GRATTAN
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The housing we'd choose

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Overview

Housing matters. Building enough of the right housing not only provides for our individual choices, but also sets the structure of our cities, which, in turn, can affect issues such as the time we spend commuting (and in congestion), the cost of infrastructure, even the continued concentration of economic and social vulnerability at the fringes of our cities.

This report explores the relationship between the housing we say we want and the housing we have. It tests a hypothesis that housing demand and housing stock do not meet: in other words, that the housing in our cities is not a good match for the choices and trade-offs that people would make if they could.

The report is in two parts. To bring data to a discussion that can sometimes seem evidence-free, Grattan commissioned a survey of more than 700 residents of Sydney and Melbourne to discover their housing preferences. The survey asked respondents what home they would like to live in, taking into account realities such as current housing costs and their income. This often required respondents to make trade-offs between size and type of housing, and its location.

Once these trade-offs are taken into account, big differences emerge between the housing Australians say they'd choose and the stock we have. In particular, there are large shortages of semi-detached homes and apartments in the middle and outer areas of both Melbourne and Sydney.

Construction of new dwellings in the last ten years has not reduced the gap between the housing people say they want, and the housing we have. In Sydney, the volume of construction has contracted sharply. In Melbourne, detached homes in outer and fringe areas have predominated.

If people say they want different types of housing, why aren't they being built? The answers are largely to be found in the incentives facing residential developers. Through interviews with developers, banks, builders, councils and others, along with our own analysis, we discovered a range of reasons why some housing types are not being built where people say they would like to live. These include financing practices, planning and land issues and material and labour costs.

If we are serious about shaping our cities in the directions residents say they want to see, the incentives facing developers would have to change.

Once housing is built, it lasts for a long time, and can be costly or impossible to modify. For this reason, it is urgent that what people say about how they want to live is embedded in all our discussions about housing in Australia.

We should not be afraid to shape our cities: otherwise we risk them shaping us. But we should shape them in accordance with what Australians say they would choose.

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1. Introduction

1.1 What this report is about

The kind of house we live in and its location is of fundamental importance to us. It affects our everyday lives in a multitude of ways: the length of the daily commute; our choices about bringing up and educating our children; even how often we see family and friends. We know that moving house is one of the more stressful experiences life has to offer. And for the 65% of Australians who own their own homes, a house is usually by far the largest purchase we will make in our lifetime, a purchase that is often part-investment as well as involving considerations about where and in what type of house we want to live.

This report centres on the kind of housing we have, what is being built, and where. It tests a central hypothesis that housing in our cities is not a good match for the choices and trade-offs that people would make if they could – trade-offs between type of house, size and location.

There are many assumptions, but very little actual data available on the housing preferences of Australians. The only certainty seems to be that when people are asked to choose anything they want, they typically say they'd like a large detached house near the centre of the city. But real people also know that in the real world, we don't always get everything that we want; we make all sorts of considered trade-offs every day.

Meanwhile, the public debate about housing in Australia is dominated by commentary on the price of a detached house-and-land package,[1] and tends to focus disproportionately on one household type, that of young families. Of course house prices are very important, and couples with children are an important part of Australian society, but there are other important questions as well.

This report considers not just what is being built today, but rather how all the housing in Sydney and Melbourne matches up to the choices people say they would like to make. It does not just examine the choices of those who are looking to buy something in the near future, but instead asks a sample of the whole population about the housing trade-offs they would choose.

Building enough of the right housing is not only important for the individual needs and preferences of Australians, but also for the structure of our cities. As with the congestion that can follow many individual choices to travel by car, there are trade-offs for cities associated both with more compact housing (such as less living space) and with many detached houses (such as more expensive infrastructure, potentially longer commutes, and higher transport and electricity costs).

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[1] This framing of housing affordability neglects ongoing costs (e.g. transport and energy) of living in a particular type of dwelling, in a specific location. Other factors include the affordability of mortgage payments and vulnerability to interest rate rises (see Dodson and Sipe (2008)). It is also important to acknowledge that a comprehensive understanding of affordability would include non-monetary factors, such as the time and social costs of commuting. For a recent example of these social costs see Sandow (2011).

This is a fraught area often characterised by loud voices and a variety of myths and assumptions. One of the main goals of this report is to bring some data to a conversation that sometimes seems to lack evidence.

Due to time and resource constraints, the report looks at housing in Sydney and Melbourne. A similar approach could be applied to other major cities in Australia; the results may, of course, differ.

This analysis will be followed with by a second report containing policy recommendations. During its preparation, we look forward to hearing a wide range of views about what they might be.

1.2 What this report is not about

Because of the complexity of the housing market, it is important to be clear about the aims of this paper. Among the most publicised – and undoubtedly important – aspects of housing that are **not the explicit focus** of this analysis are:

- house prices and housing affordability
- home ownership rates
- an assessment of the overall shortfall of housing

The report will also not focus on a range of external factors that could affect what we want and need. These include the effect of natural resource constraints, especially energy. A substantial shift in energy costs in the long term could make living far from work unaffordable. Similarly, the cost of heating and cooling houses may reach a point where it starts to significantly change the size and type of dwellings people want.

Given such uncertainties, the goal of the report is not to predict future levels of housing demand and supply, but rather to compare what people say they would choose today to both the existing housing stock and what is being built. This critical perspective should be embedded in any discussion about the future of Australia's cities.

1.3 Report structure

Chapter 2 lays out our methodological approach.

Chapter 3 presents the results of primary research into what people think of different aspects of housing, along with how they rank these features. It concludes with survey results of the housing preferences of residents of Sydney and Melbourne, broken down by type and location.

Chapter 4 looks at the current housing stock in Melbourne and Sydney and compares this with the housing we say we want.

In order to see whether construction is closing the gap between what we have and what we want, **Chapter 5** looks at what has been built in each city over the last decade, and unpicks the incentives faced by developers in the market.

Chapter 6 concludes by asking what all this adds up to, and lays out next steps.

2. Methodology

2.1 Demand and supply in the housing market

To test the hypothesis that housing in our cities is not a good match for the realistic trade-offs that people say they would make, we split the market in two, as shown in Figure 1.

Of course, this split is somewhat artificial: there is significant interplay between the two sides of the market. Changing tastes can shape the type and quality of dwellings that are built. The existing stock also influences aspirations, and hence people's preferences and willingness to pay for certain types of housing.

Figure 1 – Forces driving demand and supply
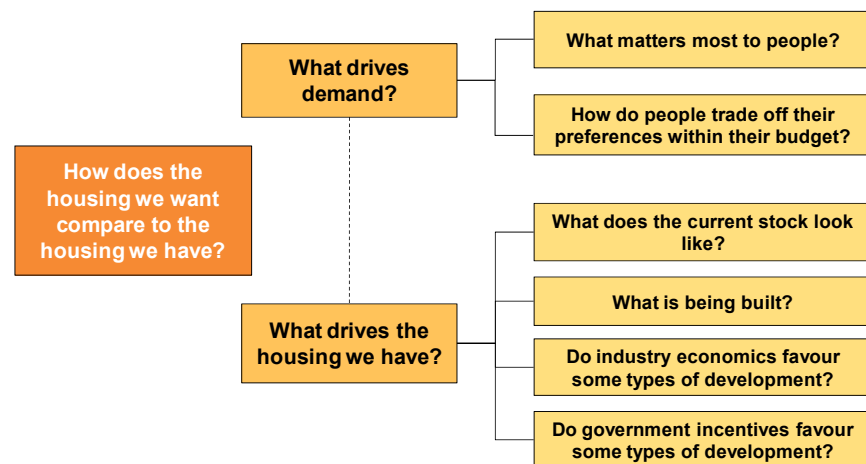
2.2 Analysing demand

Our analysis of demand included two strands of research:

1. **Housing Attributes:** primary research on the relative importance of different characteristics of housing, or housing attributes. This research was in two parts.

   a. Qualitative research based on six focus groups held in Melbourne and Sydney. The focus group work aimed to identify housing features commonly regarded as desirable, and provide a richer understanding of *why* people valued these attributes.[2]

   b. A quantitative online survey: '*What Matters Most?*', which asked 706 people in Melbourne and Sydney to *prioritise* housing features (from a list of 57 variables relating to both dwelling and locational attributes. See Appendix A for a full description.)

2. **Making Trade-Offs:** primary research on how people across the whole population *trade off* the type, size and location of dwellings, based on a quantitative online survey of 572 people (this was based on '*Trade-off Survey*' described in Appendix B)

The primary output from this second strand of research was a *Trade-Off Model* that sought to place real-world constraints on

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[2] Sweeney Research's Final Report is available at www.grattan.edu.au.

people's housing preferences. The outline of the *Trade-Off Survey* was as follows:

- Each respondent's housing budget constraint was calculated based on individual income and net assets. Whether respondents had the financial means to afford a particular housing option depended on whether they were renting or buying (renters' and buyers' preferences were analysed separately). The income profile and tenure of the random sample was broadly representative of the population as a whole.

- Respondents in each city were presented with four housing options at a time, drawn from 48 possible options that differed by:
  - **type** (detached, semi-detached, flats of two to three storeys, flats of four or more storeys);
  - **size** (smallest, medium-size, largest); and
  - **location** ('Zone 1', 'Zone 2', 'Zone 3' and 'Zone 4'), which differed according to whether respondents lived in Sydney or Melbourne (see Box 2.1 for definitions);

- Each option was described in a variety of ways, including:
  - an image showing the outside of the dwelling (with an accompanying description);
  - a map showing in which part of the relevant city (Sydney or Melbourne) the option was located;
  - a 3D, scaled floor plan, illustrating the size of the interior; and
  - a price (price for renters was given in weekly rent; for buyers it was given in terms of monthly mortgage repayments).

- Respondents nominated their most and least preferred option from the four presented, repeating this process 16 times.

- The preferred mix of housing for each city was calculated by combining the budget-constrained preferences of buyers and renters, with housing options costed at current levels.

2.3 Analysing stock and supply

Research on the housing **stock** (all the houses which currently exist) centred on a high-level analysis of housing in Sydney and Melbourne.

Research on the **supply** of new dwellings sought to unpick the range of incentives that motivate private developers to produce particular types of dwellings in various locations.[3] In particular, we wanted to clarify:

- the most important factors in deciding the type and location of dwellings; and

- if public policy could influence any of those factors.

As well as reviewing existing literature on incentives and barriers, Grattan conducted 20 interviews among developers, builders, municipal councils, planners, state governments, and bankers (for a full list of interviewees, see Appendix C). We took care to interview a cross-section of developers in terms of market share, location of activity, and housing type focus.

We also consulted members of the National Housing Supply Council, peak property groups and others, as well as academics conducting research in the area.

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[3] Public housing, which constitutes ~4% of housing stock, is out of scope in this report.

Box 2.1 Definitions of type; size; and locations

House Types

Group	Comment
Detached	Sometimes referred to as 'separate houses'. Detached houses vary significantly in size
Semi-Detached	Includes townhouses, terrace houses, row houses, courtyard houses and villa units.
Up to 3 Storeys	Sometimes referred to as 'low rise' or 'walk ups' these are apartments or units in buildings up to 3 storeys
4 Storeys and above	This covers a range of buildings – including high-rise apartments, and blocks of flats. This report focuses its attention on apartments in buildings 5-8 storeys.

House Sizes

House size was proxied by the number of bedrooms. Each type was assigned a 'small', 'medium' and 'large' option, as follows:

Number of bedrooms	Small	Medium	Large
Detached	2	3	4
Semi-Detached	2	3	3
Up to 3 Storeys	1	2	3
4 Storeys and above	1	2	3

Zones

Sydney and Melbourne were each split into four zones based on land prices. (See Appendix B for details)

SYDNEY   MELBOURNE

Legend
Zone 4
Zone 3
Zone 2
Zone 1
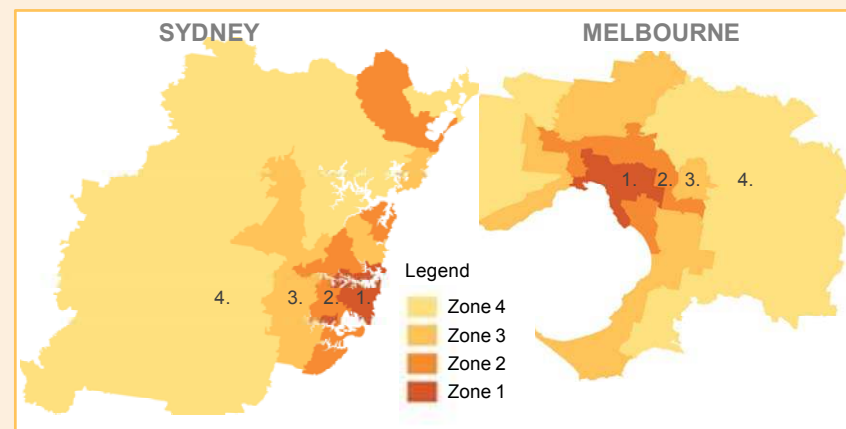
Source: Grattan estimates based on ABS (2006) and unpublished RP data

3.   Understanding demand

This section provides an overview of demand for dwellings of different types, and in different locations. Demand is understood as the combination of preferences (what people ideally want) and constraints (how much they can afford, and what things cost). The concept of demand, as used here, encompasses not just the preferences and constraints of people "in the market" today, *but the population as a whole*. It therefore reflects the housing that residents overall say they want, providing a picture of the city that residents would like to choose.

The section starts by exploring people's *preferences*. Based on previous research findings and the results of six focus groups in Melbourne and Sydney, we identify dwelling features and location attributes that are frequently regarded as desirable. Using an online survey of 706 people we then ask: which of these attributes matters most? How do people prioritise dwelling features and location?

The section concludes by introducing real-world costs to housing choices. It presents the results of a survey in which people explicitly made *trade-offs* based on current housing costs and how much they could spend. As the sample is broadly representative, the output of this analysis reflects the *mix* of housing types and locations that city residents say they would choose in today's world.

3.1   What do people want in a world where they can have anything?

There is a broad consensus in the literature that most Australians aspire to own a large, detached house.[4]

To bring the research up to date, and to investigate why particular aspirations prevail, Grattan commissioned six focus groups in Melbourne and Sydney. Groups were divided by household type and age, as outlined in Table 1.

Table 1 – Focus group breakdown

Group	Melbourne	Sydney
Young couples (25-39) with children	✓	
Middle aged couples (35-50) with children		✓
Older couples (45-59) with or without children	✓	
Lone person (45-59)	✓	
Older households (60+)	✓	✓

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[4] This is perhaps best illustrated through surveys of housing preferences. On the issue of house type, for example, Gibbings (1973) found that 86% of Brisbane households wanted detached housing; Kendig (1981) reported that 75% of singles and 95% of couples in Adelaide preferred detached housing; Maddocks (cited in Wulff (1993)) found that 90% of respondents from Sydney, Melbourne, Perth and Townsville preferred a detached house; Thorne (1983) found that 90% of 18-39 year olds in Sydney wanted a detached house; King (1983) reported that 67% of households thinking of moving in Melbourne preferred detached housing; Wulff *et al.* (2004) reporting on work in Perth by the Department of Planning and Infrastructure suggested that 93% of people said the detached housing was either 'very' or 'quite' attractive.

At the aggregate level, the preferences across groups were consistent with previous research. Most households – although not all – aspired to live in a large, detached house.[5] As one participant put it:

> *"A quarter-acre block, detached… that's the dream."*

The **importance of inside space** (i.e. the number of bedrooms, living areas etc.) was repeatedly emphasised, particularly among middle-age families with children. Lone-person households were less focussed on internal space, but nonetheless maintained a preference for larger dwellings. Some respondents in the 60+ age groups discussed the difficulties involved with maintaining a large home – but infrequently went as far as nominating a 'small' dwelling as a preference.[6] Respondents suggested that space offered freedom, flexibility and privacy. In some cases it was even considered to be a right. Lack of space was nominated as one of the primary reasons to reject a house.

Similarly, having a **detached house** was frequently nominated as an aspiration. Consistent with previous research, there was a clear hierarchy of preference in housing type, from the limited appeal of apartments, through to the ideal of a detached house.

