New Zealand new housing characteristics and costs

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Abstract

New Zealand housing is mainly timber framed with a variety of wall and roof cladding types. Layouts and elevations are diverse and the amount of "standardisation" is quite small. The typical building firm is small scale and the top 50 builders account for only 25% of all new houses. This paper describes how the design characteristics of new housing and the structure of the industry affect the cost of housing. Comparisons with Australian housing costs are made. The analysis is based on two surveys, first a survey of the physical characteristics of new housing, second a survey of builders on factors affecting new housing costs. The New Zealand Productivity Commission has recently examined the affordability of housing and some of their findings and recommendations are discussed.

Keywords: Housing, costs, design, firms, standardisation

1. Introduction

New Zealand housing has traditionally been made from light timber framing, usually 100 x 50 mm nominal sizes, on timber piles but more recently on concrete slab foundations. In the early days of settlement the main cladding was timber weatherboard and corrugated steel roofing, continuing through to the early 1950's. Now a wide variety of materials are used for claddings. Australian houses are similar in construction to NZ housing with timber framing in widespread use. Generally Australian builders produce a similar quality house more cheaply than in NZ. It is instructive to compare the similarities and differences in design and construction in order to better understand reasons for the cost differences between the two countries. Ownership rates are dropping from about 75% in the early 1990s to 65% now and falling. Affordability has always been a low income household issue but more recently middle income New Zealand households in some locations have found ownership unaffordable. The Productivity Commission (2012) said "it is not yet clear if this is a cyclical phenomenon or a structural trend." This paper is about the supply side of housing rather than proposing measures to assist affordability, but it provides some reasons why new housing is increasingly unaffordable for many households.

2. Main results

This section examines a number of characteristics of New Zealand new housing with some comparisons with Australia. The characteristics examined are:

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- New housing costs, material costs and labour rates.
- Building form, detached versus attached housing
- Average floor area sizes
- Structural types.
- Wall cladding types
- Building firm size

2.1 New house costs

The prices for a typical new house in New Zealand and Australia are shown in Table 1. This is taken from the NZ Productivity Commission report on housing affordability (NZ Productivity Commission 2012, Table 10.3). Prices were adjusted for purchasing power parity (PPP) and the Commission found Australian prices were 15% to 25% lower, depending on the cities compared. There are slight differences in specification, but generally the quality of houses is similar in all locations. Building code requirements differ (e.g. thermal insulation, double glazing, structural loading, termite protection, etc) but these do not amount to more than an extra 5% cost for NZ houses. So the conclusion is that new housing in New Zealand is at least 10% more expensive than the same house in Australia.

Part of the reason for the price difference appears to be material costs. A comparison of ten common materials (Kenly 2003) found a price premium in New Zealand of about 55% after exchange rate adjustments. The Productivity Commission (Table 10.2) identified an average price differential of about 24% for materials in place, (i.e. labour installation costs are included), see Table 2. Some items, e.g. framing hardware, have a large price difference which is believed to be due to specific building code requirements. Rawlinson (2012) has average tradesman rates at $A62/ hour in Australia compared to New Zealand rates at $NZ38 per hour, including all overheads. In PPP terms the skilled labour cost in Australia is twice that of New Zealand. Hence the lower installed costs must be due to a combination of cheaper materials and more efficient use of labour. In fact Table 3 indicates less labour is used in Australia compared to New Zealand for most housing components.

Table 1 New house building costs per sq meters

Location	Price (PPP adjusted to $NZ)	% of Auckland	% of Dunedin
Auckland	$1,650/sqm	100%	108%
Dunedin	$1,525/sqm	92%	100%
Sydney	$1,175/sqm	71%	77%
Brisbane	$1,209/sqm	73%	79%

Source: Rawlinsons Australia and Rawlinsons New Zealand. Prices are for a moderate quality standard house using the mid-points of the price ranges given in the respective Rawlinsons Cost handbooks. Prices exclude GST and consent/ approval fees.

