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External Research Report

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2018 Census
Tenure outcomes and the impact of administrative data

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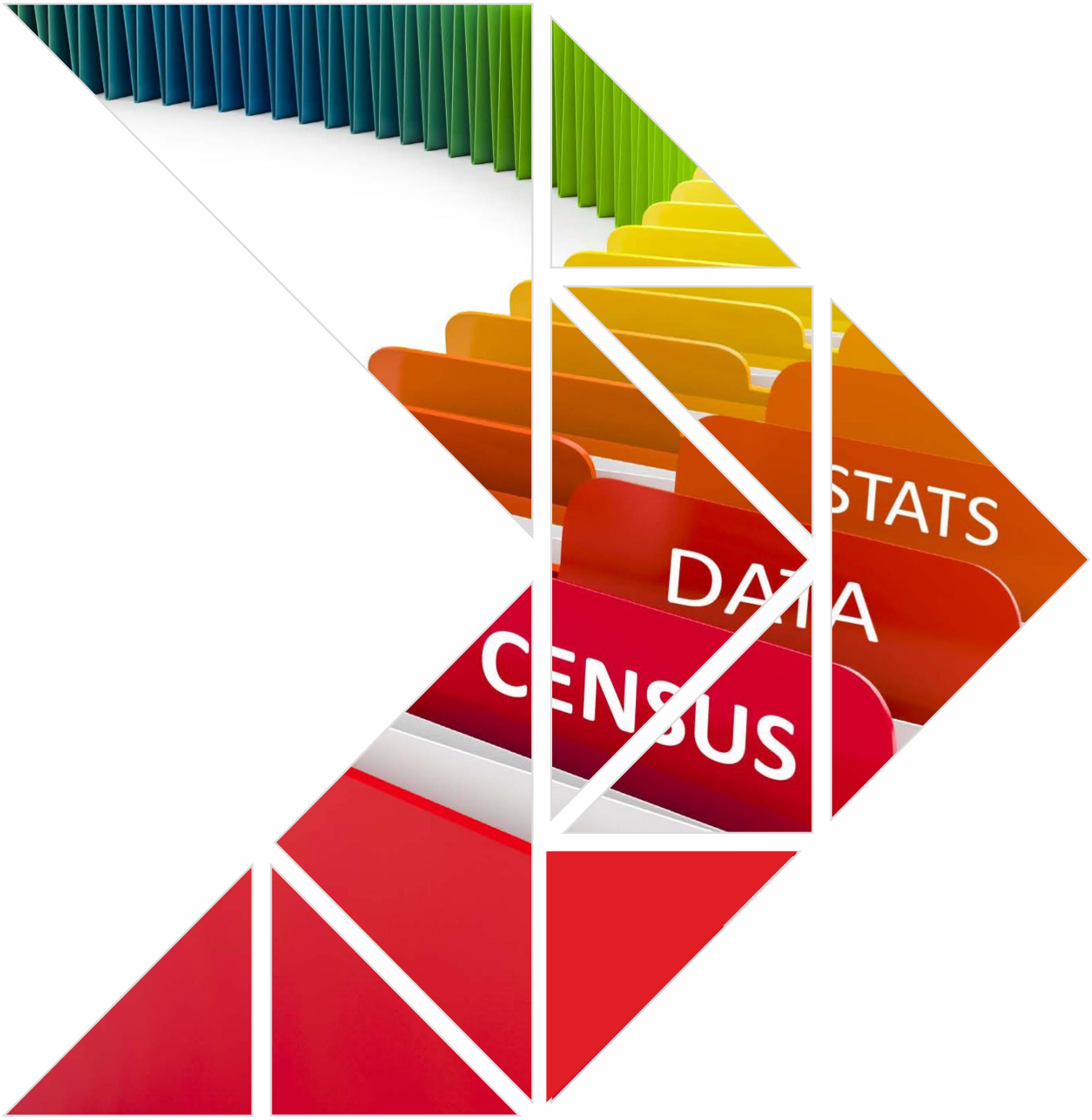

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RESEARCH REPORT

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1. Introduction

Census data has in the past formed the foundation upon which our understanding of the interrelationship between families, households, and housing market outcomes for our communities. The regular five yearly updates have allowed us to track trends within the housing market which identify important issues in a market, social and policy contexts. For example, census data has allowed the identification of structural changes in the rate of owner occupation in households over the last 30 years and consequently the rise of generation rent.

The census has been one of the few sources of data which enable the research community to examine trends at a territorial authority level. The objective of this research is to examine the impact that the use of non-2018 census data has had on the reliability and comparability of tenure outcomes. This is important, analysts and policy makers need to understand the limitations, if any, of the 2018 census.

The census response rate to the tenure questions in 2018 was lower than previous census (91.5% in 2018 compared to 94.9% in 2013). Statistics New Zealand as part of a broader programme used alternative data sets to improve census coverage relating to tenure outcomes. This approach increased the census coverage from 91.5% to over 99%.

The objective of this report is to investigate the impact Statistics New Zealand's decision to supplement the results of the 2018 Census with other data sources has had on our understanding of household tenure outcomes.

The data used in this report was sourced from Statistics New Zealand and rounded to the nearest 10.

2. The impact of other data sources on Census 2018 tenure question response rate

2.1 Introduction

Statistics New Zealand's challenges associated with the higher than expected non-response to the 2018 Census have been well publicised. The focus of this report is on 2018 census tenure outcomes and the impact the use of "alternative data sources[1]" have had on the rate of owner occupation. The report presents:

- The impact of alternative data sources on tenure question response rates;
- National tenure outcomes and the impact of alternative data sources;
- The impact of alternative data sources on rates of owner occupation by Territorial Local Authority;
- Census Outcomes 1996 to 2018 – highest and lowest rates of owner occupation in 2018; and
- Census 2018 outcomes – largest and smallest change in the rate of owner occupation 1996 to 2018.

2.2 Census 2018 tenure response rates

The response to the census 2018 tenure questions was lower than in previous years however the use of alternative data sources improved the overall coverage. Table 2.1 presents the non-response rate for the 2006, 2013 and 2018 census.

Table 2.1: Census 2018 non-response coverage

Census	Categorised as "not included elsewhere"
2006	4.7%
2013	5.1%
2018 (non-response to census questionnaires)	8.5%
2018 (non-response after adjustments)	<0.1%

Source: Statistics New Zealand

The 2018 census non-response rate to the questions on tenure was 3.4 percentage points higher than in 2013.

[1] Alternative data sources in the context of this report are non 2018 census data sources.

Statistics New Zealand used alternative data sources (2013 census results, administrative data, and data imputation) for the first time to supplement the 2018 census survey results to provide a fuller picture of tenure outcomes. This has resulted in the number of households in the "not elsewhere included" tenure category falling from 97,050 households in 2013 (6.3% of all households) to 730 households in 2018 (0.1% of all households). The impact of the change in methodology potentially has an impact on the comparability of Statistics New Zealand's published results for the 2018 census with previous censuses. They used three types of data to supplement the census responses. These were:

- Census 2013 responses were used as they were seen by Statistics New Zealand as a good source of information for variables that do not tend to change much over time, for example, if the household lived in the same dwelling in 2013 and 2018 its likely the tenure has remained the same so the tenure in 2013 can be used to populate the 2018 tenure outcome.
- Administrative data adjustments utilised Ministry of Business Innovation and Employment's (MBIE) tenancy bond data records and Housing New Zealand[2] (HNZC) tenancy information to identify renter households that had not responded to the tenure questions in the 2018 census; and
- Statistical imputation was used for 'fully non-responding households' where Statistics New Zealand have evidence that the dwelling was occupied on census night, but no census information was received from the household.

