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AFFORDABLE HOUSING FOR GENERATIONS
Building Better Homes, Towns and Cities
National Science Challenge

Housing Affordability Price Points in NZ: Settings at 'Rice and Beans' or 'Smashed Avocado'

Dr Michael Rehm, Senior Lecturer &
Dr William Cheung, Senior Lecturer
Department of Property
University of Auckland Business School

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Author Contact Details

Dr Michael Rehm
Senior Lecturer, Department of Property
University of Auckland Business School
m.rehm@auckland.ac.nz

Dr William K.S. Cheung
Senior Lecturer, University of Auckland
william.cheung@auckland.ac.nz

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Executive Summary

Housing unaffordability is a global concern impacting not just low-income but also middle and upper-income households, especially in New Zealand's hyper-inflated markets. Unaffordability exacerbates social inequality and has fostered inter-generational division, particularly impacting post-baby boomers unable to achieve owner occupation and save for retirement as their parents' generation did.

This paper proposes a novel approach using a variation of the traditional residual income model to redefine housing unaffordability thresholds. Unlike the conventional approach, where households are assumed to survive on minimal expenses ('rice and beans lifestyle'), we prioritise the wellbeing of household members and the general economy. Our affordable price point model stresses the importance of families living beyond sustenance and avoiding enslavement to housing expenses.

Our modelling centres on households' financial capacity, including bank lending, rather than anchor on market-derived home purchase prices and rents. Our findings accentuate the gap between market prices and what typical households can genuinely afford without compromising non-housing expenses (food, clothing, transport, entertainment, etc), which are purposefully benchmarked against spending patterns of 40- to 64-year-old owner-occupant households.

We illustrate New Zealand's housing unaffordability predicament through case studies of Horowhenua District and Auckland. In both markets households with substantial incomes have few suitable housing options that permit them to match the benchmark cohort's non-housing spending patterns. In Auckland, even first-time owner occupiers with $200k incomes face trade-offs that previously generations of similar means did not encounter.

1. Introduction

This report sets out a method to establish housing affordability that moves beyond a traditional approach which all too often assumes that residual incomes after housing costs can legitimately only be sufficient for a life of 'rice and beans'. In this novel twist on the residual income approach, we argue that affordable price points should be calibrated to household wellbeing and the health of the general economy.

The development of this methodology has been undertaken with the Affordable Housing for Generations (AHFG) research programme in the Building Better Homes Towns and Cities National Science Challenge. That programme is designed to "develop effective and practical approaches to alleviating the crisis of affordable housing and housing affordable to key workers through targeted research-based solutions which will sustain people in their homes and communities over generations and contribute to thriving regions." This methodology and its testing, initially in Wellington, and then in this report, Horowhenua and Auckland cross-cuts two components of AHFG. Those are: Component A, which focuses on housing distribution and wellbeing through markets and Component B, which is more directly concerned with affordable price points.

This report, as well as research within AHFG more generally, have been undertaken in a context in which New Zealand is recognised as having the most unaffordable housing over the past decade across the OECD with 'key workers' particularly strained (Xiong, Cheung & Filippova, 2021). The Reserve Bank of New Zealand (2021) conceded that "*house prices are above their sustainable level*" and reported that New Zealand's real house prices, price-to-rent and price-to-income ratios all exceed the same metrics in peer countries (Fitchett & Jacob, 2022).

The report is structured as follows:

- Section 2: Defining Housing Affordability
- Section 3: Building on a Residual Income Approach
- Section 4: Affordable Price Point Methodology
- Section 5: Two Cases: Horowhenua and Auckland
- Section 6: Discussion: Housing Affordability, Society, and the Economy
- Section 7: Conclusions

2. Defining Housing Affordability

The terms 'housing affordability' and 'affordable housing' are often conflated but have distinct meanings. Affordable housing focuses on providing subsidies to impoverished households who cannot afford market-based housing costs. Housing affordability, however, considers how housing expenses affect a family's budget and compromises their overall quality of life. Wetzstein

(2017) characterises housing unaffordability as a global issue affecting both low- and middle-income households. This study's findings indicate that even upper-income households aiming for owner occupation can face housing affordability challenges in higher priced markets like Auckland.

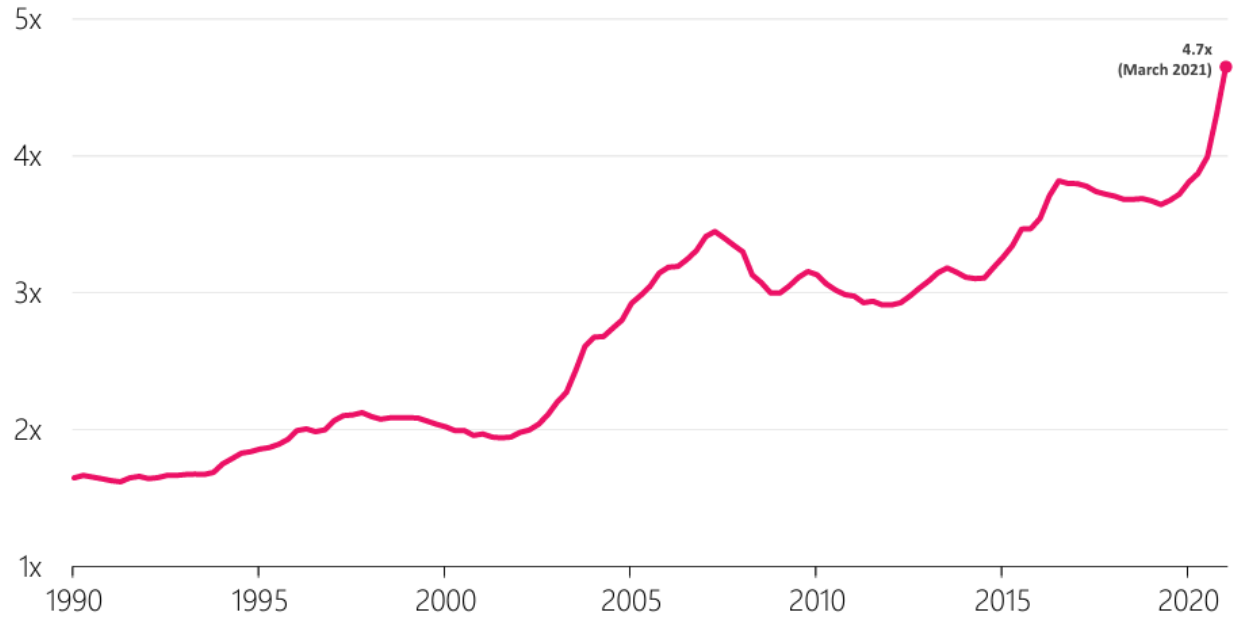
Housing unaffordability not only exacerbates social inequality (see Arundel, 2017), but "*urban housing is becoming a key site of growing inter-generational divisions as many post-baby boomers unable to buy homes and save for retirement are currently facing material decline relative to the generation of their parents*" (Wetzstein, 2017, p. 3162).

The intertwining of subsidised affordable housing and housing affordability in broader terms is evident in the literature on determining whether households under particular circumstances are under housing stress and in unaffordable housing situations. For example, two popular approaches to measuring housing affordability, the 30:40 rule and the residual income approach, effectively classify a household as facing unaffordable housing only when it is pushed to the brink of or into poverty.

Before the mid-1980s the rule of thumb, was that rental housing costs should not exceed 25% of net income (Stone, 2006) and owner occupation mortgage costs should not exceed 30% of net annual earnings of the household 'breadwinners'. A Reserve Bank of New Zealand report by Coleman (2007) cited a leading bank's 1981 statement that "*principal and interest payments* ***should not exceed 20%*** *of the breadwinner's annual gross earnings,* ***or at most 25%*** *where other commitments are of little consequence"*. With the deregulation of the 1980s and 90s, this ratio standard gradually increased to 30% of gross household income (Norazmawati, 2015) for home mortgages.

Both borrowing and lending became increasingly complicated by the tendency for couples to have dual income sources as well as shifts in equity evident among households already in owner occupation. The widespread nature of owner occupation evident in New Zealand and associated equity and housing wealth prompted a transformation in the 1990s in which mortgages increasingly shifted from a form of pre-retirement saving to fuelling consumption (Murphy & Rehm, 2016; Broome, 2008). As illustrated in Figure 2.1, the expansion of housing wealth in New Zealand experienced numerous periods of rapid growth relative to GDP with the most recent during COVID.

Figure 2.1: New Zealand housing assets as a multiple of annual GDP



Source: RBNZ, Carvalho *et al.* (2022, p. 2)

As the place of housing wealth and equity changed in New Zealand and elsewhere in the world, definitions of housing affordability became more nuanced and multiple definitions emerged (Gabriel *et al*., 2005; Yates and Miligan, 2007). Galster and Lee (2021b) condensed various methodologies into four approaches to defining affordability. These are set out in Infobox 2.1.

Galster and Lee (2021b) identified two common problems evident in all four approaches set out in Infobox 2.1. Most particularly, all the approaches identify different sets of households facing putative housing affordability problems. Secondly, there is an on-going problem of classifying households and the risk of erroneously classifying household compositions, household incomes and household expenditures.