As the most 'flexible' option, detached houses were seen to enable self-expression. They provided a sense of privacy and autonomy, offering residents space to relax and act as they pleased without worrying about neighbours:

> *"You have your own little plot – it's yours. When you get home from work and you're tired, you don't need to worry about anything else."*

The dream of "owning your own home" was often automatically associated with a detached house on a block of land, and seen as a mark of success and achievement. The dream is deep in Australia's cultural psyche, as one respondent made plain:

> *"We're born and bred in Australia – we're ingrained and conditioned to have that attitude towards detached homes."*

Equally, people expressed a range of concerns about **apartments**. They were generally seen as too small and lacking outdoor space, a view particularly common among younger families.

The proximity of neighbours (especially above and below) was also seen as a problem. Respondents feared unwanted disturbance, or being forced to modify their own behaviour. They didn't want to have to worry about what others see or hear, and didn't want to see or hear others either. Neighbours were seen as a factor over which people had little control, and the risk of bad neighbours loomed large.

Respondents also worried about the nuisance and expense of body corporate organisations, the risk of 'problematic renters' and the quality of apartment stock. The concern about quality was perhaps one reason why people assumed that very few apartments had any noise privacy:

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[5] We note here that this was coupled with a desire to own a property. Tenure plays an important role in housing choices; however, for the remainder of this section, we focus on dwelling and location preferences.

[6] It is possible that for older households, the preference would change. Our sample was under-representative in the percentage of people over 75 years old (who made up 2% of the sample, compared to 8% in Australia).

"I used to live in flats so I want to stay away now – if someone goes to the toilet in the middle of the night, everyone enjoys the flushing."

In terms of location, people emphasised **safety and security** – both of the home and of the neighbourhood. Proximity to the city was also highlighted, particularly among some older couples.

Households with school-age children stressed the importance of access to good schools. This matched research from overseas (particularly the US) in which schools are an important determinant of an area's attractiveness – although this finding has been less prominent in Australia.[7]

3.2   What matters most to people about housing?

Having identified a series of features widely held to be desirable, our analysis turns to which of these attributes matters most. A household's most preferred housing option may be a detached dwelling that has four bedrooms, is near the city, close to shops, and in the same area as many of their friends and family. But how are these features prioritised? To what extent does the ideal of owning a spacious, detached home dominate all other considerations?

To answer these questions, Grattan commissioned an online survey of 706 people who were asked, 'What matters most when you choose housing?' Because many factors can affect housing choice, the survey included 57 variables that could influence people's housing preferences. Respondents were presented with eight variables at a time, and asked to identify the one that mattered most to their housing choice, and the one that mattered

least. The process was then repeated 18 times, each time with a new systematically chosen selection of eight variables. (For a full description of the *What Matters Most Survey*, including the full list of variables, see Appendix A).

These 57 variables can be divided into four broad categories relating to dwelling features, and features of an area (safety and security; convenience and access; and attractiveness of environment). These categories are illustrated in Figure 2, with examples.

Figure 2 – Overview of attribute categories, with examples

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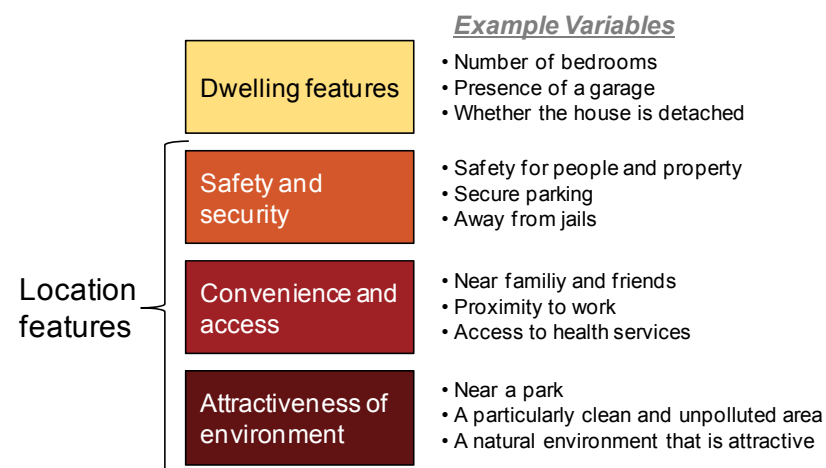
[7] Montgomery and Curtis (2006) p.19.

The results from the survey, aggregated across the full sample, are presented in Figure 3.

Figure 3 – Aggregate *What Matters Most* results[8]

Unsurprisingly, these results suggest that in choosing dwellings, people give priority to the number of bedrooms, having a detached house with a garage, and ample living space. In short, 'bigger is better'.

In terms of location, respondents said they preferred to live in a safe neighourhood, close to family, friends, shopping, and public transport.
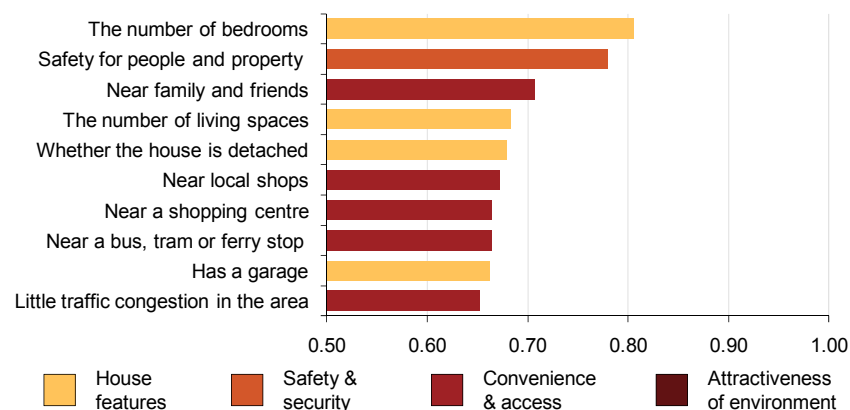
Notably, closeness to work did not rank highly. Although this result seems surprising – and there is some evidence that being

close to work *is* important to people[9] – previous Australian survey evidence (much of which is dated) does not unanimously support the idea that proximity to work is critical to housing choice. The 1980 Melbourne Housing Study, for example, asked nearly 2,000 people to rate aspects of their current suburb that they liked: 'close to employment' ranked 9th.[10] Moreover, the rise of double-income households, along with the frequency with which Australians change jobs, makes the relationship between housing location and employment more complicated.

People of different ages and household types prioritised housing and location attributes in different ways. Lone person households, for example, were much more likely to prioritise location features over dwelling attributes.[11]

In general, though, perhaps the most striking feature of the results at the aggregate level is the *balance* between housing features and those dependent on location. In other words, people value both housing type *and* location. Previous research has often looked at these elements separately.[12] Given real-world budget

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[8] These results represent the differences in the number of times people selected the variable as 'mattering most' and number of times it was chosen as 'mattering least'. Results were then transformed from the *interval* scale they were on (via an exponential transformation), to be on the *ratio* scale presented in Figure 3.

[9] For example, the most comprehensive survey on housing and location preferences (the 1991 Housing and Location Choice Survey of 8,530 households in Melbourne and Sydney) found that proximity to work was the most important locational variable other than price. See Burgess and Skeltys (1992) p.31.

[10] The variable did not feature in the 'dislikes associated with present suburb' analysis. See King (1983) p.85. Around the same time, a Sydney survey of around 800 households living in "medium density" found that for the 32% of households who nominated "convenience" as the primary reason for choosing their current home, the dominant explanations provided were 'being close to relatives or friends' or 'general convenience'– not proximity to work. See Thorne (1983) p.80.

[11] These differences will be discussed in detail in a forthcoming Grattan working paper.

[12] Examples include King (1983), the two surveys reported in Thorne (1983) and Burgess and Skeltys (1992).

constraints, there is inevitably tension in satisfying preferences for both.

3.3 Real-world trade-offs

Having identified housing attributes that people prioritise, the next question was how households *trade off* these attributes when faced with real-world costs and budget constraints.

The difficulty of modelling overall housing demand

There are at least three ways of building a quantitative understanding of these trade-offs:[13]

1. Look at where people live now

2. Look at the newly constructed dwellings that households buy

3. Ask people what they want, given real-world constraints

The first two methods have the advantage of reflecting decisions people actually make, or have made in the past. Yet both have serious disadvantages in terms of methodology and data.

Looking at where people live now provides an imperfect picture of current housing preferences for several reasons:

- **A majority of housing was built over 20 years ago,**[14] when costs, prices and the structure of the city were all very different.

- People **stay in the same house for a long time.** A quarter of Australians have lived in the same house for over 15 years,[15] even though household needs may well change over time.[16]

- **Relatively few houses are available at any one time**. Combined with time constraints and search costs, this lack of choice can lead movers to choose a second-best option.[17]

- **Lack of local choice** (along with the infrequency of property vacancy) means that some households can't live in the type of house they want, in their prefered location.

Looking at newly constructed dwellings provides a more current picture of what housing people want. Yet this sample skews the picture towards the preferences of the subset of the community that buys new dwellings. Turning 'new construction' into a useful picture of overall demand would require data on the personal information of households who bought newly constructed homes. These data are not publicly available.[18]

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[13] Another method to gain insight into preferences is to examine the *growth* in prices and rental yields for dwellings of different types, and in different locations. While this is a potentially useful technique in ascertaining the direction in which preferences are moving over time, it provides little information about the current *mix* of preferences or trade-offs of city residents.

[14] The last major audit of Australia's housing was ABS (1999). At that point less than 40% of housing was less than 20 years old.
[15] ABS (2010).
[16] The view that housing needs change over time is sometimes called the 'life-cycle' or 'housing career' approach to housing demand, which goes back at least as far as Rossi (1955), and has had considerable influence. See Beer and Faulkner (2009) for an excellent review of this literature in the Australian context.
[17] Richardson (1977).
[18] While the ABS collects some demographic data on people purchasing homes, we were unable to find information on those buying *new* homes – which would be a better guide to the preferences of those consumers.

Both these approaches also **ignore supply-side distortions** that may result in construction patterns which are not well matched with demand. A range of possible barriers on the supply side are outlined in Section 5 "Understanding Supply".

A survey approach

To avoid these difficulties and to provide a richer quantitative understanding of the *trade-offs* that apply to the whole population (rather than just people currently "in the housing market"), Grattan adopted a survey approach. In conjunction with the Centre for the Study of Choice (CenSoC) a survey was designed to explore the real world trade-offs people would make between houses of different **type**, **size**, and **location**. Refer to Box 2.1 for definitions of these variables.

572 residents in Sydney and Melbourne completed the survey. The sample was broadly representative of each city's population in terms of income and current housing type/location.[19]

A critical element of CenSoC's modelling was that each survey participant's financial means were taken into account. No-one was ultimately allowed to choose a housing option which was beyond their budget. Given the importance of tenure, the trade-offs of buyers and renters were modelled separately. For a full description of the methodology, see Appendix B.

The *Trade-Off Survey*, of course, had limitations of its own. It could not reproduce the level of learning and thought that goes into a decision to move home. Nor could it present a full spectrum of housing options. Even with 48 discrete options for each city, attributes such as house age, style and quality had to be

standardised to make the survey manageable. Also, while the survey endeavoured to use neutral language and images, some participants may have been influenced by factors beyond the survey's control. Finally, although there is strong evidence in general that people's choices in surveys correspond to the choices they actually make in the market, it remains difficult to verify the extent to which respondents can grasp the hypothetical dwellings and locations they are presented with.[20]

While it is clearly the case that no survey could take into account all the complexity of the real world, it does nevertheless give us powerful new information about the nature of real-world trade-offs people would make.

3.4   *Trade-Off* results: what people said they'd choose

Information collected on participants' choices was modelled for buyers and renters in Sydney and Melbourne.[21]

Although there were differences between renters and buyers, and between Melbourne and Sydney, the main effects of **type**, **location**, and **size** were surprisingly similar across these different groups and cities: households typically preferred large dwellings to small, detached and semi-detached houses to apartments, and living closer to the centre of the city rather than further away.[22]

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[19] A comparison of sample to population averages is provided in Appendix B.

[20] As noted in Morrow-Jones *et al.* (2004) p.176.

[21] This modelling was undertaken by the Centre for the Study of Choice (CenSoC) at UTS. We are extremely grateful to Elisabeth Huynh, Terry Flynn, Edward Wei, Maria Lambides, Karen Cong, Jane Pong and Jordan Louviere for all their efforts and expertise.

[22] It is worth noting here that as initial results suggested a high degree of homogeneity in the way survey respondents made choices, it was decided to identify and estimate what are known as 'covariate by feature' interactions to

These preferences are quantified in Figure 4 for Sydney renters and Melbourne buyers as examples. Full results (including marginal effects) are laid out in Table 13.

In addition to these effects, the modelling included a significant number of interaction effects, which captured preferences for combinations of variables. This allowed the models to estimate the importance of combining, for example, an apartment *with* a central location.

Perhaps most importantly, the **modelling also took into account respondents' financial means**.[23] In the final analysis, people were constrained from choosing options beyond what their budget would allow (based on the current price of housing options). As such, the output of the model provides an estimate of the real-world trade offs people say they would make. These results are summarised in Table 2 for Sydney and Melbourne.

Comparing the two cities, we note the greater proportion of Melburnians who, when faced with real-world prices and budget constraints, say they want to live in detached housing. This can partly be attributable to Sydney's higher land prices (which makes a detached house on a block of land less affordable), but may also reflect the fact that the city of Sydney has a lower percentage of detached housing than Melbourne – which may well shape underlying preferences.

Figure 4 – The effects of type, size and location in the *Trade-Off* model[24]

Sydney renters

Coefficient values

Melbourne buyers

Coefficient values

House type   **Location**   **House Size**
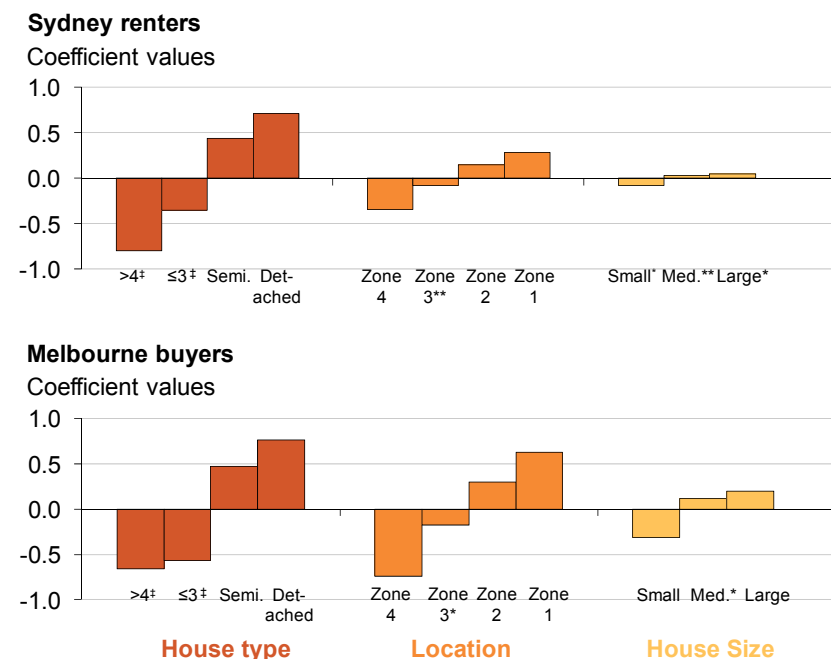
‡ ">4" is an apartment in a building four storeys or above; "≤ 3" is an apartment in a building up to 3 storeys. All estimates are significant at 5% except those indicated by *significant at 10%, **not significant at 10%.

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capture differences by city and segment. The results of these analyses showed that there were significant differences by city, but not by demographic segment.
[23] This was primarily based on reported levels of income and net assets – and calculated by the NAB mortgage calculator. See Appendix B for details.

[24] These marginal effects are coefficients from the conditional logit models, presented in Table 13 (in Appendix B). These numbers represent how the marginal utilities for zone, size and type estimated from the conditional logit models vary across their levels.