Table 2 Material prices for a typical house in New Zealand and Australia

Material	NZ price	Australian Price (PPP adjusted to NZ$)	Australian price as a %

Bricks	4,978	4,051	81%
Framing hardware	2,428	344	14%
Pre-nailed frames	10,575	7,920	75%
Eaves/ gable materials	3,524	1,395	40%
Finishing materials	1,032	978	95%
Finishing timber	677	867	128%
Internal doors	713	526	74%
Carpenter frame	6,870	6,142	89%
Trusses	8,111	7,158	88%
Metal fascia/ spouting	2,148	2,777	129%
Metal roofing	11,567	12,226	106%
Windows	12,873	5,325	41%
Cupboards	5,442	4,758	87%
Insulation	2,227	1,699	76%
Plasterboard	12,713	8,973	71%
Total	85,878	65,139	76%

Notes:
1. Framing hardware in New Zealand houses includes metal straps, angles, bolts and weatherproof wraps at exterior openings. New Zealand windows are double-glazed while Australian houses generally have single-glazed windows.
2. These prices include labour costs for installation.

Table 3 Labour hours by component in new Zealand and Australia

Component	Unit	New Zealand	Australia	Australia as % of NZ.
Ground floor joists 200 x50	hr/m	0.21	0.185	88%
Plates and studs 100 x50	hr/m	0.13	0.155	119%
Dwangs/ nogs 100 x50	hr/m	0.17	0.155	91%
Ceiling joists 150 x50	hr/m	0.20	0.17	85%
Erect trusses 6m span	hrs each	1.5	1.25	83%
Particleboard flooring 19mm	hrs/sqm	0.36	0.21	58%
Brickwork lay standard	hr/1000 bricks	16	13	81%
Brick clean/ point	Hr/sqm	0.20	0.15	75%
Weatherboard timber	hr/sqm	0.85	0.475	56%
Roofing concrete tiles	hr/sqm	0.30	0.17	57%
Roofing sheet steel	hr/sqm	0.15	0.20	133%
Painting Walls prep + 2 coats	hr/sqm	0.20	0.13	65%
Painting Ceiling prep + 2 coats	hr/sqm	0.25	0.15	60%

Source: Rawlinsons NZ Construction Handbook 2012. Rawlinsons Australian Construction Handbook 2012.

2.2 Building form and materials

The predominant structural material in new detached housing is framing timber, typically 100 x 50 mm nominal size. In recent years it has lost market share to concrete masonry, light steel framing and a variety of minor structural systems such as solid wood, mud brick and reconstituted timber panels. In the last 5 years steel framing has gained market share, see Figure 1. Similar data is not readily available for Australia but in the late 2000s (Australian Bureau of Statistics) the main systems were timber framing (approximately 65%), double brick (15%), light steel framing (15%), and Other (5%, concrete block and panels).