Gan and Hill (2009) apply several of the above definitions (options) to the Sydney housing market (1996-2006). They distinguish between purchase affordability, repayment affordability and income affordability. Purchase affordability assesses a household's ability to borrow sufficient funds to purchase a house. Repayment affordability examines the mortgage repayment burden on a household, while income affordability measures the ratio of house prices to income.

Infobox 2.1: Four Approaches to Defining Housing Affordability

Definition 1: The residual income approach Where housing is affordable if the income remaining after housing expenditure is sufficient to consume a specified amount of non-housing expenditure. (Grigsby and Rosenburg (1975), Stone (1993), Kutty (2005) and Padley and Marshall (2019)).
Definition 2: The income approach (often called the price to income ratio (PIR)) Where housing is affordable if the ratio of housing expenditure to income does not exceed a specified standard (the rule of thumb is housing is considered affordable if it costs less than 30 per cent of gross (or sometimes net) household income (Norazmawati, 2015)).
Definition 3: Acceptable standard of household consumption Housing is affordable if the household consumes more than a minimally acceptable standard of housing. (United Nations High Commissioner for Human Rights, 2014).
Definition 4: Acceptable Standard of living with defined percent of income expended Housing is affordable if the minimally acceptable standard of housing could be consumed by the household with no more than a specified percentage of its income (Eggers & Moumen, (2013), Lerman and Reeder (1987) and Thalmann (1999)).

Their study suggests that banks' credit expansion over the study timeframe inflated house prices without improving affordability. This reflects a tendency for banks to adopt a 'rule of thumb' approach. This means that while the approaches set out in Infobox 2.1 involve nested assumptions and complicated computations, a simple, commonly used measure of housing affordability is the median multiple, or house price-to-income ratio. The adoption of 'rule of thumb' is manifest in, and effectively promulgated, by some market reporting such as that found in the Demographia International Housing Affordability report. The Demographia International Housing Affordability report defines affordable housing as having a median multiple ratio of 3.0 and under. This ratio is calculated by dividing the median house price by the gross median household income (pre-tax). Housing is considered moderately unaffordable at a ratio of 3.1 to 4.0, seriously unaffordable at 4.1 to 5.0 and severely unaffordable 5.1 and over (Cox, 2023).

Perhaps due to the acute housing affordability pressures in New Zealand, the government has embarked on its own approach to measure affordability. The Housing Affordability Measure (HAM) was introduced by MBIE in 2017, evaluating housing affordability for first home buyers and renters by utilising various data sources such as the 2013 Census, Council property records, tenancy bond data and the Integrated Data Infrastructure (IDI), managed by Stats NZ. HAM employs a residual income approach, calculating the proportion of renters or potential first home homebuyers in a housing market overburdened by housing costs.

HAM computes an equivalised household disposable income, considering the ages of household members using methods developed by the European Union's statistical office (Eurostat). This income is then adjusted by subtracting housing costs to determine the residual income available for non-housing expenses such as food, clothing, etc. To assess affordability, it's compared

against the 2013 Household Economic Survey (HES) non-housing expenditures across all tenure groups. However, HAM has certain limitations, including that all affordability determinations are based on a 2013 National Affordability Benchmark, which is directly applicable only to one-person households due to the use of equivalised household disposable income.

Several tool versions were developed, with the final one being HAM 1.4. However, in November 2022 the Ministry of Housing and Urban Development introduced a new *Change in Housing Affordability Indicators* (CHAI) dashboard, replacing HAM. These new indicators do not reveal the percentage of the population facing unaffordable housing but instead tracks changes in the government's efforts to combat housing unaffordability.

Table 2.1 summarises the findings of HAM v1.0[1] showing that in every region, most renters and prospective first home buyers are dealing with unaffordable housing situations. The Hawke's Bay stands out as the most severely affected region with 80% of renters and 86% of prospective first home buyers burdened by housing costs.

Table 2.1: Share of first home buyer and renting households below HAM's 2013 National Affordability Benchmark by region in June 2015

Region	HAM Rent	HAM Buy
Auckland	63.5%	85.7%
Bay of Plenty	74.5%	83.5%
Canterbury	60.9%	77.8%
Gisborne	78.8%	84.1%
Hawke's Bay	80.0%	86.0%
Manawatu-Wanganui	77.3%	81.9%
Marlborough	67.9%	79.7%
Nelson	73.6%	85.1%
Northland	76.6%	84.1%
Otago	75.4%	83.4%
Southland	72.1%	77.1%
Taranaki	66.7%	74.9%
Tasman	69.6%	84.2%
Waikato	71.6%	81.7%
Wellington	61.7%	73.7%
West Coast	66.4%	70.9%
National Total	66.6%	81.4%

Source: MBIE (2017, p.15)

[1] https://www.mbie.govt.nz/dmsdocument/2985-housing-affordability-new-zealand-results-pdf

The 30:40 rule

The 30:40 rule is a widely accepted measure of housing stress and stipulates that a household is under stress if (i) its income is in the bottom 40% and (ii) they spend more than 30% of their income on housing costs. These households are labelled as 'under *housing stress*', and their housing is considered '*unaffordable*'.

Yates and Milligan (2007, p.4) state that the 30:40 rule

> "*…is a conservative and robust broad-brush indicator of the number of households potentially at risk of housing affordability problems*."

The 30:40 rule assumes that higher income individuals who spend more than 30 percent of their income on housing do so by choice, with minimal impact on their ability to afford essential items such as food, health care, education etc. Corrigan (2019, p. 123) critiques the 30:40 rule stating that:

> "*While the international benchmark of 30/40 does capture households with acute housing affordability challenges, residual incomes (the amount of income left after housing payments are met) do not start to rise substantially until we reach the 60th percentile of the income distribution, indicating that the 40 per cent income threshold may be too low*."

This contrasts somewhat with Rowley *et al.*, (2015), who argue that applying a fixed ratio to all households will overstate unaffordability, as higher-income households can bear higher ratios than lower-income households. Either way it is crucial to note that allocating more income to cover increased rents and mortgage payments will reduce non-housing discretionary spending in the local economy.

3. Building on a Residual Income Approach

Another popular measure of housing affordability is the residual income approach. Like the 30:40 rule it is linked to the poverty line and has its roots in subsidised, affordable housing policy. Hancock (1993) and Bramley (1994) advocated for residual income as a superior means of determining housing affordability versus the more prevalent approach: housing cost-to-income ratio. Hancock held that "*from economic first principles it is more logical to use some form of residual income definition than one based on a prescribed ratio of housing costs to income*" (Hancock, 1993, p. 127).

In the same vein, Bramley postulated:

> "*The most coherent normative concept of affordability is one that links normative judgements about housing needs/standards with judgements about minimum income requirements for non-housing consumption. This implies that housing affordability is closely bound up with the definition of a poverty line, and that the key ratios are likely to be expressed in terms of residual income (after housing costs) relative to that line.*" (Bramley, 1994, p. 104)

The residual income approach typically begins with fixed housing costs and calculates the remaining income for non-housing expenses like food, clothing, transport, etc. The established threshold for non-housing expenditure covers basic necessities, essentially constituting a 'rice and beans' approach. Under this approach a household is classified as facing unaffordable housing only when it is pushed to the brink of poverty.

Rice and Beans vs Smashed Avocado

When looking at housing affordability through a residual income lens, it is important to critically consider at which end of the residual equation the focus should be placed. Early work by Hancock (1993), Bramley (1994) and others afterwards, started their residual analysis with market housing costs as a given then determined whether the family would be thrust into poverty or not. This 'rice and beans' approach does not consider the general well-being of the assessed family members nor the downstream impacts of the reduced non-housing consumption in the broader economy as housing costs consume an increasing share of the family budget.

Residential mortgage underwriting tends to embrace a version of the 'rice and beans' approach. As discussed later in this paper, a key example is Australia's Housing Expenditure Measure (HEM) and its purposefully frugal assumptions around households' non-housing budgets. Doing so unlocks the family budget for greater principal and interest payments to the bank. Given that lending activities have a direct connection to house prices and unaffordability, this 'rice and beans' approach is self-reinforcing. House prices are pushed higher, and households' belts are collectively tightened an extra notch.

We propose an alternative to the 'rice and beans' approach dubbed a 'smashed avocado' take on housing affordability. The key difference is that housing costs are left as the residual and the aspirational starting point is to maintain households' well-being by benchmarking non-housing expenditures rather than letting them continue to give way to speculative house prices. Although market rents are not directly subject to housing speculation – tenants do not tend to feverishly outbid one another in the hope for some future payout, speculative activity places pressure on rents as investors are compelled to raise rents as much as possible to limit the amount of cash subsidy from other income sources they must dedicate to their rental property.

Critical to this approach is understanding the key dimensions of household composition and patterns of household expenditure. That data is drawn from the New Zealand's Household Economic Survey (HES). The remainder of this section starts with the scope of HES before moving key patterns of household expenditure and consumption.

New Zealand's Household Economic Survey

The HES is an annual survey conducted by Statistics New Zealand to assess the economic well-being of New Zealanders. While income and housing costs are surveyed annually, a more comprehensive examination of sampled households' expenditures is conducted every three years (StatsNZ, 2023). Housing costs, as defined by Statistics NZ encompass rent, mortgages (principal and interest repayments), property rates and building-related insurance.