Table 2 – Housing *Trade-Off* model results[25]

Sydney					
	Detached	**Semi detached**	**Up to 3 storeys**	**4 storeys & above**	**TOTAL**
Zone 1	9%	4%	2%	5%	20%
Zone 2	9%	7%	4%	5%	26%
Zone 3	12%	7%	4%	6%	30%
Zone 4	10%	6%	5%	4%	25%
TOTAL	**41%**	**25%**	**15%**	**20%**	**100%**

Melbourne					
	Detached	**Semi detached**	**Up to 3 storeys**	**4 storeys & above**	**TOTAL**
Zone 1	8%	6%	3%	5%	22%
Zone 2	14%	8%	4%	4%	30%
Zone 3	14%	6%	3%	3%	26%
Zone 4	12%	6%	2%	2%	22%
TOTAL	**48%**	**26%**	**12%**	**14%**	**100%**

Note: *Values may not sum to 100% due to rounding.*
Zones are defined according to land prices, as laid out in Appendix B.

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[25] These results assume that interest rates, relative prices, and incomes are at current levels. The results are the weighted average of the outcomes for the "conditional" rental model and the "conditional" buyers' model in both cities. Weights were based on the 2006 Census splits of buyers and renters of private dwellings. Note: these values may not sum to 100% due to rounding errors.

Box 3.4 – What difference does changing the price of a detached house make?

A primary strength of the *Trade-Off Model* is the ability to simulate the effect of changes in relative prices. One such change – a decrease in the price of the detached housing options – is presented in Figure 5.

The different coloured bars in Figure 5 represent the change to the *Trade-Off Model* output that result from reducing the price of detached housing by 10%, 20%, and 30% respectively – holding the prices of all non-detached housing options constant.

Reducing the price of detached housing changes the trade-offs people make. Naturally, this shift in relative prices increases the proportion of respondents who can and would choose detached housing. In Sydney, for example, results suggest that a 30% decrease in the price of detached dwellings equates to a 15% increase in the overall proportion of households who would choose a detached house.

An important limitation of these scenarios is that they are *not dynamic*. Rather they are static point estimates of the effect a price change would have. However, the robustness of the model output even to large changes in input prices provides confidence in the results presented in Table 2.

Figure 5 – Effect on *Trade-Off* model results of reducing the relative price of detached housing

Sydney
Change to the % of households choosing a particular housing type
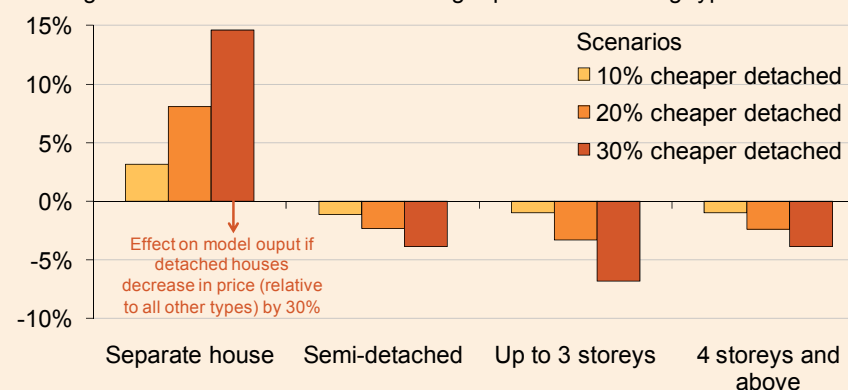
Melbourne
Change to the % of households choosing a particular housing type
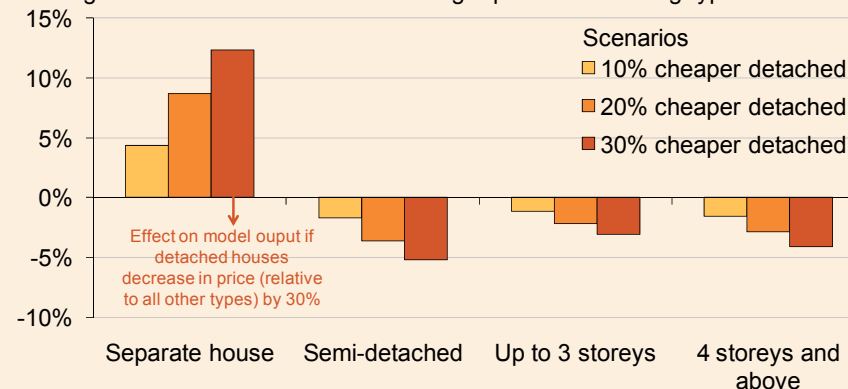
4. The mismatch between demand and stock

How does this picture of what people say they want compare to the housing we have? This section describes the housing in Sydney and Melbourne at a high level before illustrating the potential mismatch between the overall trade-offs city residents say they would make today, and the housing stock we have.

4.1 Housing stock: the housing we have

Australia's housing stock is dominated by detached houses. This mix has changed little over the last 30 years: in 1976, detached houses comprised 78 per cent of Australia's housing stock; in 2006 the share was 74%.[26]

This consistency of the aggregate statistics does conceal some variation – both between cities and, especially, within them. Detached houses are typically more common where land is less expensive, while more central locations (with a higher land price) have a greater percentage of apartments.

Table 3 splits the housing in Sydney and Melbourne by type and location. Although Sydney's stock doesn't differ dramatically from Melbourne's there are important differences. The most notable of these is the higher proportion of detached housing across all parts of Melbourne – and especially in Zones 1, 2 and 3. Also, apartment buildings of 4 storeys and above are roughly three times more common in Sydney than in Melbourne.

Table 3 – Housing stock (2006)[27]

Sydney					
	Detached	Semi detached	Up to 3 storeys	4 storeys & above	TOTAL
Zone 1	6%	4%	6%	6%	23%
Zone 2	14%	3%	5%	2%	25%
Zone 3	20%	3%	4%	1%	28%
Zone 4	21%	2%	1%	0%	25%
TOTAL	**62%**	**12%**	**16%**	**10%**	**100%**

Melbourne					
	Detached	Semi detached	Up to 3 storeys	4 storeys & above	TOTAL
Zone 1	12%	5%	7%	3%	28%
Zone 2	23%	3%	3%	0%	30%
Zone 3	23%	2%	2%	0%	28%
Zone 4	14%	1%	0%	0%	15%
TOTAL	**72%**	**12%**	**13%**	**3%**	**100%**

Source: *2006 Census.*
Note: *Excludes dwellings listed as 'Not stated' and 'Other dwelling'.*

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[26] Census data are available on the ABS website. See Tables 61 and 62 for 1976, and Cat. 2068.0 for 2006.

[27] Although Table 3 does not incorporate construction from 2007 onwards, it is important to note that adding 2007-10 completions data (which are only available at a city-wide level) would have a very limited impact on the figures. In Melbourne, the construction mix from 2007-10 has been very similar to the mix of stock (for example, 2007-10 construction was 70% detached housing, compared to the stock figure of 72%). While in Sydney, only 4% has been added to the overall stock since 2007.

4.2   Mismatch between the housing we want and the stock

There is a clear mismatch between the current stock of housing in Sydney and Melbourne, and the mix of housing respondents say they would choose.

This 'mismatch' is calculated as the difference between the percentage of overall households who say they want a particular combination of house-type and location and the percentage of the overall stock represented by this house type/location option (as outlined in Figure 6).

For example, 7.4% of all Sydney's households say that, given current prices and their budget, they would choose a semi-detached house in Sydney's Zone 3. However, only 2.8% of Sydney's total housing stock are semi-detached dwellings in this area. This leaves 4.6% of Sydney's households (c.70k households) whose preferred trade-offs can't be accommodated by the city's housing.

The mismatch between housing stock and the housing people say they would choose is presented on the next page, in Table 4.

Figure 7 and Figure 8 present areas in which there are **major shortfalls** of particular housing types.[28] The main shortages in Sydney are semi-detached houses in all zones (apart from the Zone 1), and apartments in buildings of 4 storeys and over in Zones 3 and 4.

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[28] As can be seen in Table 4, the mismatch implies a corollary 'oversupply' of some dwelling types in some locations. We have chosen to highlight the major shortfalls since: (i) we are obviously not suggesting that 'oversupplied' dwellings should be demolished, and (ii) if we are interested in providing choices that people don't currently have, shortfalls are more meaningful than oversupply.

In Melbourne, a similar pattern emerges. People's choices in the survey suggested a shortfall of semi-detached houses in Zones 2-4. The results also showed a 4% (c.55k) shortage of apartments in building of 4 storeys and over in Zone 2.

Figure 6 – How the mismatch is calculated

Housing Stock

TABLE 3

	Detached	Semi detached	Up to 3 storeys	4 storeys & above
Zone 1	A_1%	A_2%	…	…
Zone 2	…			
Zone 3	…			
Zone 4	A_{13}%	…	…	A_{16}%

LESS

Housing people say they would choose

TABLE 2

	Detached	Semi detached	Up to 3 storeys	4 storeys & above
Zone 1	B_1%	B_2%	…	…
Zone 2	…			
Zone 3	…			
Zone 4	B_{13}%	…	…	B_{16}%

=

'Mismatch'

TABLE 4

	Detached	Semi detached	Up to 3 storeys	4 storeys & above
Zone 1	$A_1 - B_1$%	$A_2 - B_2$%	…	…
Zone 2	…			
Zone 3	…			
Zone 4	$A_{13} - B_{13}$%	…	…	$A_{16} - B_{16}$%

Table 4 – Overview of the mismatch

Sydney					
	Detached	**Semi detached**	**Up to 3 storeys**	**4 storeys & above**	**TOTAL**
Zone 1	-3%	0%	5%	2%	4%
Zone 2	5%	-4%	1%	-3%	-1%
Zone 3	8%	-5%	-1%	-5%	-2%
Zone 4	12%	-4%	-4%	-4%	0%
TOTAL	**22%**	**-13%**	**1%**	**-10%**	

Melbourne					
	Detached	**Semi detached**	**Up to 3 storeys**	**4 storeys & above**	**TOTAL**
Zone 1	5%	-1%	4%	-2%	6%
Zone 2	9%	-5%	-1%	-4%	-1%
Zone 3	10%	-4%	-1%	-3%	2%
Zone 4	1%	-5%	-1%	-2%	-7%
TOTAL	**24%**	**-15%**	**1%**	**-10%**	

Note: *Values may not sum to 100% due to rounding.*
      Zones are defined according to land prices, as laid out in Appendix B.

Figure 7 – Major shortages in <u>Sydney</u> by dwelling type and location

Zone 4
Trade-Off analysis suggests shortages of:
- c.60k **semi-detached** dwellings
- c.60k **apartments** in buildings up to 3 storeys
- c.60k **apartments** in buildings 4 storeys and above

Zone 3
Trade-Off analysis suggests shortages of:
- c.70k **semi-detached** dwellings
- c.70k **apartments** in buildings 4 storeys and above

Zone 2
Trade-Off analysis suggests shortages of:
- c.65k **semi-detached** dwellings
- c.50k **apartments** in buildings 4 storeys and above

Figure 8 – Major shortages in <u>Melbourne</u> by dwelling type and location

Zone 4
Trade-Off analysis suggests shortages of:
- c.75k **semi-detached** dwellings
- c.25k **apartments** in buildings 4 storeys and above

Zone 2
Trade-Off anaylsis suggests shortages of:
- c.70k **semi-detached** dwellings
- c.55k **apartments** in buildings 4 storeys and above

Zone 3
Trade-Off anaylsis suggests shortages of:
- c.55k **semi-detached** dwellings
- c.45k **apartments** in buildings 4 storeys and above

4.3 Do these shortages exist when prices change?

The major results in terms of mismatches are robust to significant changes in the price of different dwelling types, and the cost of building in different zones.

To illustrate this, Figure 9 shows what happens to the *Trade-Off Model* results for Sydney and Melbourne in three scenarios:

- Semi-detached houses become 30% more expensive

- Housing options in Zone 4 (i.e. on the most affordable land) become 30% cheaper

- Detached houses become 30% cheaper

In Sydney, for example, results from the *Trade-Off* analysis suggest that increasing the price of semi-detached houses by 30% (and holding other prices constant) would see a 7 percentage point decrease in the overall proportion of Sydney households who would choose this housing type. Even this change, however, is less than the 13% shortfall identified between the percentage of stock which is semi-detached (12%) and the percentage of households who would choose a semi-detached option at current prices (25%).

In summary, even with large changes to assumptions about the price of different housing options, the shortages identified above remain.

Figure 9 – Comparing the effect of changing prices to the mismatch identified in Table 4
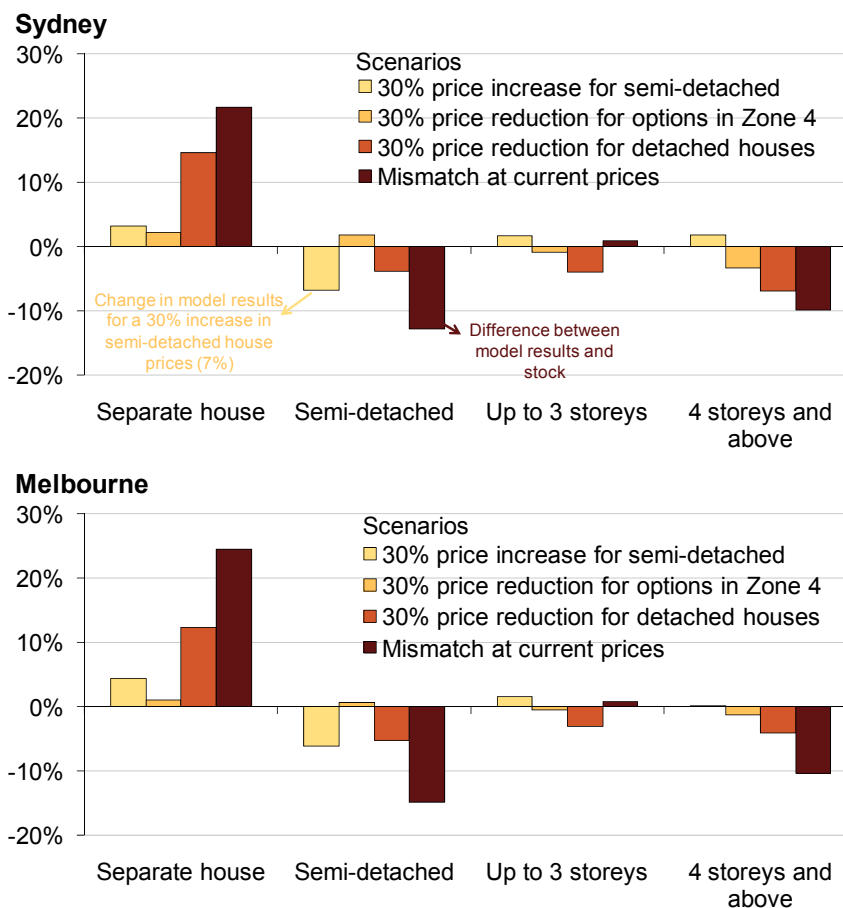
4.4 Why might there be a mismatch?

Many factors could result in a mismatch between a city's housing stock and the trade-offs residents say they would choose at a given point in time. One of the main candidates is simply that housing develops and grows over a long time. Although Australia's housing is young by international standards[29] (with more than 80% built after World War II – as outlined in Figure 10), the conditions, constraints and preferences that shaped our housing have varied considerably as our cities have developed.
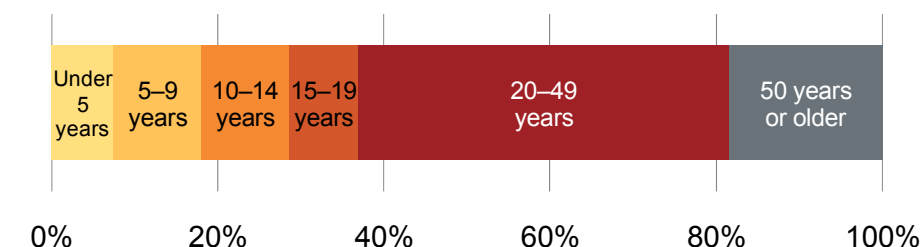
Figure 10 – The age of Australia's housing stock as at 1999

Source: ABS (1999) Australian Housing Survey – Housing characteristics, costs and conditions, 4182.0

To illustrate one way in which conditions have changed, we take a snapshot of Melbourne 35-45 years ago, and compare it with today. Figure 11 shows the areas of Melbourne that were primarily developed before 1965 (in dark red), those that mainly developed after 1965 (in light red), and areas which were built much more recently (in orange circles). Although these measures of 'when a suburb was built' are very rough, they can nonetheless be instructive. The map highlights four areas which were relatively new and 'outer' 35-45 years ago (Altona, Coburg, Ringwood and

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[29] Andrews *et al.* (2011), p.14.

