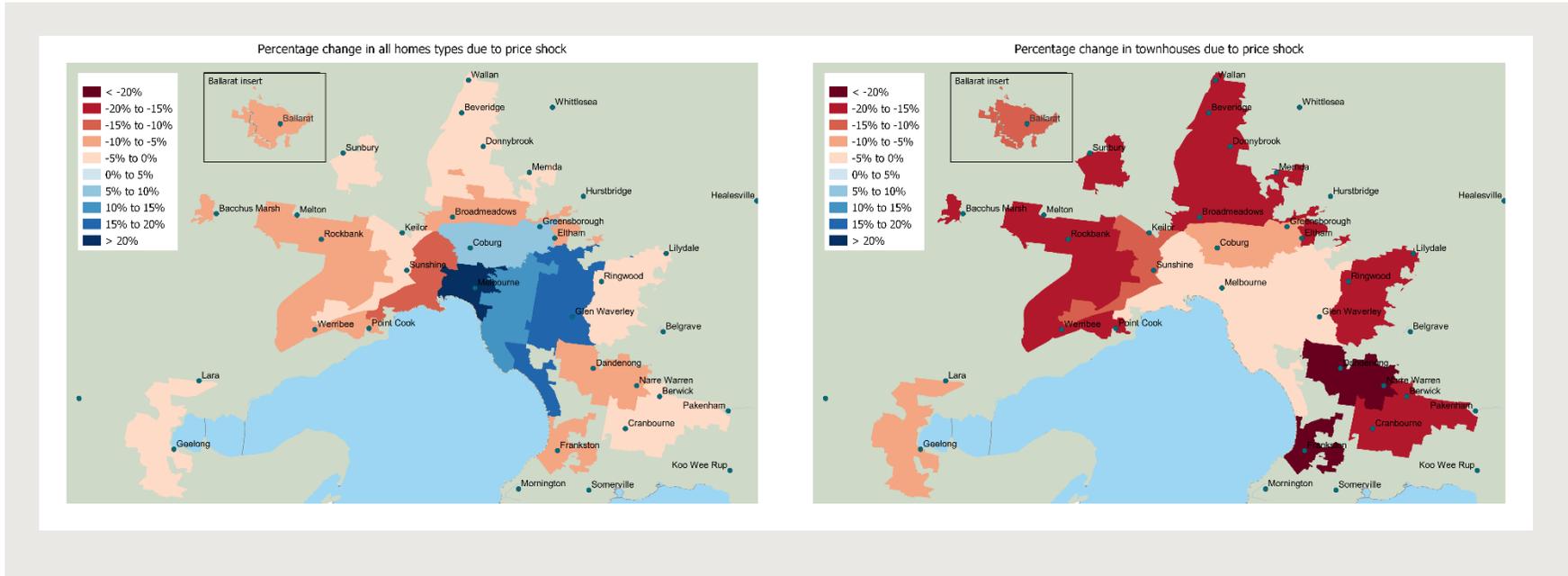
Source: CIE

10.28 Headline results for 30 per cent price decrease to apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand		Shocked demand vs baseline demand			Shock impact as a proportion of stock
						#	per cent		per cent
Inner	House	1-2 bed	1,370	1,328		-42	-3.1		-0.3
Inner	House	3+ bed	15,507	15,460		-46	-0.3		0.0
Inner	Townhouse	1-2 bed	4,842	4,382		-461	-9.5		-1.5
Inner	Townhouse	3+ bed	7,804	7,653		-152	-1.9		-0.3
Inner	Apartment	1-2 bed	145,858	210,043		64,184	44.0		41.6
Inner	Apartment	3+ bed	8,739	25,683		16,944	193.9		87.8
Middle	House	1-2 bed	17,095	15,606		-1,489	-8.7		-4.3
Middle	House	3+ bed	86,942	85,632		-1,310	-1.5		-0.5
Middle	Townhouse	1-2 bed	33,485	29,905		-3,581	-10.7		-7.4
Middle	Townhouse	3+ bed	34,057	33,025		-1,032	-3.0		-1.8
Middle	Apartment	1-2 bed	95,938	103,493		7,555	7.9		11.9
Middle	Apartment	3+ bed	7,460	18,403		10,943	146.7		117.1
Outer	House	1-2 bed	36,640	29,501		-7,139	-19.5		-28.2
Outer	House	3+ bed	343,782	335,199		-8,583	-2.5		-2.7
Outer	Townhouse	1-2 bed	55,116	36,461		-18,654	-33.8		-78.1
Outer	Townhouse	3+ bed	33,145	31,162		-1,983	-6.0		-7.6
Outer	Apartment	1-2 bed	27,233	20,683		-6,551	-24.1		-50.0
Outer	Apartment	3+ bed	4,344	6,386		2,042	47.0		60.5
Growth	House	1-2 bed	21,072	15,492		-5,580	-26.5		-63.5
Growth	House	3+ bed	412,500	398,010		-14,490	-3.5		-5.0
Growth	Townhouse	1-2 bed	18,574	12,590		-5,984	-32.2		-68.3