The Household Economic Survey began in 1973 and has undergone many changes over the years with a significant redevelopment in the 2007 survey, hence this iteration of the survey being the earliest analysed in the present study. A key change was a shift away from interviewer-administered paper questionnaires to computer assisted interviewing. Furthermore new expenditure classifications were developed, which enable families' budgets to be better partitioned between housing and non-housing. The HES features three versions of the survey: household income, expenditure and savings. The full survey, including all three elements, is conducted three-yearly and lies at the core of this study.

HES sampling has increased over the years. For instance, the 2007 HES (Expenditure) sample size was 3,000 households while the 2016 and 2019 surveys' sample sizes were 5,500. According to Stats NZ, the increase in sample size was done to reduce margins of error in the data and provide data at sub-populations levels. An inherent challenge with the HES (Expenditure) survey is that it requires respondent households to maintain detailed diaries of their spending. Where missing entries occur, Stats NZ undertakes imputations for using the nearest neighbour donor imputation method implemented in the Statistics Canada software (CANCEIS)[2].

The relatively small sample sizes, particularly in the earlier HES (Expenditure) surveys, inherently limit the potential cross tabulations across factors such as geography, tenure, etc. Furthermore, the imputations for missing entries increases the potential for error in the data. That said, the HES offers the highest quality and most detailed information available on household expenditure in New Zealand.

This study primarily relies on the comprehensive, three-yearly survey. Specifically, it analyses HES data from 2007, 2010, 2013, 2016 and 2019 to identify spending patterns among New Zealand households for non-housing expenditures based on factors such as by income, tenure, age and location (Auckland, Wellington and All of New Zealand).

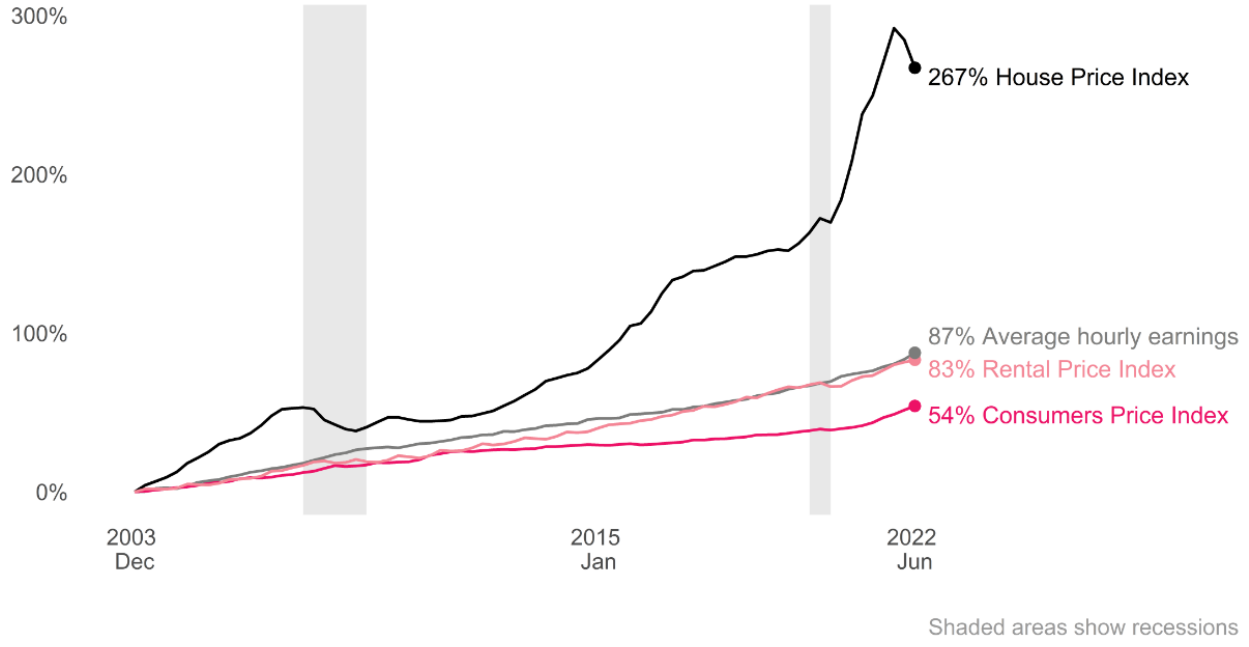
[2] https://www.stats.govt.nz/methods/changes-to-the-household-economic-survey-201819

The HES surveys a sample of households, leading to data limitations, especially when conducting cross tabulations. To adhere to Statistics NZ's data privacy requirements, we combined pairs of HES surveys for analysis. This means the earliest data combines information from both the 2007 and 2010 HES surveys, while the most recent data combines information from the 2016 and 2019 surveys.

Expenditure trends

An analysis of New Zealand's Household Economic Survey (HES) across all subpopulations paying rent or a mortgage by age, tenure, income, and location unveils a common, universal trend of housing costs consuming an increasing share of household budgets. In context of the country's housing markets, this is unsurprising. As shown in the below Figure 3.1, featured in the Housing Technical Working Group's recent report on the drivers of rent (see Bentley *et al.*, 2023), house price and rent appreciation has outpaced inflation (captured in the consumer price index (CPI)). While house prices appear disconnected from wages, rents are closely coupled and are efficiently extracting renters' wage increases.

Figure 3.1: New Zealand CPI, average wages, indexed rents and house prices (cumulative change since Q3 2003)



Source: Ministry of Housing and Urban Development, Stats NZ

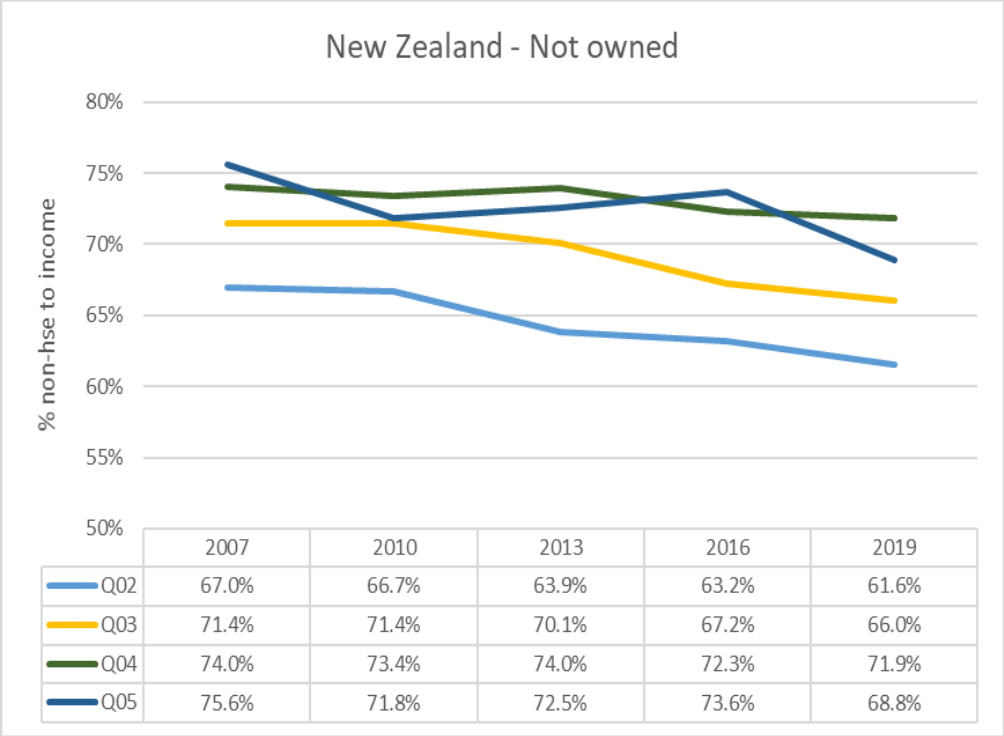
Non-housing spending patterns by households

When examining New Zealand households in the triennial HES survey and categorising them based on tenure and income, a consistent pattern emerges with a gradual decrease in family budget allocations for non-housing expenses (such as food, clothing, and travel). As depicted in

Figures 3.2 and 3.3, between the first HES survey in 2007 and the most recent HES survey in 2019, renters consistently allocated a larger portion of their income to housing expenses compared to those who owned homes with mortgages.

The below series of figures provide non-housing expenditure patterns by income quintile, tenure and geography (New Zealand and Auckland alone). Quintile 1, the lowest income households, have been omitted from the figures as this income group has access to unique housing cost subsidies such as income-related rents and property rates rebates.