Chelsea), along with 4 areas which have been developed much more recently (Sunbury, Melton, Wyndham, and Cardinia).

Figure 11 – Periods of development of urban Melbourne
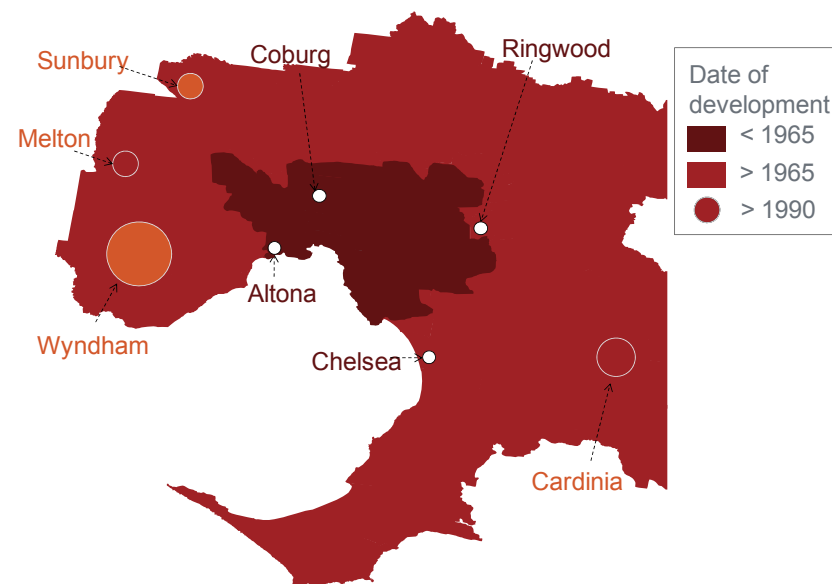
Source: VicUrban and ABS Census data from 1901.

To illustrate the effect of how city growth may affect housing, we take a more detailed look at two suburbs – Altona, developed in the 1960s and 70s, and Wyndham, developing now.

Located in Melbourne's Zone 3, building or buying a detached house in Altona in 1976 was a relatively affordable proposition. Like many suburbs that are, today, in Zones 2 or 3 the ratio of

house price to household salary in Altona was 4.4. This ratio is broadly similar to contemporary Melbourne's Zone 4 areas – such as Wyndham. Table 5 presents an historical comparison between a number of Zone 2 and 3 suburbs, and today's greenfield areas.[30]

Table 5 – Historical comparison of Zone 2 and 3 suburbs and today's Zone 4 suburbs

	Median house price/ median income	
	1976	2006
Altona	4.4	6.6
Chelsea	4.1	6.2
Coburg	4.0	6.6
Ringwood	4.6	5.9
Cardinia		3.9
Melton		3.3
Sunbury		4.3
Wyndham		4.0

Source: ABS 1976 and 2006 censuses; DSE (2009, 1999) "A guide to property values"

Today, Altona is a more sought-after suburb than it once was. Compared to its position in the city in 1976, it has become more central and desirable. Given its location in the Melbourne of 2011, if Altona were to completely redevelop today it would likely have fewer detached houses. Its stock of housing, however, is a

function of many past decisions when different conditions, a different city structure and different prices prevailed.

There are, of course, a host of other factors which could contribute to a mismatch between what today's households would choose, and the housing stock. On the demand side, for example, views on the acceptability of housing types may well change. In 1919, for instance, townhouses were effectively outlawed in Sydney largely on public health grounds.[31] This was accompanied by a range of negative associations with this housing type (they were largely regarded as slums, many being marked for demolition at the end of World War II). While not entirely dissipated, such stigma is much less prevalent around townhouses in Sydney and Melbourne today.

In short, many of the detached houses in the Zone 2 and 3 suburbs are a legacy of a time when Sydney and Melbourne were different cities. Today's stock reflects attitudes formed and decisions made under different conditions, some of which no longer apply.

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[30] When examining Table 5, it should be noted that the comparison does not account for differences in interest rates. Although they varied considerably, on average median interest rates in the 1970s were several percentage points higher than those in the 2000s.

[31] The New South Wales *Local Government Act*, 1919. Source: Thorne (1983)

Box 4.1 – If we were able to move house more easily, would that make a difference?

Housing mobility may have an important role in reducing any mismatch between housing demand and stock, as high levels of mobility increase the likelihood that households are living in a dwelling that relates to the *current* housing trade-offs they would make.

By international standards, Australians as a whole are highly mobile – overall we move house more often than most other comparable countries. But this is driven largely by renters and younger Australians. Owner-occupiers are much less likely to move: indeed the difference in mobility between owners and renters in Australia is the highest in the OECD.[32]

The main barrier cited by survey participants who had not recently moved and were not happy with their current home was "the hassle and cost of finding and moving into a new house is prohibitive".[33] The second most commonly cited barrier[34] was that "it would not make financial sense, because of government charges (e.g. stamp duty) or tax arrangements". Other research has found that Australia has one of the highest transaction costs of moving house in the OECD.[35]

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[32] ABS (2009b) & Caldera Sanchez and Andrews (2011).
[33] This was cited by 22.9% of survey participants as what most discouraged them from moving into a different house. This is supported by an ABS (2009a) survey that found the main barriers to moving were the cost of buying a new dwelling (56%), the cost of moving (26%), effort (16%) and frailty and disability (4%).
[34] Identified by 10.4% of participants.
[35] Caldera Sanchez and Andrews (2011).

5. Understanding supply

For a variety of reasons we might expect there to be a gap between housing demand and stock. The practical question is whether new construction is lessening or widening the gap.

This section looks at what has been built in Melbourne and Sydney in the last 10 years, and examines the incentives and barriers faced by developers that may have motivated these construction patterns.

5.1 Housing supply: what have we been building?

Over the past decade, the construction mix in Melbourne and Sydney has differed dramatically. The most striking differences, as illustrated in Figure 12, are the volumes of detached housing (which are much higher in Melbourne) and the trend in overall construction since 2005 (a period in which residential building in Sydney has contracted sharply).

In Melbourne, the mix of housing type has been broadly in line with existing stock. In the first half of the last decade, there was a noticeable build-up and peak in buildings of 4 storeys and above. Since then there has been an increase in *overall* volumes, driven predominantly by detached housing.

As well as differences in volume and type, construction has also taken place in different parts of the two cities. By comparing the past 10 years' new supply of housing with the existing stock, Figure 13 illustrates Melbourne's focus on outer areas compared to Sydney's more even distribution of construction (predominately in established areas).

Figure 12 – Sydney and Melbourne new dwelling completions (2001-10)
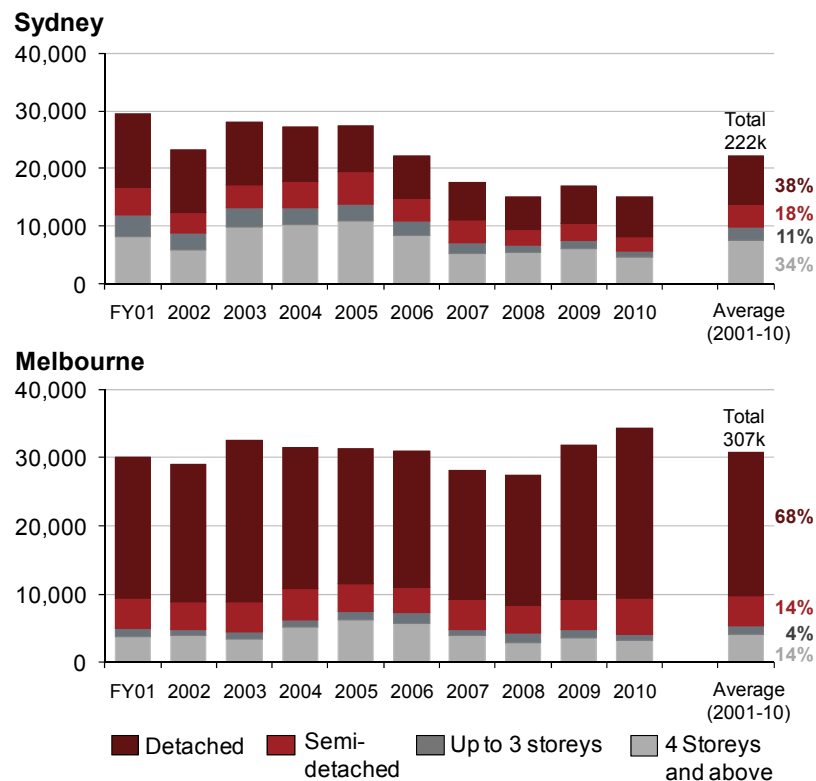
Source: ABS special data request, Grattan Analysis.

Figure 13 – Comparison of Stock and Supply for Sydney and Melbourne

Sydney
Percentage increase in dwellings (2001-10) compared to stock (2006)
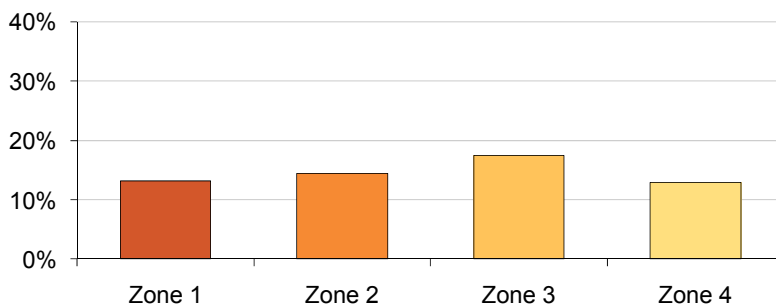
Melbourne
Percentage increase in dwellings (2001-10) compared to stock (2006)
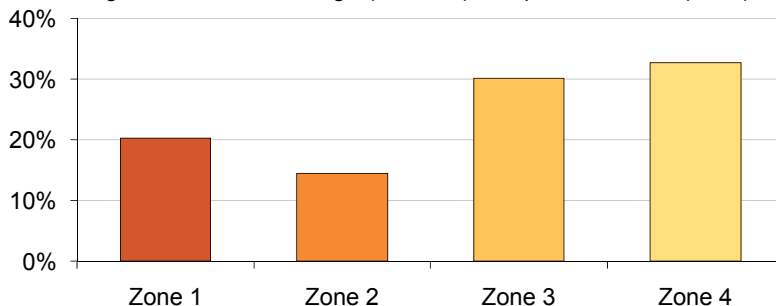
Source: Grattan analysis of ABS special data request on building approvals.[36]

It is important to note that new supply changes the overall stock relatively slowly. In the past 10 years, Sydney has added 1.4% to its housing stock every year on average. Development in

Melbourne has been more rapid, but on average, has still only added 2.1% a year to the stock.

As a consequence, in the absence of *substantial* alterations to existing housing, the only way to shrink the gap between current stock and the housing people say they want is for the mix of new construction to diverge sharply from the housing we have.

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[36] Not all approvals result in completed dwellings – however we were unable to find historical completions data at SLA level.

5.2 What drives the mix of what gets built?

This section explores the supply of new housing in the Australian market: *what* is being built *where*, and *why*?

The housing market is famously complex. Even so, supply in a well-functioning market should reflect shifts in demand. The difference in what has been built in the last decade in Sydney and Melbourne suggests there may be a mismatch between demand and supply. So, if buyer preferences are not driving supply, what is?

The elements of supply include:

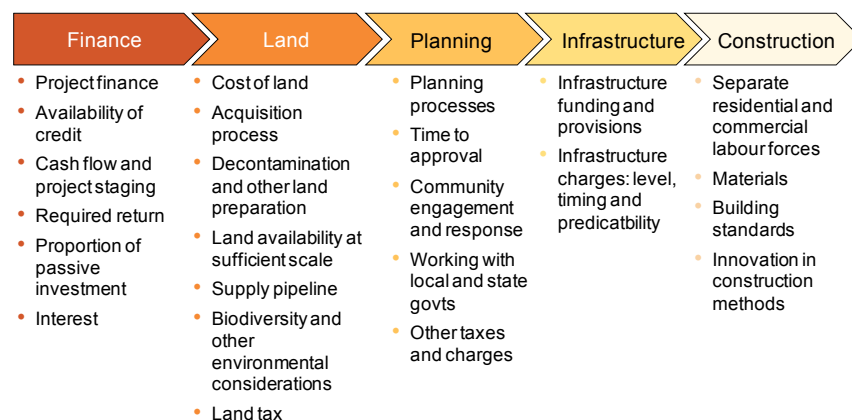| Finance	Land	Planning	Infrastructure	Construction
• Project finance • Availability of credit • Cash flow and project staging • Required return • Proportion of passive investment • Interest	• Cost of land • Acquisition process • Decontamination and other land preparation • Land availability at sufficient scale • Supply pipeline • Biodiversity and other environmental considerations • Land tax	• Planning processes • Time to approval • Community engagement and response • Working with local and state govts • Other taxes and charges	• Infrastructure funding and provisions • Infrastructure charges: level, timing and predicatbility	• Separate residential and commercial labour forces • Materials • Building standards • Innovation in construction methods

We examined each element through two lenses: the most important factors in deciding what type of dwelling to build where; and whether public policy could influence any of those factors.

The diagrams in Figure 14 and Figure 15 summarise disincentives to supply by type and location, first for Sydney, then for Melbourne.

They were put together following over 20 interviews with developers, builders, bankers and local authorities, combined with Grattan analysis, analysis of secondary research, and widespread consultation (see Appendix C for details).

Figure 14 – Disincentives to development in Sydney, by type and location

Sydney (note that the main difficulties in Sydney relate to <u>volume</u>, rather than type)

Type		Finance	Land	Planning	Infrastructure	Construction
	Detached		Important			
	Semi-detached (incl. townhouses)		Important	Important		
	Up to 3 storeys	Important	Important	Important		
	4 storeys and over	Important	Important	Important	Minor	Important

Location		Finance	Land	Planning	Infrastructure	Construction
	Infill (Inner city)		Minor	Important		
	Infill (Other established areas)	Important	Important	Important	Minor	
	Greenfield		Important		Critical	

■ Critical Disincentive	■ Important Disincentive	▢ Minor Disincentive

Figure 15 – Disincentives to development in Melbourne, by type and location

Melbourne

Type		Finance	Land	Planning	Infrastructure	Construction
	Detached		Minor			
	Semi-detached (incl. townhouses)		Minor	Important		
	Up to 3 storeys	Important	Important	Critical		
	4 storeys and over	Important	Important	Critical	Minor	Critical

Location		Finance	Land	Planning	Infrastructure	Construction
	Infill (Inner city)		Minor	Important		
	Infill (Other established areas)	Important	Important	Critical	Minor	
	Greenfield		Minor		Minor	

Legend:
- Critical Disincentive (red)
- Important Disincentive (orange)
- Minor Disincentive (pale yellow)

Finance

What gets funded, gets built. Accordingly, financing can act as a barrier to particular forms of housing construction.

Some developers believe that financing requirements discourage high-rise projects. This was especially true during the financial crisis, when non-house approvals contracted much more rapidly than approvals for detached houses.[37] The cash flows required for apartment buildings may cause financing difficulties. Unlike developments of detached homes, apartment buildings cannot be built and sold in increments. Banks therefore require a level of 'pre-sale' commitments – often around 55-60% and sometimes as high as 90-100%. Many developers are reluctant to accept the level of risk these commitments can entail.[38]

Pre-sale requirements may also constrain innovation in the apartment market, as investors are more likely than owner-occupiers to pre-commit. These investors are often more focussed on 'standard' products with a proven return.

Ultimately, though, banks largely reject claims that access to capital and financing are a barrier to medium and high density development, with the caveat that applicants usually have to have a track record: proven developers doing things that have proven to work in the past. This seems to be a handicap for smaller operators who tackle infill projects too small for larger developers, which are the types of projects that would be an important element of efforts to increase construction in established areas. Smaller developers do report that financing is more difficult than in the past.[39]

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[37] According to analysis in National Housing Supply Council (2010), the Global Financial Crisis resulted in a contraction in non-house approvals of 17%, compared to a drop of 8% for housing.
[38] Also see National Housing Supply Council (2010) p. 114.
[39] Industry and government interviews.