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Growth	Townhouse	3+ bed	31,618	26,621	-4,997	-15.8	-28.3
Growth	Apartment	1-2 bed	4,396	2,854	-1,543	-35.1	-51.5
Growth	Apartment	3+ bed	1,266	1,002	-264	-20.8	-30.2
Regional	House	1-2 bed	23,486	20,080	-3,405	-14.5	-29.1
Regional	House	3+ bed	202,150	190,129	-12,021	-5.9	-13.1
Regional	Townhouse	1-2 bed	20,089	16,739	-3,351	-16.7	-48.0
Regional	Townhouse	3+ bed	7,960	7,202	-757	-9.5	-16.6
Regional	Apartment	1-2 bed	3,440	4,710	1,271	36.9	46.7
Regional	Apartment	3+ bed	514	989	475	92.4	87.6

Source: CIE.

10.29 30 per cent price decrease to apartments in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Price shock to townhouses in Inner, Middle, Outer Melbourne, and established Ballarat/Geelong
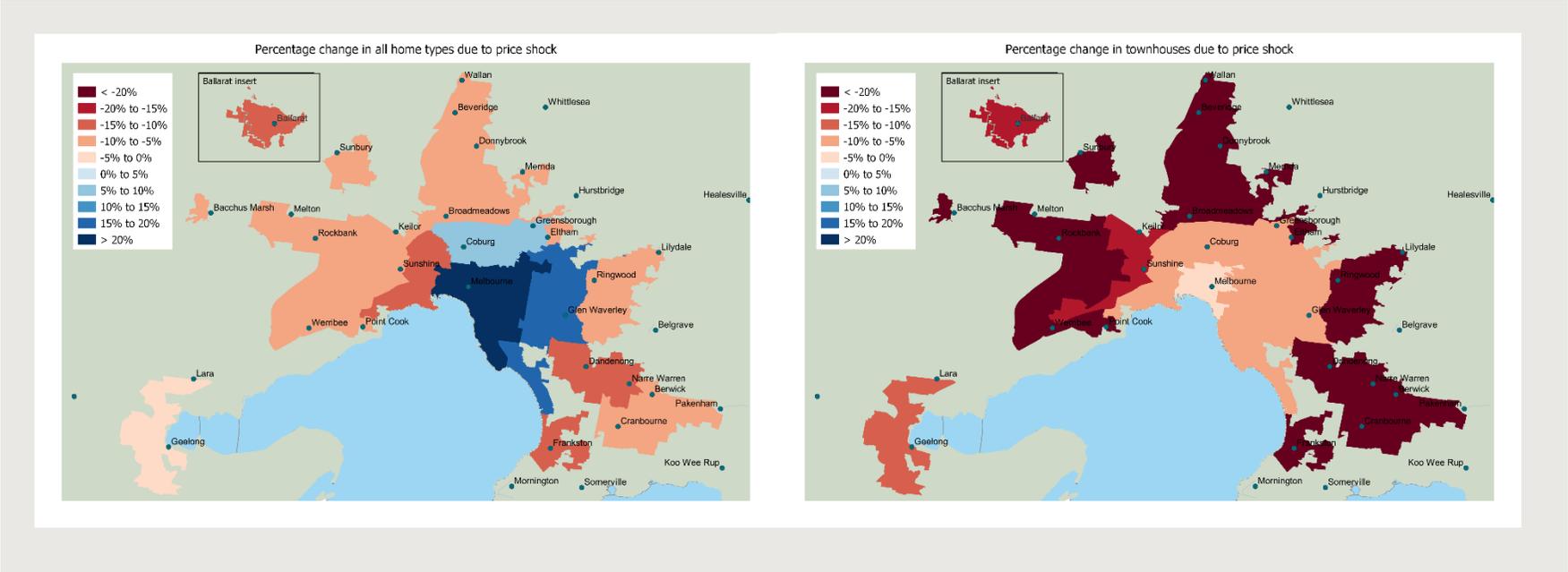
10.30 Headline results for 10 per cent price decrease to townhouses in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,350	-21	-1.5	-0.2
Inner	House	3+ bed	15,507	15,425	-82	-0.5	-0.1
Inner	Townhouse	1-2 bed	4,842	11,493	6,650	137.3	21.6
Inner	Townhouse	3+ bed	7,804	11,632	3,828	49.0	8.5
Inner	Apartment	1-2 bed	145,858	136,518	-9,340	-6.4	-6.0
Inner	Apartment	3+ bed	8,739	8,498	-241	-2.8	-1.2
Middle	House	1-2 bed	17,095	16,205	-889	-5.2	-2.6
Middle	House	3+ bed	86,942	85,650	-1,293	-1.5	-0.5
Middle	Townhouse	1-2 bed	33,485	53,932	20,447	61.1	42.1
Middle	Townhouse	3+ bed	34,057	47,102	13,046	38.3	22.8
Middle	Apartment	1-2 bed	95,938	89,719	-6,219	-6.5	-9.8
Middle	Apartment	3+ bed	7,460	7,152	-308	-4.1	-3.3
Outer	House	1-2 bed	36,640	34,454	-2,186	-6.0	-8.6
Outer	House	3+ bed	343,782	334,386	-9,396	-2.7	-3.0
Outer	Townhouse	1-2 bed	55,116	56,464	1,349	2.4	5.6
Outer	Townhouse	3+ bed	33,145	44,672	11,527	34.8	44.2
Outer	Apartment	1-2 bed	27,233	25,498	-1,736	-6.4	-13.3
Outer	Apartment	3+ bed	4,344	4,097	-247	-5.7	-7.3
Growth	House	1-2 bed	21,072	19,725	-1,347	-6.4	-15.3
Growth	House	3+ bed	412,500	397,860	-14,640	-3.5	-5.1
Growth	Townhouse	1-2 bed	18,574	17,363	-1,211	-6.5	-13.8