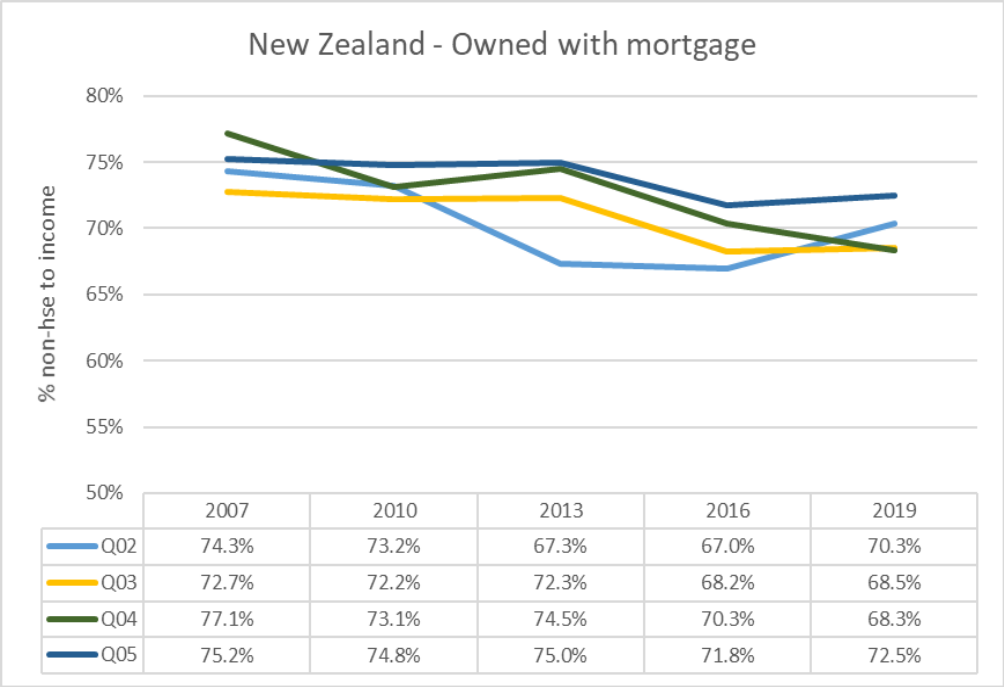
Figure 3.2: Non-housing expenses as a percentage of household income (NZ renters)



	2007	2010	2013	2016	2019
Q02	67.0%	66.7%	63.9%	63.2%	61.6%
Q03	71.4%	71.4%	70.1%	67.2%	66.0%
Q04	74.0%	73.4%	74.0%	72.3%	71.9%
Q05	75.6%	71.8%	72.5%	73.6%	68.8%

Source: HES survey, Stat NZ

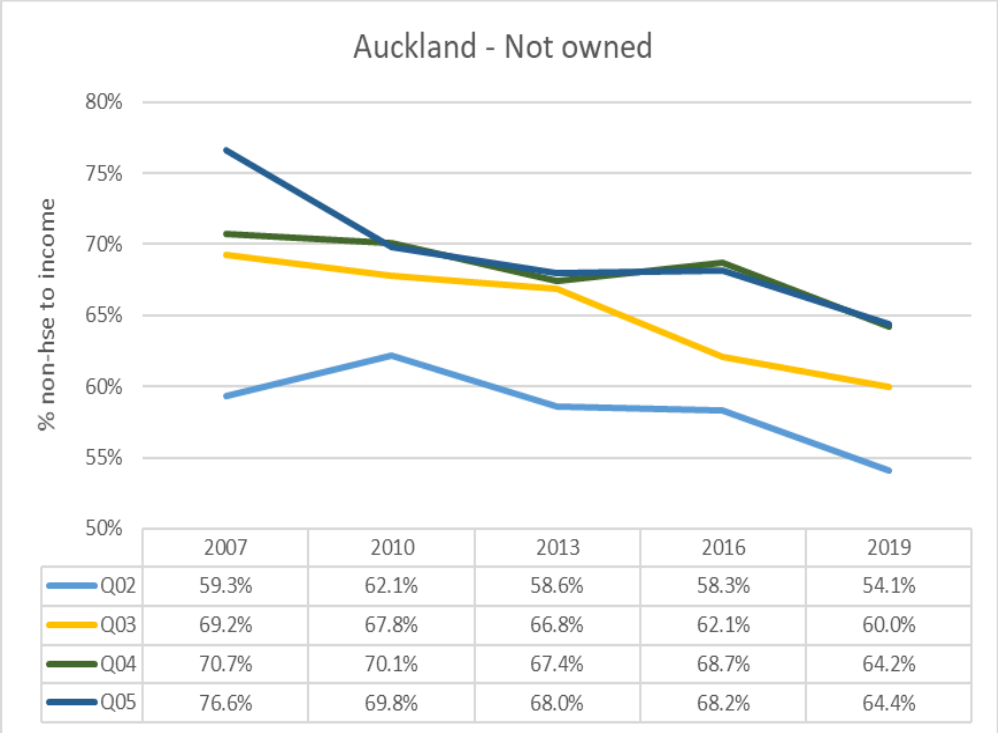
Figure 3.3: Non-housing expenses as percentage of income (NZ mortgaged owner-occupants)



	2007	2010	2013	2016	2019
Q02	74.3%	73.2%	67.3%	67.0%	70.3%
Q03	72.7%	72.2%	72.3%	68.2%	68.5%
Q04	77.1%	73.1%	74.5%	70.3%	68.3%
Q05	75.2%	74.8%	75.0%	71.8%	72.5%

Source: HES survey, StatNZ

Figure 3.4: Non-housing expenses as percentage of income (Auckland renters)



	2007	2010	2013	2016	2019
Q02	59.3%	62.1%	58.6%	58.3%	54.1%
Q03	69.2%	67.8%	66.8%	62.1%	60.0%
Q04	70.7%	70.1%	67.4%	68.7%	64.2%
Q05	76.6%	69.8%	68.0%	68.2%	64.4%

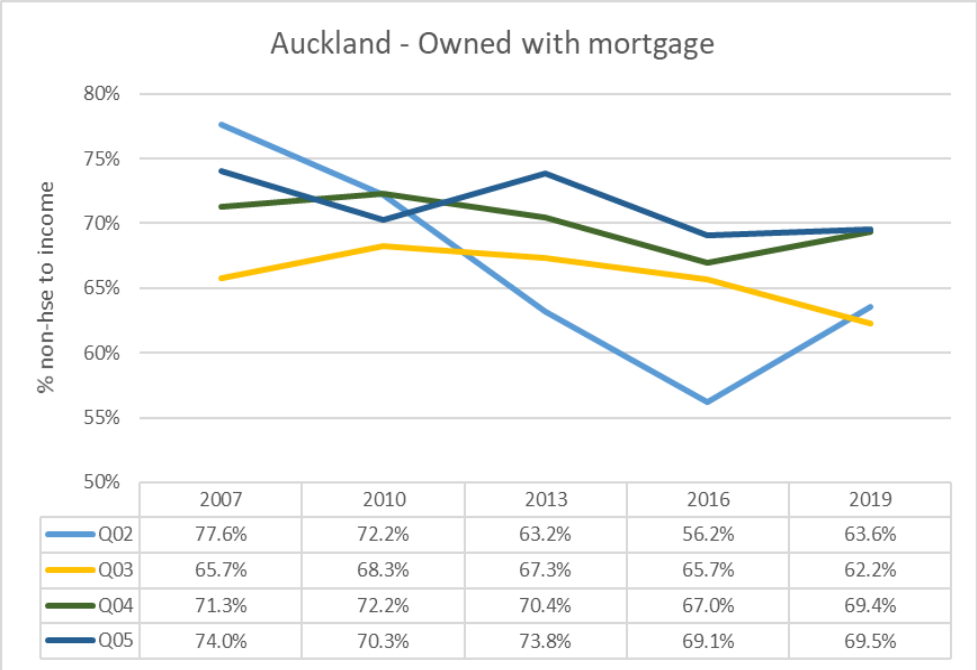
Source: HES survey, StatNZ

Renters in Auckland have foregone an even greater share of the family budget to housing, as evident in Figure 3.4. Even the wealthiest renting households, with the highest (quartile 5) incomes, are dedicating a far higher proportion of their pay packets to housing, according to the latest 2019 HES survey versus the initial 2007 survey. Specifically, these wealthiest Auckland renting households went from directing over 75% of their income to non-housing costs in 2007 to dedicating less than 65% of their income in 2019 towards food, clothing, and other non-housing costs.

The patterns evident in HES survey data for Auckland owner-occupants with mortgages are similar. There are some seemingly erratic data points shown in Figure 3.5, particularly for the survey participants who occupy the second income quartile. The HES is not a longitudinal study tracking the same family's expenditure patterns. Rather it provides a cross-section of sampled households with each HES survey involving entirely different families some with more bespoke spending behaviours than others. Setting aside the noise within the data, the general pattern is clear at both the national and Auckland level and between the two main tenure groups, renters, and owner-occupants with mortgages. Escalating house prices and rents are absorbing a greater share of household income making housing affordability matters worse over time.

Although on paper, New Zealanders who own property are becoming wealthier thanks to asset price inflation, the figures shown here indicate that the well-being of kiwi households is diminishing as they are having to dedicate an increasing share of their income towards housing leaving less income for living well.

Figure 3.5: Non-housing expenses as percentage of income (Auckland mortgaged owner-occupants)



	2007	2010	2013	2016	2019
Q02	77.6%	72.2%	63.2%	56.2%	63.6%
Q03	65.7%	68.3%	67.3%	65.7%	62.2%
Q04	71.3%	72.2%	70.4%	67.0%	69.4%
Q05	74.0%	70.3%	73.8%	69.1%	69.5%

Source: HES survey, StatNZ

The above graphs illustrate only some of the cross-tabulations of the raw HES data from Statistics New Zealand. Table 3.1 below provides estimated weekly non-housing expenditures based on differing household composition, tenure, and income levels at the national level.

As discussed earlier, to explore data at this level pairs of HES surveys must be combined. That said the below table summarises the data from the latest HES surveys (2016 and 2019).