This is the first time Statistics New Zealand has adopted this approach to reduce the non-response rate to the tenure questions in the census. The impact of their approach on the non-response rate is presented in Table 2.2.

Table 2.2 Data sources - household tenure –occupied private dwellings

Source	Response rate (percent)
Response to the 2018 census question	91.5%
Data from alternative data sources	
Respondents' - 2013 census data	2.9%
Administrative data (MBIE and HNZC records)	2.7%
Statistical imputation	2.9%
Total overall response including alternative data sources	>99%
no information	<0.1%
Total	100%

Source: Statistics New Zealand

Overall, the adjusted census response is likely to provide a fuller picture of tenure outcomes. The use of alternative data sources (administrative data, statistical imputation and 2013 census data) means care will need to be taken when assessing inter-census trends. We note "not owned" tenure households are over-represented in the missing census responses (represented by administrative data from MBIE and HNZC records) which is typical of surveying non-response outcomes. Overall, the use of alternative data sources is likely to have improved overall census bias typically resulting from census field collection in 2018.

[2] Housing New Zealand has subsequently been merged into Kāinga Ora

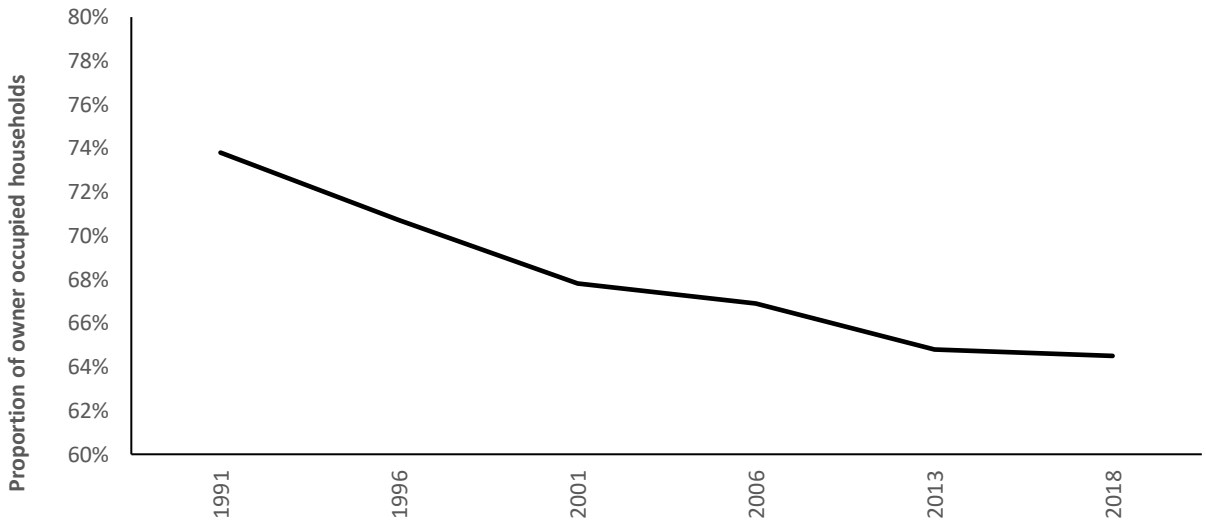
The Independent Panel commissioned by Statistics New Zealand to investigate Census External Data Quality[3] had a range of views about the 'Moderate' quality rating for the tenure variable. There are changes in the trends between 2006, 2013, and 2018 Censuses that might be a result of new/different tenure questions used in the 2018 census and the use of alternative data, but may also be the result of independently observable changes. Statistics New Zealand state that "*The overall quality of the data is sound and the use of alternative sources means there is no missing data. 2018 can be compared with 2006 and 2013 data with discretion, noting the change in question and use of alternative sources in 2018 and the impact of missing data in previous censuses." (Statistics New Zealand, 2019, page 107)*

2.3 National tenure outcomes and the impact of alternative data sources

The objective of this section of the report is to present the trend in the national rate of owner occupation as well as the impact Statistics New Zealand's use of alternative data sources have had on the overall tenure outcomes in 2018. The rate of owner occupation in New Zealand fell from 70.7% in 1991 to 64.5% in 2018, however the rate of decline between 2013 and 2018 (the rate of owner occupation fell from 64.8% in 2013 to 64.5% in 2018 a decline of 0.3 percentage points) was significantly lower than the previous inter-census period(the rate of owner occupation fell from 66.9% in 2006 to 64.8% in 2013 a decline of 2.1 percentage points). Although the 2018 tenure result continues the trend of lower rates of owner occupation it was at a significantly slower pace than expected.

Figure 2.1 presents the trend in the rate of owner occupation between 1991 to 2018.

Figure 2.1: National rates of owner occupation 1996 to 2018



Source: Statistics New Zealand

[3] See full report at https://www.stats.govt.nz/reports/2018-census-external-data-quality-panel-assessment-of-variables

Note the results are only indicative due to changes in the way in which tenure questions[4] have been asked over the last 27 years and the use of alternative data sources to supplement respondents answers. These changes mean the individual estimates are not directly comparable with each other.

Table 2.3 presents the trend in the number of households by tenure outcomes between 1996 and 2018

Table 2.3: Households by tenure 1996 to 2018

	Number of households				Rate of owner occupation[5]
	Not owned	Owned inc Trusts	Not elsewhere included (non-response)	Total households	
1996	355,790	857,530	50,000	1,263,320	70.7%
2001	410,990	865,150	63,030	1,339,160	67.8%
2006	450,570	911,880	90,330	1,452,780	66.9%
2013	512,110	940,730	97,050	1,549,890	64.8%
2018	586,140	1,066,940	730	1,653,810	64.5%
Change					
96 to 01	55,200	7,620	13,030	75,840	-2.9 % points
01 to 06	39,580	46,730	27,300	113,620	-0.9 % points
06 to 13	61,540	28,850	6,720	97,110	-2.1 % points
13 to 18	74,030	126,210	-96,320	103,920	-0.3 % points
96 to 18	230,350	209,410	-49,270	390,490	-6.2 % points

Source: Statistics New Zealand

The number of "*not owned"* tenured households increased by 14.5% between 2013 and 2018. The number of *"owned (including trusts)"* tenured households increased by 13.4% over the same time period. The rate of owner occupation has continued to decline between 2013 and 2018 albeit at a slower rate than in the past. Statistics New Zealand also managed to reduce the number of households in the "*not elsewhere included (non-response)"* category by supplementing the census responses with alternative data sources.

[4] See Appendix One

[5] The rate of owner occupation is calculated from "stated" households

The impact of alternative data sources on the estimated tenure outcomes is presented in Table 2.4.