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Growth	Townhouse	3+ bed	31,618	29,909	-1,709	-5.4	-9.7
Growth	Apartment	1-2 bed	4,396	4,117	-280	-6.4	-9.3
Growth	Apartment	3+ bed	1,266	1,199	-67	-5.3	-7.7
Regional	House	1-2 bed	23,486	22,179	-1,307	-5.6	-11.2
Regional	House	3+ bed	202,150	196,227	-5,923	-2.9	-6.4
Regional	Townhouse	1-2 bed	20,089	20,705	615	3.1	8.8
Regional	Townhouse	3+ bed	7,960	9,237	1,278	16.1	28.0
Regional	Apartment	1-2 bed	3,440	3,165	-274	-8.0	-10.1
Regional	Apartment	3+ bed	514	490	-24	-4.7	-4.4

Source: CIE.

10.31 10 per cent price decrease to townhouses in Inner, Middle, Outer Melbourne and established Ballarat/Geelong
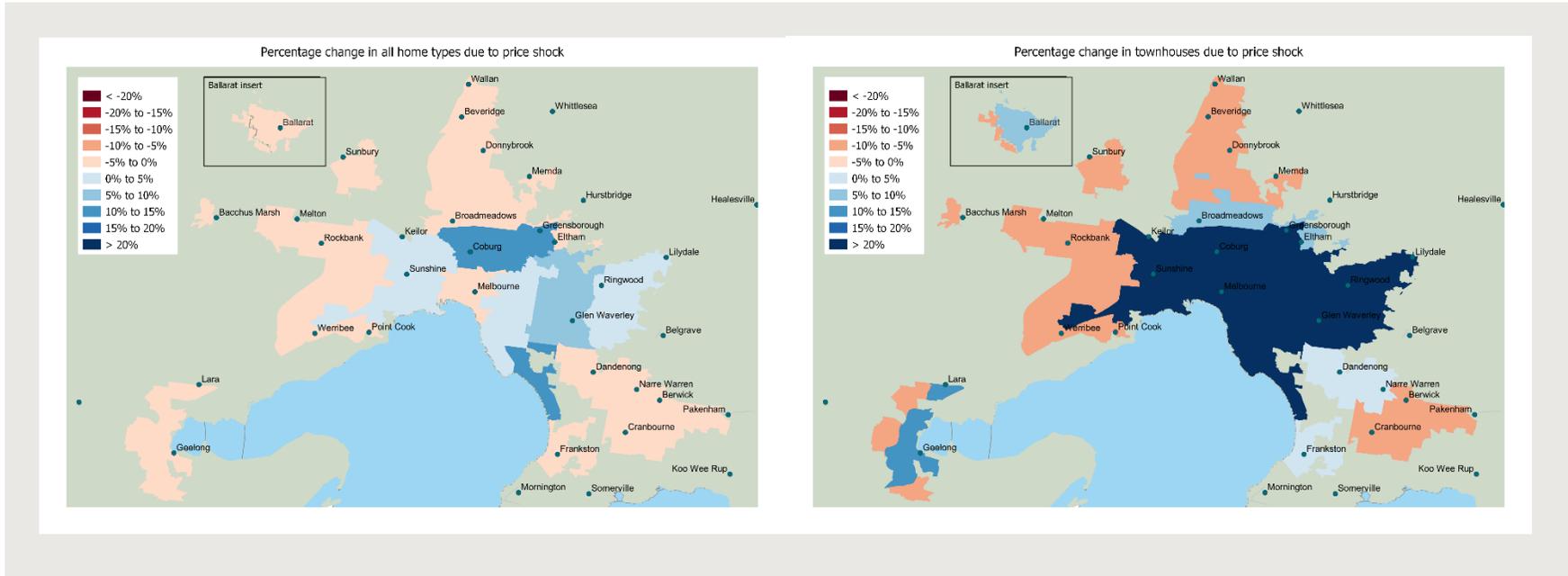

Source: CIE

10.32 Headline results for 20 per cent price decrease to townhouses in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand		Shocked demand vs baseline demand			Shock impact as a proportion of stock
						#	per cent		per cent
Inner	House	1-2 bed	1,370	1,331		-39	-2.9		-0.3
Inner	House	3+ bed	15,507	15,354		-152	-1.0		-0.1
Inner	Townhouse	1-2 bed	4,842	14,973		10,130	209.2		32.9
Inner	Townhouse	3+ bed	7,804	14,906		7,102	91.0		15.8
Inner	Apartment	1-2 bed	145,858	120,337		-25,521	-17.5		-16.5
Inner	Apartment	3+ bed	8,739	8,304		-435	-5.0		-2.3
Middle	House	1-2 bed	17,095	15,652		-1,443	-8.4		-4.2
Middle	House	3+ bed	86,942	84,666		-2,277	-2.6		-0.8
Middle	Townhouse	1-2 bed	33,485	86,312		52,826	157.8		108.8
Middle	Townhouse	3+ bed	34,057	67,172		33,115	97.2		57.9
Middle	Apartment	1-2 bed	95,938	75,763		-20,175	-21.0		-31.8
Middle	Apartment	3+ bed	7,460	6,909		-551	-7.4		-5.9
Outer	House	1-2 bed	36,640	30,911		-5,729	-15.6		-22.7
Outer	House	3+ bed	343,782	326,981		-16,801	-4.9		-5.3
Outer	Townhouse	1-2 bed	55,116	57,258		2,142	3.9		9.0
Outer	Townhouse	3+ bed	33,145	58,883		25,738	77.7		98.6
Outer	Apartment	1-2 bed	27,233	20,962		-6,271	-23.0		-47.9
Outer	Apartment	3+ bed	4,344	3,849		-495	-11.4		-14.7
Growth	House	1-2 bed	21,072	17,304		-3,768	-17.9		-42.9
Growth	House	3+ bed	412,500	386,168		-26,332	-6.4		-9.1
Growth	Townhouse	1-2 bed	18,574	14,868		-3,706	-20.0		-42.3
Growth	Townhouse	3+ bed	31,618	27,773		-3,845	-12.2		-21.8
Growth	Apartment	1-2 bed	4,396	3,483		-914	-20.8		-30.5
Growth	Apartment	3+ bed	1,266	1,095		-171	-13.5		-19.6