Land

The housing industry frequently cites the availability of land as one of its most pressing supply-side constraints. A range of related (but distinct) challenges – in particular, planning issues and infrastructure charges – are often presented under this banner. Land supply is also linked to housing affordability across the city. Some developers make the argument that the primary driver of house prices is the rate of supply of new housing, which in turn is primarily driven by land supply. However, as discussed recently by the Productivity Commission, the supply of land is only one factor that affects house prices, while the Local Government Association of Queensland has found that the level of housing stock was only one influence on house prices in South East Queensland. Others included equity prices, real interest rates, unemployment and inflation.[40]

While it is relatively clear that supply of ready-for-market land is an important element in the volume of construction (for example, fragmentation of land ownership was identified as a constraint to greenfield development in Sydney), the effect on the *types* of housing that are built is less direct. An increase in the supply of land at the fringe would very likely increase the overall percentage of detached housing in our cities. In Melbourne, for example, more than 90% of dwellings built in Zone 4 in the past 10 years have been detached. This is because of the relatively low cost of land in (compared with suburbs in Zones 1-3). Developers suggest that for higher-density dwellings to be attractive, the price of land needs to reach a 'tipping point'. Figure 16 shows evidence of the relationship between land price (per square metre) and the likelihood of developing non-detached housing.

Accordingly, constraining the availability of land could well encourage more non-detached housing as land prices rise and become increasingly attractive for higher-density development.

Figure 16 – Relationship between land price and dwelling type (for Melbourne SLAs)[41]
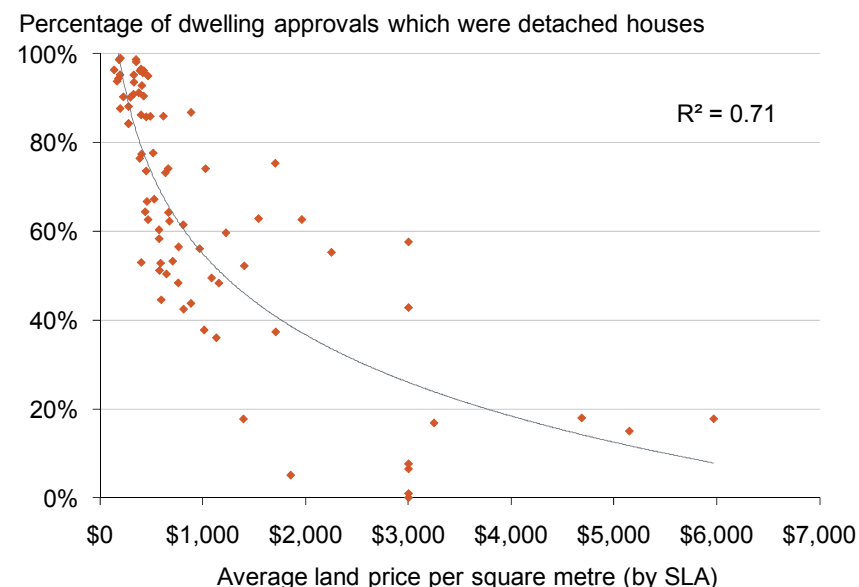
Source: Grattan analysis based on 2006 Census and unpublished land price information from RP Data.

Another dimension to land supply that may affect the type of housing constructed is the size of the land-parcels available in

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[40] Productivity Commission (2011).

[41] Relationship modelled as logarithmic, and estimated as:
Non-detached dwelling percentage = - 0.26 ln (average land price per square meter) + 2.37

established areas. A number of larger developers reported difficulties with aggregating land into commercially-viable plots, particularly in suburbs in Zones 2 and 3.[42] The timeframes associated with land assembly create uncertainty and increase holding costs. Where required, decontamination can also add significantly to time and cost. Several larger developers said this situation contributes to limiting their company's participation in higher density infill development.

Planning

In theory, planning should be almost entirely within the power of government to influence. Yet despite many and ongoing efforts to reform the system over the years to better deliver what we want from our cities, planning has proven to be a complex and difficult policy lever to pull.

Numerous studies have diagnosed problems with Australian planning systems. Often noted issues include complexity, lack of consistency and clarity, and significant delays.[43]

Developers report that planning delays, and the uncertainty and costs they cause, are a significant disincentive to embarking on medium density housing projects, particularly in established areas of Melbourne. In both Melbourne and Sydney, planning seems to be particularly problematic for small-scale medium density development in established areas.[44]

Single dwellings that comply with prescribed standards do not require planning approval or attract a planning fee in Victoria,[45] and the NSW Housing Code allows one and two storey code compliant houses to go through an accelerated process. In both Melbourne and Sydney, multi-residential and sub-divisions are significantly more likely to be decided outside the statutory time (as shown in Table 6), incurring increased holding costs. This is also the case in Victoria where single residential developments have triggered a requirement for planning approval.

The greatest area of concern for developers is Melbourne's wide-ranging third party appeals. As one said: *"anyone can appeal and take the decision to VCAT, creating significant uncertainty"*. In Victoria, 1 in 10 applications are appealed, compared to 1 in 83 in NSW and 1 in 1000 in Queensland. The median length of the Victorian appeals process is 21 weeks.[46]

Third party appeal rights also disproportionately affect multi-unit developments. Recent research shows that in 2007-8, 42% of all applications for multi-dwelling developments in Melbourne are referred to VCAT, compared to 23% of single dwelling applications.[47] Developers say this reflects community concerns about medium-density development in established areas. These concerns are important, but developers regard the current process as a major problem, adding considerable time and uncertainty and constituting a significant disincentive to the development of semi-detached housing, and apartments up to 3 storeys.

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[42] Also see National Housing Supply Council (2010).
[43] See, for example, DSE (2003); Gurran *et al.* (2008); Gurran *et al.* (2009); Goodman *et al.* (2010); Urbis (2010a;b); COAG (2011); Productivity Commission (2011); UDIA (2011).
[44] Gurran *et al.* (2009).

[45] This is also the case in Queensland, Western Australia, the ACT and the Northern Territory.
[46] COAG (2011).
[47] These are single dwelling applications outside prescribed standards, which do not require planning permission (Taylor (2011)).

Table 6 – Percentage of applications decided in the statutory time (by application type)

	Single residential	Sub-division	Multi-unit residential
NSW	65	52	44
Victoria	64	53	47

Source: COAG (2011)

In other cities the appeals process is more circumscribed. Only some types of applications are subject to third party appeal in Sydney, while in Brisbane, an application for development in a commercial centre is code assessed and therefore has no third party appeal rights.

In Victoria, there is also the option of projects being 'called in' for Ministerial consideration. In 2009-10, 528 determinations were called in, compared to 245 in NSW (where this path was recently abolished[48]), and two in Queensland. These projects are more likely to be large-scale, and therefore this fast-tracking tends to favour larger developers. The Productivity Commission also recently noted that "*[we] were often told that, in some jurisdictions, the criteria for triggering these alternative assessment paths are so vague as to increase uncertainty and undermine overall confidence in the fairness of the planning systems*."[49]

Infrastructure

Government also has significant control over infrastructure charges, which vary by state, within cities and sometimes within council areas.
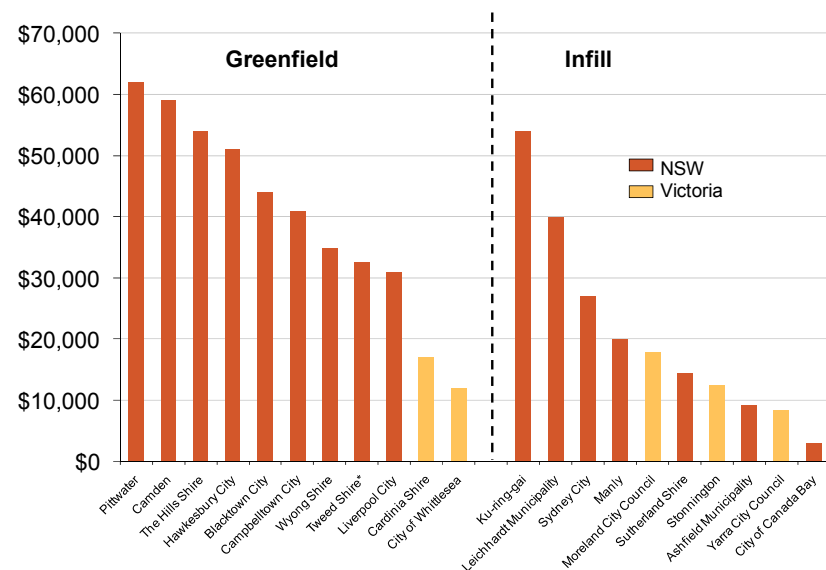
Infrastructure is usually more expensive to provide in greenfield areas. In outer Sydney, councils used contributions to recover a high proportion of their infrastructure costs, to the extent that developers chose to build less. NSW has recently moved to cap infrastructure charges to $20,000 per lot in infill, and $30,000 per lot in greenfield areas, although the application of some charges under existing plans have been allowed to continue.

How infrastructure costs are charged can also affect the type of housing that is built. Some levies in NSW are charged on a per hectare basis, which encourages higher density, while others are charged on a per lot basis, which can act to encourage large detached homes.

In general, though, with the exception of recent greenfield development in New South Wales, infrastructure charges have a limited effect on type and volume.

Delays and lack of provision of infrastructure – both completely new infrastructure in greenfield areas and upgrades to existing infrastructure in established areas – also affects volume of development. Developers and local authorities identified this as an issue in both NSW and Victoria, though these concerns were greatest in greenfield areas of Sydney.

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[48] Liberal Party of Australia Website (2011)
[49] Productivity Commission (2011), p.231.

Figure 17 – Infrastructure charges per lot

Source: Productivity Commission (2011)
* authority not within a capital city statistical district

Construction

Construction costs vary across housing types. Buildings over four storeys high currently cost much more to build than other housing types. This is due to both materials and labour costs.

Material costs vary significantly between buildings above and below three storeys high. Timber and bricks – the main materials used for buildings under three storeys – are far less expensive than the steel and concrete required by building codes above three storeys. High-rise apartment buildings, which require lifts, scaffolding and underground excavation, are the most expensive to build.

Labour costs also depend on building type. For detached buildings and multi-unit dwellings lower than four storeys, the presence of many small to medium-sized builders and sub-contractors drive down labour costs through competition. Buildings of four storeys and over are classified as commercial projects, for which a different – and highly organised – workforce is required. This is particularly the case in Victoria, in which virtually all buildings four storeys and over are built by unionised labour.

Some developers argue that the commercial wage premium overstates the specialised skills required and the risks of working at height. They believe significant savings could be made if residential construction workers could undertake some activities like plastering, carpentry and painting in apartment buildings.

Figure 18 – Construction costs by housing type and city
($ per square metre of floor area, high and low cost estimates)
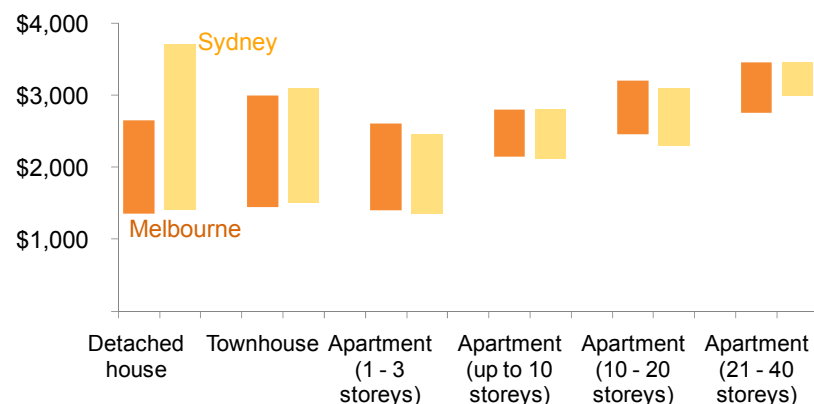
Source: Rider Levett Bucknall (2010), Grattan analysis.

However, it is difficult to calculate the commercial labour cost premium with any level of confidence. Five developers provided us with estimates of the construction cost savings they expected from using the residential workforce. These estimates varied from 10% to 50%, and were difficult to verify.[50]

It is clearer that current cost structures have pushed high-rise apartment supply towards inner-city areas and the higher end of the market,[51] where buyers are able to pay the higher costs associated with being close to the centre of the city.

Box 5.1 – Innovation in construction

The dominant type of Australian housing innovation has been the streamlining of construction processes and costs for detached houses.

Developers, builders and suppliers are either vertically integrated or maintain very close relations, and sub-contractors compete vigorously. Competition has helped drive the adoption of new building materials, such as Hebel boards.

Widespread innovation is harder to find in other housing types. There are a few examples of modular or unitised apartment construction, which speeds up construction time by approximately 50% while reducing the overall environmental footprint (through less material, wastage, transport energy, and disruption to neighbours and traffic). It is reported that it is difficult to get financing for such approaches, however, particularly if units are pre-fabricated offshore.

Meanwhile, banks increasingly prefer to fund proven developers, undertaking the kinds of projects that have proven successful in the past. This means that innovative developments are generally funded other than through mainstream financing avenues, for a lower return, by developers whom one described as *"doing it for the love rather than for the money"*.

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[50] Sub-contracted activities aren't directly comparable between residential and commercial housing; and costs aren't broken down into labour, materials and necessary overheads (like making a place safe for 'working at heights').
[51] The exception is much smaller apartments, usually marketed towards students.

5.3 Supply conclusion

While housing construction has much in common in Sydney and Melbourne, they are different enough markets to warrant making separate conclusions. In both cities, greenfield and established area developments have quite distinct risk profiles.

Sydney

Sydney has done a better job than Melbourne in producing a range of housing types, but volume has contracted sharply since 2005. The vast majority of what *has* been built in Sydney has been infill development in already established areas. The lack of **greenfield** development in Sydney reflects the land supply, land price, and infrastructure charge issues discussed above.

In **established areas**, planning complexity and delays along with higher construction costs for buildings over four storeys have resulted in a low volume of construction. Established area development has longer timeframes, and time is money.

Given the difficulties with greenfield development, and the risk and low volumes in established areas, some larger developers have exited the NSW market altogether.

Melbourne

Greenfield development is regarded as much lower risk for a range of reasons, making it particularly attractive to an industry that often has to lock up its capital for years. Developments of detached homes – which take up an overwhelmingly large proportion of greenfield development – can be staged, helping with cash flow and making financing easier. Building on greenfield land is also much more predictable. Planning risk is much lower:

detached houses do not generally require planning approval, and in any case there are no pre-existing communities to have to consult or who can delay approvals by appealing decisions. While developers are understandably keen to reduce planning timelines, and are concerned about the amount of 'new' land in the supply pipeline, these issues do not appear to significantly affect dwelling type or volume.

Development in **established areas** is regarded as more difficult, and much riskier. Planning risk is seen as being considerably higher, due to complexity and frequent delays. Buildings of four storeys and above are generally confined to the inner city, where provision is split between premium apartments and small apartments often directed at overseas students. Other than inner-city high rise, multi-unit dwellings have been built in low numbers. Due to higher construction costs, and frequent planning delays, developers say the numbers often simply don't add up.

Why take the risk?

These circumstances have resulted in an industry that can be described as cautious. Banks are conservative, preferring to finance proven developers doing what they have done before; real estate agents are described as even more conservative, and strongly resist any proposal that departs from the norm.

One interviewee identified the presence of both *"inertia and momentum - there is plenty of business to be had from doing the same thing we've been doing for a while".*

6. What does this all add up to?

This report has explored the mismatch between the housing trade-offs residents of Sydney and Melbourne say they would make, and the housing we have. New construction in Sydney is moving in the right direction, but very slowly, while in Melbourne, it remains very similar to current stock. Changes in stock happen slowly – over the past decade Sydney and Melbourne have added on average 1.4% and 2.1% of overall stock each year. If new construction is to shape our cities in accordance with our housing preferences, it must be significantly different from the mix of housing we have accumulated over the past decades.

However, our analysis of supply shows that there are a series of reasons why we are unlikely to see the substantial shift in supply needed to better reflect what people would choose.

Indeed, the strongest disincentives in the market overlap with the most acute shortages relative to what people say they want in the trade-off survey.