Table 3.1: Estimated weekly average non-housing expenditures (New Zealand) based on combined 2016 & 2019 Household Economic Surveys

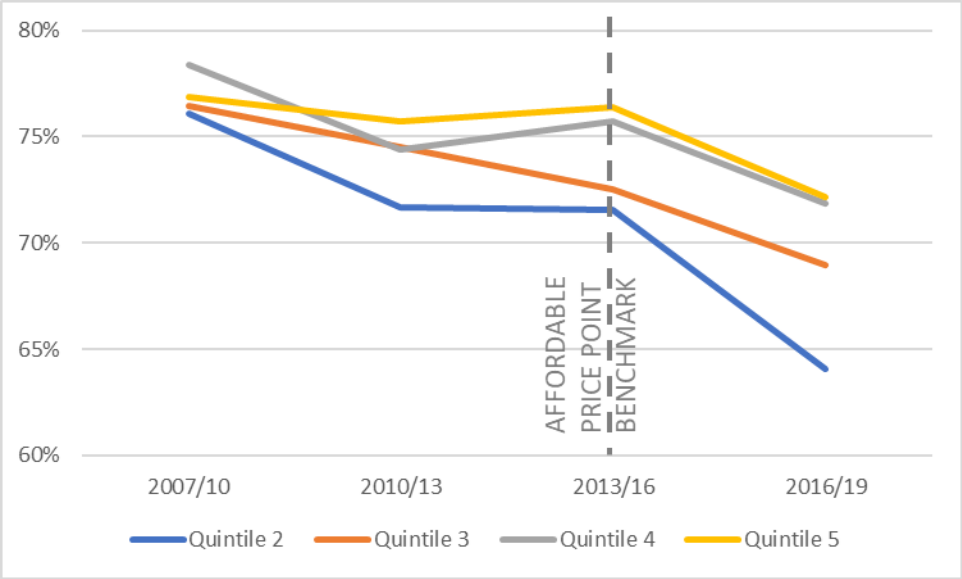
	Income Quintile				
Household Composition	**1 (Low)**	**2**	**3**	**4**	**5 (High)**
Couple with children (rent)	283	532	861	1,347	1,612
Couple with children (own)	283	597	891	1,310	1,652
Single parent (rent)	259	457	844	1,374	1,735
Single parent (own)	284	539	844	1,342	1,666

Unsurprisingly the key factor that drives weekly non-housing expenditure (food, clothing, transportation, etc) is household income. The pattern is strikingly consistent across the different household composition type by tenure. After reviewing the various HES trends and patterns, the researchers selected New Zealand mortgaged owner-occupants in the 40-to-64-year age cohort to form the basis for housing affordability benchmarks for non-housing expenditures.

As with the above figures, this cohort's share of income directed at non-housing costs such as food and clothing has declined over time. Rather than simply benchmarking against the latest HES data (2016 & 2019), the affordable housing price point benchmark has been purposefully associated with the 2013/16 HES data.

As clearly illustrated in Figure 3.6, the owner-occupying 40-to-64-year age cohort's non-housing costs plateaued across 2010/13 and 2013/16 before sinking across all income quintiles in 2016/19 HES. To embrace the 'smashed avocado' approach to housing affordability, the 2013/16 HES was adopted for price point benchmarking.

Figure 3.6: Household non-housing expenditure: All NZ – 40-64 yr old, mortgaged owner-occupants



As Figure 3.6 shows, all benchmark households between income quintiles 2 and 5 spent over 70% on average of their income on non-housing expenses based on the combined 2013/16 HES surveys and the top two income quintiles spent over 75% on food, clothing, and other non-housing needs.

One reason for choosing this cohort is that these mature households have 'arrived' in terms of their housing life course. Households in this group are likely near their peak earning potential and many would have paid down the bulk of their mortgage. Lastly, many would have likely entered home ownership before housing affordability became so dire in New Zealand. This cohort embodies the 'smashed avocado' approach to housing affordability as these households are collectively not under the same housing stress as other cohorts. Furthermore, selecting the 40-to-64-year cohort acknowledges the above-discussed inter-generational tension that exists in New Zealand and around the world with younger generations likely to enjoy less material wealth than baby boomers who dominated this HES cohort.

4. Affordable Price Point Methodology

In developing a more nuanced approach to affordable housing cost price points we have created different income brackets and then determined a modest expenditure pattern beyond rice and beans which, while modest, we refer to as 'smashed avocado' household residual income. Table 4.1 sets out our estimated percentage of disposable income on non-housing household expenditure.

Table 4.1: Estimated percentage of disposable income directed towards non-housing expenditures for 'smashed avocado', 'rice and beans' and the affordable price point benchmark

	2022 Income Quintile[3]				
	1	**2**	**3**	**4**	**5**
Disposable household income quintiles	**Below $38.1k**	**$38.1k – $64.6k**	**$64.6k - $97.8k**	**$97.8k - $135.7k**	**Over $135.7k**
Average, 'smashed avocado' non-housing expenditure	69%	68%	71%	74%	74%
Affordable price point benchmark expenditure	60%	62%	67%	71%	71%
'Rice and beans' non-housing expenditure	52%	56%	63%	68%	68%

Those estimates were developed using custom HES expenditure data provided by Statistics NZ classified into four aggregations of expenditure data:

1. Total housing expenditure (or cost);
2. Household energy costs;
3. Transport expenditure (excluding purchases);
4. Net household expenditure (i.e., disposable income).

The middle two aggregate expenditures (energy and transportation) were acquired for the purpose of conducting further housing affordability modelling that lies beyond the scope of the present study. The focus here is to determine how much households' disposable income is directed at non-housing expenses. This is found by deducting the total housing expenditure (item 1 in the list above) from net household expenditure (item 4 in the list above).

Distribution of HES non-housing expenditures

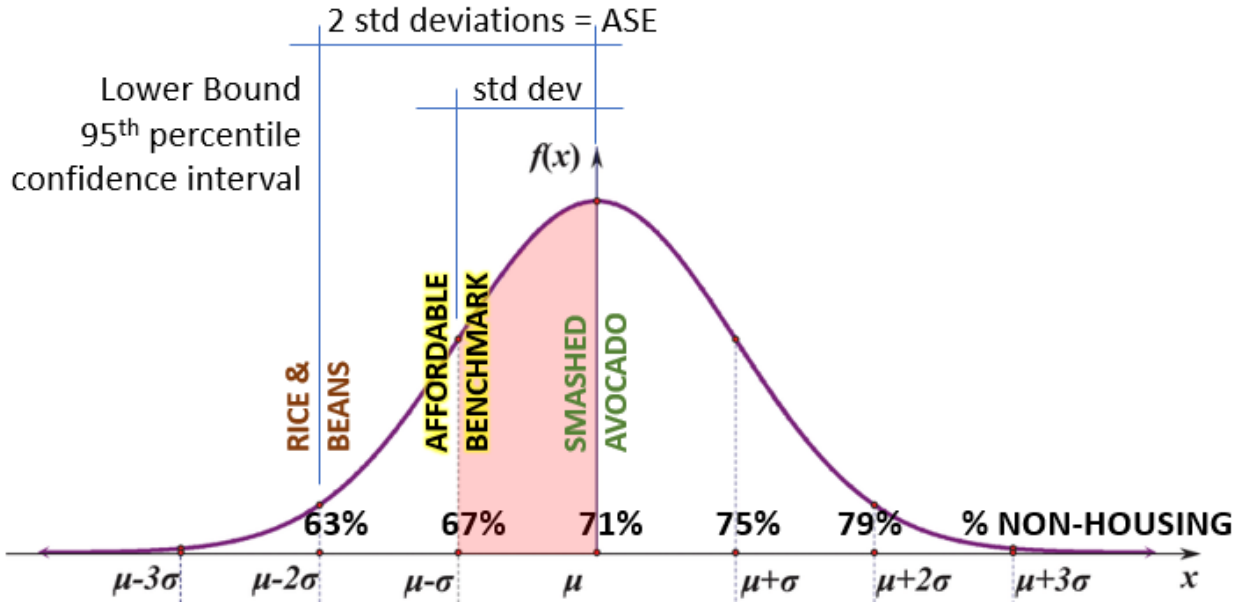
The household composition selected to form the benchmark of non-housing expenditures are 40- to 64-year-old, mortgaged homeowning households sampled from across New Zealand. The expenditure patterns of this cohort at differing income quartiles form the baseline for the residual income model used to determine affordable housing price points. As discussed, this approach is somewhat aspirational given many of these households would have entered owner

[3] https://www.stats.govt.nz/information-releases/household-income-and-housing-cost-statistics-year-ended-june-2022/

occupation when housing affordability was far less dire and would have reduced the size of their comparatively modest mortgages.

Figure 4.1, below, provides a stylised view of the range of non-housing expenditure patterns captured through the 2013 & 2016 HES surveys of this household cohort. The below graphic outlines the proportion of disposable household income directed at non-housing costs such as food and clothing for New Zealand wide 40- to 64-year-old, mortgaged homeowning households in the third income quintile.

Figure 4.1: Stylised distribution of non-housing expenses as a percentage of disposable income (NZ, 40 to 64 yrs old mortgaged owner-occupiers, 3rd income quintile based on combined 2013 & 2016 HES)



Supplied alongside the above-mentioned aggregate HES data is the absolute sampling error (ASE) calculated by Statistics NZ for each data point and is a measure of the variability that occurs by chance because a sample rather than an entire population is surveyed. The ASE relates to confidence intervals. The greater the error, the wider the confidence interval becomes to ensure a degree of certainty that expenditure estimates derived from the HES survey accurately reflect the spending characteristics of the total population.