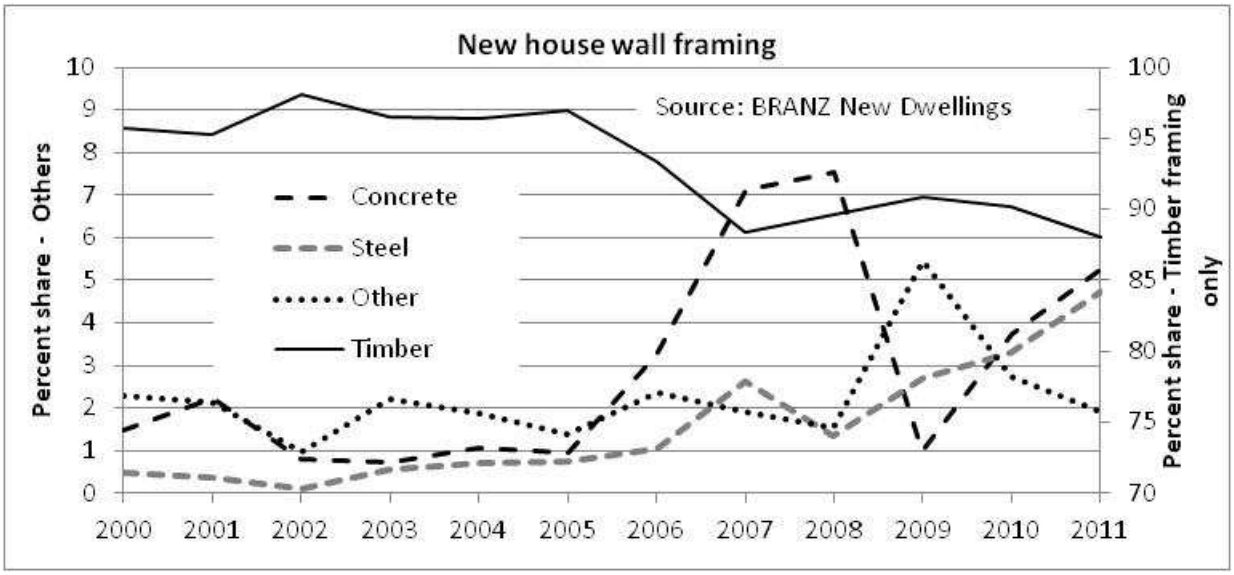

Figure 1 Framing systems in NZ housing

Wall claddings are shown in Figure 2. From the mid 1990s onward a "mediterranean" style with no eaves, flat roof and a flat wall finish became popular. Weather-tightness problems associated with these designs became apparent in the early 2000's and by the mid 2000's there was a shift back to traditional designs and materials represented by clay brick and weatherboard, and a reduction in the monolithic cladding represented by fibre cement sheet and EIFS. A feature of new NZ houses is the wide variety of cladding types as indicated on the chart. The "other" category includes plywood sheet, PVC weatherboard, and corrugated steel sheet. Furthermore many new houses have more than one cladding type, see Figure 3. Common combinations are brick and weatherboard. Owners appear to demand houses that look different to adjacent houses, both in cladding and in layout, the so-called "bespoke" housing. In contrast Australian detached houses are more limited in wall cladding types, with clay brick having well over 70% share and usually just one cladding type per house.

Roof cladding types show similar patterns with NZ housing having a variety of cladding types, with approximately equal shares in concrete tiles, pressed metal tiles and long run steel sheet, and small shares of flexible membranes and shakes. Australian new houses have mainly concrete or clay tiles. The BRANZ New Dwellings Survey referred to in the above charts is described in a report by Page and Curtis (2011).

The diversity of claddings is believed by the author to be one factor causing additional costs in New Zealand housing. Other cost factors relate to design characteristics and the size of the industry.