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Regional	House	1-2 bed	23,486	20,404	-3,082	-13.1	-26.3
Regional	House	3+ bed	202,150	189,177	-12,973	-6.4	-14.1
Regional	Townhouse	1-2 bed	20,089	20,575	486	2.4	7.0
Regional	Townhouse	3+ bed	7,960	11,825	3,866	48.6	84.6
Regional	Apartment	1-2 bed	3,440	2,771	-669	-19.5	-24.6
Regional	Apartment	3+ bed	514	457	-56	-11.0	-10.4

Source: CIE.

10.33 20 per cent price decrease to townhouses in Inner, Middle, Outer Melbourne and established Ballarat/Geelong
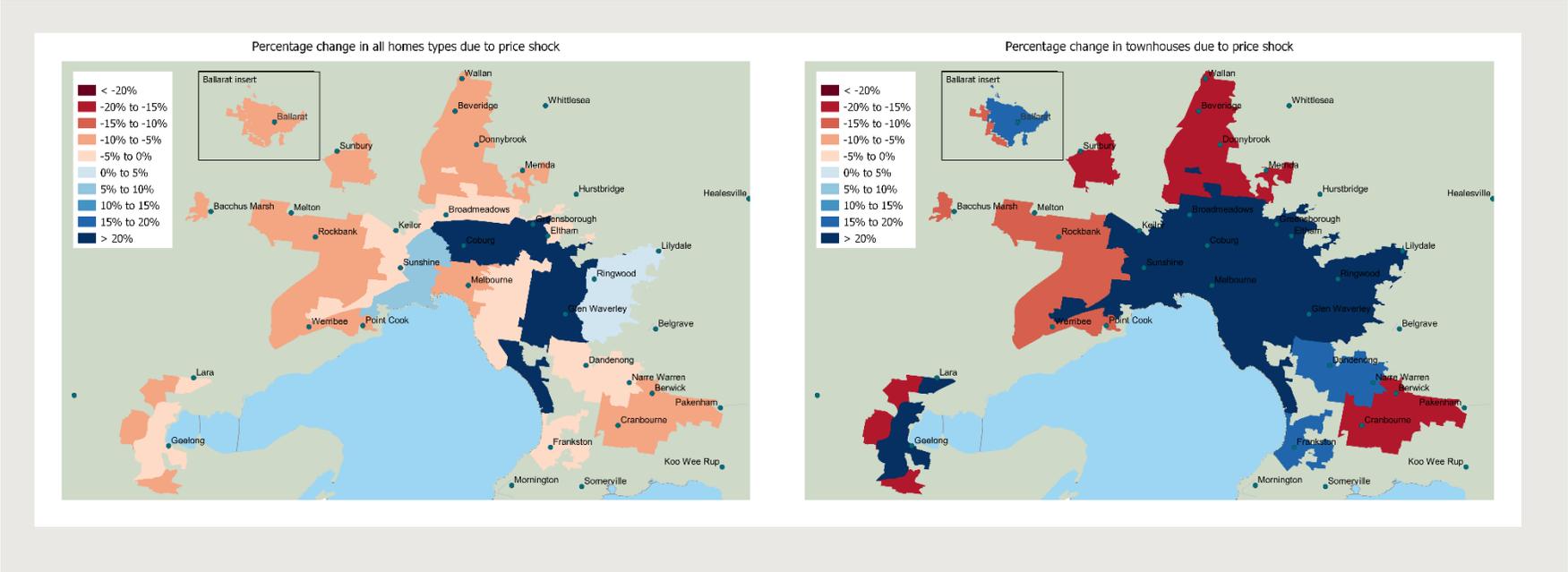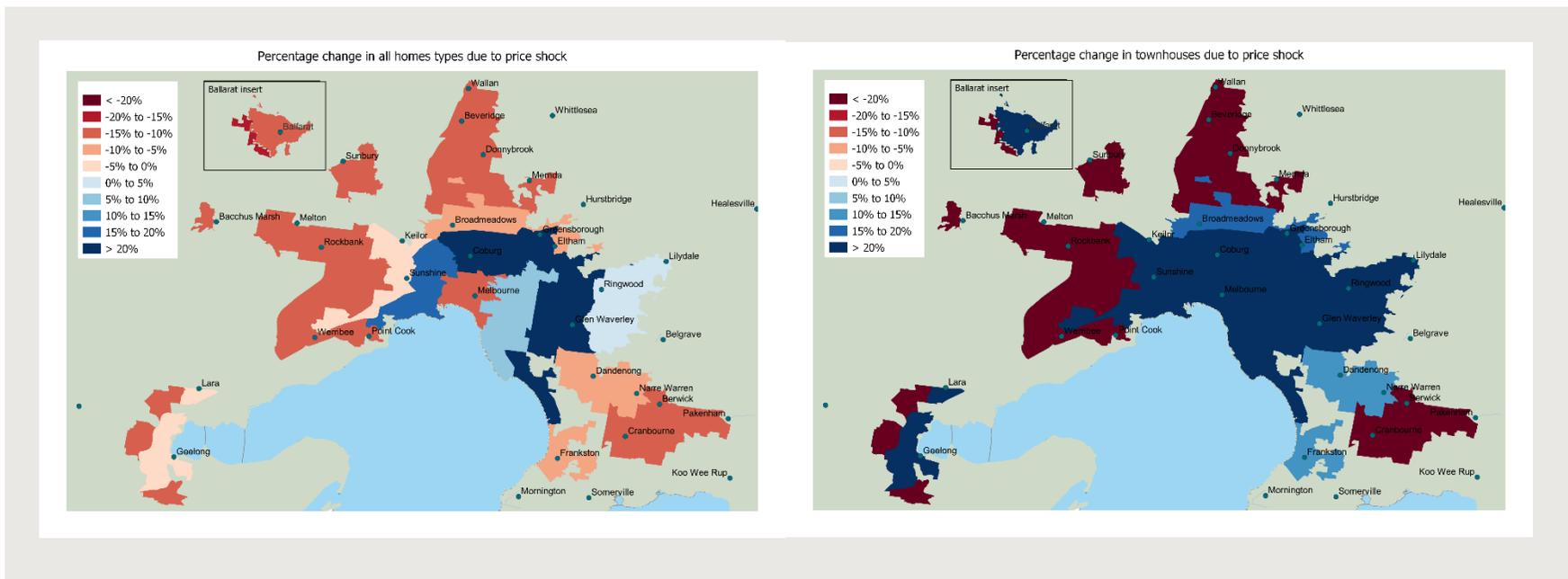