Within the HES expenditure data some line items have a considerable amount of sampling error because, so few surveyed households engage in such spending. An extreme example would be the consumption of illicit drugs. However, the aggregate expenditures in the present study, housing costs and net total expenditures, do not tend to suffer from high sampling errors.

As shown in Figure 4.1, the affordable price point benchmark cohort, referred to as the 'smashed avocado' lifestyle, would, on average (μ), experience a comfortable standard of living by allocating 71% of their disposable income to non-housing expenses. To the far left along the figure's normal distribution marks the boundary of the 95% confidence interval, the mean non-

housing expenditure less the absolute sampling error (ASE) of housing costs (μ-2σ). This point along the expenditure curve is labelled the 'rice and beans' lifestyle and reflects the harsh belt tightening akin to the traditional residual approach to housing affordability and mimics Australia's Household Expenditure Measure (HEM).

Using 40- to 64-year-old mortgaged owner-occupiers as the benchmark cohort, households following a 'rice and beans' lifestyle are spending 63% of their disposable income on non-housing costs such as food and clothing. Midway between these points along the distribution, or one standard deviation below the mean non-housing expenditure (μ-σ), lies the established affordable price point benchmark for the 3rd income quintile. As expenditure patterns depend greatly on disposable income level, the benchmark must be determined separately for each income quintile.

Extending the above discussed approach to the other income quintiles using the combined 2013 and 2016 HES survey data, the range of non-housing expenditure patterns are presented in Table 4.1. As discussed above, the midpoint between the 'smashed avocado' and 'rice and beans' lifestyles of the 40- to 64-year-old mortgaged owner-occupant households serves as the affordable price point benchmark in this study. The benchmark acknowledges that households have a willingness to tighten their belts when seeking to enter owner occupation. In fact, a proportion of kiwi society would expect a degree of sacrifice when a family seeks to graduate from renting to owning their own home.

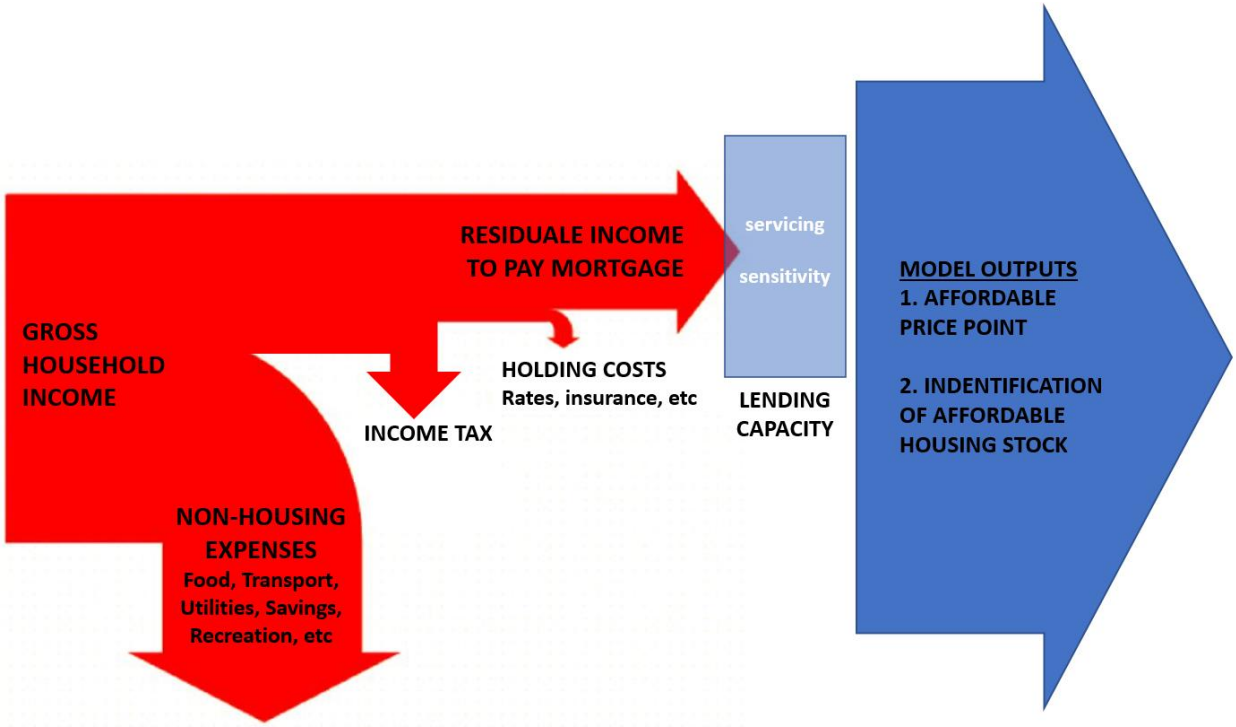
The same benchmark is employed irrespective of tenure (renting and owning). One could argue, however, that long-term renters who do not aspire to become owner occupiers should not be expected to tighten their belts as would a prospective first home buyer who must save the necessary deposit and then cover their debt service, which is generally greater than market rent. On the other hand, long-term renters are destined to enter retirement without a mortgage free home. As the New Zealand superannuation system does not accommodate paying market rent during retirement, a household locked out of owner occupation may be compelled to tighten their belts in order to boost their retirement savings.

Residual income affordable price point model

The 'smashed avocado' residual income approach to determining housing affordability hinges on the above proportions of disposable income earmarked for non-housing expenses. Figure 4.2 presents the affordable price point model for home purchases. The model begins with a given household's gross income, which is gradually reduced through payment of income tax, non-housing costs (food, clothing, etc) and a range of holding costs that owner-occupiers must prioritise (property rates, insurance, etc). The residual household income remaining is then available to service a mortgage. That latter sum of income cashflow is used to determine a given household's lending capacity under two competing scenarios.

An assumed saved home deposit, along with a household's lending capacity, produces an affordable price point. This price point can then be mapped against information on a market's housing stock to gain an appreciation as to how much housing is genuinely affordable to that household, assuming all housing stock is available for purchase.

Figure 4.2: Residual income affordable price point model (purchase)



The same residual income approach is applied to renting households but is more simplistic as the holding cost is limited to contents insurance and there is no lending involved. The result is the same with an affordable price point in dollars of rent per week, which can then be mapped against market rent data to determine which submarkets of a given city or district the households could genuinely afford to rent in.

In both modelling exercises, the housing services (e.g. 2-, 3-, 4-bedroom etc) must be considered when assessing the amount of genuinely affordable housing. In the worked examples and case study analysis shared in this paper, the household composition considered is a nuclear family featuring a couple with two children in need of a dwelling with at least three bedrooms.

Since the HES involves disposable (after-tax) income, household gross income must first be adjusted to find the after-tax equivalent. As many households are dual income, care must be taken to accurately model the household's tax paid to the IRD. The income tax calculations

undertaken in the present study are based on the IRD's online taxable income calculator[4]. In addition to income tax, a deduction is also made to account for the ACC Earners' Levy[5]. As income tax is determined at the personal rather than household level in New Zealand, each income earner must be modelled individually with the disposable income per earner summed to arrive at the household's net income.

With the household's disposable income determined, this figure can then be applied to appropriate non-housing expenditure percentage that aligns with the given household's income quintile. At this point, the lion's share of the household's available income has been earmarked for other purposes. However, some additional costs must be accounted for to arrive at an affordable price point.

As discussed earlier, Statistics NZ defines housing costs as expenditures on rent, mortgages (principal and interest repayments), property rates and building-related insurance. Of this list of costs, the rent and mortgage interest and principal payments must be isolated from the other housing costs. For renters, this is straightforward as landlords cover residential property rates in New Zealand along with home insurance, leaving only contents insurance. For first-time homebuyers, all of these holding costs must be accounted for and deducted from the household's income after paying taxes and the earmarked non-housing costs.

Although estimates for property rates and home insurance are best modelled using providers such as Quashed Market Scan[6] for insurance premium information and property data from Councils' district valuation roll (DVR) databases, the analysis presented in this paper employs nominal fixed estimates for these costs, some adjusted by Council. For example, the annual property rates cost is based on the Taxpayers Union's 2022 Ratepayers Report, which indicates Auckland's average residential rates bill was $2,825[7]. The residual income remaining is available to service a mortgage, in the case of homebuyers, or pay market rent. The range of holding costs for renters and owner occupants are presented in Table 4.2.

In addition to the owner-occupier holding costs listed in Table 4.2, there are potential, additional costs for owner-occupiers living in body corporates (apartments, terraced house developments, etc). These revolve around the management of the body corporate including fees paid to a body corporate manager. Depending on the amenities (pool, gym, etc) available to body corporate members, these ongoing costs could be considerable. At present such community ownership costs have not been included in the price point modelling.

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[4] https://www.ird.govt.nz/income-tax/income-tax-for-individuals/how-income-is-taxed/work-out-tax-on-your-yearly-income

[5] https://www.ird.govt.nz/income-tax/income-tax-for-individuals/acc-clients-and-carers/acc-earners-levy-rates

[6] https://quashed.co.nz/market-scan

[7] https://www.taxpayers.org.nz/2022ratepayers_report_released

With the holding costs estimated and subtracted from the remaining disposable income, the residual income is either directly applied to rent or subjected to a lender's sensitivity analysis to determine lending capacity.