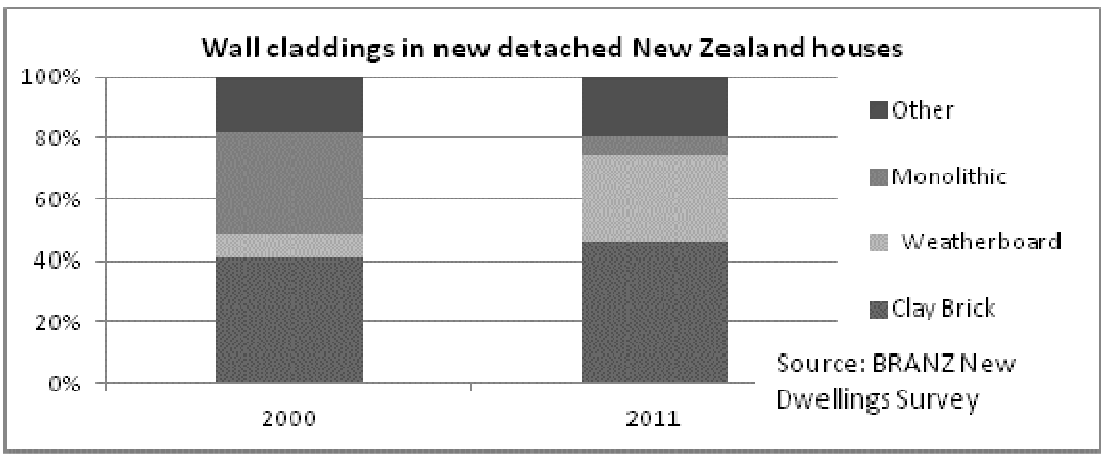

Figure 2 Wall claddings on NZ houses

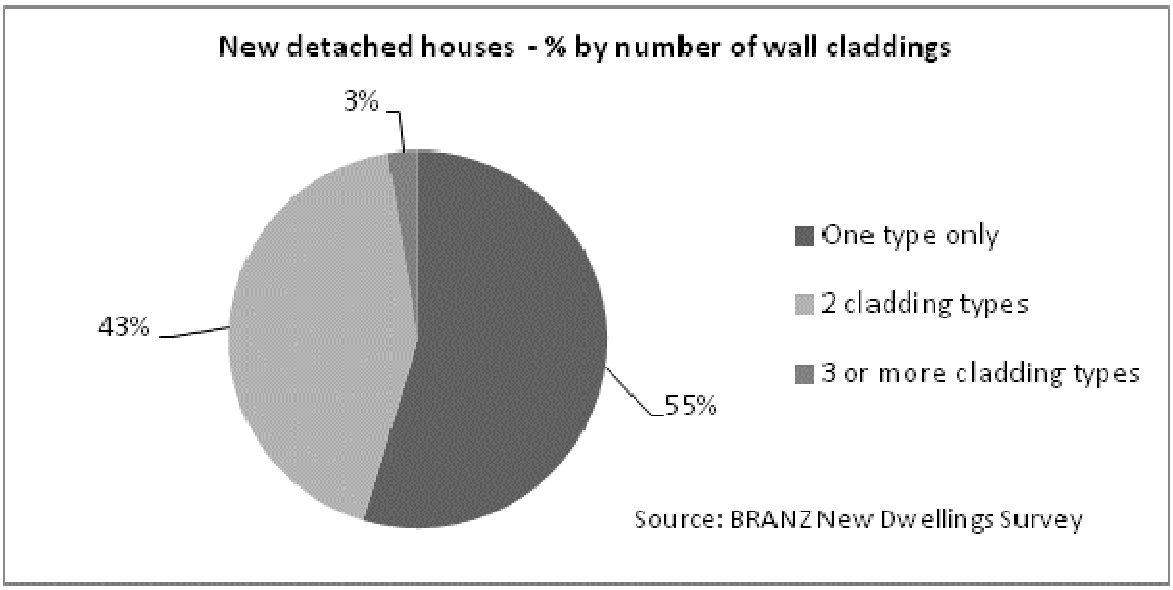

Figure 3 Numbers of cladding types on NZ houses

2.3 Detached versus attached new housing

The analysis in this paper is for detached housing because it is by far the majority of new housing in New Zealand. The proportion of multi-unit is quite low compared to Australia, see Figure 4, and most other Western countries. Average floor areas for detached houses are high by world standards, see Figure 5, with NZ houses third in size after Australia and the USA. Sizes have been rising in both countries for many years but now appear to have levelled out and may be declining.