Table 2.4: The impact of alternative data sources on the national rate of owner occupation

Data source	Owned	Not owned	In family trust	Total stated	Not elsewhere included	Total	Implied rate of owner occupation[6]
2018 Census	798,090	509,920	205,840	1,513,850	139,940	1,653,790	66.3%
Adjustments							
2013 Census	24,530	15,830	6,880	47,240	0	47,240	66.5%
Admin data	0	43,800	0	43,800	0	43,800	0.0%
Imputation	24,760	16,590	6,840	48,190	0	48,190	65.6%
No info	0	0	0	0	730	730	-
Adjusted 2018 outcome	847,380	586,140	219,560	1,653,080	730	1,653,810	64.5%

Source: Statistics New Zealand

A total of 139,938 households did not respond to the 2018 census tenure question and Statistics New Zealand decided to supplement the 2018 census responses with other alternative data sources with the objective of providing a better quality response which reduced the "not elsewhere included" category to 730 households (from 139,940 households)[7]. The use of alternative data improved the 2018 census coverage however the change in approach compared to previous censuses will mean care will need to be taken comparing the results to previous census.

The use of alternative data sources reduced the overall rate of owner occupation from 66.3% of all households to 64.5%, a reduction of 1.8 percentage points. The use of administrative data (MBIE's tenancy bond records and HNZC's tenancy database) has the most significant impact on the overall tenure outcomes.

[6] The implied rate of owner occupation is based on households with "stated" tenure only.
[7] See Table 2.2 for the source of alternative data on overall coverage and Appendix 2

2.4 The impact of alternative data sources on rates of owner occupation by Territorial Local Authority

The objective of this section of the report is to present the impact Statistics New Zealand's use of alternative data sources has had on the 2018 tenure outcomes by local authority area. Table 2.5 presents the impact the use of additional alternative data sources have had on the estimated rate of owner occupation by local authority area.

Table 2.5: Impact of alternative data sources on rates of owner occupation by Territorial Local Authority

	Census 2018 response prior to the use of alternative data sources	Adjusted census 2018 response	Difference
Far North District	68.1%	67.3%	-0.8%
Whangarei District	69.0%	67.5%	-1.4%
Kaipara District	71.5%	70.9%	-0.6%
Auckland	61.7%	59.4%	-2.3%
Thames-Coromandel District	73.9%	73.4%	-0.5%
Hauraki District	69.8%	68.6%	-1.2%
Waikato District	72.3%	70.5%	-1.8%
Matamata-Piako District	67.2%	66.3%	-0.9%
Hamilton City	56.3%	53.9%	-2.5%
Waipa District	71.8%	71.0%	-0.8%
Otorohanga District	63.8%	63.4%	-0.4%
South Waikato District	64.7%	63.2%	-1.5%
Waitomo District	60.4%	59.7%	-0.8%
Taupo District	67.9%	66.3%	-1.6%
Western Bay of Plenty District	75.3%	74.8%	-0.6%
Tauranga City	68.1%	66.7%	-1.3%
Rotorua District	66.0%	62.1%	-3.9%
Whakatane District	67.5%	66.2%	-1.3%
Kawerau District	68.9%	65.1%	-3.9%
Opotiki District	62.3%	62.2%	-0.2%
Gisborne District	62.2%	59.4%	-2.8%
Wairoa District	61.2%	60.8%	-0.4%
Hastings District	69.2%	66.4%	-2.8%
Napier City	68.7%	66.2%	-2.5%
Central Hawke's Bay District	72.9%	72.0%	-0.8%

Source: Statistics New Zealand

Table 2.5: Impact of alternative data sources on rates of owner occupation by Territorial Local Authority continued

	Census 2018 response prior to the use of other data sources	Adjusted census 2018 response	Difference
New Plymouth District	71.5%	70.2%	-1.3%
Stratford District	71.2%	70.4%	-0.8%
South Taranaki District	65.2%	63.4%	-1.7%
Ruapehu District	60.7%	59.8%	-1.0%
Whanganui District	70.4%	67.3%	-3.1%
Rangitikei District	69.4%	68.6%	-0.7%
Manawatu District	73.9%	73.1%	-0.8%
Palmerston North City	64.5%	62.8%	-1.7%
Tararua District	70.4%	69.4%	-1.0%
Horowhenua District	70.8%	69.4%	-1.4%
Kapiti Coast District	75.2%	74.2%	-1.0%
Porirua City	67.6%	64.3%	-3.3%
Upper Hutt City	73.6%	72.7%	-0.9%
Lower Hutt City	68.3%	66.0%	-2.3%
Wellington City	60.4%	58.7%	-1.6%
Masterton District	70.2%	68.6%	-1.6%
Carterton District	77.4%	77.0%	-0.3%
South Wairarapa District	76.8%	76.1%	-0.7%
Tasman District	76.0%	75.6%	-0.4%
Nelson City	70.0%	68.7%	-1.3%
Marlborough District	73.5%	72.5%	-1.0%
Kaikoura District	67.3%	66.7%	-0.6%
Buller District	68.2%	68.1%	-0.2%
Grey District	70.3%	70.0%	-0.3%
Westland District	66.2%	65.7%	-0.4%
Hurunui District	71.7%	71.0%	-0.7%
Waimakariri District	81.2%	80.5%	-0.7%
Christchurch City	65.2%	63.5%	-1.7%
Selwyn District	80.1%	79.5%	-0.6%
Ashburton District	67.5%	65.9%	-1.5%
Timaru District	73.7%	72.4%	-1.3%

Source: Statistics New Zealand

Table 2.5: Impact of alternative data sources on rates of owner occupation by Territorial Local Authority continued

	Census 2018 response prior to the use of other data sources	Adjusted census 2018 response	Difference
Mackenzie District	63.9%	64.2%	0.3%
Waimate District	68.8%	68.3%	-0.5%
Chatham Islands Territory	51.3%	55.4%	4.2%
Waitaki District	72.8%	72.1%	-0.8%
Central Otago District	74.6%	74.3%	-0.2%
Queenstown-Lakes District	63.8%	62.7%	-1.1%
Dunedin City	68.3%	67.1%	-1.2%
Clutha District	70.4%	70.2%	-0.2%
Southland District	67.4%	67.1%	-0.2%
Gore District	73.5%	72.3%	-1.2%
Invercargill City	71.7%	70.4%	-1.3%
Total	66.3%	64.5%	-1.8%

Source: Statistics New Zealand

With the exception of the Chatham Islands and Mackenzie District the use of alternative data sources reduced the rate of owner occupation. The Territorial Local Authorities with the largest negative adjustment were:

- Rotorua District (a -3.9 percentage point adjustment)
- Kawerau District (a -3.9 percentage point adjustment)
- Porirua City (a -3.3 percentage point adjustment)
- Whanganui District (a -3.3 percentage point adjustment)

The Territorial Local Authorities experiencing the smallest adjustment were:

- MacKenzie District (+0.3 percentage point adjustment)
- Clutha District (-0.2 percentage point adjustment)
- Southland District (-0.2 percentage point adjustment)
- Central Otago District (-0.2 percentage point adjustment)
- Buller District (-0.2 percentage point adjustment)
- Opotiki -District (-0.2 percentage point adjustment)
- Grey District (-0.3 percentage point adjustment)
- Carterton District (-0.3 percentage point adjustment)
- Westland District (-0.4 percentage point adjustment)
- Tasman District (-0.4 percentage point adjustment)
- Otorohanga District -0.4 percentage point adjustment)

The size of the adjustment was directly influenced by the number of MBIE's tenancy bond records and the number of Housing New Zealand's tenancies in each local authority area.

