

## **5th Australasian Housing Researchers' Conference**



**17-19 November 2010, University of Auckland, New Zealand**

### **Moving in and unpacking: exploring issues in housing supply and demand.**

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#### **Abstract**

Under its mandate of investigating issues of supply, demand and affordability, the National Housing Supply Council (the Council) presents estimates and projections of housing demand and supply in its annual *State of Supply Report*. This paper outlines key findings of the 2010 report and the key research questions and methodological issues identified as priorities for inclusion in forthcoming reports. Research questions of keen interest to the Council include an exploration of key elements driving housing demand, particularly changing household size (including a review of estimates of household size and analysis of the reasons for change over time), intergenerational change in housing preferences, and the housing needs and preferences of new settlers to Australia. The Council is also exploring supply issues through an investigation of factors constraining the availability of development finance and their impact on construction activity. The allied housing supply issue of lengthy development assessment processes and their impact on land and housing costs is also being explored. A key area of policy concern is the 'demand-supply gap' or the shortfall of dwellings relative to underlying demand, the way this affects housing affordability and access to housing among various population sub-groups, and the impact of supply and affordability constraints on effective demand. Capacity constraints in the housing construction industry and innovations to increase productivity and affordability are also areas of interest.

## **Introduction**

The housing market is complex and interlinked with urban systems, land markets and the markets involved in the production of housing (particularly labour and capital markets). It is also characterised by numerous submarkets defined by various supply and demand-side characteristics - including locality, tenure type, housing type, and socio-demographic variables - that tend to produce differing market conditions and dynamics. While theoretically an efficient housing market provides housing at a price that an individual is willing (and able) to pay, if supply is fixed or lags substantially behind increases in demand, prices will rise as demand increases. Over the past decade, house prices have been increasing and the home ownership rate (particularly among younger cohorts) has been falling. For several years, growing awareness and prevalence of “housing stress” and concern about housing affordability have progressively pushed housing policy up the policy priority list of the Australian, state and territory governments.

The National Housing Supply Council (the Council) was established in 2008 by the Australian Government to monitor housing demand, supply and affordability.

Thus far, the Council has published *State of Supply Reports* for 2008 and 2010. The first report projected additional underlying demand of 3.1 million households over the next twenty years. It also developed an estimate of the current gap between demand and supply (an estimated shortfall of 85,000 dwellings) and published indicators of affordability and “availability” (the latter highlighting the shortage of affordable rental housing for lower income households after excluding low cost housing occupied by higher income households). This important indicator illustrates the distributional impact of an aggregate housing shortfall.

In the second report, the Council updated:

- its projections of demand and supply over the 20 years from 2009 to 2029
- the gap between housing demand and supply, using a revised methodology
- key indicators on demand, supply and affordability, especially for low-income renters.

The second report contained expanded data on land supply. These data were assembled with the assistance of state and territory planning agencies. The Council also added “Key Indicator 7” on the efficiency of the housing market. Several topical issues were also investigated, including the challenges of building infill housing, the efficiency of the housing market, and the implications of population ageing.

Both reports are available at [www.nhsc.org.au](http://www.nhsc.org.au)

This paper outlines key results from the 2010 State of Supply report including notable methodological issues, and then the key research questions identified as priorities by the Council for inclusion in its forthcoming *State of Supply* Reports.

### **Part A: Key results on demand from the 2010 report**

#### **How many households does Australia need to accommodate now and in the future?**

In *State of Supply Report 2010*, the Council estimated that there were 8.5 million households in Australia at 30 June 2009 (compared with 8.3 million households at 30 June 2008). These estimates and the Council’s 20-year projections of household numbers represent “underlying” demand for housing. Growth in underlying demand reflects population growth being driven by natural increase, migration and changes in household size. The Australian Treasury Intergenerational Report 2010 projects the Australian population will reach 29.2 million by

2030.<sup>1</sup> The Council’s “medium” projection assumes a lower rate of migration in the near term, with the total population reaching 28 million by 2029.

The Council’s medium growth scenario for households sees underlying demand for housing growing by 3.2 million households to 2029, an average increase of 160,000 additional households per annum. The low and high growth scenarios project increases of 2.7 million households (135,000 a year) and 3.7 million (183,000 a year), respectively.

The low, medium and high household growth scenarios are based on different assumptions about migration. The low growth scenario has net overseas migration increasing from around 120,000 in 2008 to around 160,000 in 2028, while the medium growth scenario sets net overseas migration at a constant rate of 180,000 a year from 2008 onwards. The high household growth scenario sets net overseas migration at a constant rate of 230,000 a year from 2008 onwards. The latest available figures show net overseas migration exceeded 285,000 people in 2008-09 but there are suggestions that this has fallen, with the Minister for Sustainable Population, Tony Burke, quoting an estimate of 230,000 for 2009-10 in a radio interview in June.<sup>2</sup>

Table 2.1 (figure and table numbers are extracted from the 2010 Report and are numbered accordingly) shows the projected total number of households and distribution of different household types for the period 2009 to 2029.<sup>3</sup> Lone person households are projected to become the most common household type by 2029 (31.6 per cent of all households), followed by two-parent families (27.5 per cent) and couples without children (27 per cent).

**Table 2.1: Projections of national underlying demand by household type ('000 households, with percentage of increase in brackets), 2009 to 2029, medium household growth scenario**

Household type	Year, as at 30 June							
	2009	2010	2011	2012	2013	2014	2019	2029
Two-parent families	2,689.4 (31.5%)	2,714.9 (31.3%)	2,740.7 (31.0%)	2,767.0 (30.7%)	2,793.7 (30.5%)	2,820.9 (30.2%)	2,960.4 (29.2%)	3,228.4 (27.5%)
Single-parent families	973.6 (11.4%)	986.4 (11.4%)	999.0 (11.3%)	1,010.6 (11.2%)	1,021.2 (11.1%)	1,030.8 (11.1%)	1,081.0 (10.7%)	1,212.6 (10.3%)
Couples without children	2,318.5 (27.2%)	2,370.8 (27.3%)	2,423.2 (27.4%)	2,475.6 (27.5%)	2,527.6 (27.6%)	2,578.7 (27.6%)	2,813.1 (27.7%)	3,170.5 (27.0%)
Lone-person households	2,210.8 (25.9%)	2,270.4 (26.1%)	2,332.5 (26.4%)	2,396.8 (26.6%)	2,463.3 (26.9%)	2,531.6 (27.1%)	2,896.5 (28.6%)	3,712.8 (31.6%)
Group households	337.7 (4.0%)	344.2 (4.0%)	350.3 (4.0%)	355.9 (4.0%)	361.3 (3.9%)	366.4 (3.9%)	389.8 (3.8%)	435.7 (3.7%)
<b>Total households</b>	<b>8,530.2 (100.0%)</b>	<b>8,686.7 (100.0%)</b>	<b>8,845.7 (100.0%)</b>	<b>9,005.9 (100.0%)</b>	<b>9,167.1 (100.0%)</b>	<b>9,328.4 (100.0%)</b>	<b>10,140.9 (100.0%)</b>	<b>11,760.0 (100.0%)</b>

**Note:** Figures are rounded to the nearest '00. Percentages were calculated using raw data. Numbers and percentages may not sum to totals due to rounding.