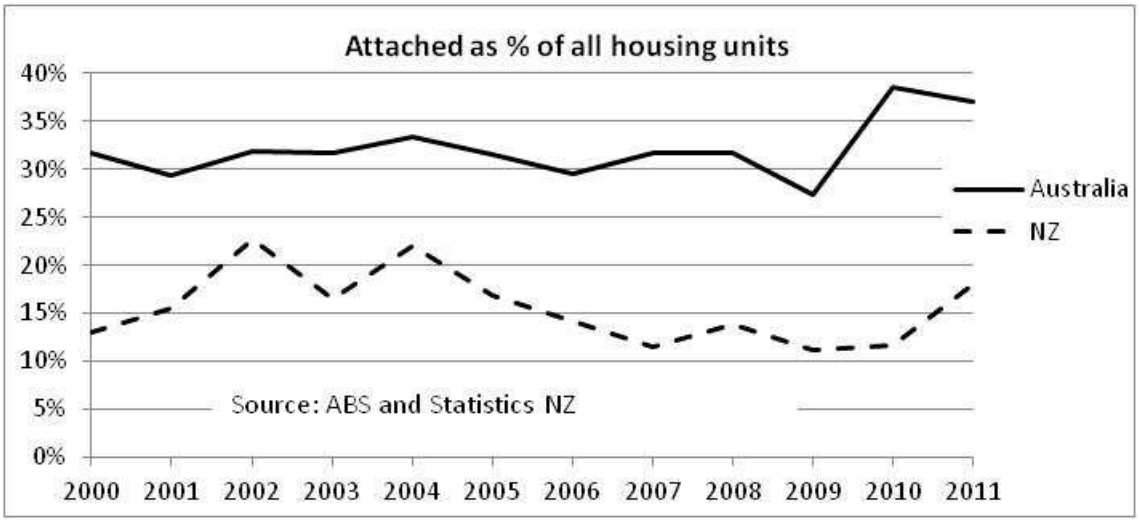

Figure 4 Attached new housing as a percentage

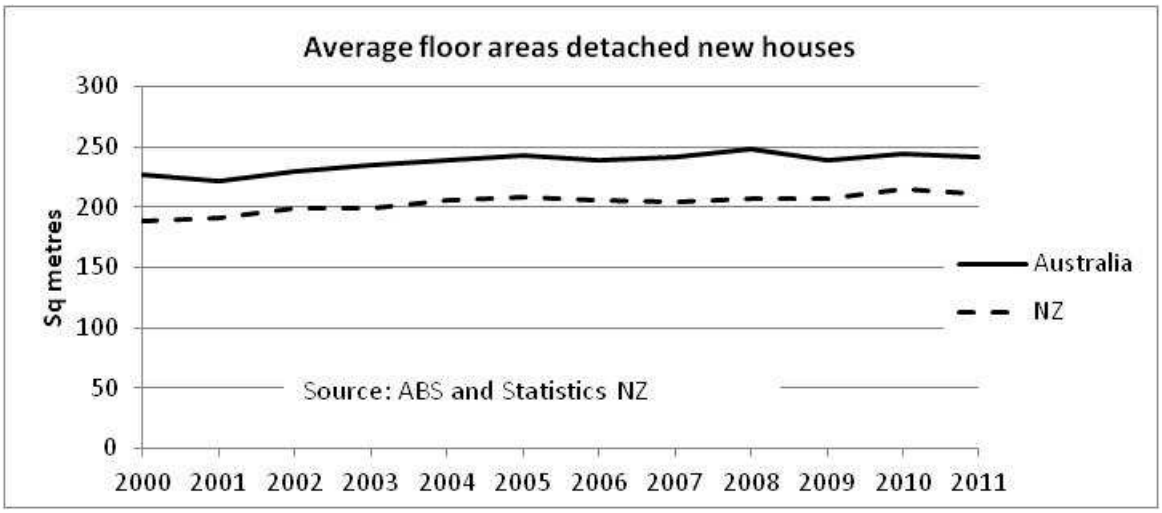

Figure 5 Average floor areas for detached new housing

Most new detached new housing is single level, see Table 4, However this is likely to change as new starts are increasingly on small lot sizes.

Table 4 Number of storeys in New Zealand new detached houses

	Percent	Average floor area sqm
One storey	78.2%	202
Two storey	20.3%	253
>Two storey	1.5%	313
	100%	
Source: BRANZ New Dwellings Survey.		

2.4 Firm size

The average size of house building firms in New Zealand is small, in common with many other countries, see Table 5. However for such a small country the NZ concentration percentage is unusually low, indicating it is very much a “cottage type” industry. This obviously affects firm market power in terms of material purchasing.

Table 5 House building firm concentration

	Percentage share			
	Australia	UK	USA	NZ
Top 10 firms	15%	28%	15%	13%
Top 50 firms	33%	66%	23%	25%
Source: Ball M (2007) Firm size and competition: A comparison of the house building industries in Australia, UK and USA. Working papers in Real Estate and Planning 02/07. Page I (2011) Cost efficiencies of standardised housing. Study Report No196, BRANZ, Wellington.				