2.5 Census Outcomes 1996 to 2018 – Highest and lowest rates of owner occupation

The objective of this section of the report is highlight the Territorial Local Authorities with the lowest and highest rates of owner occupation in 2018.

Table 2.6 presents the local authority areas with the lowest rates of owner occupation in 2018.

Table 2.6: Territorial Local Authority's ranked by the 2018 rate of owner occupation – lowest to highest

Lowest to highest	Territorial Local Authority	Census					Change 96 to 18
		1996	2001	2006	2013	2018	
1	Hamilton City	65.3%	61.0%	60.7%	57.2%	53.8%	-11.4%
2	Wellington City	65.2%	61.7%	60.5%	59.1%	58.7%	-6.5%
3	Gisborne District	65.0%	62.9%	61.8%	59.2%	59.4%	-5.7%
4	Auckland Region	69.2%	64.4%	63.8%	61.5%	59.4%	-9.8%
5	Waitomo District	64.9%	64.0%	59.7%	57.9%	59.6%	-5.3%
6	Ruapehu District	55.0%	58.8%	58.0%	55.0%	59.8%	+4.8%
7	Wairoa District	63.3%	66.3%	61.1%	57.4%	60.9%	-2.4%
8	Rotorua District	68.7%	66.1%	64.5%	61.6%	62.0%	-6.7%
9	Opotiki District	67.9%	66.9%	62.6%	59.2%	62.2%	-5.7%
10	Palmerston North	65.1%	63.2%	63.6%	62.4%	62.7%	-2.4%
11	Queenstown-Lakes	59.1%	58.6%	59.8%	59.6%	62.8%	3.7%
12	Mackenzie	64.5%	69.5%	65.7%	65.5%	63.1%	-1.5%

Source: Statistics New Zealand

Hamilton City has the lowest estimated rate of owner occupation (53.8%) in 2018 followed by Wellington City (58.7%) and Gisborne (59.4%).

Table 2.7 presents the local authority areas with the highest rates of owner occupation in 2018

Table 2.7: Territorial Local Authority's ranked by the 2018 rate of owner occupation – highest to lowest

Highest to lowest	Territorial Local Authority	Census					Change 96 to 18
		1996	2001	2006	2013	2018	
1	Waimakariri	82.9%	81.0%	81.2%	80.3%	80.4%	-2.5%
2	Selwyn District	77.2%	79.9%	78.7%	78.5%	79.4%	2.2%
3	Carterton District	76.3%	78.6%	76.3%	73.8%	76.9%	0.6%
4	South Wairarapa	74.2%	74.5%	73.1%	72.2%	75.9%	1.8%
5	Tasman District	77.3%	75.8%	75.8%	75.0%	75.5%	-1.8%
6	Western BOP	76.0%	73.7%	73.3%	70.2%	74.7%	-1.2%
7	Central Otago	74.0%	74.5%	74.1%	73.1%	74.2%	0.2%
8	Kapiti Coast	81.0%	77.1%	75.7%	74.5%	74.2%	-6.8%
9	Thames-Coroman	72.7%	71.4%	69.4%	68.7%	73.4%	0.7%
10	Manawatu	74.0%	74.3%	71.8%	71.2%	73.0%	-1.0%
11	Upper Hutt City	77.3%	73.5%	73.7%	72.1%	72.6%	-4.6%
12	Marlborough	74.6%	73.6%	72.5%	70.9%	72.4%	-2.2%

Source: Statistics New Zealand

Waimakariri District has the highest rate of owner occupation in 2018 (80.4%) followed by Selwyn District (79.4%) and Carterton District (76.9%). Although it is beyond the scope of this report to investigate the causes of these trends, these areas appear to be either relatively affordable retirement destinations, located in "sunshine" locations, or on the fringe of larger metroplotian areas. This may warrant further investigation when more detailed census 2018 data becomes available.

2.6 Census 2018 outcomes – Largest and smallest change in the rate of owner occupation 1996 to 2018

The objective of this section of the report is to present the territorial local authorities with the largest negative and positive changes in the rate of owner occupation between 1996 and 2018. Table 2.8 presents the local authority areas which experienced the largest change in the rate of owner occupation between 1996 and 2018.

Table 2.8: Largest negative change in the rate of owner occupation 1996 to 2018)

Rank	Territorial Local Authority	Census					Change
		1996	2001	2006	2013	2018	96 to 18
1	Hamilton City	65.3%	61.0%	60.7%	57.2%	53.8%	-11.4%
2	Ashburton District	77.0%	76.0%	71.9%	66.7%	65.7%	-11.3%
3	Waimate District	78.6%	78.2%	73.2%	70.3%	68.3%	-10.3%
4	Southland District	77.1%	77.8%	71.9%	67.1%	66.9%	-10.2%
5	Auckland Region	69.2%	64.4%	63.8%	61.5%	59.4%	-9.8%
6	Kawerau District	74.3%	69.9%	66.4%	61.9%	65.1%	-9.3%
7	Christchurch City	72.1%	68.4%	67.6%	64.8%	63.5%	-8.6%
8	Invercargill City	77.6%	74.1%	74.2%	70.4%	70.4%	-7.3%
9	Gore District	79.0%	76.0%	74.0%	72.5%	72.1%	-6.9%
10	Kapiti Coast	81.0%	77.1%	75.7%	74.5%	74.2%	-6.8%
11	Rotorua District	68.7%	66.1%	64.5%	61.6%	62.0%	-6.7%
12	Wellington City	65.2%	61.7%	60.5%	59.1%	58.7%	-6.5%

Source: Statistics New Zealand

Hamilton City experienced the largest fall in the rate of owner occupation between 1996 and 2018 (a fall of 11.4 percentage points) followed by Ashburton District (a 11.3 percentage point fall) and Waimate District (a fall of 10.3 percentage points).

Table 2.9 presents the local authority areas experiencing the largest increase in the rate of owner occupation between 1996 and 2018.

Table 2.9: Largest positive change in the rate of owner occupation 1996 to 2018 by Territorial Local Authority (Territorial Local Authority)

Rank	Territorial Local Authority	Census					Change
		1996	2001	2006	2013	2018	96 to 18
1	Ruapehu District	55.0%	58.8%	58.0%	55.0%	59.8%	4.8%
2	Central Hawke's Bay	68.1%	67.4%	69.0%	70.3%	72.0%	3.9%
3	Queenstown-Lakes	59.1%	58.6%	59.8%	59.6%	62.8%	3.7%
4	Waikato District	68.3%	70.3%	73.8%	67.2%	70.5%	2.2%
5	Selwyn District	77.2%	79.9%	78.7%	78.5%	79.4%	2.2%
6	Rangitikei District	66.8%	69.7%	66.4%	65.5%	68.6%	1.8%
7	South Wairarapa	74.2%	74.5%	73.1%	72.2%	75.9%	1.8%
8	Thames-Coro	72.7%	71.4%	69.4%	68.7%	73.4%	0.7%
9	Carterton District	76.3%	78.6%	76.3%	73.8%	76.9%	0.6%
10	Taupo District	65.9%	65.0%	64.0%	61.6%	66.4%	0.5%
11	Kaipara District	70.5%	73.2%	70.1%	68.3%	70.9%	0.4%
12	Hurunui District	70.6%	73.7%	72.1%	68.9%	70.9%	0.3%

Source: Statistics New Zealand

Ruapehu District experienced a 4.8 percentage point increase in the rate of owner occupation between 1996 and 2018 followed by Central Hawkes Bay (an increase of 3.9 percentage points) and Queenstown Lakes (3.7 percentage points).