**Source:** National Housing Supply Council projections based on McDonald–Temple medium household growth scenarios, 2009 to 2029.

### The Council’s model for projecting underlying demand

As noted above, the Council’s demand projections focus on underlying demand (the number of households) rather than effective demand (demand expressed in the housing market,

<sup>1</sup> The Treasury, *Australia to 2050: future challenges*, Commonwealth of Australia, Canberra, 2010

<sup>2</sup> Minister Burke I/V with Fran Kelly on ABC Radio National ‘breakfast’ 26 July 2010

<sup>3</sup> National Housing Supply Council, ‘*2nd State of Supply Report, 2010, ACT 2010*’ p.17

including the social housing system which competes with the private rental sector). Broadly speaking, underlying demand would equal effective demand if the market could provide housing products to meet the needs, aspirations and capacity-to-pay of all households, although a small proportion of households would choose not to consume housing or be accommodated outside the housing sector (such as in nursing homes and shelters).

The level of underlying demand is driven predominantly by migration and demographic factors but, as also noted above, can also be affected by housing supply and affordability, which influence household formation. The Council's projections do not take account of these supply factors except to the extent that they are reflected in historical rates of household formation. Rather, the Council's projections simply show what Australia's underlying demand for dwellings would be if the assumed levels of the components of household change (births, deaths, migration and household formation) were realised over the next 20 years.

The Council's 20-year outlook of housing demand is based on projections by Professor Peter McDonald and Dr Jeromey Temple (of the Australian Demographic and Social Research Institute, Australian National University), using a model that estimates the probable formation of different household types (drawn from the 2006 Census) and incorporates various assumptions on migration and household transition.

The model works as follows. The population at the 2006 Census is moved forward year by year on the basis of location-specific estimates of future fertility, mortality and net migration, also applying transition probabilities of change in each person's household classification type (arising from coupling, separation, birth of child, death of partner and so on). The estimates are judgements (assumptions) based on historical trends. The key assumptions are outlined in the table "household projection assumptions" below.<sup>4</sup>

<b>Input</b>	<b>Household projection assumptions</b>
Fertility	Age-specific fertility rates are assumed to be the same as those in the ABS Series B projections from the 2008 official projections of population.
Mortality	The mortality assumptions are also the same as the 2008 Series B projections of the ABS.
International Migration	Three assumptions are used that constitute the three scenarios: net migration equal to 100,000, 180,000 and 250,000 per annum.
Internal Migration	Assumed levels are taken from the 2008 ABS official projections of population.
Dwelling Type	The 2006 Census distributions of dwelling type by region, type of household and age of the reference person were assumed to remain constant throughout the projection period.
Tenure Type	The 2006 Census distributions of tenure type by region, dwelling type, type of household and age of the reference person were assumed to remain constant across the projection period.

<sup>4</sup> For further detail on the methodology, refer to McDonald and Temple Projections of Housing Demand in Australia, 2008-2038: Narrative Report for the National Housing Supply Council, by: Professor Peter McDonald and Dr Jeromey Temple, Australian Demographic and Social Research Institute, Australian National University, Canberra 2008 ([www.nhsc.org.au/housing\\_demand/default.htm](http://www.nhsc.org.au/housing_demand/default.htm))

The model does not differentiate household formation rates or housing preferences between migrants and the existing population. Neither does it incorporate possible changes in housing consumption preferences since 2006. The Council is interested in exploring the household formation patterns of migrants (differentiated by period since arrival, household size and countries of origin), and younger generations of Australians, and comparing these with the household formation propensities used in our model.

### Projected demand by dwelling and tenure type

The Council has also projected demand by dwelling and tenure type. The model assumes that the 2006 Census distributions of dwelling type and tenure type by region, type of household and single-year age and gender of reference person will persist over the projection period. This assumption is irrelevant for the assessment of aggregate underlying demand, but is clearly an issue for interpretation of projected underlying demand by tenure, dwelling type of both.

The Council has used projected underlying demand by dwelling type to demonstrate the impact of changing demography (mostly population ageing) on the demand for various types of housing, rather than to suggest that the projected level of demand for, say, apartments will not change for reasons other than demographic change. A variety of factors is likely to produce housing preferences and outcomes that are significantly different from actual patterns of housing usage in 2006. For instance, it is likely that, unless present trends change, the demand for rental dwellings and apartments will continue to grow.

**Table 2.4: Projections (medium growth scenario) of demand by dwelling structure ('000 dwellings), 2009 to 2029**

Dwelling structure	Year, as at 30 June						Per cent increase 2009-29
	2009	2011	2014	2019	2024	2029	
Separate house	7,146.1	7,398.7	7,785.0	8,445.0	9,110.5	9,761.3	36.6
Semi-detached	577.3	602.3	640.3	701.8	762.6	824.6	42.8
Flat	694.2	726.6	776.3	852.4	923.2	1,001.2	44.2
Other	112.6	118.1	126.7	141.7	157.1	172.8	53.5
<b>Total</b>	<b>8,530.2</b>	<b>8,845.7</b>	<b>9,328.4</b>	<b>10,140.9</b>	<b>10,953.4</b>	<b>11,760.0</b>	<b>37.9</b>

**Note:** 'Other' includes caravans, cabins, houseboats, improvised homes, tents, sleepers-outs and houses or flats attached to a shop, office, etc. Figures are rounded to the nearest '00. Numbers may not sum to totals due to this rounding.

**Source:** National Housing Supply Council projections based on McDonald-Temple medium household growth scenario, 2009 to 2029.

Table 2.4 projects the outcome of anticipated changes in the population profile on underlying demand for different dwelling types over the 20 years to 2029.<sup>5</sup>

This table suggests that demand for separate houses will grow proportionally less than demand for other types of dwellings, including semi-detached dwellings and flats. However, if the supply of dwellings does not match anticipated demand, or if factors related to affordability favour, say, smaller medium density attached dwellings, demand may be redirected. For example, households may retain their dwelling preference but change their location, or they may change their dwelling preference within their location. Lack of supply may also prevent or defer the formation of new households.