2.5 Design factors affecting cost

A previous section mentioned the demand for "bespoke" housing in New Zealand which is manifest in varied layouts and different cladding materials for houses in the same housing development area. The large majority of new home owners have some input into the design (Curtis 2011); see Table 6. Almost half have a major input and even when standard plans are used over 40% have make some changes. This affects layout and other features such as windows, kitchens and bathrooms where common sizes of components are rare. For example, window sizes are not standardised and it is not uncommon for 6 to 8 difference sizes to be used per house. Bathroom vanities and showers are usually preformed but kitchen layouts are different in each house with custom made joinery quite common.

Builders were surveyed on design aspects and the effect on building costs (Page, Fung 2011), see Figure 6. The design features adding most to costs were an upper storey, complex roof lines, changing ceiling heights, sloping sites, and poor foundations. The latter two results from the varied NZ terrain causing issues with foundations in many locations. In the larger cities the better ground has already been claimed for housing and often new developments are forced onto more difficult sites.

Table 6 Owner input into NZ new house design

What input do owners have into the new house design?	
Select design from the builders standard plans with NO CHANGES	2%
Select design from the builder's standard plans with SOME CHANGES BY OWNER	43%
One-off design by an architect with MAJOR OWNER INPUT	48%
One-off design by an architect with MINOR OWNER INPUT	6%
Source: BRANZ New Home Owners Satisfaction Survey 2011. Sample size 481.	100%

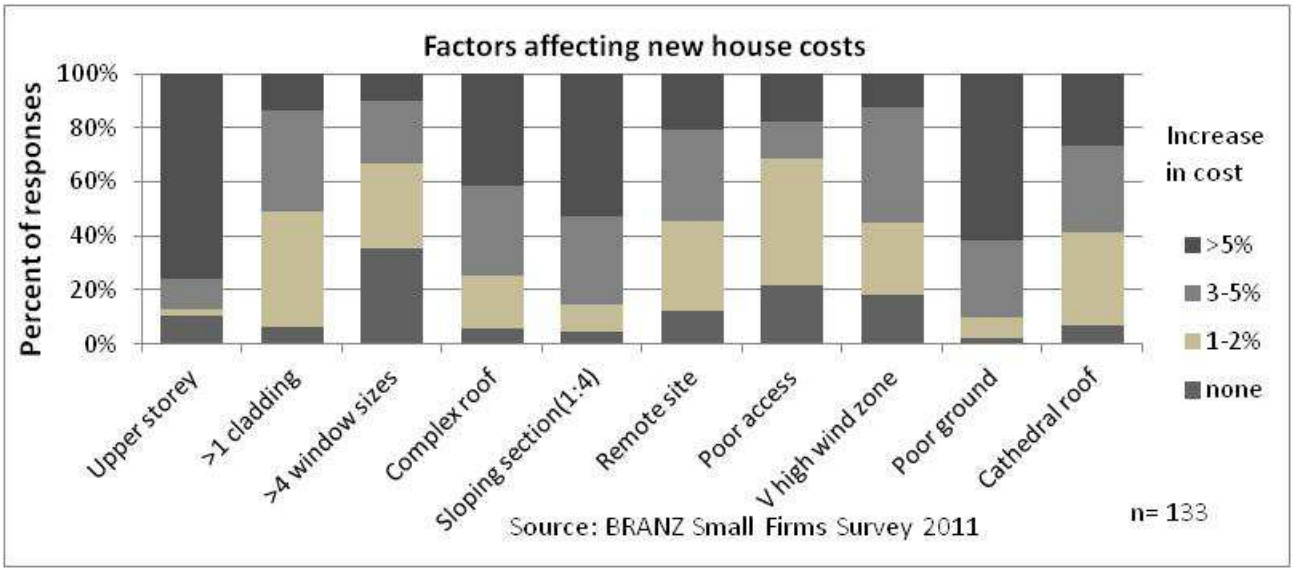

Figure 6 Factors affecting costs for new NZ detached houses

3. NZ Productivity Commission findings on housing costs

The Productivity Commission was tasked with the evaluation of the factors influencing the affordability of housing and to examine the opportunities to increase affordability. The main recommendations were:

- Increase land supply for new housing, including moderate –density development of brownfield sites and development of greenfield sites.
- Councils review regulatory processes with the aim of providing simplified, speedier and less costly consenting processes and inspections.
- Territorial authorities should develop strategies that promote competition between developers for the right to develop land.
- Treasury review the quality and robustness of the RIS process for changes to the Building Code.
- Building Consent Authorities (BCAs) adopt a customer-focused approach in their interaction with building practitioners.
- The Law Commission should consider a review of liability and the incentives faced by councils to minimise their liability.
- The Department of Building and Housing (DBH) should provide specific guidance for BCAs about what is required for an alternative solution to comply with the building code.
- The DBH should review the Multi-proof building consent process (where the same design is acceptable in all locations) to identify barriers to its application.
- Urgency should be given to Government efforts to improve BCA performance and promote greater consistency and efficiency in the building regulatory system.

Most of these relate to land zoning and other council processes. Making more land available and speeding up processes on the surface appear to be worthwhile solutions but the first conflicts with sustainability goals, and second, councils are wary of liability issues as they are often the “last man standing” in legal cases and have in the past incurred large repair costs. So while there can be improvements in land supply and council processes the right balance is needed.

The report examined the structure of the building industry and material manufacturing in some detail, but did not have many specific recommendations. The main one related to the industry Productivity Partnership (2012) work which the commission said “should develop, in consultation with the sector, practical responses to supply chain issues”. The Commission did not list these issues but they are believed by the author to include:

- Need to increase the average firm size to achieve scale efficiencies.
- Promote more standardisation in housing design.
- Better integration between owners, designers, builders, material suppliers and sub-contractors in procurement, time management and in allocating costs fairly.
- Improved processes within regulatory authorities for monitoring compliance.
- Use more prefabrication, both from a quality and time-saving viewpoint.
- Improve skills both in firm management and the on-site trades.

4. Discussion

New housing in New Zealand is characterised by a variety of housing forms with little standardisation. There are a large number of cladding types compared to Australian houses and the floor plan layout varies with almost every detached house. Average sizes of new housing are large despite average household size declining in recent years (currently the average occupancy is 2.7 persons per occupied house, down from 3.5 persons in the mid 1970s.)

Why are new house floor areas in NZ among the largest in the world? Affordability could be significantly improved with smaller houses and although home ownership rates are quite high, at 65%, they are currently declining rapidly due to affordability constraints. The reason for the large sizes appears to be the role of housing as a financial asset. For most households it is their largest single asset and new owners build with re-sale in mind for what they perceive to be the main market, i.e. 4 bedrooms, double garage and as much floor area as their budget allows. These choices are influenced by the high cost of land. In Auckland the land cost represents over 50% of the house and land package (Productivity Commission Figure 2.8). Owners do not want to under-capitalise on the house given the high land price. The average new section size is now about 450 sqm in the major cities and quite often the new house needs to be 2-storey to fit on the section. This has addition construction costs, compared to single storey construction. Poor ground conditions and lack of flat sites In many New Zealand cities is also a factor contributing to cost particularly during housing booms when the best sites are developed first.

Local councils are now zoning for more intensive housing. The Auckland Council (2012) expects about 60% of new housing over the next 30 years to be within the current urban limits and most of that will be attached housing varying from semi-detached, terraced housing and medium to high rise apartments. So house sizes are likely to decrease on average and possibly reduce or stabilise new housing price rises. Prospective owners are now becoming more aware of choices affecting energy and water use, travel times and other design factors which impact on their on-going costs. Recently developed intensive housing in greenfield and brownfield locations has been quite well designed. So possibly there will be a trend to smaller but better designed houses which cost less to run and have lower sustainability impacts.