2.7 Discussion

Statistics New Zealand has used alternative data sources to improve the response rate to the tenure questions in the 2018 census. Although they have improved the census coverage. It will mean data users will need to take care when comparing the 2018 results with previous censuses due to the change in methodology outlined in this report.

Although the overall fall in the rate of owner occupation has slowed a number of trends appear to be emerging[8]. The rate of owner occupation fell in the larger urban centres however it also appear to increase in areas adjacent to these cities. Initial analysis of the tenure outcomes from the 2018 census demonstrate the change in the rate of owner occupation varies significantly around the country. Auckland, Hamilton, MacKenzie and Waimate local authority areas all experienced falls in the rate of owner occupation in excess of two percentage points between 2013 and 2018. Whereas, Thames Coromandel, Taupo, Western Bay of Plenty, and Ruapehu Districts all experienced increases in the rate of owner occupation in excess of four percentage points between 2013 and 2018.

It is beyond the scope of this report to investigate the reasons behind the change in the relative levels of owner occupation between territorial local authorities however a number of potential factors are likely to have influenced the 2018 owner occupation outcomes. These include:

- The fall in mortgage interest rates and changes in the availability of mortgage finance between 2013 and 2018 are likely to have had a positive impact on rates of owner occupation;
- House prices and rents have, in the majority of locations, increased faster than household incomes and as a consequence made it harder for households to become owner occupiers;
- Changes in household aspirations around owner occupation may mean some households delay or do value owner occupation as much as previous generations;
- Over the last 5 years New Zealand has experienced high net inflows of overseas migrants and their decisions around owner occupation are likely to have influenced tenure outcomes in different local authority areas; and
- Anecdotal evidence also suggests there has been significant redistribution of New Zealanders (internal migration) away from higher cost housing markets (typically main centres) to lower cost areas which may have influenced tenure outcomes.

The 2018 Census family and household data has not yet been released and as yet no firm release date has been announced. Without this data it is difficult to undertake more detailed analysis to understand the factors driving tenure outcomes by different housing markets in New Zealand.

[8] It is uncertain how much changes in the way tenure questions were asked between the 2013 and 2018 census and the use of alternative data sources has impacted on the comparability between census.

Appendix One[9]

Households Tenure
(extract from "2018 Census: Changes and how they might affect data" – Statistics New Zealand Publication)

[9] [9] See full report at https://www.stats.govt.nz/methods/2018-census-changes-and-how-they-might-affect-data

Households Tenure
(extract from "2018 Census: Changes and how they might affect data" – Statistics New Zealand Publication)

Priority 2 variable Minor real-world change, minor data collection change

The census dwelling form asks a series of questions designed to ascertain the tenure of households in privately occupied dwellings. The variable 'tenure of household' refers to whether the household owns the dwelling they live in, has it in a family trust, rents it, or whether it is provided rent-free.

Questionnaire change

The concept of the household tenure variable has not changed since the 2013 Census, however the design of the questionnaire has had some changes, see Table 8. The suite of questions used in 2018 are simpler, with fewer questions and fewer routing instructions. These changes were made in order to reduce respondent burden and improve data quality. By simplifying the suite of questions, and promoting online response (where individual questions are less easily skipped), it is hoped that non-response will decrease and we will observe an accompanying increase in data quality.

Imputation

Another important change for tenure of household is the use of imputation in the 2018 Census. Imputation is being planned to resolve cases where there is no response or the response is unidentifiable. The data sources used for imputation will be 2013 Census data and tenancy bonds. It is likely that this imputation will improve data quality.

Households that rent are less likely to complete their census forms. They tend to be younger, have lower income levels, and be more transient than owner-occupier households. The use of tenancy bonds data for imputation will mean that more of these households will now be able to be identified in the census data. We anticipate that, in addition to real-world changes, this change could contribute to an increase in the proportion of households coded to a household tenure of renting.

The changes to questionnaire design, greater use of online forms, and introduction of imputation may have some effect on the comparability of the data over time, and make the data a little less comparable than previously but this is not expected to have a major impact on data quality.

Table 8: Comparison of the tenure questions included in the 2013 and 2018 Census

2013 Census questions

7 Look for the 'go to' instruction after you answer the question.
Do you, or anyone else who lives here, hold this dwelling in a family trust?
- yes → go to 8
- no → go to 9
- don't know → go to 9

See the Guide Notes if you need more information

8 Does that trust make mortgage payments for this dwelling?
- yes → go to 14
- no → go to 13

9 Do you, or anyone else who lives here, own or partly own this dwelling (with or without a mortgage)?
- yes → go to 13
- no → go to 10

10 If nobody who lives here owns this dwelling, who owns it?
- private person, trust or business
- local authority or city council
- Housing New Zealand Corporation
- other state-owned corporation or state-owned enterprise, or government department or ministry
- don't know

11 Does this **household** pay rent to an owner (or to their agent) for this dwelling?
- yes → go to 12
- no → go to 14

12 Look for the 'go to' instruction after you answer the question.
How much rent, to the nearest dollar, does this **household** pay to the owner (or to their agent) for this dwelling?

$, . 0 0

each
- week
- two-week period
- four-week period
- calendar month
- other. Print period:

→ go to 14

13 Do you, or anyone else who lives here, make mortgage payments for this dwelling?
- yes
- no

See the Guide Notes for help

2018 Census questions

5 Do you, or anyone else who lives here:

See the Guide Notes for help

- hold this dwelling in a family trust?
- own or partly own this dwelling, with or without a mortgage?

→ go to 9

or
- neither of these → go to 6

6 If nobody who lives here owns this dwelling, who owns it?
- private person, trust or business
- local authority or city council
- Housing New Zealand Corporation
- iwi, hapū or Māori land trust
- other community housing provider
- other state-owned corporation or state-owned enterprise, or government department or ministry
- don't know

7 Does this household pay rent to an owner (or to their agent) for this dwelling?
- yes → go to 8
- no → go to 10

8 How much rent, to the nearest dollar, does this household pay to the owner (or to their agent) for this dwelling?

$, . 0 0
- each week
- each two-week period
- each four-week period
- each calendar month
- other. Print period between rent payments

→ go to 10

9 Are mortgage payments made for this dwelling by someone living here or by a family trust of someone living here?
- yes
- no
- don't know

Appendix Two [10]

Households Tenure

(extract from "2018 Census: Changes and how they might affect data" – Statistics New Zealand Publication)

[10] [10] See full report at https://www.stats.govt.nz/reports/2018-census-external-data-quality-panel-assessment-of-variables

2018 Census External Data Quality Panel
Assessment of Variables

Introduction to the 2018 Census External Data Quality Panel

Stats NZ constituted the 2018 Census External Data Quality panel in August 2018.