<sup>5</sup> National Housing Supply Council, '2nd State of Supply Report, 2010, ACT 2010 p.20

## Projected demand by region

The demand projections used in the report were compiled using national data and were primarily designed to provide a national picture of demand. The model has also been used to produce capital city and “rest of state” estimates for states (Table 2.2 below).<sup>6</sup> It is important to note that these estimates may differ considerably from projections undertaken by the state and territory planning agencies. Their estimates are informed by local knowledge and development strategies, especially for capital cities and regions within them. But do not assume that they are consistently more likely to be correct. They may also contain an element of wishful thinking, with development strategies and hence household estimates aligning with short term gains in, or aspirations for, economic growth, workforce and population rather than by a continuation of longer term trends.

**Table 2.2: Additional households by region for low, medium and high household growth scenarios ('000 households), 2009 to 2029 as at 30 June**

Region	Low growth scenario	Medium growth scenario	High growth scenario
Sydney	359.1	514.9	644.7
Rest of NSW	304.5	311.6	317.5
<b>Total NSW</b>	<b>663.6</b>	<b>826.5</b>	<b>962.2</b>
Melbourne	469.7	600.0	708.4
Rest of Vic.	156.0	163.9	170.5
<b>Total Vic.</b>	<b>625.7</b>	<b>763.9</b>	<b>879.0</b>
Brisbane	303.3	361.4	409.9
Rest of Qld.	498.3	539.8	574.4
<b>Total Qld.</b>	<b>801.5</b>	<b>901.2</b>	<b>984.3</b>
Adelaide	89.9	123.0	150.6
Rest of SA	46.6	49.7	52.2
<b>Total SA</b>	<b>136.5</b>	<b>172.7</b>	<b>202.8</b>
Perth	267.4	335.9	393.0
Rest of WA	99.1	107.0	113.6
<b>Total WA</b>	<b>366.5</b>	<b>442.9</b>	<b>506.6</b>
Hobart	20.4	23.1	25.3
Rest of Tas.	21.2	23.1	24.7
<b>Total Tas.</b>	<b>41.6</b>	<b>46.2</b>	<b>50.0</b>
<b>Total NT</b>	<b>31.2</b>	<b>34.3</b>	<b>36.9</b>
<b>Total ACT</b>	<b>38.9</b>	<b>42.2</b>	<b>44.9</b>
<b>Australia</b>	<b>2,705.6</b>	<b>3,229.8</b>	<b>3,666.6</b>
South-east Qld (a)	591.6	672.4	739.7

**Note:** Figures are rounded to the nearest '00. Numbers may not sum to totals due to this rounding.

(a) South-east Queensland includes the statistical divisions of Brisbane, Gold Coast, Sunshine Coast and West Moreton and Toowoomba Regional Council (Cambooya Shire – PtA, Crows Nest – Pt A, Jondaryan Shire – Pt A, Rosalie Shire – Pt A and Toowoomba City).

**Source:** National Housing Supply Council projections based on McDonald-Temple low, medium and high household growth scenarios, 2009 to 2029.

According to the Council’s projections, around two-thirds of the growth in underlying demand is projected to occur in and around four of Australia’s major cities: Brisbane and surrounding areas in south-east Queensland (21 per cent), Melbourne (19 per cent), Sydney (16 per cent), and Perth (10 per cent).

<sup>6</sup> National Housing Supply Council, ‘2nd State of Supply Report, 2010, ACT 2010 p.18

The demand projections model (2009-2029) will be updated to cover the period 2010-2030, for inclusion in the 2011 State of Supply projections. We are exploring options for updating the assumptions on migration and household size.

### **How much housing will we have? Projecting supply and key findings on supply**

At June 2009 the stock of private dwellings in Australia was estimated to be 9,009,000 dwellings. The medium trend projection for housing supply, based on a continuation of the trend for average annual net additions to the housing stock since 1980, would see total growth of 2,998,600 dwellings in the period 2009 to 2029 (an average net increase of just under 150,000 dwellings per annum).

Building activity levels generally dropped in 2008 and 2009 as a result of the global financial crisis. Dwelling approvals and completions were affected. In 2008-09, compared with the previous ten years, the average monthly number of approvals for houses across Australia fell by 7 per cent and 16 per cent for multi-unit dwellings. The greatest falls occurred in NSW where approvals for houses fell by 35 per cent and for multi-unit dwellings by 40 per cent.

Between January 2008 and September 2009, average quarterly house completions fell by 3 per cent and multi-unit dwelling completions fell by 7 per cent, when compared with quarterly completions over the previous 10 years. The largest falls occurred in New South Wales, where house completions fell by 39 per cent and multi-unit completions fell by 33 per cent. Given the lag between approvals and completions, it is likely that the former will recover more quickly from the slump during the global financial crisis or, put another way, the impact on slow growth in actual supply will be more attenuated than the impact on levels if activity in the residential construction industry. However, there are signs of faltering recovery in building activity levels, especially in the multi-unit sector, associated with a more conservative approach to lending being applied by the banks to developers, rental investors and home buyers.

### **Projecting supply**

In projecting supply, the first step is estimating existing stock of housing. The existing stock of 9,009,000 private dwellings in Australia as at June 2009 incorporates revised data for demolitions for the years 2007–09<sup>7</sup>. The calculation of existing stock of housing is shown in Table 3.1.<sup>8</sup>

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<sup>7</sup> The revised demolitions data mask the fall in production levels as a result of the global financial crisis

<sup>8</sup> National Housing Supply Council, '2nd State of Supply Report, 2010, ACT 2010 p.26

**Table 3.1: Existing supply, 2009**

		Number of dwellings
1	2006 ABS Population Census occupied private dwellings and unoccupied dwellings adjusted for undercounting	8,605,800
	plus	+
2	ABS dwelling completion data for 2007, 2008 and 2009	438,100
	minus	-
3	Estimated stock losses in 2007, 2008 and 2009 due to demolition	34,900
	equals	=
<b>Total supply in 2009 (rounded to nearest '00)</b>		<b>9,009,000</b>

**Source:** Adapted from Australian Bureau of Statistics, *Census of Population and Housing – Details of Undercount*, cat. no. 2940.0, ABS, Canberra, 2007; ABS, *Building Activity, Australia, June 2009*, cat. no. 8752.0, ABS, Canberra, 2009; National Housing Supply Council estimates.