Material costs are on average more expensive than in Australia. This is probably due to scale effects. With an average demand of 20,000 new houses per year the size of most building material manufacturers is below world scale. Also builders find it difficult to efficiently use their labour and sub-contractors as work sites are often scattered rather than being concentrated in large developments. There are only two major manufacturers of building materials and so price competition is limited for some materials. The population is well distributed across New Zealand with Auckland having at most 30% of new building work, so transport of bulky materials over the quite mountainous terrain adds to costs.

The Productivity Partnership (2012) has a programme of work to improve productivity in the building and construction industry by 20% by 2020. It is currently addressing the topics

mentioned in the NZ Productivity Commission report and it has four streams of work; Procurement, Skills, Processes and Evidence. Procurement is mainly focused on large projects and big clients (i.e. central and local government) with attempts to co-ordinate work so that boom-bust cycles are lessened. The skills stream emphases trade training but has recognised a gap in management skills in the small builder sector. The Processes group is looking at the value stream and trying to identify what processes add value and which do not and hence should be eliminated. It is considering the greater use of technology and innovation (e.g. BIM, pre-fabrication, etc) to improve overall industry performance. The Evidence stream is looking at measurement of progress toward the goals including measures of quality. One of the biggest challenges for the Partnership is to improve the performance of the small firm housing sector and make housing more affordable. Some solutions have been discussed above, including smaller houses, more standardisation, and larger firm sizes. But issues outside the industry also need to be addressed such as land and material costs, and regulation and compliance costs.

5. Conclusions

New housing in New Zealand has specific local characteristics arising out of a tradition of ownership and a wish of owners to put their mark on the new house. Due to land and consent costs most owners feel they need to build as large as possible. All this has gradually made new housing unaffordable for many households and ownership levels are dropping rapidly. Councils are zoning to contain urban sprawl and the first new house for many owners will increasingly be a multi-unit on a redevelopment site within existing urban limits rather than a detached dwelling on a green field site. It is likely in the future we will see a trend to smaller dwellings, more intensification and more standardisation. The average firm size is likely to increase to undertake this more intensive construction. This will lead to a significant change in the characteristics of new housing, possibly leading to better quality, enhanced affordability and improved sustainability.

References

Auckland Plan (2012), Auckland Council, New Zealand.

Australian Bureau of Statistics. Dwelling materials - Outside walls, (available online http://

www.abs.gov.au/AUSSTATS/abs@.nsf/39433889d406eeb9ca2570610019e9a5/87057589DAC54461CA25750E001088B7 [accessed on 12 November 2012].)

Curtis M (2011). New house owners satisfaction survey. Study Report No 270. Building Research Association of New Zealand, Wellington.

Kenly K (2003). Strewth mate! It's a rip off. Architecture New Zealand, 4, July/August issue.

Page I, Curtis M (2011). Physical characteristics of new houses. Study Report No 261. Building Research Association of New Zealand, Wellington.

Page I, Fung J (2011). Cost efficiencies of standardised new housing. Study Report No 247 Building Research Association of New Zealand, Wellington.

Productivity Partnership (2012) Research Action Plan (available online http://www.buildingvalue.co.nz/publications [accessed on 15th November 2012]).

NZ Productivity Commission (2012) Housing affordability inquiry. March 2012, Wellington.

Rawlinsons Australian Construction Handbook 2012. Sydney.

Rawlinsons New Zealand Construction Handbook 2012. Auckland.

Appendix

BRANZ New Dwellings Survey

This is a postal survey to builders. It asks questions on types of materials by selected components (frame, roof, walls, floor, etc) for a specific building identified from building consent lists obtained from local authorities. Approximately 1,200 returns are received per year. It was originally developed to provide specific product information on market size and share for manufacturers. It has been underway since 1999 and over the years additional questions have been added as requested including efficiency measures (insulation, glazing, lighting water conservation, solar panels, etc), and questions on structural design and weather-tightness. The latter are generally requested by officials and regulators. The survey's value is that it provides data not available from official sources, and it now has wide use including time trend data. More details of the survey are available in a BRANZ Study Report (Page, Curtis, 2011).