Panel members are as follows:

- Richard Bedford, Emeritus Professor, recently retired Professor of Population Geography, Auckland University of Technology and University of Waikato (co-Chair)
- Alison Reid, Team Manager, Economic and Social Research and Evaluation, Auckland Council (co-Chair)
- Dr. Barry Milne, Director, COMPASS Research Centre, University of Auckland
- Dr. Donna Cormack, Senior Lecturer, Te Kupenga Hauora Māori, University of Auckland; Senior Research Fellow, Te Rōpū Rangahau Hauora a Eru Pomare, University of Otago, Wellington
- Ian Cope, international census expert, ex-Office of National Statistics (ONS), United Kingdom
- Len Cook, former New Zealand Government Statistician and former National Statistician of the United Kingdom
- Tahu Kukutai, Professor of Demography, National Institute of Demographic and Economic Analysis, University of Waikato
- Thomas Lumley, Professor of Biostatistics, University of Auckland.

1. Introduction

Statistics New Zealand (Stats NZ) has adopted a rating scale to assess the quality of each variable measured in the 2018 Census of Population and Dwellings. The 2018 Census External Data Quality Assurance Panel (the panel) has summarised its findings on the variables it has assessed by using this scale as well. The scale has five options - Very High, High, Moderate, Poor, Very Poor – and there are three metrics that Stats NZ has adopted to calibrate this scale. A summary of these metrics is provided in Appendix 1; further detail can be found in Data quality assurance for 2018 Census.

The quality assessments by Stats NZ are a welcome initiative. Such measures enable users to assess the fitness for use of the statistical estimates and models that Stats NZ produce, and to have those assessments independently challenged. As a result, the richness of the information obtained in each population census can be used more critically in public policy, social and economic research and analysis, and community development. When assessing the quality of data for several of the variables covered in this report, the panel has found a single category on the rating scale was not appropriate. For example, the data may be 'moderate' in terms of its quality at certain levels of aggregation and for certain groups in the population, but 'poor' at other levels of aggregation and for other groups. In some of the assessments in this report the panel's consensus judgement is that a fair assessment spans two categories.

The panel assessed key variables such as age, sex, usually resident population count, Māori descent electoral, and ethnicity (levels 1 and 2) in the Initial report of the 2018 Census External Data Quality Panel, which was published to coincide with the 23 September first release by Stats NZ of 2018 Census data.

The panel has assessed an additional 30 variables in this report. These variables, along with the ones assessed in the initial report, and a small number that will be commented on in the panel's final report to be published in early 2020, are listed in Tables 1.1 and 1.2. The shaded areas in these tables highlight the variables covered in this report.

1.1. Quality assessment

The panel adopted a standard format for each assessment. For each variable this assessment includes the following information:

- the panel's rating of quality;
- Stats NZ's rating of quality;
- a link to the relevant Stats NZ DataInfo+ page with more detail on each variable;
- an overall assessment;
- background information; and
- consideration of various aspects of quality (such as completeness, regional/ethnic coverage, whether the data used was contemporaneous to the census date). Note that ethnic coverage is only investigated for variables about individuals. Stats NZ does not usually release variables about dwelling and households stratified by ethnicity (because dwelling and households often comprise several ethnicities).

These headings were based on, and informed by, the Statistics Canada data quality framework (Statistics Canada, 2017) and are broadly consistent with the approach taken by Stats NZ. Higher levels of aggregation are likely to mask data quality issues through equal and opposite errors cancelling; conversely greater disaggregation is likely to reveal data quality problems. The panel has given greater weight to the level of disaggregation (geographic or by level of the relevant classification) at which the data are likely to be used, which has led to some variables having a panel quality rating that is lower quality than assessed by Stats NZ.

The very nature of a population census means that not all variables can be measured with the same quality expectations. This reflects the conceptual, methodological and practical limitations of census-type enquiries. In this report, the panel has sought to provide and summarise information that will be of value to users when they use 2018 Census data – pointing out:

- those variables for which the data can be used with confidence, especially at high levels of spatial aggregation (there are often caveats attached about use of the data at low levels of spatial aggregation – e.g. SA1 and SA2)
- where limitations in the data were regarded as acceptable and anticipated at the design stages
- those variables for which the data can be used, but with caution, and
- those variables for which the data should not be used.

The panel made use of three resources to assess the quality of each variable:
(i) the Stats NZ DataInfo+ page for each variable, which gives a high level summary of the quality of the variable;
(ii) In depth 'warrant of fitness' assessments undertaken by Stats NZ and made available to the panel (see Processing and evaluating the quality of 2018 Census data for a description of the 'warrant of fitness' process); and
(iii) information on the sources of data that contributed to each census variable (e.g., directly from 2018 census, 2013 census, administrative data, imputation), stratified by small area and ethnicity.

1.2. Data sources

Both the panel's and Stats NZ's rating of the quality of variables was influenced by the extent to which data for variables were obtained from sources other than individuals' responses to questions on the 2018 census forms. There were potentially four sources of data for each census variable, each with their own limitations.

First, data could be sourced directly from 2018 census responses. The limitation of this source is that due to the non-response problems for the 2018 Census information was often not available for a sizeable part of the population. The census returns also included 'residual category' information (i.e., 'not stated', 'response outside scope', 'response unidentifiable', 'refused to answer', or 'don't know'). Data from this source was always used where it was available and did not constitute a residual category.

Second, data from the same individual's 2013 census response was used. When an individual was successfully linked to the Integrated Data Infrastructure (IDI), which included the 2013 census dataset, existing responses to the 2013 census could be copied across to fill in gaps in individual variables. For example, information on smoking and 'usual residence five years ago' were taken from 2013 census responses. Some variables (such as birthplace, or number of bedrooms) don't change over time, or do so slowly – in such instances the 2013 Census is a high quality source. The primary limitation of this method is that the data was reported at an earlier time point, so change, where it exists, will be increasingly underestimated with increasing use of 2013 census data.

Third, 'admin data' were used. When an individual was successfully linked to the IDI, existing administrative (admin) data could be copied across to fill in gaps in individual variables. For example, ethnicity was taken mostly from birth, education and health data. Limitations of this source include that

(i) admin data sometimes doesn't measure exactly the same concept as the census question sought to measure;
(ii) admin data sometimes isn't classified using the same classification systems as Stats NZ census variables;
(iii) admin data sometimes is measured at a different time to the 2018 census measure; and
(iv) individual's responses to questions may differ between administrative settings and the census (e.g. ethnicity may be reported differently across different settings).

Fourth, 'imputation' was used. The primary form of imputation used was a form of 'nearest neighbour' 'donor' imputation (i.e. find a census respondent who is similar to the census respondent with missing information for a census question, and copy cross the 'donor's response). The specific system was called CANCEIS (CANadian Census Edit and Imputation System), developed by Statistics Canada. This is described in more detail in section

3.2.5 of the panel's initial report and also in Stats NZ (2019a). For example, occupation data was imputed using CANCEIS. Imputation tends to be *unbiased*, so accurate counts are likely to be generated. However, the main limitation of imputation is that it can be inaccurate at the individual level (i.e. a response is used for an individual that does not match the response that individual would have given had they completed the 2018 census). This inaccuracy may serve to decrease estimates of association between two variables, where one or other variable used a substantial amount of imputation.

Stats NZ have applied imputation to 27 variables in 2018, but to only four variables – age, sex, usual residence and labour force status – in 2013 (Stats NZ, 2014). This means that the 2018 Census dataset is more 'complete' than for previous censuses, which in itself can impact on measures of change. We note that use of alternative sources (i.e., second through fourth above) will have substantially improved the data compared to leaving large amounts of 'no information' (i.e. if only 2018 census responses were used). However, the data will tend to be less reliable and less timely than if higher response rates to the 2018 census had been achieved.