The supply projections of housing construction activity are based on the trend line for Australian Bureau of Statistics (ABS) completions data over the period 1 July 1980 to 30 June 2009, less estimated demolitions, projected for the period 2009 to 2029. The low, medium and high supply scenario projections are shown in Table 3.2.<sup>9</sup>

**Table 3.2: Projected net increase in supply of dwellings, Australia, low, medium and high scenarios, 2009 to 2029**

Time period	Low supply scenario	Medium supply scenario	High supply scenario
2009–10 to 2010–11	232,400	282,100	340,900
2009–10 to 2013–14	585,000	710,300	858,400
2009–10 to 2018–19	1,183,600	1,437,100	1,736,700
2009–10 to 2028–29	2,421,200	2,940,100	3,553,200

**Sources:** Projections are based on dwelling completion trend, 1 July 1980 to 30 June 2009, from Australian Bureau of Statistics, *Building Activity, Australia, June 2009*, cat. no. 8752.0, ABS, Canberra, 2009, and National Housing Supply Council estimates for completions net of demolitions.

The medium supply projections are based on the trend in building completions from July 1980 to 2009. The trend was projected for each state and territory.

A low supply trend was estimated using the lowest level of completions in each state and territory as identified using a moving average annual calculation from ABS quarterly data from July 1980 to 2009.

Similarly, a high supply trend was estimated using the highest level of completions in each state and territory as identified from the ABS data.

The supply projections of the 2010 State of Supply Report incorporate improved estimates of demolitions based on additional census information and data from state and territory planning agencies where available.

<sup>9</sup> National Housing Supply Council, *2nd State of Supply Report, 2010, ACT 2010* p.27

In the 2008 Report, the Council estimated the stock of private dwellings in Australia to be 8,860,000 in June 2008. In the 2010 report using a similar methodology, but with revised estimates of demolitions, the Council revised the June 2008 estimate of stock of dwellings to 8,874,200. At June 2009 the stock was just over 9 million dwellings.

In the 2008 report, demolition rates were calculated based on the difference in the total dwelling counts between the 2001 and 2006 Censuses and the number of completions reported by the ABS for the same period. The 2010 report uses the same methodology. However in the 2008 report, the total dwelling counts included 'other dwellings' in the census data. These dwellings are not counted in the building activity completions data. The methodology in the 2010 report includes only the number of houses, townhouses and apartments from the census data.

The new methodology has substantially reduced the estimated annual supply losses due to demolitions, leading to an upward adjustment to estimated net additional housing stock of around 14,300 dwellings a year. The 2008 report estimated demolitions to be around 24,100 (or 16.0 per cent of completions) a year, while the 2010 report estimates the demolitions to be around 9,800 (or 6.5 per cent of completions) a year. This change has masked the effect of declining building activity associated with the global financial crisis that exacerbated the supply gap associated with the decline of building activity signalled by falling approvals and commencements in 2004.

In the 2008 report the Council produced a chart showing the stages involved in the land and dwelling production pipeline. In the 2010 *State of Supply Report*, the time in the supply pipeline was estimated for land development commenced in 2009. Table 3.9 shows a summary of this information.<sup>10</sup>

Greenfield development initiated in 2009 will generally take between 6 and 15 years from raw land made available for urban use through to dwellings for sale in a new suburb. The Council has estimated that some greenfield development activity commenced in 2009 may not result in dwelling construction activity until 2023.

The significant time period required to convert raw land to new dwelling and land packages reflects the cost, logistical challenges and regulatory requirements associated with each stage in the development pipeline and the economic and social environment associated with each individual land development project. The generic stages in the residential supply pipeline used by the council do not include the provision of social and economic infrastructure, such as public transport, arterial road improvements, schools, health services and shops. Delays in the provision of such infrastructure may further delay the release of land and the period for development and sale of dwellings.

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<sup>10</sup> National Housing Supply Council, '2nd State of Supply Report, 2010, ACT 2010 p.40

**Table 3.9: Estimated time in supply pipeline for land development activity started during 2009**

Pipeline start in 2009	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Facilitated	Stage 1	Stage 2	Stage 3	Stages 4 & 5	Stage 6										
Normal	Stage 1		Stage 2		Stage 3		Stage 4	Stage 5	Stage 6						
Difficult or complicated	Stage 1			Stage 2			Stage 3			Stage 4	Stage 5	Stage 6			

**Legend:**

Facilitated track = 6.25 years

Normal track = approximately 10 years

Difficult or complicated track = 14.5 years

**Moving in – a tighter focus on the elements of supply**

For future reports, the Council hopes to explore data and options for using a range “what if” assumptions related to construction capacity, market factors and productivity in projecting supply. We are also considering including recent trends in housing starts and building activity in supply in the next report along side longer term trend projections.

The work of the Council is constrained by a lack of comprehensive, consistent and independent information for detailed analysis of existing (and planned) residential development in metropolitan areas. This has been a matter of concern to the housing and development industries for some time, and was targeted for correction by the Council of Australian Governments (COAG) at the same time that the National Housing Supply Council was formed. Areas identified for future attention by the latter Council and the COAG Data Sub-Group (made up of Australian Government, state and territory officials) include:

- better indicators of lot production data such as the number of residential titles issued
- better use of the wide range of information held by state and territory and local governments, including on smaller, ad hoc infill development
- improving the quality and consistency of data holdings on land activities in the pipeline including standard definitions to enable a more informative compilation of a national housing supply picture, and
- comprehensive analysis of the factors affecting development risk and the relative price of various types of residential development.

For future projections we are seeking to further refine the supply projection methodology, including revisiting the treatment of demolitions in line with the revised census methodology for demolitions outlined in the 2010 report.<sup>11</sup>

**The demand-supply gap**

Last year’s conference paper<sup>12</sup> outlined some of the methodological challenges that the Council has faced in estimating the balance between demand and supply. In 2008, the Council estimated that the gap was 85,000 dwellings based on the incidence of certain types of homelessness and the level of vacancy rates in the private rental markets. The Council

<sup>11</sup> National Housing Supply Council, 2nd State of Supply Report, 2010, ACT 2010 Appendix 3 (page 193)

<sup>12</sup> Donald, O, Wilson, D and Waldegrave, A *Does Australia have enough housing?* 2009 National Housing Conference, W9 – Supplying the Demand

recognised the crudeness of this previous estimate and reviewed the measure for the 2010 report.

In developing the estimates for the 2010 report, the Council developed a different methodology – which resulted in a revised gap of 99,500 in June 2008 and a housing shortfall in June 2009 of around 178,000 dwellings. This estimate measures the difference between the projected total number of households and the total supply of houses. The net increase in the supply of houses is considered to be the number of new dwellings in that year, less the number of demolitions, and then adjusted to account for unoccupied dwellings (5.9 per cent of dwellings), since the 2001 Census.