What gets built matters, not only so that our individual housing choices can be met, but also for the overall structure of Sydney and Melbourne as they continue to develop. If we are serious about shaping our cities in the directions residents say they want, some of the incentives faced by developers need to be modified, allowing markets to respond to what people would like to see.

We should also investigate other possible barriers which might discourage people from moving into housing that would be a better match for their needs. For example, factors such as moving costs (including stamp duty), or concerns about how body corporates function may be contributing to people moving less often than they might prefer.

Figure 19 – Comparison of preferences, stock and supply
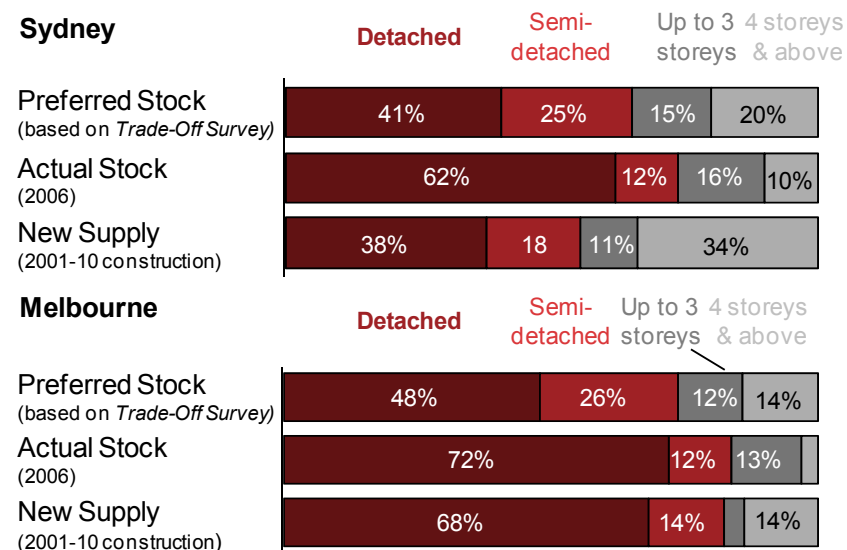
What now?

This report has deliberately avoided making recommendations.

Over the next few months, the Grattan Institute will work towards a second publication on this issue, containing policy recommendations. We look forward to hearing a wide range of views on what should be done to address these findings.

Appendix A – *What Matters Most* survey

Grattan engaged expert decision choice modellers *The Centre for the Study of Choice* at the University of Technology Sydney (CenSoC) to design and implement this survey.

A sample of 706 people was randomly selected across the Sydney and Melbourne metropolitan areas from online panel provider PureProfile. This sample was recruited for the *What Matters Most* survey, with the intention that respondents subsequently be approached to complete the *Trade-Off* survey.

A breakdown of the sample in terms of age, housing tenure, and city of residence is presented below. When compared to ABS breakdowns of the Australian population, we observe that the PureProfile sample is generally representative, except for ages 18-24, and over 75.[52]

Age	Frequency	Sample%	(ABS%)
18-24	8	1.1	12.4
25-29	35	5.0	8.5
30-34	88	12.5	9.3
35-39	96	13.6	9.7
40-44	83	11.8	9.8
45-49	88	12.5	9.6
50-59	147	20.8	16.9
60-64	72	10.2	6.3
65-69	56	7.9	5.0
70-75	22	3.1	4.1
75+	11	1.6	8.4
TOTAL	**706**	100.0	100.0

[52] Disaggregated results of the *What Matters Most* survey will be published by Grattan later in 2011.

Tenure	Frequency	Sample%	(ABS%)
Owned outright	226	32.0	35.3
Owned with a mortgage	272	38.5	35.4
Renting	208	29.5	29.2
Total	**706**	**100.0**	**100.0**

City	Frequency	Sample%
Sydney	356	50.0
Melbourne	350	50.0
Total	**706**	**100.0**

Participants were presented with eight attributes of a home (which included features related to dwelling and location) and asked to nominate which one 'matters most to you when choosing housing' and which of the remaining seven features matters least. Each participant completed this choice task 19 times. An example of the choice set is presented in Figure 20.

The options were selected from a broader list of 57 attributes (listed in Table 7 below).[53] This list comprised variables that: focus group participants had identified as important; or had been found to be influential in previous housing preference studies; or had been shown to have a statistically significant effect on house

[53] The 57 attributes were randomised without replacement to 3 sets of 19, and repeated three times to minimise the effects of any one random assignment without proliferating versions.

prices.[54] Other variables were identified through interviews with developers and academics.

Two assumptions were applied to transform survey results into estimates of the relative importance of each attribute. The first was that people are better at identifying extremes (most and least preferred) than they are at ranking a list of attributes. The second assumption was that although people might make errors when deciding between options, when they choose repeatedly their choice frequencies indicate how much they value the items under consideration. Thus, how often attribute A is picked over attribute B gives an indication of how much attribute A is preferred to attribute B.

Figure 20 – Example choice set from the *What Matters Most* survey

Set 1 of 19:

Please tick ONE box to indicate which feature matters **most** to you, then Tick ONE box to indicate which feature matters **least** to you.

Please select one answer per column.

If you are unsure about any factors listed below, please click here to see further explanations relating to those highlighted phrases.

	Matters Most	Matters Least
Is in a particularly **clean/unpolluted** area	○	○
Near **cafes and restaurants**	○	○
A **neighbourhood design** you find attractive	○	○
Near **the beach**	○	○
Whether the dwelling has **Stilts or a Concrete Slab** foundation.	○	○
Has **air-conditioning**	○	○
The presence of **aged person friendly design**	○	○
Has a **diverse mix of people in the neighbourhood**	○	○

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[54] These were taken from 'hedonics' literature, which by and large looks at underlying change in house prices over time, breaking the value of each house into its composite location and dwelling factors. See, for example, Hansen (2006). This research is limited by data availability. For example, one study (Cominos *et al.* (2007)) valued bathrooms at around $100k when houses are sold, which the authors note is likely a proxy variable for house quality.

Table 7 – Variables included in the *What Matters Most* survey

Convenience and Access	Attractiveness of environment	Safety and Security	Dwelling Features
Little traffic congestion in the area	A natural environment you find attractive	Away from jails/correctional facility	# of bathrooms/en-suites
Near a bus, tram or ferry stop	A particularly clean/unpolluted area	Has secure parking	# of bedrooms
Near a golf club	A neighbourhood design you find attractive	Safety of people and property	# of floors (for apartments)
Near a hospital	Near a park or reserve		# of living spaces
Near a local swimming pool	Near community gardens, or garden space		Has a big garden
Near a pre-school	A mix of different housing types in the neighbourhood		Has a fireplace
Near a railway station	Near a national park		Has a garage
Near a school or university	Away from a cemetery		Has a gym
Near a shopping centre	Near an airport		Has a home cinema
Near aged-care facilities	Near railway lines		Has a separate dining room
Near cafes and restaurants	A diverse mix of people in the neighbourhood		Has a swimming pool
Near family and friends			Has a tennis court
Near general health services			Has aged-friendly design
Near local shops			Has air conditioning
Near nightlife (i.e. pubs)			Has an outdoor dining space
Near recreational facilities			Has double brick walls
Near the beach			Has floorboards
Near the CBD			Has walk-in wardrobes
Near work			Has weatherboard cladding
			Presence of a city view
			Presence of a water view
			Whether the dwelling is on stilts or a concrete slab
			Whether the house is detached

Appendix B – *Trade-Off* survey and modelling

Sample

Around two weeks after the *What Matters Most* survey, respondents were asked to take part in the *Trade-off* survey. 572 respondents (or 81% of the original 706) agreed to participate.

The sample was representative of the population in terms of current dwelling type and location as illustrated in Table 8. The greatest discrepancy was in Melbourne, with the sample exhibiting a lower proportion of detached houses relative to the population (64% compared to 72%).
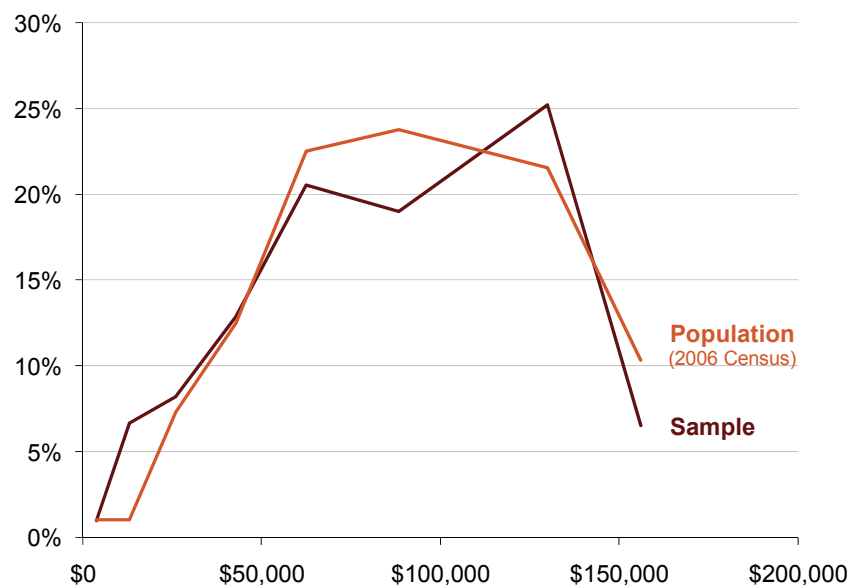
The *Trade-Off* survey sample was also relatively representative in terms of income, as illustrated in Figure 21.[55]

Table 8 – Breakdown of respondents' current dwelling type and location (compared to city-wide ABS figures from the 2006 census, in brackets)

			Sydney		
	Detached	**Semi detached**	**Up to 3 storeys**	**4 storeys & above**	**TOTAL**
Zone 1	11%	4%	11%	6%	**30%** (23%)
Zone 2	13%	4%	5%	1%	**23%** (25%)
Zone 3	20%	2%	1%	0%	**24%** (28%)
Zone 4	19%	1%	2%	0%	**23%** (25%)
TOTAL	**63%** (62%)	**12%** (12%)	**18%** (16%)	**7%** (10%)	

			Melbourne		
	Detached	**Semi detached**	**Up to 3 storeys**	**4 storeys & above**	**TOTAL**
Zone 1	11%	7%	10%	3%	**30%** (28%)
Zone 2	21%	3%	4%	0%	**29%** (30%)
Zone 3	21%	2%	2%	0%	**26%** (28%)
Zone 4	11%	2%	2%	0%	**16%** (15%)
TOTAL	**64%** (72%)	**15%** (12%)	**19%** (13%)	**3%** (3%)	

[55] Note that the household income brackets that appear in the survey were initially created to be comparable to those provided by Australian financial institutions. These income brackets are different to those supplied by the ABS, making it difficult to compare the distribution of the sample vs. the population. For indicative purposes, we compared the sample income distribution against the ABS statistics by assigning each respondent a midpoint gross figure, which we treated as their true income figure. They were then grouped accordingly to be comparable against collapsed ABS income brackets. The household income figures along the x-axis are the midpoints of the grouped income brackets. We can observe that although there are slightly more respondents that fall into the lower income brackets, the sample is otherwise comparable to the population.

Figure 21 – Comparison between sample incomes, and population income

How the survey worked

Participants were first presented with eight high-ranking attributes from the *What Matters Most* survey (apart from those variables such as house size and type which were systematically varied in the options presented by the *Trade-Off* survey). Participants were asked which of these high-ranking attributes they 'must-have' before choosing a home. Participants were then asked to assume that all of the housing options presented had these 'must-have' attributes. This was an important step to avoid what is known as 'endogeneity bias' – in this case, a situation where the respondent's choices are affected by whether or not respondents assume – unbeknownst to the researchers – that options have their 'must-have' attributes.

Based on self-reported information regarding income and net assets, participants were then given a budget constraint, expressed as a monthly rental or mortgage payment. They were advised that "an expert in mortgage or rent affordability would tell you that you should not pay more than $X per month or you risk running into financial difficulty".

Subsequent modelling ensured that even if participants chose options that, based on our budget calculations, were beyond their financial means, these preferences were discarded – and only options within a respondent's budget constraint were considered in the final results. This was an important part of making the survey realistic, i.e. ensuring that respondents were making real-world trade-offs.

Participants were then presented with four housing options, which varied by **type** (detached; semi-detached; up to 3 storeys; 4

storeys and above), **size** (small; medium; large), and **location** (according to four zones: Zone 1, Zone 2, Zone 3 and Zone 4). This resulted in 48 different housing options.

Each of the 48 options was represented by:

- a small picture of the dwelling's exterior;

- a small picture of the floor plan;[56]

- a zone of the city; and

- a price (in terms of a monthly mortgage or rental payment).

A screenshot from the *Trade-Off* survey is presented in Figure 22.

If respondents wanted to find out more information about the options they could click on the exterior image, the floor plan, or the zone to get a more detailed picture. Examples of these more detailed stimuli are provided in Figure 23 - Figure 25.

For each set of four options, buyers were asked "assume you are considering BUYING one of the following homes to live in, which would you MOST prefer to live in?". Then "Would you purchase ANY of the homes?".

Similarly, renters were asked "Assume you are considering RENTING one of the following homes to live in, which would you MOST prefer to live in".

This process was repeated 16 times with different sets of housing options.

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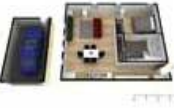
[56] It is worth noting that Nakata (2007); Ishikawa *et al.* (2011) cite evidence that there are differences in the way that people read floor plans – with distinct preferences either for the number of bedrooms, or the shape of the plan. Although bedrooms and size were controlled, the shape of the floor plans varied by type, which may have resulted in some bias in the results.

Figure 22 – Screenshot from *Trade-Off* survey

NOTE – this is just an example: these options were systematically varied as described below.

Figure 23 – Example detached house option

These home and floor-plan images are **INDICATIVE** only.
Note that all housing options are **medium quality.**

TYPE of home: A detached home.

SIZE of home: A 3 bedroom home with 190 square metres of floor s
(including the double garage), set on a 400 square metre lot.

Figure 24 – Example floor plan for detached house

Figure 25 – Example information on housing zone

This outer-middle zone is typically around 20 to 50 km from the city centre and includes the Central Coast. Average land costs 140% the price of land in the outer-fringe zone and 20% of the inner zone.

Options within the choice set

The variety of possible housing options in any city is very large, and it was impossible to present respondents with every possible mix of housing attributes. Moreover, to ensure that respondents weren't making choices based on unobserved variables, every effort was made to standardise variables which were not under investigation (i.e. those other than house size, type and location). In particular, the survey attempted to control for the age of the home (by making them all new); the quality of the fit-out, and the size of the block for semi-detached and detached houses. While people may have strong preferences for these variables (e.g. a preference for an old house), these controls were necessary to make the choice exercise sufficiently simple, and to make the modelling tractable. Moreover, it seems unlikely that, for example, a preference for old housing (compared to new) would substantially alter the trade-offs people would make with respect to type, size and location.

48 discrete options were provided in Melbourne, and Sydney, with each option being defined by a **size**, **type** and **location**. This section provides some more detail on these categories.

Sizes

Grattan made a judgment that respondents would be able to gain more information about the housing options presented if number of bedrooms (rather than an area in m^2) was used as a proxy for the internal area of a dwelling. Accordingly, whether an option was 'small', 'medium' or 'large' depended on the number of bedrooms (as outlined in Box 2.1 above). It should be noted that

respondents were also informed about the square meterage of each option, as is illustrated in Figure 24.

Types

The survey used four housing types:

- Detached

- Semi-detached

- Apartments in buildings up to three storeys

- Apartments in buildings four storeys and above

These types were selected largely so that the results of the survey could be compared to ABS data on the stock of housing. This rationale was particularly important in regards to the split of apartment buildings into those 'up to three storeys', and those 'four storeys and above'.

In the choice set, pictures of apartments in buildings that were three storeys and below were all represented by three storey buildings. An example is provided in Figure 26.

Apartments in buildings four storeys or above were represented by buildings 5-8 storeys high. As an example, the 7 storey building is presented in Figure 27.

Figure 26 – Example exterior picture of an apartment option in 'up to three storeys'

Figure 27 – Example exterior picture of an apartment option in a building 'four storeys or above'

Zones

Both Sydney and Melbourne were split into four zones based on land prices of SLAs.