1.3. Variables assessed

Variables which were assessed in the panel's initial report are listed in Tables 1.1 and 1.2 but they have not been assessed further in this report. Reference should be made to the initial report for detailed assessments of the quality of the data for these variables. The panel's final report contains further analyses of ethnicity, down to Level 4 of the ethnicity classification, a section on small area data and a section on the quality of data on families and households.

The panel has not been able to assess all variables that Stats NZ will be releasing and has focussed its efforts on those which Stats NZ has rated as having data which is of Very High, High, or Moderate quality. The Stats NZ quality ratings for the variables considered by the panel in this report, its initial report and its final report are listed in Tables 1.1 and 1.2.

In addition, the usual residence five years ago variable was assessed as, uniquely, this was always designed to be generated from comparing 2013 and 2018 Census data rather than, as previously, asking a specific question in the census. One variable rated as Very Poor (Absentees) has been assessed, partly as a matter of completeness and to be able to explain the drivers for a Very Poor rating.

Tables 1.1 and 1.2 summarise the position for all variables. The first table covers variables about people (derived from the individual form), the second table covers those variables collected at the dwelling level (from the dwelling form). The tables provide the variable name (which links to the relevant DataInfo+ page), the Stats NZ priority level, where the variable has been assessed (initial report, this report, final report, not assessed) and the panel's and Stats NZ's quality ratings. By and large the panel endorse the quality ratings given by Stats NZ, but in several instances the panel has rated the variables of mixed quality or lower quality than Stats NZ.

Assessment of the independent panel on Tenure of household
3.8. Tenure of household

DataInfo+ link: http://datainfoplus.stats.govt.nz/Item/nz.govt.stats/4c68913e-f620-4a6e-8bd3-af2019269a27/

EDQ Panel rating: **Moderate**
Stats NZ rating: **Moderate**

3.8.1. Overall assessment

The Panel had a range of views about the 'Moderate' quality rating for this variable. There are changes in the trends between 2006, 2013, and 2018 Censuses that might be a result of new questions and the use of alternative data, but may also be the result of independently observable changes. Stats NZ state that "*The overall quality of the data is sound and the use of alternative sources means there is no missing data. 2018 can be compared with 2006 and 2013 data with discretion, noting the change in question and use of alternative sources in 2018 and the impact of missing data in previous censuses."*

The use of admin data to identify households who rent their home has improved. Likewise, the use of information on sector of landlord in the derivation for tenure of household is new to 2018 and will have improved the derivation of households in the 'do not own or hold in a family trust' category. These changes may have impacted on trends since 2013 at this level.

The combined proportion of owned/trust vs not owned/trust is unchanged between 2013 and 2018 at 65 percent/35 percent. What has changed is the split between owned and family trust, which has gone from 77 percent v 23 percent in 2013 to 79 percent v 21 percent in 2018. This shift is behind the increase in 'owned' dwellings. Since 91.5 percent of those are from census forms, the change to the question is likely to be the main driver of the shift in balance of owned and trust. Similarly, the question change is likely to have the biggest impact on the shift in proportions paying mortgages.

There is a relatively small increase in non-response for this question from 5.1 percent in 2013 to 8.5 percent in 2018. The use of alternative data sources, even if they are not perfect, may well lead to better data when used for the 8.5 percent in 2018 than the 2013 situation where 5.1 percent were left as missing.

The panel cannot distinguish how much of the estimated change in tenure of household in 2018 is due to the change in question form; the use of alternative data sources in 2018; bias in 2013 due to missing data; or might be driven by actual changes. Stats NZ note *"The 2016 GSS [General Social Survey], saw an increase in the proportion households that 'own/partly own' between 2012 and 2016 (results for 2018 are not yet available). The increase in the proportion of households that 'own/partly own' may be partially explained by real-world changes, including access to KiwiSaver funds and lower mortgage rates bringing more new home owners into the owning categories."*

Further analysis of the impact of the change in the question format, and the impact of non-response bias in 2013 should be undertaken by Stats NZ. The panel recommend that **Stats NZ should** carry out further assessment of

tenure of household; an informed analysis of recent changes in the financial, demographic and economic influences on the proportion of households that 'own/partly own' would help support or challenge the reliability of this important measure.

3.8.2. Background

Tenure of household information is used for monitoring trends and changes in home ownership rates, for formulating and monitoring of housing policy by central and local government, and in constructing the New Zealand Deprivation Index. Table 3.8 below shows the various data sources used for this variable

Table 3.8. data sources: Tenure of household – Households in occupied private dwellings

Source	Percent
Response from 2018 census	91.5
2013 census data	2.9
Administrative data	2.7
Statistical imputation	2.9
no information	<0.1
Total	100

Tenure of household (information about this variable and its quality)

Description

Tenure of household indicates whether a household in a private dwelling rents, owns, or holds that dwelling in a family trust, and whether payment is made by the household for the right to reside in that dwelling. Tenure of household does not refer to the tenure of the land on which the dwelling is situated. A dwelling held in a family trust is owned by the family trust, so the household does not directly own the dwelling.

Statistics - Variable Details

Priority level - **Priority level 2**

We assign a priority level to all census variables: Priority 1, 2, or 3 (with 1 being highest and 3 being the lowest priority). Tenure of household is a priority 2 variable. Priority 2 variables cover key subject populations that are important for policy development, evaluation, or monitoring. These variables are given second priority in terms of quality, time, and resources across all phases of a census. The census priority level for tenure of household remains the same as 2013. **Quality Management Strategy** and the **Information by variable for tenure of household (2013)** have more information on the priority rating.

Overall quality rating for 2018 Census - Moderate quality

Data quality processes section below has more detail on the rating for this variable. The external data quality panel had provided an independent assessment of the quality of this variable. **2018 Census External Data Quality Panel: Assessment of Variables** has more information.

Subject population - Households in occupied private dwellings

'Subject population' means the people, families, households, or dwellings to whom the variable applies.

How this data is classified

Census tenure of household V1.0.0

Tenure of household is a hierarchical classification with three levels. Level 1 contains 4 categories (code length of 3), level 2 contains 5 categories (code length of 1), and level 3 contains 11 categories (code length of 2). Levels 1 and 3 are shown below:

- ***001 Dwelling owned or partly owned***
  - 10 Dwelling owned or partly owned, mortgage arrangements not further defined
  - 11 Dwelling owned or partly owned, mortgage payments made
  - 12 Dwelling owned or partly owned, mortgage payments not made
- ***002 Dwelling not owned and not held in a family trust***
  - 20 Dwelling not owned and not held in a family trust, rental arrangements not further defined
  - 21 Dwelling not owned and not held in a family trust, rent payments made
  - 22 Dwelling not owned and not held in a family trust, rent payments not made
- ***003 Dwelling held in a family trust***
  - 30 Dwelling held in a family trust, mortgage arrangements not further defined
  - 31 Dwelling held in a family trust, mortgage payments made
  - 32 Dwelling held in a family trust, mortgage payments not made
- ***999 Not elsewhere included***
  - 77 Response unidentifiable
  - 99 Not stated

Census tenure of household data can be output at the lowest level of the classification, subject to meeting confidentiality requirements. Alternative labels are also available:

- Tenure of household – short labels V1.0.0**.**

Home ownership figures given in census publications are often presented as the percentage of households who owned their home or held it in a family trust. Combining these categories provides a summary indication of total households in these situations (which are similar and distinct from not owning) and the overall trend for home ownership. The classification of tenure of household in the 2018 Census is consistent with the classification used in the 2013 and 2006 Censuses. 'Dwelling owned or partly owned' includes households who purchased a dwelling under unit title, stratum title, composite leasehold, or licence to occupy for example households in self-care units in retirement complexes.