The Council was attracted to a cumulative measure of the demand supply gap commencing in 2001 as this was a census year, in which updated comprehensive data on housing and households are available, a time of reasonable parity between dwelling production and population growth at national level, and is sufficiently long ago for “ones” and “offs” to produce something approximate to market equilibrium in most States and Territories.

There were inherent weaknesses in the previous measure of the gap between underlying demand and supply. Data on homelessness and marginal residents of caravan parks are updated only once every five years, and data on rental vacancies are volatile and available for capital cities only. In addition, it is possible that an interaction between homelessness and rental vacancies could result in some over estimation of the gap. Moreover, a host of factors influences homelessness in addition to the availability and cost of housing, including mental health, family violence and breakdown, and substance abuse.

### **Affordability**

The Council recognises that housing influences and outcomes differ by submarkets in terms of location and the characteristics of groups demanding housing. An exclusive focus on aggregate demand and supply would mask the diversity of circumstances and outcomes that prevails at the submarket level. A focus for the Council’s work is the outcome of market forces, policies and programs at the lower end of the market, in which failure is most likely to occur.

One of the consequences of a gap between demand and supply is that prices rise until supply responds or demand reduces. As a result of the current gap, house prices and rents are high relative to incomes. The Council is especially concerned about lower income households in terms of access, affordability and choice of housing. Many lower income households that cannot access either home ownership or social housing are likely to become long-term tenants in the private rental market.

The Council’s key concerns are:

- the affordability of housing for households at various income levels, especially for those below median incomes, and
- whether affordability is improving or declining for these groups.

Housing affordability for home buyers and renters can be measured in a number of ways. For home buyers it is typically measured by the ratio of household income to the income required to meet repayments on the mortgage needed to buy a median priced dwelling. Generally, affordability for home buyers declines whenever house prices grow faster than borrowing capacity. For renters, affordability refers to the relationship between rents and incomes. More detail on possible measures of affordability is included in Appendix 5 of the 2008 report.

In both *State of Supply Reports*, key indicators 3 – 6 illustrate access and affordability for lower income households.

Key indicator 3 shows the number of households in the bottom 40 per cent or 50 per cent of the income distribution that are buying homes, and are paying more than 30 or 50 per cent of their income in repayments. In 2007-08, half (312,000) of all home buyers in the lower 40 per cent of the income distribution were in so-called “housing stress”, with housing costs being greater than 30 per cent of their disposable household income.

Affordability for renters is captured in key indicator 4 which shows the number of households in the bottom 40 or 50 per cent of the income distribution paying more than 30 or 50 per cent of their income in rent. In 2007-08, over 20 per cent of lower income private renters paid rents in excess of 50 per cent of their disposable household income.

Key indicator 5 shows the shortage in the number of rental dwellings that are affordable for households in the bottom 40 or 50 per cent of the income distribution. Key indicator 6 shows the shortage in the number of rental dwellings that are both affordable and available to renters in the bottom 40 or 50 per cent of the income distribution. Affordable means rent is less than 30 per cent of gross income and available means the dwelling is not occupied by a higher income household.

Together these indicators show that in 2007-08 there was an estimated shortfall of 493,000 dwellings that were affordable and available for those renter households in the bottom 40 per cent of the income distribution. Much of the stock that could have improved rental affordability for these lower income households, if it had been available to them, was occupied by households in the higher income percentiles.

It is important to note changes in the data sources and methodology for the affordability indicators between the 2008 and 2010 editions of the State of Supply report. In 2008, the Council used information from the 2006 Census to analyse the supply of affordable private rental housing, and the profile of households accessing this housing. Data for key indicator 5 (affordable housing supply for lower income renters) and key indicator 6 (affordable and available housing supply for low income renters) were drawn from the 2006 Census.

The 2010 report used more recent data from the 2007-08 ABS Survey of Income and Housing for these indicators. Due to different methodology and definitions, data from these two sources are not directly comparable.

In addition, there is a difference in the methodology for key indicator 6 – affordable and available housing supply for low income renter households. In the 2008 report, affordable dwellings were considered available if they were not occupied by a household in a higher income percentile. For 2010, dwellings are considered affordable and available if they are actually occupied by a lower income household paying less than 30 per cent of their gross income in rent.<sup>13</sup>

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<sup>13</sup> This methodology aligns more closely to that used by the United States Department of Housing and Urban Development.

## **Part B: Moving in and unpacking – exploring the drivers of demand and supply**

The 2010 report outlined the Council's intended future work on:

- developing a greater understanding of some key drivers of underlying demand, including the settlement patterns of migrants, changes in household size and changing housing preferences<sup>14</sup>
- a more detailed analysis of the cost of producing housing, including land development and infrastructure
- further exploring the supply-side of the housing market.

The remainder of this paper highlights the issues that the Council would like to explore further.

### **Exploring key drivers of demand**

Recent increases in average household size (following decades of decline) may indicate that housing shortages and costs are leading to larger household sizes and reduced household formation rates. But there are other influences at work, including an increase in the fertility rate and possible changes to household formation patterns associated with the experience of various immigrant groups.

For future reports, the Council intends to better understand changes in household size and changing housing preferences, especially among younger people, and, as noted earlier, the settlement patterns and housing preferences of migrants and temporary residents.

### **Estimates of household size and changing household preferences**

Figure 2.1 shows substantial differences in the age distribution of various tenures that reflect well known transitions in “housing careers”. In 2006:<sup>15</sup>

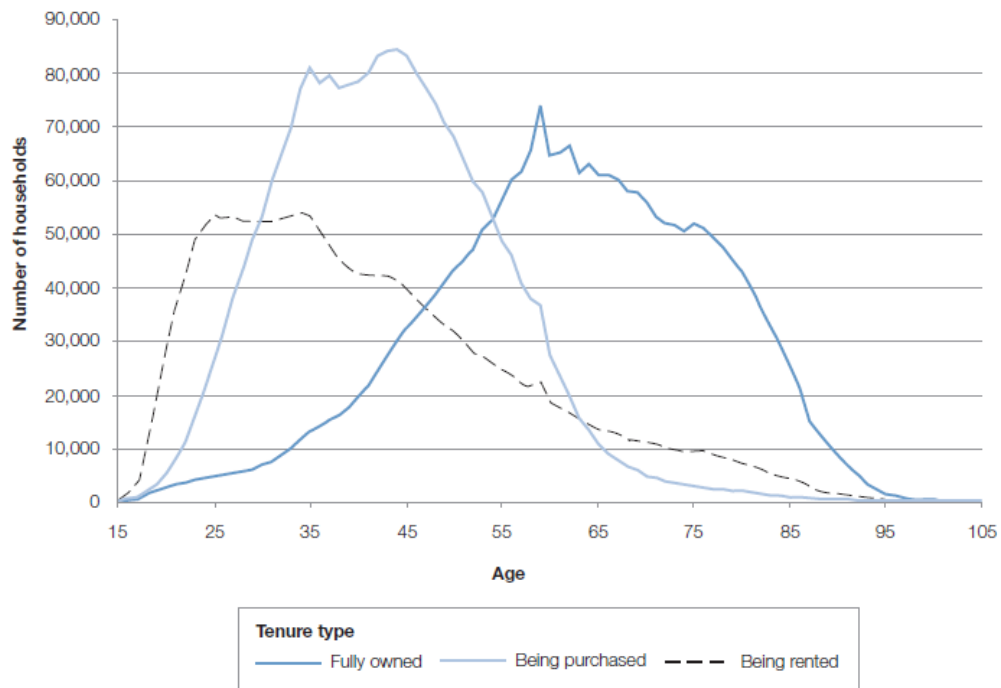
- the median age of renters is 38, although the age distribution is skewed towards younger households
- the median age of households with a mortgage is 42
- the median age of outright owner-occupiers is 61.