Land prices were based on unpublished RP data of average price per square metre, for vacant residential land transactions in 2010. Data points were excluded if the land area was greater than 10,000sqm, less than 100sqm, or where the overall sale price was less than $10,000 or greater than $10m. For SLAs with insufficient sales in 2010 (less than 20 data points), previous years' vacant land sales were included. To remove the effect of land price inflation, prices from previous years were adjusted by the RP Data hedonic index. Given data limitations, no adjustment was made to reflect the premium paid for zoning of a particular block of land.

Broadly speaking, land price increased with proximity to the city centre. Notable exceptions were related to infrastructure (especially train lines) and proximity to water.[57]

Table 9 and Table 10 list SLAs in Sydney and Melbourne by their zone classification.

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[57] By far the biggest outlier (in terms of land prices being driven by proximity to the city) was Wyong South and West on Sydney's north coast.

Table 9 - Allocation of <u>Sydney's</u> Statistical Local Areas to zones

Zone 1	Zone 2	Zone 3	Zone 4
Botany Bay (C)	Hurstville (C)	Sutherland Shire (A) - West	Fairfield (C) - West
Leichhardt (A)	Rockdale (C)	Bankstown (C) - North-East	Liverpool (C) - West
Marrickville (A)	Sutherland Shire (A) - East	Bankstown (C) - North-West	Camden (A)
Sydney (C) - Inner	Canterbury (C)	Bankstown (C) - South	Campbelltown (C) - North
Sydney (C) - East	Ashfield (A)	Fairfield (C) - East	Campbelltown (C) - South
Sydney (C) - South	Burwood (A)	Liverpool (C) - East	Wollondilly (A)
Sydney (C) - West	Canada Bay (A) - Concord	Auburn (A)	Blue Mountains (C)
Randwick (C)	Strathfield (A)	Holroyd (C)	Hawkesbury (C)
Waverley (A)	Parramatta (C) - Inner	Parramatta (C) - North-West	Penrith (C) - East
Woollahra (A)	Parramatta (C) - North-East	Parramatta (C) - South	Penrith (C) - West
Kogarah (A)	Ryde (C)	Blacktown (C) - North	Blacktown (C) - South-East
Canada Bay (A) - Drummoyne	Willoughby (C)	Baulkham Hills (A) - Central	Blacktown (C) - South-West
Hunter's Hill (A)	Ku-ring-gai (A)	Baulkham Hills (A) - North	Hornsby (A) - North
Lane Cove (A)	Pittwater (A)	Baulkham Hills (A) - South	Gosford (C) - West
Mosman (A)	Wyong (A) - South and West	Hornsby (A) - South	Wyong (A) - North-East
North Sydney (A)		Warringah (A)	
Manly (A)		Gosford (C) - East	

Table 10 - Allocation of Melbourne's Statistical Local Areas to zones

Zone 1	Zone 2	Zone 3	Zone 4
Melbourne (C) - Inner	Brimbank (C) - Keilor	Brimbank (C) - Sunshine	Melton (S) Bal
Melbourne (C) - S'bank-D'lands	Maribyrnong (C)	Hobsons Bay (C) - Altona	Wyndham (C) - North
Melbourne (C) - Remainder	Moonee Valley (C) - West	Melton (S) - East	Wyndham (C) - West
Port Phillip (C) - St Kilda	Moreland (C) - Coburg	Wyndham (C) - South	Hume (C) - Sunbury
Port Phillip (C) - West	Moreland (C) - North	Hume (C) - Broadmeadows	Nillumbik (S) - South
Stonnington (C) - Prahran	Banyule (C) - Heidelberg	Hume (C) - Craigieburn	Nillumbik (S) - South-West
Yarra (C) - North	Banyule (C) - North	Whittlesea (C) - North	Nillumbik (S) Bal
Yarra (C) - Richmond	Darebin (C) - Northcote	Whittlesea (C) - South-West	Manningham (C) - East
Hobsons Bay (C) - Williamstown	Darebin (C) - Preston	Knox (C) - North-East	Yarra Ranges (S) - Central
Moonee Valley (C) - Essendon	Whittlesea (C) - South-East	Knox (C) - North-West	Yarra Ranges (S) - Dandenongs
Moreland (C) - Brunswick	Manningham (C) - West	Maroondah (C) - Croydon	Yarra Ranges (S) - Lilydale
Boroondara (C) - Camberwell N.	Monash (C) - South-West	Maroondah (C) - Ringwood	Yarra Ranges (S) - North
Boroondara (C) - Camberwell S.	Monash (C) - Waverley East	Gr. Dandenong (C) - Dandenong	Yarra Ranges (S) - Seville
Boroondara (C) - Hawthorn	Whitehorse (C) - Nunawading E.	Gr. Dandenong (C) Bal	Cardinia (S) - North
Boroondara (C) - Kew	Whitehorse (C) - Nunawading W.	Casey (C) - Cranbourne	Cardinia (S) - Pakenham
Monash (C) - Waverley West	Knox (C) - South	Casey (C) - Hallam	Cardinia (S) - South
Whitehorse (C) - Box Hill	Glen Eira (C) - South	Frankston (C) - East	Casey (C) - Berwick
Bayside (C) - Brighton	Kingston (C) - North	Frankston (C) - West	Casey (C) - South
Bayside (C) - South	Kingston (C) - South	Mornington P'sula (S) - South	Mornington P'sula (S) - East
Glen Eira (C) - Caulfield		Mornington P'sula (S) - West	
Stonnington (C) - Malvern			

How the options were costed

The primary results reported above constrained respondents' choices according to the *current cost* of developing and selling each of the 48 housing options. All endeavours were made to make the costs as realistic as possible. We made particular efforts to ensure that the *relative costs* of the various options were realistic.

The total cost of each option was broken into four discrete components which could be calculated in a consistent manner.[58] This approach follows the methodology outlined in Urbis (2010b), namely the sum of **construction**, **land costs**, **developer costs and government charges**.

The **construction** component reflected the floorspace of each dwelling option, the average construction cost per square meter of the different dwelling options, and other costs associated with each housing type such as the presence of lifts, or garages. The *floorspace* for each house type and size combination (i.e. semi-detached, 2 bedroom) was based on the average of a number of floor plans from new-build construction projects with adjustments following consultations with an industry expert. The *average construction costs* were based on the average cost of building the "medium quality version" of each housing type in the relevant city, along with any other costs associated with particular housing options (e.g. a lift) as presented in Rawlinson (2010).

Land costs were a product of lot size (or an imputed amount of land for apartments) and land value per square metre.

For detached and semi-detached houses, *lot sizes* were estimated as an average of the lot sizes were based on the floor plan examples collected for estimates of construction costs. Lot sizes of "medium"-sized options for the "up to 3 storeys" and "4 storeys and above" apartments used the site density ratios (SDRs) for a typical three storey and nine storey apartment building respectively.[59] The SDR figures used were based on an industry expert, as only two independent SDR observations for apartment blocks of 3 and 9 storeys could be found. The amount of land assigned to "small" and "large"-sized apartments was directly proportional to the relative floor space of the "medium" apartment option.

Land values per square metre were calculated as the median price per square metre of vacant residential land sold in each of the four zones outlined above.[60]

Developer costs and government taxes and charges[61] were based on the average of the cost estimates for each housing type in Urbis (2010b) and Urbis (2010a). These reports provided cost breakdowns for a number of different housing projects within each

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[58] This approach excludes some important costs elements; such as project risk (e.g. the possibility a project will not gain planning approval), economies of scale, and differences in construction costs between zones (e.g. that building a single house in the confined areas of established suburbs cost more than building the same home as part of a Greenfields development project).

[59] SDRs are calculated as the total number of dwellings in an apartment complex divided by the total square metres of land taken up by the apartment complex and grounds.

[60] Land prices were based on unpublished RP data of average price per square metre for total vacant residential land transactions in 2010.

[61] These included Government charges (e.g. stamp duty, local council fees, infrastructure charges, land tax, GST liability); other developer costs (marketing and sales costs); interest (on land and purchase costs); and professional fees.

city.[62] Our final costs also included a 10 per cent developer profit margin, consistent with the last ABS survey of private sector residential dwelling construction.[63]

Finally, cost estimates were checked against advertised prices of equivalent housing options for those housing options currently being built.

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[62] Figures were based on the average of cost found across both Urbis (2010b) and Urbis (2010b) for each housing type within each city.
[63] ABS (2003).

Table 11 – **Characteristics of housing options**

	Cost base	Small	Medium	Large
Detached	Project house, medium standard finish, brick veneer.	2 bedroom 125 sqm floor space 20 sqm single garage inc 300 sqm lot	3 bedroom 190 sqm floor space 35 sqm dble garage inc. 400 sqm lot	4 bedroom dbl-storey 240 sqm floor space 35 sqm dble garage inc. 500 sqm lot
Semi-detached	Two-storey town-house, medium standard finish, full brick, tiled roof.	2 bedroom 120 sqm floor space 20 sqm single garage inc 210 sqm lot	3 bedroom 180 sqm floor space 20 sqm single garage inc 250 sqm lot	3 bedroom 220 sqm floor space 35 sqm dble garage inc. 320 sqm lot
Up to 3 storeys	Apartment (up to 3 storeys), medium standard finish, no balcony, no lift, basic car-park. Land assumes 3 storeys	1 bedroom 85 sqm floor space 20 sqm single carpark inc	2 bedroom 115 sqm floor space 20 sqm single carpark inc	3 bedroom 155 sqm floor space 35 sqm single carpark inc
4 storeys and above	Apartment multi-storey (4 storeys and above), medium standard finish, no balcony, basic car-park, slow lifts. The land component assumes a height of 9 storeys.	1 bedroom 85 sqm floor space 20 sqm single carpark inc	2 bedroom 115 sqm floor space 20 sqm single carpark inc	3 bedroom 155 sqm floor space 35 sqm single carpark inc

Source: Grattan analysis based on industry consultation and advertisements and Rawlinson (2010).

Table 12 – Summary cost of each housing option

		Detached			Semi-detached			Up to three storeys			Four storeys and above		
		Small	Medium	Large	Small	Medium	Large	Small	Medium	Large	Small	Medium	Large
Sydney	Zone 1	1,341,254	1,816,280	2,355,265	1,118,706	1,408,494	1,808,651	804,910	1,128,164	1,603,180	513,231	733,724	1,027,713
	Zone 2	617,442	851,197	1,148,912	612,038	803,307	1,036,585	474,750	645,623	917,464	381,167	540,707	753,427
	Zone 3	520,611	728,208	1,013,772	507,101	684,440	885,995	413,847	551,526	783,747	357,010	504,491	701,132
	Zone 4	451,337	635,843	898,315	458,609	626,519	812,103	382,248	505,343	718,119	344,371	486,018	674,881
Melbourne	Zone 1	892,178	1,218,723	1,611,999	824,471	1,063,502	1,369,580	606,180	834,867	1,186,390	437,010	621,642	867,817
	Zone 2	477,680	666,059	921,170	534,323	716,936	927,449	417,111	558,535	793,708	361,383	511,109	710,745
	Zone 3	379,434	538,304	771,322	436,362	603,550	783,387	371,167	486,128	690,814	336,307	473,998	657,585
	Zone 4	325,982	467,035	682,236	398,946	558,858	726,372	346,786	450,494	640,175	326,555	459,744	637,330

Source Grattan estimates based on ABS (2003), Urbis (2010b), Rawlinson (2010) and unpublished RP data

How budget constraints were calculated and applied

A housing budget constraint was calculated for each participant.

For buyers, the constraint was based on self-reported income, available net assets, household type and the presence of children.

We used the NAB loan calculator[64] to provide an estimate of the loan a respondent could secure (based on income, households type, and presence of children).[65]

To test whether a housing option was in any way realistic, we deducted a respondent's net assets from the price – and compared the mortgage repayment on the remaining principal to a respondent's monthly salary. We applied the generous criteria that only in instances where the repayment was greater than a person's salary was the preference deemed 'unaffordable' and therefore discounted. In such a case (as described below) the respondent's preferences would then be directed towards those options which were within their financial means.

Mortgage repayments assumed an 8.78% p.a. interest rate and a 25 year loan period.

In the case of renters, net assets were not taken into account. Options were deemed realistic, once again, on the generous basis that rental payments did not exceed income (payments were determined using average rental yields for Melbourne and Sydney in 2010, from RP Data).

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[64] See http://www.nabhomeloanscalculator.com.au/
[65] If the respondent was unable to secure a loan of any amount, they were automatically counted as a renter.

Technical survey design

This section describes the technical way in which housing options were varied on the dimensions of size, type, location and price – and how they were presented to respondents. Much of the following material is taken from CenSoC's work, commissioned by Grattan.

Because there were four housing options in each choice set and each option was described by four attributes (size, type, location and price), the survey required 16 attributes to be simultaneously varied. From a statistical standpoint, it is desirable to be able to vary all attributes independently, and to observe all possible attribute-level combinations (a "full" factorial design).[66] Such a design would contain a total of 1,358,954,485 potential choice sets ($3^4 \times 4^{12}$).

Some of these choice sets contain duplicates (i.e. options that are exactly the same), and are eliminated.

Still, it is hopefully obvious that the remaining number of choice scenarios cannot be implemented in a survey due to the sample size constraints. Thus, CenSoC used statistical design theory to generate a subset of all the possible scenarios. Because the survey was unlabelled (as shown in Figure 22, options were presented as 'Home A', 'Home B' etc) only correlations between

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[66] CenSoC chose a full factorial design because i) it is orthogonal (i.e. the columns of the design that represent each attribute and associated levels of the attributes are uncorrelated); and ii) all of the potential effects that might appear in the decision rule used by respondents can be estimated independently of one another. A "decision rule" is also known as an "indirect utility function" in choice modelling economics.

attributes within an option matter. The model (discussed below) was a conditional logit. Thus, if the attributes in the design were not perfectly correlated <u>between</u> options, and if the attributes <u>within</u> each option were uncorrelated, one can estimate all the factorial effects. The foregoing was relied on to create a survey design, by first generating a full factorial of attribute level combinations for one choice option (e.g. 'Home A').

There are 192 ($3x4^3$) distinct specifications for Home A. CenSoC made four copies of the 192 combinations, and put them into four "boxes". Then, one combination from each box was randomly sampled without replacement to make 192 choice scenarios (i.e. sets of four options between which survey respondents chose).[67]

Of course, 192 scenarios is still too many for any one respondent. Thus, "versions" of the survey were created to which respondents were randomly assigned. These versions were created by generating an extra column in the design. Known as a "blocking column", this extra design column is generated by adding a "pseudo-attribute" to the original design that is used solely to allocate specific scenarios to versions. Each version was to have 16 of the 192 choice sets (scenarios).

This required a 12-level blocking column. As the survey design is orthogonal within each choice option but not between choice options, the ideal outcome (an orthogonal blocking column) is not possible. Instead, a computer code was used to minimise correlations between the choice scenarios assigned to various blocks. The highest correlation between the blocking column and

any of the design attribute columns was 0.07. Thus, the attribute levels in the survey scenarios were approximately independent of one another, satisfying the requirement that the design provides independent estimates of all effects.

Model specification

Much of the following material is taken from CenSoC's work, commissioned by Grattan.

Statistical choice models are derived by making assumptions about error distributions and properties. In this study CenSoC assumed that the errors were independent and followed an extreme value type 1 distribution, with constant variance. This assumption led to what is known as a conditional logit model. The model has the advantage of relying on the assumption that how often a respondent chooses a detached house over a semi-detached house gives an estimate of how much more the former is valued over the latter. For a brief, clear description of conditional logit models in general, see Rodriguez (2011).

CenSoC estimated a number of conditional logit models. This section explains some of the different models considered, before presenting the results of the four models (Sydney buyers; Sydney renters; Melbourne buyers; Melbourne renters) which formed the basis of the main results in the report. Forthcoming work will present other results of CenSoC's modelling.

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[67] As previously noted, CenSoC checked whether the same attribute level combination occurred across two or more choice options – and no duplicates were found.

Measures of price

One of the dimensions that differed across models was how the value of a housing option was measured. Two different measures were estimated:

1. a value given by a price (in the default case, the market price); and

2. a value expressed as a percentage of a respondent's income.

The model in which dwelling values were measured as *prices* (as distinct from a percentage of a respondent's income) required the assumption that loan periods were 25 years, and the interest rate of the loan was 8.78%: Predictions from this model will apply to the extent that:

- the income distribution in the sample is representative of the current population; and

- the income distribution does not change considerably.