Table 4.2: Table of housing costs by affordable price point model for Auckland Council

Housing costs as per Statistics NZ (HES)	Tenure type expenses is applicable to	Researchers' classifications	Estimated expense cost
Actual rentals for housing	Renting	Rents	Calculated using residual model
Payments connected with renting	Renting		
Property rates	Owner occupation	Council rates	$2,825 p.a.[8]
Other payments to local authorities	Owner occupation		
Dwelling insurance	Owner occupation	Home insurance	$1,500 p.a.[9]
Insurance on buildings and house contents	Renting & Owner occupation	Contents insurance	$500 p.a.[10]
Mortgage principal repayments	Owner occupation	Mortgage payments	Calculated using residual model
Direct charges for mortgages	Owner occupation		
Mortgage interest payments	Owner occupation		

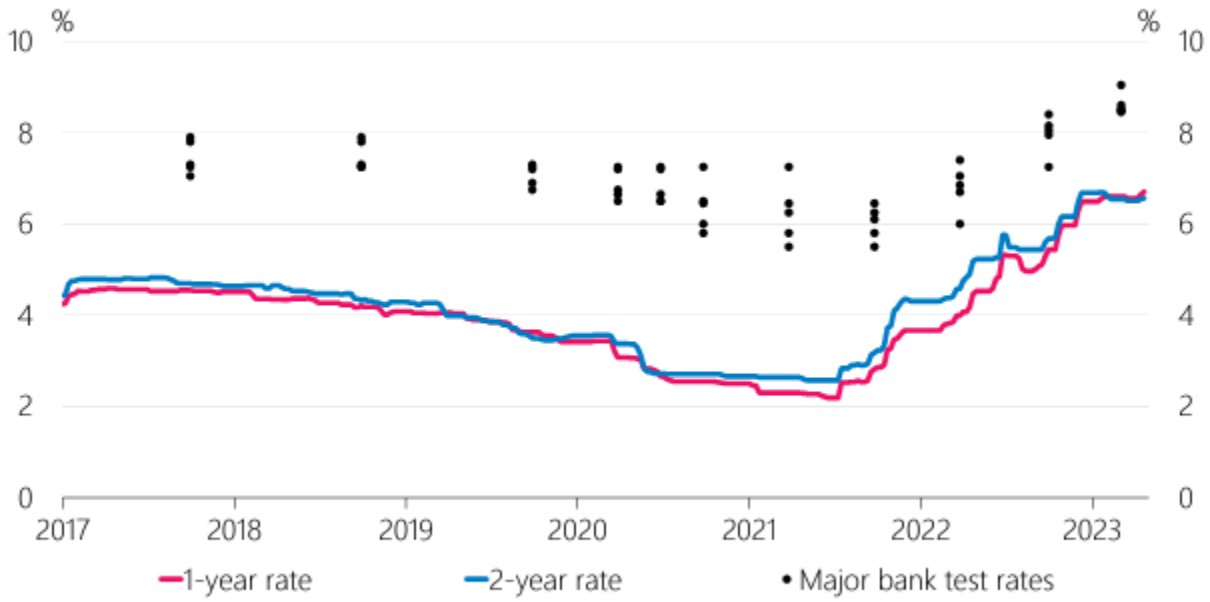
Competing approaches to testing lending capacity: long- and short-view

There are two approaches to test debt servicing. The first approach can be considered a conservative, long-term view as it does not blindly adopt current market interest rates but acknowledges that in the New Zealand mortgage market, fixed terms are far shorter (e.g., 2 years) than typical loan maturity (e.g., 25 years). Therefore, all mortgages in the country are either entirely floating or an adjustable-rate mortgage. Both are exposed to fluctuations in interest rates over the life of the loan. Lenders, and the Reserve Bank, recognise this risk and tend to apply a 'test rate' which is often 100 or 200 basis points (1 to 2 %) higher than retail interest rates.

[8] Average residential rates bill in Auckland based on the Taxpayers Union's 2022 Ratepayers Report.
[9] Nominal estimate that does not account for a dwelling's actual replacement cost (sum insured) nor property- or market-specific risks (flood, erosion, earthquake, etc).
[10] Nominal estimate that does not account for the value of a household's insurable belongings.

The Reserve Bank of New Zealand (RBNZ) is currently exploring mandating test rates as a policy tool to enhance financial stability. In the RBNZ's semi-annual financial stability report it anonymously publishes the bank's test rates. Figure 4.3 reproduces a graphic published in the RBNZ's May 2023 Financial Stability Report. In the underlying data available to download from the RBNZ website, the anonymised five reporting banks' test rates are provided. These range from 8.5% to 9% p.a. with an average test rate of 8.6%.

Figure 4.3: Mortgage serviceability test rates, compared to actual rates



Source: RBNZ *Credit Conditions survey*, *Retail Interest Rates survey*.

Taking a long-term view towards housing affordability, knowing that interest rates will adjust many times during a loan's term, the adopted interest rate for determining lending capacity under this conservative, long-term view is the average published test rate, 8.6% p.a. based on the RBNZ's May 2023 Financial Stability Report.

The second approach to assessing debt servicing takes an aggressive, short-term view and considers retail interest rates without concern for future rate fluctuations over the life of the loan. As at writing, the current special 2-year fixed interest rate offered by ANZ is 6.99% p.a., which is 160 basis points below the average test rate.

To calculate lending capacity and ultimately arrive at an affordable price point, some assumptions must be made. Firstly, the amount of deposit contributed by the first-home buyer must be stipulated. In the purchase price residual model, the authors have assumed a 20% deposit will be contributed and the loan-to-value will, therefore be 80%.

The last assumption is the loan period, or maturity. Although 30-year terms are increasingly popular, in-part due to rampant house price growth in New Zealand, the age of first home buyers has crept up over time. Therefore, a first-time purchaser over the age of 35 will find themselves with a mortgage balance remaining at retirement if they assume a 30-year mortgage. Given this, the loan term has been set at the historic norm of 25 years.

Worked affordable price point examples (Auckland median income household)

Tables 4.3 and 4.4 provide worked examples of the affordable price point models (purchase and rent) applied to a dual income Auckland household at the 2022 median gross income ($114,000). The example household has two income earners. The first data inputs are those individuals' gross salaries. The household's after-tax (disposable) income is determined with an underlying assumption that the household has no explicit tax deductions (donations, etc). Tax paid by household earners includes both income tax and ACC earners' levy.

Next a proportion of this disposable income is earmarked for non-housing costs such as food, clothing, transport, recreation, etc. The proportion used in the model is drawn from Table 4.3. Specifically, the example household's affordable price point benchmark non-housing expenditure is 67% as the household's disposable income falls within the 2022 HES's 3rd income quintile.

Subtracting non-housing costs from disposable income leaves the residual income to pay housing costs. Of these costs, some are prioritised before lending capacity can be calculated. These costs for first-time buyers include property rates, fixed water charges, home insurance and contents insurance. For the purposes of the below worked example, the Auckland average 2022 residential property rates bill was assumed, Watercare's current fixed water charge was applied and nominal estimates for house and contents insurance were entered.

The surviving residual income was then subjected to two competing debt servicing sensitivity tests: a conservative, long-view approach using the most recent published 'test rates' and an aggressive, short-view approach using a current 2-year retail interest rate. These interest rates and the assumed loan terms (weekly fully amortised payments over a 25-year period) produced a lending capacity per approach for the example household. Combining the loan potential with the borrower's 20% home deposit arrives at two affordable price points for the example household.

The conservative, long-view loan sensitivity approach indicates an affordable price point of $328,600 while the more aggressive short-view approach employing retail interest rates is slightly higher at $377,900. When compared against gross household income, which is a popular, simple indicator of housing affordability, the lower price point produces an 'affordable' price-to-income ratio of 2.88 while aggressive lending pushes this up to 3.31, which is 'moderately unaffordable' as per the classifications laid out in the *Demographia International Housing Affordability Survey*. Both income multipliers would have been typical in decades past. However,

current price-to-income ratios are well in excess of the 3.0 affordability threshold with Auckland's 2022 median multiple at 10.7, despite recent house price declines (Cox, 2023).