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<sup>14</sup> National Housing Supply Council, *2nd State of Supply Report, 2010*, ACT 2010 Page xix

<sup>15</sup> National Housing Supply Council, *2nd State of Supply Report, 2010*, ACT 2010 p.12

Figure 2.1: Tenure type by age of reference person, 2006 (number of households)



Source: Australian Bureau of Statistics, 2006 Census of Population and Housing 'Family/Household Reference Person Indicator and Age by Tenure Type', ABS, Canberra, 2009. Figure generated using ABS TableBuilder.

While these data reflect the fact that renting is partially a transitional tenure for younger people who will ultimately buy, a small proportion of older households also rent. The average age of first home purchase has increased over the last 20 years, with many younger households renting for longer periods and more not purchasing at all.

It is also likely that rising house prices are reducing access to home ownership at progressively higher household incomes. This could ultimately reduce home ownership rates across the population and increase rents and demand for rental housing, even among older age groups. Changes in patterns of household formation and housing choices will also reflect the preferences and expectations of younger generations, which in turn are likely to be influenced by supply-side factors.<sup>16</sup>

According to a new report from social researchers Ipsos Mackay, almost everyone in their 20s to mid-30s who participated in their group discussions wanted the "trifecta" of marriage, house and children. What's changed is they're a lot more flexible about the order in which they come and how long they take.

Ross Gittins. SMH September 1, 2010

<sup>16</sup> National Housing Supply Council, 2nd State of Supply Report, 2010, ACT 2010 p11.

Social change has accompanied changes in the housing market. The relationship between social change and housing outcomes runs both ways. For instance, increasing time spent in education while living at home with parents and subsequent delays in entering the full-time workforce have both influenced and been influenced by the housing market. The changing nature of the labour market has meant increasing diversity of employment arrangements and increasing rates of casual employment. These factors together with delays in family formation have meant that for many Australians, home ownership has become deferred or may increasingly not be an option.

The approach taken to projecting underlying demand in the State of Supply Reports assumes that household formation decisions are taken without regard to housing market conditions. However, it is likely that market conditions are affecting household formation decisions - manifested in, among other things, adult children remaining at home for longer periods, delays in having children, overcrowded dwellings and homelessness.

The Australian Local Government Association's *State of the Regions* report notes a recent reversal in the trend to smaller household sizes. It notes that between 1998 and 2010 the national average household size increased from 2.95 to 3.05 people. It also notes average household size increased markedly in areas with rising rents or tight supply whereas household size fell in areas with relatively slack housing markets like non metropolitan regions of South Australia and Tasmania.<sup>17</sup> This observation is consistent with the hypothesis that the availability and price of housing stock influence household structures and, therefore, underlying demand for housing.

The Council has earmarked for further investigation household formation, housing preferences and outcomes for different Australian generations. The Council is considering research into the housing experiences of two generations – Generation 1 born between 1950 and 1965 (aged 25 to 40 in 1990) and Generation 2 born between 1970 and 1985 (aged 25 to 40 in 2010) – the age group at which key household formation decisions are usually made. We note that very substantial work has been undertaken in this field by Andrew Beer and Debbie Faulkner and many collaborators<sup>18</sup>.

Unpacking demand requires a better understanding of the origin of preferences to enable insight into the extent that housing options may be driving preferences or vice versa.

### **Impacts of migration on housing demand**

Immigration is a key contributor to growth in the labour force, to additional internal demand for goods and services and to economic growth. However, it is also a significant driver of underlying demand for additional housing stock.<sup>19</sup> Higher immigration rates have a significant influence on the demand for housing, especially given the large proportion of young adults among the immigrant population.<sup>20</sup>

Housing demand projections commissioned by the Council based on 180,000 net overseas migration per annum point to an additional 3.2 million households in Australia over the next twenty years. If migration is lower or higher than this “medium” scenario, the household demand projections vary accordingly. The current model does not account for any differences

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<sup>17</sup> National Economics, Australian Local Government Association, *State of the Regions 2010-11* pp.10-11

<sup>18</sup> A. Beer and D Faulkner, *21<sup>st</sup> Century Housing Careers and Australia's Housing Future*, AHURI Final Report No 128, Melbourne 2009.

<sup>19</sup> National Housing Supply Council, *2nd State of Supply Report, 2010, ACT 2010*, p.xvii.

<sup>20</sup> National Housing Supply Council, *2<sup>nd</sup> State of Supply Report, 2010, ACT 2010*, p.xvii.

in the household formation patterns between immigrants and the resident population that could impact on demand.

Australians' home ownership aspirations are generally shared by new settlers. Migrants tend to go through a housing progression, which starts with shared housing or public rental accommodation, before moving on to private rental or the purchase of a home. However, continued high migration levels (coupled with a fall in production levels as a consequence of the global financial crisis) are likely to put more pressure on the housing market, especially for lower income households.

It is evident that the current wave of migration differs from earlier waves with regard to countries and cultures of origin and the proportion of temporary migrants (students and workers with limited tenure to fill skills gaps).

The largest contribution to net overseas migration in recent years has been from people on temporary visas. In 2007-08, temporary migrants accounted for 186,500 people or two-thirds of all net migration. Students made up the largest category of temporary net migration and 39 per cent of all net overseas migration.<sup>21</sup>

Whereas earlier waves of migration ultimately resulted in similar housing consumption patterns to those of Australian-born residents, it is not self-evident that this will recur. Variations in the volume of temporary migrants need to be assessed for their stock and flow consequences for housing demand, and changes in the mix of migrants' employment prospects, demographic structure, household formation patterns and level of education (among other factors) may result in lesser or greater lags in the assumption of a typical Australian housing consumption trajectory.