Source: CIE

10.34 Headline results for 30 per cent price decrease to townhouses in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand		Shock impact as a proportion of stock
					#	per cent	per cent
Inner	House	1-2 bed	1,370	1,312	-58	-4.2	-0.5
Inner	House	3+ bed	15,507	15,294	-213	-1.4	-0.2
Inner	Townhouse	1-2 bed	4,842	24,034	19,192	396.3	62.4
Inner	Townhouse	3+ bed	7,804	26,095	18,290	234.4	40.7
Inner	Apartment	1-2 bed	145,858	105,729	-40,130	-27.5	-26.0
Inner	Apartment	3+ bed	8,739	8,065	-674	-7.7	-3.5
Middle	House	1-2 bed	17,095	14,980	-2,114	-12.4	-6.1
Middle	House	3+ bed	86,942	83,753	-3,190	-3.7	-1.2
Middle	Townhouse	1-2 bed	33,485	103,812	70,326	210.0	144.9
Middle	Townhouse	3+ bed	34,057	104,132	70,075	205.8	122.5
Middle	Apartment	1-2 bed	95,938	65,011	-30,927	-32.2	-48.8
Middle	Apartment	3+ bed	7,460	6,633	-827	-11.1	-8.8
Outer	House	1-2 bed	36,640	28,273	-8,367	-22.8	-33.1
Outer	House	3+ bed	343,782	318,733	-25,049	-7.3	-7.9
Outer	Townhouse	1-2 bed	55,116	52,362	-2,753	-5.0	-11.5
Outer	Townhouse	3+ bed	33,145	61,447	28,302	85.4	108.5
Outer	Apartment	1-2 bed	27,233	17,637	-9,596	-35.2	-73.3
Outer	Apartment	3+ bed	4,344	3,560	-784	-18.1	-23.2
Growth	House	1-2 bed	21,072	15,036	-6,036	-28.6	-68.7
Growth	House	3+ bed	412,500	372,534	-39,966	-9.7	-13.9
Growth	Townhouse	1-2 bed	18,574	12,696	-5,878	-31.6	-67.1
Growth	Townhouse	3+ bed	31,618	25,210	-6,408	-20.3	-36.3
Growth	Apartment	1-2 bed	4,396	2,957	-1,440	-32.7	-48.1
Growth	Apartment	3+ bed	1,266	973	-292	-23.1	-33.5