The predictions of both were very similar at current 'market' prices (as calculated by Grattan).

The report focuses on the model using price as a measure of home value, as all the main results are generated at current prices.[68] We acknowledge that using this measure of value does not account for an income effect, and is therefore less robust to future predictions *should the income distribution change*.

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[68] These were also the models on which CenSoC based a Decision Support System (provided to Grattan) which allows various changes (and all the interactive effects of the model) to be easily simulated.
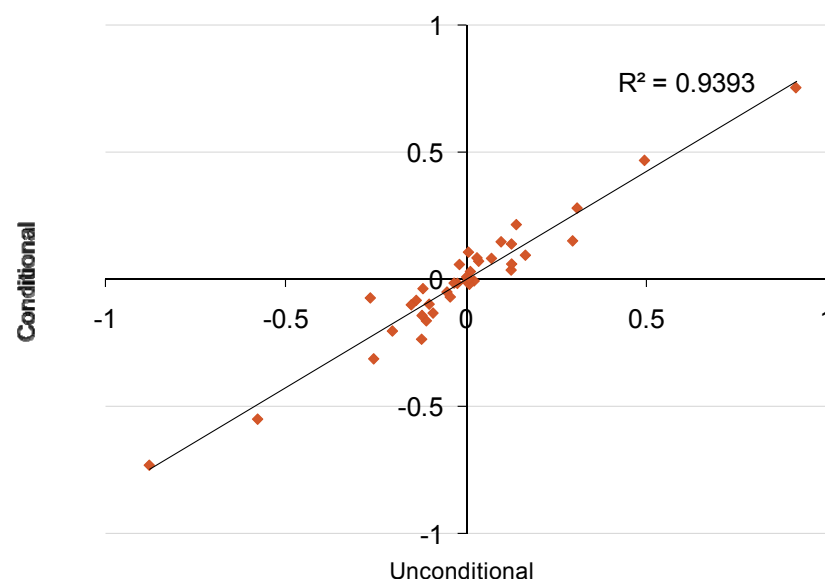
Choosing the 'no' option

Models were also estimated on the basis that:

1. probabilities of choosing particular housing options *were conditional* on the respondents choosing one of the four options presented; and

2. probabilities of choosing particular housing options *were not conditional* on the respondents choosing one of the options presented. That is, they were allowed to choose the 'no' option when asked whether they wanted any of the options presented.

As is shown in Figure 28, both models are proportional. Moreover, when the *conditional* results (i.e. where results are conditional on respondents not being allowed to choose 'no option') incorporate individual respondents' financial means, these sets of demand estimates are the same.

In the end, the conditional demand model with the income constraint proved to be the better model and was what underpinned the results in the main body of the report.

Figure 28 – Comparison of pooled results[69] for unconditional and conditional demand (for buyers, market value)

R² = 0.9393

Conditional

Unconditional

As such, the report centres on four final models:

1. conditional demand (based on prices rather than income), constrained by financial means, for **Sydney buyers.**

2. conditional demand (based on prices rather than income), constrained by financial means, for **Sydney renters.**

3. conditional demand (based on prices rather than income), constrained by financial means, for **Melbourne buyers.**

4. conditional demand (based on prices rather than income), constrained by financial means, for **Melbourne renters.**

Differences between cities

Much of the initial analysis involved pooled data across Sydney and Melbourne. Given the possibility of heterogeneous preferences, CenSoC tested for differences in preferences between demographic segments (varying by age and household type), but found that these differences were far outweighed by "city effects". Accordingly, separate conditional logit models for Sydney and Melbourne were estimated.

[69] Includes Sydney and Melbourne data

Results

Table 13 – Output of City-Specific _Trade-Off_ models

	Sydney		Melbourne	
	1. Buyers	2. Renters	3. Buyers	4. Renters
Alternative Specific Constant [ASC]				
*ASC=1	-0.0558*	-0.0799***	-0.0374	-0.0523*
*ASC=2	0.1114***	0.1095***	0.0743***	0.0337
*ASC=3	-0.0042	0.016	0.0363	0.0461**
Primary effects				
SizeSmall	-0.1229***	-0.0798*	-0.3097***	-0.2166***
SizeMedium	0.0137	0.0316	0.1154*	0.1036**
TypeDetach	0.7486***	0.7135***	0.7586***	0.7741***
TypeSemi	0.4675***	0.4387***	0.4656***	0.3352***
Type4andabove	-0.7760***	-0.7955***	-0.6597***	-0.7001***
Zone4	-0.4147***	-0.3467***	-0.7428***	-0.5672***
Zone3	0.0164	-0.0817	-0.1747**	-0.1009*
Zone2	0.1611***	0.1490***	0.2936***	0.2155***
Price	-0.3253***	-0.2561***	-0.3020***	-0.2237***
Income*price	0.0729***	0.0571***	0.0703***	0.0546*
Interaction effects				
Small*detached	-0.1171***	-0.0611	-0.0792*	0.0162
Small*semi-detach	-0.1267***	-0.0394	-0.1977***	-0.0998**
Small*4andabove	0.1351***	0.0401	0.1611***	0.072
Medium*detached	0.2537***	0.2815***	0.3111***	0.2685***
Medium*semi-detach	0.1088***	-0.0006	0.1039**	0.0326
Medium*4andabove	-0.1414***	-0.1042***	-0.1204**	-0.1012**
Small*Zone4	0.1875***	0.1303***	0.0724	0.0666
Small*Zone3	-0.1104***	-0.0962**	0.0459	0.0188

Small*Zone2	-0.0216	-0.014	-0.0736	-0.0978***
Medium*Zone4	-0.1427***	-0.0712	-0.0438	-0.0044
Medium*Zone3	0.1462***	0.0846**	-0.0849*	-0.0873**
Medium*Zone2	-0.0536	-0.031	0.0429	0.0148
Small*price	-0.0231***	-0.0287***	-0.0052	-0.0187***
Medium*Price	0.0009	-0.0041	-0.0102	-0.0035
Detach*Zone4	0.0623	0.0354	0.2563***	0.1347***
Detach*Zone3	0.0918**	0.1281***	0.0856*	0.1136***
Detach*Zone2	-0.0311	-0.0122	-0.1202**	-0.0102
Semi-Detach*Zone4	0.053	0.0618	0.1564***	0.1445***
Semi-Detach*Zone3	-0.1292***	-0.0588	-0.1574***	-0.0830*
Semi-Detach*Zone2	0.0781	-0.0011	0.0354	0.017
4andabove*Zone4	-0.2335***	-0.2327***	-0.2269***	-0.0575
4andabove *Zone3	0.0653	0.0276	0.0918	0.0023
4andabove *Zone2	-0.1071**	-0.0042	-0.0487	-0.0587
TypeDetach*price	0.0268**	0.0131	0.0356***	0.0277***
TypeSemi*price	0.0032	0.0055	0.0175*	0.0236***
Type4andabove*price	-0.0091	0.0055	-0.0329***	-0.0219**
Zone4*price	-0.0255*	-0.0383***	0.0015	-0.0154
Zone3*price	-0.0073	0.002	-0.0126	-0.0307***
Zone2*price	0.002	0.0011	-0.0007	0.0093
Model information				
Psuedo R2	0.205	0.169	0.235	0.202
Log-Likelihood	-4146.455	-5255.1433	-3938.2719	-5077.0197
BIC	8696.8857	10922.364	8279.9798	10566.411
N	*235*	*285*	*232*	*287*

*Note: ***5% significance level; **10% significance level; *15% significance level*

Model Fit

It is important to note that the estimates presented in Table 13 are **just the starting point for the *Trade-Off* analysis**. They don't include the modelling whereby each individual respondent's financial means were used to limit choices. Adding these individualised constraints significantly improved the performance of the models.

The most common violation of the assumptions that lead to the conditional logit model is when preferences differ across the sample population (which implies that the preferences recovered from the model are sample averages, and that the differences between people are random). However, as financial means likely explain a lot of differences in housing choices, the fact that the modelling was individualised to reflect differences in assets and income minimised this risk. As mentioned above, this process of accounting for individual financial means was also a primary reason why the models fit the choice data so well.

A second reason that the models performed so well was that unlike the vast majority of choice modelling applications, the models that CenSoC applied included not only the additive "main effects", but also interaction effects.

Choice model fits are evaluated using what is known as log-likelihoods (LLs). Basically, one compares the LL for a model in which the housing features do not matter (their estimates equal zero), to the LL for the final model estimated. A measure of goodness-of-fit of the model is known as "pseudo r-squared", which is how much (what percentage) the LL has been reduced by the fitted model.[70] The pseudo R^2s after indiviual financial means were taken into account were between 0.32 and 0.40 – which is very high for a conditional logit choice model.

As CenSoC noted "these models provided the best empirical fits to choice data that we have experienced in several decades of applied work."

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[70] Note the difference with the normal R^2 reported in regressions, which measure the percentage of variation in the dependent variable explained by the model.

Appendix C – List of interviewees

Interviewees	Others consulted	Others consulted (continued)
ANZ	Ashton de Silva, RMIT University	Master Builders Association
Australand	Australian Housing and Urban Research Institute (AHURI)	Michael Buxton, RMIT University
AV Jennings	Bernard Salt, KPMG	National Growth Areas Alliance
Burbank	Bill Randolph, UNSW	National Housing Supply Council
Central Equity	Chris Wight	NSW Department of Planning
Commonwealth Bank	COAG Reform Council: Capital City Strategic Planning Systems	Peter McDonald, ANU
Delfin Lend Lease	Commonwealth Department of Sustainability, Environment, Water, Population and Communities	Property Council of Australia
Equiset	Commonwealth Treasury	Residential Property Council
Evolve	Duncan Maclennan, St. Andrew's University	Robyn Goodman, RMIT University
Intrapac	Elizabeth Taylor, RMIT University	SGS Economics
Mirvac	Gavin Wood, RMIT University	Shane Murray, Monash University
Peter Davis Homes	Geoffrey London, Victorian Government Architect	Urban Development Institute of Australia
Stockland	Graeme Hugo, University of Adelaide	Urbis
The City of Camden	Growth Areas Authority, Victoria	Victorian DPCD
The City of Hume	Housing Choices Australia	Victorian Department of Treasury and Finance
The City of Stonnington	Housing Industry Association (HIA)	VicUrban
The City of Whittlesea	Jeromey Temple, ANU	
The City of Wyndham	Judy Yates, University of Sydney	
Villawood	LandCom	
Vivas Lend Lease	Major Cities Unit, Commonwealth	

References

ABS (1999). The 1999 Australian Housing Survey. Cat 4182.0.

ABS (2003). Private Sector Construction Industry. Cat. 8712.0

ABS (2009a). Housing Mobility and Conditions. Cat. 4130.0.55.002.

ABS (2009b) "Housing mobility and conditions 4130.0.55.002 2007-08."

ABS (2010). Australian Social Trends December 2010: Moving House. Cat. 4102.0.

Andrews, D., A. C. Sánchez and Å. Johansson (2011) "Housing Markets and Structural Policies in OECD Countries." OECD Economics Department Working Papers, No. 836,

Beer, A. and D. Faulkner (2009). 21st century housing careers and Australia's housing future, AHURI Final Report No. 128.

Burgess, R. and N. Skeltys (1992). The findings of the Housing and Location Choice Survey: an overview, Commonwealth Government.

Caldera Sanchez, A. and D. Andrews (2011). To Move or Not to Move: What Drives Residential Mobility Rates in the OECD?, OECD Economics Department Working Papers.

COAG (2011). First National Report on Development Assessment Performance 2008/09. Local Government and Planning Ministers' Council,. Prepared by the South Australian Government.

Cominos, H., A. Rambaldi and D. S. P. Rao (2007) "Hedonic Imputed Housing Price Indices from a Model with Dynamic Shadow Prices Incorporating Nearest Neighbour Information." CEPA Working Papers Series, http://ideas.repec.org/p/qld/uqcepa/24.html:

Dodson, J. and N. Sipe (2008). Shocking the suburbs: oil vulnerability in the Australian city, UNSW Press.

DSE (2003). Better Decisions Faster. Melbourne, Victorian Government Department of Sustainability and Environment.

Gibbings, M. J. (1973). Housing Preferences in the Brisbane Area, Australian Institute of Urban Studies, Queensland Division.

Goodman, R., M. Buxton, P. Chhetri, E. Taylor and G. Wood (2010). Planning and the characteristics of housing supply in Melbourne. Melbourne, Australian Housing and Urban Research Institute.

Gurran, N., K. Ruming and B. Randolph (2009). Counting the Costs: Planning Requirements, Infrastructure Contributions, and Residential Development in Australia, AHURI Final Report No. 140.

Gurran, N., K. Ruming, B. Randolph and D. Quintal (2008). Planning, government charges, and the costs of land and housing. Sydney, Australian Housing and Urban Research Institute.

Hansen, J. (2006) "Australian House Prices: A Comparison of Hedonic and Repeat-sales Measures." Reserve Bank of Australia Research Discussion Paper http://www.rba.gov.au/publications/rdp/2006/pdf/rdp2006-03.pdf:

Ishikawa, T., S. Nakata and Y. Asami (2011). "Perception and Conceptualization of House Floor Plans: An Experimental Analysis." Environment and Behavior 43(2): 233-251.

Kendig, H. (1981). "Buying and Renting: Household Moves in Adelaide." Australian Institute of Urban Studies 91.

King, R. (1983). Melbourne Housing Study, Volume Two, Melbourne and Metropolitan Board of Works.

Liberal Party of Australia Website. (2011). "NSW Government to Scrap Part 3A - All New Applications Halted."   Retrieved 25/05/2011, from http://www.nsw.liberal.org.au/news/planning/nsw-government-to-scrap-part-3a-all-new-applications-halted.html.

Montgomery, M. and C. Curtis (2006). Housing Mobility and Location Choice: A Review of the Literature, Curtin University. Working paper available at http://urbanet.curtin.edu.au/local/pdf/ARC_TOD_Working_Paper_2.pdf.

Morrow-Jones, H. A., E. G. Irwin and B. Roe (2004). "Consumer Preference for Neotraditional Neighborhood Characteristics." Housing Policy Debate 15(1): 171 - 202.

Nakata, S. (2007). Effective methods of providing information about house floor plans by considering consumers' preferences, Doctoral dissertation, University of Tokyo.

National Housing Supply Council (2010). 2nd State of Supply Report, Department of Families, Housing, Community Services and Indigenous Affairs.

Productivity Commission (2011). Performance Benchmarking of Australian Business Regulation: Planning, Zoning and Development Assessments. Draft Research Report. Canberra. Draft Research Report.

Rawlinson (2010). Rawlinson's Australian construction handbook, Rawlhouse Publishing, Perth, W.A. .

Richardson, H. W. (1977). "A generalization of residential location theory." Regional Science and Urban Economics 7(3): 251-266.

Rider Levett Bucknall (2010) "Riders Digest (Melbourne and Sydney)."

Rodriguez, G. (2011). "Generalized Linear Models."   Retrieved 10 June 2011, from http://data.princeton.edu/wws509/notes/c6s3.html.

Rossi, P. H. (1955). Why families move: a study in the social psychology of urban residential mobility. Glencoe, Illinois, The Free Press.

Sandow, E. (2011). On the road: Social aspects of commuting long distances to work, Umeå University.

Taylor, E. (2011). Property ownership and planning regulation: Inside influences on urban consolidation poicies in Melbourne. Melbourne, RMIT University.

Thorne, R. (1983). Medium Density Housing in Sydney - 2 Surveys: Attitudes of Users and Non-Users, University of Sydney.

UDIA (2011). State of the land report, Urban Development Institute of Australia.

Urbis (2010a). Factors Underpinning New Housing Costs and New Housing Availability in Victoria and Queensland, Urbis.

Urbis (2010b). National Dwelling Costs Study - FaHCSIA, Urbis.

Wulff, M. (1993). "An Overview of Australian Housing and Locational Preference Studies: Choices and Constraints on the Housing Market." Urban Policy and Research 11(4): 230 - 237.

Wulff, M., E. Healy and M. Reynolds (2004). "Why don't small households live in small dwellings?--Disentangling a planning dilemma." People and Place 12(1): 58(14).