Accordingly, the Council is exploring further development of the household projections to capture differences in household formation by and among immigrants, and the impact of some migrants' occupation of non-private dwellings during their initial period of settlement in Australia. We need better data to confirm and enumerate these phenomena.

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<sup>21</sup> ABS, Population growth: past, present and future, *Australian Social Trends – Jun 2010*, cat. no. 4102.0 [www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features10Jun+2010](http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features10Jun+2010), and ABS, *Migration, Australia 2008-09*, cat. no. 3412.0.

## Can we achieve an adequate supply of housing in Australia?

The Council has identified some of the constraints on the efficiency of the housing market, including the planning, development assessment and tax systems.<sup>22</sup> Important levers for governments to improve housing affordability include increasing the supply of land, addressing other conditions for greater supply like regulatory delays and barriers and the question of who bears the cost of infrastructure, and increasing the supply of social housing. The following sections of the paper examine some factors affecting the supply of housing in Australia: the costs of dwelling construction, the availability of finance for development, and the size and make up of the construction industry.

### Housing costs

One of the oft-cited barriers to new supply, particularly affordable new supply, is the cost of construction. In the 2008 *State of Supply Report*, the Council presented Australian Bureau of Statistics data for 2007-08 on the costs of constructing detached houses, semi-detached dwellings and units. These costs were considered low compared with industry standards, based on the Council's consultation with stakeholders. As a result, the Council contracted URBIS Pty Ltd to provide more information about the costs of developing new infill and greenfield housing for the 2010 report.

The Urbis *National Dwelling Costs Study* provided a snapshot of the costs of building a two bedroom infill unit and greenfield housing across all five major cities: Brisbane, Sydney, Melbourne, Adelaide and Perth. The study used industry and geographic averages for each cost component. More detail on the methodology can be found at: [www.nhsc.org.au/nat\\_dwelling\\_costs/sec2.html](http://www.nhsc.org.au/nat_dwelling_costs/sec2.html)

The study showed that, except in Sydney, it is more expensive to build the average two-bedroom apartment in an established part of the city than an average three-bedroom detached dwelling in a new development on the urban fringe. Strategic planning policy across Australia is increasingly directing residential growth into infill areas rather than greenfield areas. Major metropolitan plans for major cities set infill targets between 50 and 70 per cent of all new dwellings over the next 20 years. The greater cost of developing infill is one barrier to achieving these targets and, conversely, to greater infill activity being consistent with the objective of improving housing affordability.

The costs of developing a two bedroom infill apartment in each of Australia's five major cities ranged from an average of \$468,389 in Adelaide to an average of \$553,621 in Sydney. The overall cost of developing three bedroom greenfield dwellings is relatively similar in all major cities (\$369,751 to \$383,958 on average for a three bedroom house), with the exception of Sydney. Building a house in Sydney was close to \$200,000 more expensive at \$560,711 on average.<sup>23</sup>

Construction costs are the largest cost component. The construction costs for a three-bedroom house in a greenfield development were around \$200,000 to \$310,000 compared with \$280,000 to \$310,000 on average for a two-bedroom infill unit.

Taxes and charges are also a significant cost component for both kinds of development. For greenfield development costs taxes and charges ranged from 17 per cent of total costs in

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<sup>22</sup> National Housing Supply Council, *2<sup>nd</sup> State of Supply Report, 2010*, ACT 2010, p.xvi.

<sup>23</sup> The dwelling cost figures published in the State of Supply Report do not include developer's profit figures published in the URBIS report.

Adelaide to 23 per cent in Sydney, and represented between 15 per cent and 17 per cent of total cost of infill development.<sup>24</sup>

The volume and type of infill development is also influenced by the availability of sites. Land supply is affected by competition for other land uses, and the time and cost of acquiring sites for development. Land costs make up between 10 and 15 per cent of the cost of developing infill dwellings, except in Melbourne where they are around 7 per cent. It is possible that differences in target market, number of units per development, and intraurban location account for much of these differences.

Sydney had the highest raw land lot cost, which represented 27 per cent of the total cost of developing greenfield housing, compared with 13-15 per cent in the other cities. Sydney has experienced extremely tight supply in greenfield land for a number of years, and this (along with infrastructure charges and other factors) has placed substantial upward pressure on raw land costs.

Possible future work on housing costs could involve updating the data in the study, completed in January 2010, to reflect current costs. The work on housing costs could also be expanded to provide information on more dwelling types, such as semi-detached and townhouses and apartments in two or three storey buildings. Housing costs in high growth regional locations around Australia could also be investigated to broaden the knowledge base about costs of developing housing.

### **Impacts of the global financial crisis and financing practices on housing supply**

While housing affordability for first home buyers and private renters decreased over the decade to 2008, the global financial crisis and lowering of interest rates have subsequently meant short-term improvements in affordability for mortgagees.

In 2007–08, there were over 300,000 lower income home buyers paying more than 30 per cent of their gross income in mortgage repayments (a common definition of ‘housing stress’). Around 160,000 of these households were paying more than half of their income in repayments. Many of these mortgagees would have experienced a lowering of repayments during and after the global financial crisis because of lower interest rates.<sup>25</sup>

Renters, however, have not benefited directly from the lowering of interest rates. In 2007–08, some 445,000 lower income households renting privately were in ‘housing stress’; around 170,000 paid more than half their gross household income in rent. The strong demand for housing resulting from population growth, coupled with falls in residential construction in many submarkets, is also likely to lead to tighter rental markets across the country.

Ernst and Young note that at the peak of the GFC (indicatively between June 2008 and June 2009) bank lending for property developments became almost non-existent.<sup>26</sup> Furthermore, the limited lending practices that continued at this time were largely restricted to supporting existing corporate clients with a known track record. In addition, a lack of liquidity and

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<sup>24</sup> National Housing Supply Council, *2<sup>nd</sup> State of Supply Report, 2010*, pp 120-121

<sup>25</sup> National Housing Supply Council, *2<sup>nd</sup> State of Supply Report, 2010*, p.xv.

<sup>26</sup> Ernst and Young, *Impact of the Global Financial Crisis and the take up of National Rental Affordability Scheme Incentives*, NSW, 2010.

amalgamation with larger banks, reduced the activity of regional banks, leading as Ernst and Young contend to a “reduced overall bank appetite for property developments.”<sup>27</sup>

The 2010 *State of Supply Report* noted the general fall in building activity levels in 2008-09 as a result of the global financial crisis. As shown in the table below, in 2008-09, compared with the previous ten years, the average number of approvals for houses across Australia fell by seven per cent, while approvals for non-house dwellings (generally multi-unit dwellings) fell by 16 per cent.<sup>28</sup>

The greatest falls occurred in New South Wales and Queensland. Building approvals for houses also fell in Western Australia. However, in spite of the falls nationally, approvals for houses and multi-unit dwellings rose slightly in Victoria and quite considerably in South Australia. Approvals for multi unit dwellings also rose in Western Australia. The fall in building levels, particularly in the multi-unit development sector, is likely to have implications for housing supply in the short to medium term.