Location	Type	Size	Baseline demand	Shocked demand	Shocked demand vs baseline demand			Shock impact as a proportion of stock
					#	per cent		per cent
Regional	House	1-2 bed	23,486	18,704	-4,781	-20.4		-40.8
Regional	House	3+ bed	202,150	180,994	-21,156	-10.5		-23.0
Regional	Townhouse	1-2 bed	20,089	20,959	869	4.3		12.5
Regional	Townhouse	3+ bed	7,960	12,620	4,660	58.5		102.0
Regional	Apartment	1-2 bed	3,440	2,454	-985	-28.6		-36.2
Regional	Apartment	3+ bed	514	424	-90	-17.6		-16.6

Source: CIE.

10.35 30 per cent price decrease to townhouses in Inner, Middle, Outer Melbourne and established Ballarat/Geelong

Percentage change in all homes types due to price shock

Percentage change in townhouses due to price shock

Source: CIE

11 Hedonic equations for prices in market share model

11.1 Hedonic equations for 'For sale' home options

	House	Townhouse	Apartment 2-3 storey	Apartment 4-10 storey	Apartment 11+ storey
	Coef.	Coef.	Coef.	Coef.	Coef.
Intercept	14.313	13.741	12.845	12.845	12.845
Current quarter	0.260	0.192	0.094	0.094	0.094
Middle North	-1.143	-0.760	-0.315	-0.315	-0.315
Middle West	-1.063	-0.748	-0.401	-0.401	-0.401
Inner metro	-0.401	-0.250	-0.182	-0.182	-0.182
Inner South East	-0.592	-0.329	-0.147	-0.147	-0.147
Middle East	-1.039	-0.650	-0.276	-0.276	-0.276
Middle South	-1.154	-0.695	-0.290	-0.290	-0.290
Outer North	-1.560	-1.110	-0.600	-0.600	-0.600
Growth North	-1.718	-1.273	-0.725	-0.725	-0.725
Outer West	-1.644	-1.175	-0.684	-0.684	-0.684
Outer East	-1.433	-0.919	-0.409	-0.409	-0.409
Growth South	-1.687	-1.212	-0.666	-0.666	-0.666
Outer South	-1.587	-1.084	-0.647	-0.647	-0.647
Growth West	-1.746	-1.310	-0.736	-0.736	-0.736
Ballarat established	-1.943	-1.555	-0.694	-0.694	-0.694
Geelong established	-1.667	-1.096	-0.307	-0.307	-0.307
Ballarat growth	-1.943	-1.555	-0.694	-0.694	-0.694
Geelong growth	-1.667	-1.096	-0.307	-0.307	-0.307
Beds: 2	0.358	0.266	0.438	0.438	0.438
Beds: 3	0.486	0.464	0.705	0.705	0.705
Beds: 4	0.632	0.659	0.960	0.960	0.960
Beds: 5	0.764	0.000	0.000	0.000	0.000
Parking:1	0.024	0.034	0.187	0.187	0.187
Parking:2	0.053	0.078	0.337	0.337	0.337
Interactions: location and bedrooms					
Middle North 2	-0.072				
Middle North 3	-0.038				
Middle North 4	-0.011				
Middle North 5	0.009				
Middle West 1	0.100				