'Mortgage payments made' includes households on short-term mortgage holidays. 'Mortgage payments not further defined' means that information on whether the household was making mortgage payments or not is not available.

Renting is defined as those households who did not own their home or have it in a family trust and were paying rent. This is households in the 'dwelling not owned and not held in a family trust, rent payments made' category (category 21). It includes households who were occupying a dwelling under a rent-to-buy agreement.

The broader 'dwelling not owned and not held in a family trust' category (category 002) includes households who were living in their home rent-free (category 22) and households for which information on whether they were paying rent or not was not available (category 20), as well as households who were renting their home.

'Dwelling not owned and not held in a family trust, rent payments not made' (category 22) includes situations where people were provided with rent-free housing as part of their employment (for example farm workers or managers, motel or hotel workers) and situations where people were living rent-free in housing provided by family or friends.

'Dwelling held in a family trust, mortgage payments made' includes situations in which mortgage payments were made by the trust and situations in which mortgage payments were made directly by the household.

The Standards and Classifications page provides background information on classifications and standards.
Question format
Tenure of household data is derived from the following questions on the dwelling form:

- dwelling owned or in family trust
- sector of landlord
- rent indicator
- rent amount, from which weekly rent paid by household is derived
- mortgage payments.

Or questions 5, 6, 7, 8, and 9 on the paper form.

Stats NZ Store House has samples for both the individual and dwelling paper forms.
There have been changes to the method of collection for this variable since the 2013 Census.
In 2018, information from sector of landlord was used in the derivation for tenure of household. The purpose of this was to improve identification of households in the 'do not own or hold in a family trust' categories, many of whom rent their home. There have been changes to the questions used to derive tenure of household for 2018 compared with 2013:

- in 2018 questions on home ownership and family trusts were combined in one question, previously in 2013 they were separate questions
- in 2018 mortgage payments questions for owned dwellings and dwellings in a family trust were combined in one question. In 2013 these were separate question.

There were differences between the wording and question format in the online and paper versions of these questions:

- rent amount on the online form has a text box that only appeared when the respondent selected 'other' for the payment frequency
- respondents were asked to enter the 'period between rent payments' online, whereas on paper the wording was 'print period'.

There were also differences in the way a person could respond: On the online dwelling form:

- it was not possible to give a multiple response to these questions
- the sector of landlord and rent indicator questions were only shown if the response to the owned or family trust question was 'neither of these'
- the rent amount question only appeared if the respondent selected yes for rent indicator (i.e. pays rent)
- the mortgage payments question was only shown if the respondent said that the dwelling was owned or in a family trust
- for the rent amount question, the write-in box for payment frequency only appeared if the respondent selected 'other'
- the highest possible rent amount that could be given was $99,999.

On the paper dwelling forms:

- it was possible to answer all, or any combination, of the questions used to derive tenure of household
- it was possible to give a rent amount higher than $99,999, although there was only space for five digits.

These responses were resolved by edits.

2018 data sources

We used alternative data sources for missing census responses and responses that could not be classified or did not provide the type of information asked for. Where possible, we used responses from the 2013 Census, administrative data from the **Integrated Data Infrastructure (IDI)**, or imputation.

The table below shows the breakdown of the various data sources used for this variable.

Table 1: 2018 tenure of household – Households in occupied private dwellings

Source	Percent
Response from 2018 Census	91.5 percent
2013 Census data	2.9 percent
Administrative data	2.7 percent
Statistical imputation	2.9 percent
No information	<0.1 percent
Total	100 percent

Nb: Due to rounding, individual figures may not always sum to the stated total(s)

The 'no information' percentage is where we were not able to source tenure of household data for a household in the subject population.

Administrative data sources

Data from the following administrative source was used:

- Housing New Zealand Corporation
- Tenancy Bonds, Ministry of Business, Innovation and Employment.

Please note that when examining tenure of household data for specific population groups within the subject population, the percentage that is from 2013 Census data, administrative data, and statistical imputation may differ from that for the overall subject population.

Missing and residual responses

'No information' in the data sources table, is the percentage of the subject population coded to 'not stated'. In recent previous censuses, non-response was the percentage of the subject population coded to 'not stated.' In 2018, the percentage of 'not stated' is lower than previous censuses due to the use of the additional data sources described above.

Consistency and coherence: Moderate quality

Changes to the questionnaire design, data collection, and the use of imputation, 2013 data, and administrative data to fill the gaps in response for 2018 means that the data for tenure of household in 2018 is not entirely comparable with previous censuses.

- There is an increase in data in the 'mortgage arrangements not further defined' categories compared with previous years affecting time series. Whether a household pays a mortgage or not varies over time so it was not possible to use 2013 Census data to obtain this information.
- The data is not totally consistent with previous trends for own or family trust.
- The data is not totally consistent with previous trends for households who do not own their home or have it in a family trust.
- Some changes in the data may be partly due to the lower than expected response to the census overall.
- There is an increase in the number of households who rent which may be partly due to more complete data for these households for 2018 due to use of other data sources and better identification of these households.

Data quality: Moderate quality

The data quality checks for tenure of household included edits for consistency within the dataset and cross-tabulations to the regional council level. Tenure of household data has various data quality issues involving several categories or aspects of the data, or an entire level of a hierarchical classification. The data quality issues could include problems with the classification or coding of data, such as vague responses resulting in coding issues, or responses that cannot be coded to a specific (non-residual) category, thereby reducing the amount of useful, meaningful data available for analysis. The use of other data sources may be contributing to these issues. Tenure of household data has various data quality issues including the following:

- some bias toward home owners/family trust households and under-representation of households who do not own their home or have it in a family trust
- data quality may vary at the regional level and be lower for some regions than others due to greater use of alternative data sources in those areas
- missing information on mortgage payments for many households who own their home or have it in a family trust
- incorrect tenure of household for households living in retirement villages due to respondent error.

Recommendations for use and further information

While the final quality rating for the data is moderate due to the low response rate, the data quality and the consistency with expectations and time series is good. This means the 2018 Census data can be compared with 2013 and 2006 data with some caution. When using this data you should be aware that:

- overall this data may have some bias toward home owners/family trust households and some under-representation of households who do not own their home or have it in a family trust, including those who rent their home. The patterns and trends seen in this data may not always fully represent the real-world situation or real-world changes.
- there is less data in residual categories for 2018 due to use of other data sources. Some caution needs to be applied when interpreting time series data because other data sources have been used for the 2018 data that were not used previously.
- data has been checked to territorial authority and Auckland local board level. Some variation is possible at geographies below this level.
- use of administrative data to identify households who rent their home has improved the quality of the data on renting for 2018, making it more complete than previous data. As administrative data was not used previously, care should be taken when interpreting changes in the data as these may be due to the changes in the data collection method rather than real-world change. Some households included in the renting category for 2018 may have previously been in the not stated category.

Contact our Information Centre for further information about using this variable.