**House and other dwellings, average monthly approvals and per cent change, January 1998 to December 2007 and January 2008 to December 2009**

	House			Other dwelling types		
	Average monthly 1998–2007	Average monthly 2008–2009	Per cent change	Average monthly 1998–2007	Average monthly 2008–2009	Per cent change
NSW	1,927	1,253	-35	1,720	1,039	-40
Vic.	2,633	2,729	4	930	1,008	8
Qld.	2,112	1,907	-10	1,024	818	-20
SA	684	806	18	171	224	31
WA	1,514	1,441	-5	335	368	10
<b>Subtotal for five states</b>	<b>9,208</b>	<b>8,554</b>	<b>-7</b>	<b>4,339</b>	<b>3,656</b>	<b>-16</b>

*Note:* 'Other dwelling types' comprise apartments, terraced houses and other medium density dwellings as well as about one per cent non-residential dwellings (such as rooming house units).

*Source:* Australian Bureau of Statistics, *Building Approvals, Australia, December 2009*, Tables 1–6, cat. no. 8731.0, Canberra, 2010.

Completions lag approvals by around 18 months and often longer for high rise dwellings. The decline in approvals through the GFC is therefore likely to be felt in lower completions in subsequent years. The data will be muddled by variations in the lag between approvals and completions, including of multi-unit developments approved before the GFC, but there seems little doubt that dwelling completions over the next few years will be diminished by reduced approvals during the GFC.

The impact of the GFC in Australia has been less pervasive and less severe than in other advanced economies due in large part to a number of economic stimulus plans put in place by the Australian Government. Lower interest rates have also stimulated demand, especially among first home buyers with the added incentive of the First Home Owners Boost. However, there has been some tightening of credit risk criteria among lending institutions,

<sup>27</sup> Ernst and Young, *Impact of the Global Financial Crisis and the take up of National Rental Affordability Scheme Incentives*, NSW, 2010.

<sup>28</sup> National Housing Supply Council, *2<sup>nd</sup> State of Supply Report, 2010*, ACT 2010, pp34-35

making access to credit more difficult for residential property developers and, to a lesser extent, residential purchasers, which may have significant impact on effective demand.

The Council is looking to investigate factors constraining the availability of development finance and will determine the extent that finance availability impacts on residential housing supply.

Anecdotal information received by the Council from representatives in the residential property sector indicates a reduction in the availability of debt capital for site acquisition and development of Australian residential development projects. Furthermore, the availability of project finance for residential development appears to vary considerably between States, regions and cities and is offered or is constrained, in line with banks' perceptions of particular risks associated with specific localities.

The Council would like to explore these issues further to assess the extent to which the supply of residential properties is being constrained by the availability of finance. This could be done through a comprehensive analytical review and series of interviews with personnel from the Reserve Bank of Australia (RBA) and the major Australian banks.

The review could include data from the Australian Bureau of Statistics (ABS) collections such as *Housing Finance Australia*, *Building Approvals Australia* and *Building Activity Australia*; data and research from the Australian Prudential Regulation Authority (APRA); and data from the Reserve Bank of Australia (RBA) and allied organisations. State and regional analyses could be undertaken throughout this review.

### **Supplying housing – some features of the construction industry**

The 2010 report included an overview of the construction industry and noted the looming risk of a skills shortage in the construction labour force.

The supply of labour is an important determinant of the supply of housing and its cost. In future reports, the Council may explore construction industry supply capacity, skills shortages and innovations.

The construction industry is an important part of the Australian economy, contributing 7.4 per cent to gross domestic product in 2008-09. The demand for and supply of construction is driven by a variety of factors including economic growth, changes in interest rates, immigration policies, labour availability and changes experienced within other industries such as agriculture, mining and manufacturing. The availability and price of existing housing is also a factor.

The construction industry employs the fourth largest workforce in Australia of just below 1 million, or 9 per cent of the workforce as at February 2010. Despite the effects of the economic downturn evident since 2008, the construction industry has experienced growth of 3 per cent per annum over the five year period to February 2010. There are currently 89,700 workers who work exclusively in the residential building construction.<sup>29</sup> However, the Department of Education, Employment and Workplace Relations (DEEWR) estimates that more than 40 per cent of all construction workers are engaged in work in the labour intensive residential building sector.

A higher proportion of construction industry workers are self-employed than in other sectors (21.1 per cent in May 2010 compared with 8.5 per cent in all industries) except for

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<sup>29</sup> For more information see Skills Info – Industry Profiles  
<http://www.skillsinfo.gov.au/skills/IndustryReportsCharts/>

agriculture, forestry and fishing. Housing subcontractors represent more than 90 per cent of workers involved in on-site home construction activity.

DEEWR projections for the five years to 2014 – 2015 suggest that employment in the construction industry as a whole will grow at 2.4 per cent per annum, and employment in residential building construction is projected to increase by 2.8 per cent per annum over this period. On the other hand, the National Housing Supply Council is aware of concerns about looming skills shortages associated with ageing of the construction workforce and competition for skilled tradespersons from growth sectors like mining.

As mentioned in the section on supply, the Council intends to investigate the existence and severity of current and future capacity constraints in the residential construction sector. In addition, we hope to investigate past and possible future changes in labour and multi-factor productivity in the construction industry, including through innovations in design, production techniques and modes of employment.

### **Conclusions and implications**

The Council's 2010 report concluded with confirmation of the considerable gap between underlying demand and supply and noted some of the more important factors constraining the supply response to burgeoning demand.

The Council aims to better understand the drivers of housing preferences and effective demand for housing as well as drivers and constraints on the supply side. This involves drilling well below the assumed interaction between production levels, average prices and the level of aggregate effective demand. A detailed understanding of producers' and consumers' behavioural responses to market conditions, related tax-transfer arrangements and regulatory requirements is needed to better inform policy development aimed at aligning underlying demand and effective demand more closely. The analysis should assist in comprehending the impact of demand-side and supply-side interventions on both affordability and market efficiency.

To address current and future supply side constraints we need a thorough understanding of supply side structures and practices and how they respond to real-world factors like building standards, environment protection measures, planning and development approval arrangements and adverse events such as the GFC (including long-run consequences for risk-assessment and the cost and availability of finance).

These issues will be in constant focus in our future work.