	House	Townhouse	Apartment 2-3 storey	Apartment 4-10 storey	Apartment 11+ storey
	Coef.	Coef.	Coef.	Coef.	Coef.
Middle West 2	-0.127				
Middle West 3	-0.075				
Middle West 4	-0.052				
Middle West 5	-0.015				
Inner metro 1	0.160				
Inner metro 2	0.002				
Inner metro 3	-0.109				
Inner metro 4	-0.139				
Inner metro 5	-0.090				
Inner South East 2	-0.092				
Inner South East 3	-0.038				
Inner South East 4	0.003				
Inner South East 5	0.048				
Inner South East 1	0.028				
Middle East 1	0.134				
Middle East 2	0.017				
Middle East 3	0.024				
Middle East 4	0.041				
Middle East 5	0.077				
Middle South 1	0.018				
Middle South 3	-0.015				
Middle South 4	-0.004				
Middle South 5	0.015				
Middle South 2	-0.077				
Outer North 1	0.000				
Outer North 2	-0.067				
Outer North 3	0.011				
Outer North 4	0.028				
Outer North 5	0.059				
Growth North 1	0.020				
Growth North 2	-0.117				
Growth North 3	-0.038				
Growth North 4	0.000				
Growth North 5	0.044				
Outer West 1	0.105				
Outer West 2	-0.072				
Outer West 3	-0.007				
Outer West 4	0.006				
Outer West 5	0.016				
Outer East 1	0.113				

	House	Townhouse	Apartment 2-3 storey	Apartment 4-10 storey	Apartment 11+ storey
	Coef.	Coef.	Coef.	Coef.	Coef.
Outer East 2	-0.046				
Outer East 3	0.054				
Outer East 4	0.072				
Outer East 5	0.091				
Growth South 1	0.115				
Growth South 2	-0.072				
Growth South 3	-0.029				
Growth South 4	0.001				
Growth South 5	0.037				
Outer South 2	-0.064				
Outer South 3	0.009				
Outer South 4	0.023				
Outer South 5	0.048				
Outer South 1	-0.011				
Growth West 3	-0.051				
Growth West 4	-0.015				
Growth West 5	0.022				
Growth West 2	-0.153				
Growth West 1	-0.101				

Note: Dependent variable is ln(price); based on Infrastructure Victoria hedonic equations. Variables not used in the market share model, such as additional quarterly dummies, are excluded from the table.
Source: CIE

11.2 Hedonic equations for 'For rent' home options

	House	Townhouse	Apartment 2-3 storey	Apartment 4-10 storey	Apartment 11+ storey
	Coef.	Coef.	Coef.	Coef.	Coef.
Beds: 2	0.3364895	0.2863394	0.2480612	0.2480612	0.2480612
Beds: 3	0.4883412	0.487467	0.532523	0.532523	0.532523
Beds: 4	0.6570264	0.6955656	0.706031	0.706031	0.706031
Beds: 5	0.8373248	0.7858898	0.6443108	0.6443108	0.6443108
Car spaces: 1	-0.001416	0.0793937	0.0763784	0.0763784	0.0763784
Car spaces: 2	0.0438265	0.1549896	0.2585293	0.2585293	0.2585293
Quarter dummy	0.1127313	0.0729357	-0.044115	-0.044115	-0.044115
Geelong	0.1410727	0.2256554	0.3829228	0.3829228	0.3829228
Growth North	0.1136974	0.187085	0.1911604	0.1911604	0.1911604
Growth South	0.1061002	0.1421614	0.1483647	0.1483647	0.1483647
Growth West	0.0595956	0.148698	0.2328055	0.2328055	0.2328055
Inner South East	0.7439791	0.6477544	0.5255092	0.5255092	0.5255092
Inner metro	0.847902	0.7704289	0.6493862	0.6493862	0.6493862
Middle East	0.3699342	0.465963	0.42563	0.42563	0.42563

	House	Townhouse	Apartment 2-3 storey	Apartment 4-10 storey	Apartment 11+ storey
	Coef.	Coef.	Coef.	Coef.	Coef.
Middle North	0.4486953	0.4626196	0.4302079	0.4302079	0.4302079
Middle South	0.4367668	0.4584799	0.405836	0.405836	0.405836
Middle West	0.4413508	0.4614489	0.3660214	0.3660214	0.3660214
Outer East	0.2602578	0.3292681	0.3479025	0.3479025	0.3479025
Outer North	0.1772369	0.2881349	0.2957076	0.2957076	0.2957076
Outer South	0.1634811	0.2468379	0.1604175	0.1604175	0.1604175
Outer West	0.0956867	0.2077459	0.1882711	0.1882711	0.1882711
(Constant)	5.202698	5.107624	5.216992	5.216992	5.216992

Note: Dependent variable is ln(rent). Variables not used in the market share model, such as additional quarterly dummies, are excluded from the table.

Source: CIE