Table 4.3: Worked affordable purchase price point for a typical household at the 2022 Auckland median income

	DISPOSABLE INCOME
54,000.00	Individual gross income 1
60,000.00	Individual gross income 2
114,000.00	Gross annual household income **(Quintile 3)**
44,029.40	Take home pay 1
48,146.00	Take home pay 2
92,175.40	Disposable (after tax) household income
67%	Disposable income directed towards non-housing costs **(Quintile 3)**
61,757.52	Estimated non-housing expenses
30,417.88	Residual income to pay housing costs
	ANNUAL HOLDING COSTS
2,825.00	Property rates
1,500.00	Home insurance
500.00	Contents insurance
4,825.00	Base holding costs of owning a home
25,592.88	Residual income available to service a mortgage
492.17	Weekly max loan payment
	LENDING CAPACITY & PRICE POINTS
25	Loan term (years)
80%	Assumed loan-to-value ratio
8.60%	Lenders' "test rate" for serviceability
262,864.89	Lending capacity at "test rate"
65,716.22	Home deposit
328,581.11	**Long-view affordable price point**
6.99%	Retail 2-year special interest rate (ANZ)
302,276.17	Lending capacity at current interest rate
75,569.04	Home deposit
377,845.21	**Short-view affordable price point**

Table 4.4: Worked affordable rent price point for a typical household at the 2022 Auckland median income

	DISPOSABLE INCOME
54,000.00	Individual gross income 1
60,000.00	Individual gross income 2
114,000.00	Gross annual household income **(Quintile 3)**
44,029.40	Take home pay 1
48,146.00	Take home pay 2
92,175.40	Disposable (after tax) household income
67%	Disposable income directed towards non-housing costs **(Quintile 3)**
61,757.52	Estimated non-housing expenses
30,417.88	Residual income to pay housing costs
	ANNUAL HOLDING COSTS
0.00	Property rates
0.00	Home insurance
500.00	Contents insurance
500.00	Base holding costs of renting a home
29,917.88	Residual income available to pay rent
575.34	**Affordable weekly rent**

As discussed earlier the affordable price point model for rent is more straightforward than its purchase price counterpart. The above Table 4.4 provides the entered assumptions and model calculations for the same median income household in Auckland to determine what weekly rent is genuinely affordable. Like the affordable purchase price estimate, the affordable rent estimate ($575 per week) is also considerably lower than the current market rent in Auckland. The July 2023 median rent across the city was $670 per week.[11]

[11] https://www.stuff.co.nz/business/property/300955540/auckland-median-rent-jumps-yearonyear-as-population-increases

5. Two Cases: Horowhenua and Auckland

Case Study 1: Horowhenua

The above worked example demonstrates how to apply the 'smashed avocado' residual income affordable price point models to a single household. An alternative application can be made for a given housing market. A key stakeholder in the present research is the Horowhenua District Council which has kindly shared its district valuation roll (DVR) database to support this study.

Input from Council staff inspired the authors to explore alternative uses of the residual model to better shed light on how a given housing market fares in terms of the affordability of its dwelling stock. Two key factors to consider from a Council's DVR are the structural attributes of the houses, apartments and units in the district and the value of this stock. Like the worked example for an Auckland median income household, some direction must be provided in terms of the typology that is to be assessed for affordability. Following on from the Auckland example household, the following Horowhenua District analysis focuses on dwellings suitable for a couple with children. We have assumed that a suitable dwelling can either be a residential dwelling, coded in the DVR as (RD), residential flat (RF) or a residential apartment (RA). As the DVR does not feature bedroom counts, it is assumed that the dwelling's floor area must be between 100 and 200 square metres to suit the needs of a couple with children.

In regard to dwelling values, the DVR includes the August 2019 capital valuation for each rating unit in the district. Although not specifically an estimate of market value, CV is an acceptable proxy. To adjust the August 2019 CVs to the latest (Sept 2023) values, the REINZ House Price Index (HPI)[12] was used. This index was developed in partnership with the Reserve Bank of New Zealand and captures housing values over time more accurately than median or average house prices as the HPI takes into account the attributes of transacted houses such as land area, floor area, number of bedrooms, etc.

As shown in Figure 5.1, the HPI for Horowhenua rose from the earliest reading in July 2020 to a peak in October 2021 and gradually declined. The most recent several months have been flat, with little house price movements. Between July 2020 and September 2023, house prices increased by 15.7%, according to REINZ's published HPI reports.

It is worth noting that the earliest HPI data readily available for the Horowhenua District is eleven months after the CV date. Moving forward, this will not be an issue as CVs are re-evaluated at a minimum every three years. For the following analysis, however, the estimated 2023 dwelling values will be slightly inaccurate.

[12] https://www.reinz.co.nz/Web/Web/Data-and-Products/REINZ-HPI-Report.aspx

Figure 5.1: REINZ House Price Index for Horowhenua District (Jul 2020 – Sept 2023)

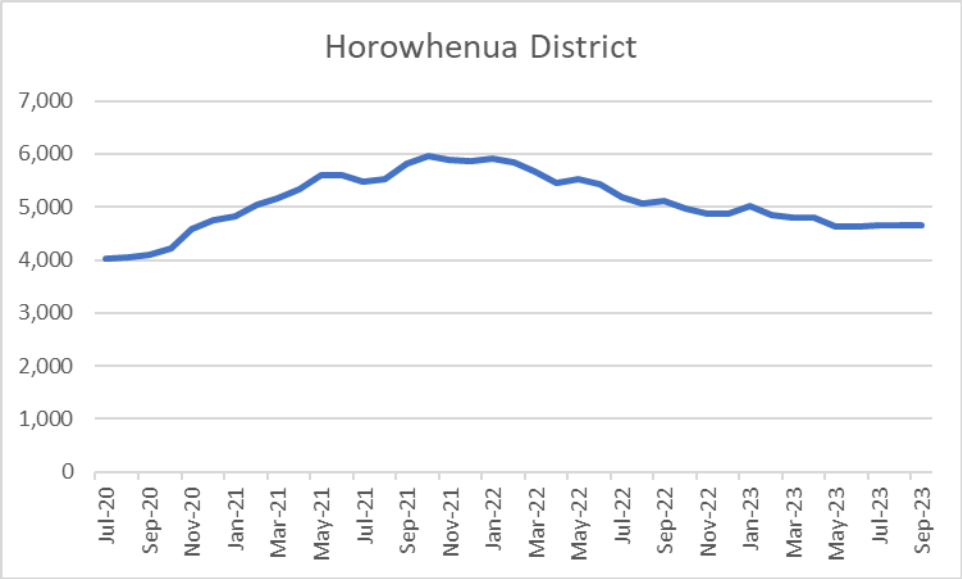


Table 5.1 summarises the affordable weekly rent along with the long- and short-view affordable purchase price points for a couple with children in Horowhenua. Seven nominal gross household incomes are considered, from $50k to $300k per year.

Table 5.1: Summary housing affordability analysis for a couple with children in Horowhenua District

		Gross household income (2023)						
		50k	**75k**	**100k**	**125k**	**150k**	**200k**	**300k**
	Disposable income quintile	2	2	3	4	4	5	5
	Income for non-housing costs	62%	62%	67%	71%	71%	71%	71%
	Number of suitable dwellings[13]	6,162	6,162	6,162	6,162	6,162	6,162	6,162
Rent	Affordable price point (weekly)	$301	$449	$514	$547	$641	$823	$1,189
Purchase	Long-view price point	147,644	246,571	247,653	311,517	374,259	496,400	740,681
	Price-to-Income	2.95	2.75	2.48	2.49	2.50	2.48	2.47
	Affordable dwellings	1	48	200	349	1,414	4,171	5,968
	% of stock that is affordable	0.0%	0.8%	3.2%	5.7%	22.9%	67.7%	96.9%
	Short-view price point	169,780	237,185	284,783	358,222	430,372	570,825	851,731
	Price-to-Income	3.40	3.16	2.85	2.87	2.87	2.85	2.84
	Affordable dwellings	4	162	602	1,023	2,967	5,049	6,090
	% of stock that is affordable	0.1%	2.6%	9.8%	16.6%	48.1%	81.9%	98.8%

[13] Homes, flats and apartments with floor areas between 100 and 200 square metres

Table 5.2 provides the lower quartile, median and upper quartile market rents for two suburbs in the Horowhenua District (Foxton and Levin). Unfortunately, other suburbs such as Shannon, which may potentially offer more affordable rental options, did not have a sufficient number of lodged tenancy bonds for Tenancy Services to report on market rents in the current period (August 2023). In regard to the estimated affordable weekly rent per income band, the lowest two incomes ($50k & $75k) are unlikely to secure suitable rental accommodation and be in a position to direct 62% of the household's disposable income towards non-housing costs as does the benchmark household (40-to-64 year old owner-occupiers with a mortgage). With a residual income of only $301 and $449 per week respectively, further belt tightening would be required for such families to afford a 3-bedroom house even at Foxton's lower quartile rent ($470/week).

Table 5.2: Tenancy Services' August 2023 market rents for 3-bedroom dwellings in Horowhenua

Suburb	Dwelling type	Lower quartile rent	Median rent	Upper quartile rent
Foxton	House	$470	$485	$528
Levin	House	$520	$550	$593

As gross household incomes rise above $100k, more affordable rental opportunities become available but in terms of owner occupation the prospects remain bleak in Horowhenua, even for these more affluent households.

Unsurprising, at the lowest income band, a family in Horowhenua has no affordable housing stock to purchase aside from a handful of dwellings. At the other end of the spectrum, if the household has a combined gross income of $300,000, nearly all dwellings in the district would be affordable even after directing 71% of their disposable income towards non-housing expenses like food, clothing and entertainment.

An inflection point lies between a gross household income of $125k and $150k. The former, slightly less affluent family has relatively limited options. However, a $150k income opens up over one-fifth of all dwellings in the district at the more conservative long-view price point and nearly half of all dwellings under the aggressive short-view approach.

Aside from the lowest two income bands ($50k and $75k) under the aggressive short-view approach, all other cross tabulations of price-to-income ratios are below 3.0 and represent an affordable purchase.

Table 5.3: Number of affordable, suitable dwellings by suburb for a $100k gross income couple with children in Horowhenua District based on aggressive, short-view residual approach

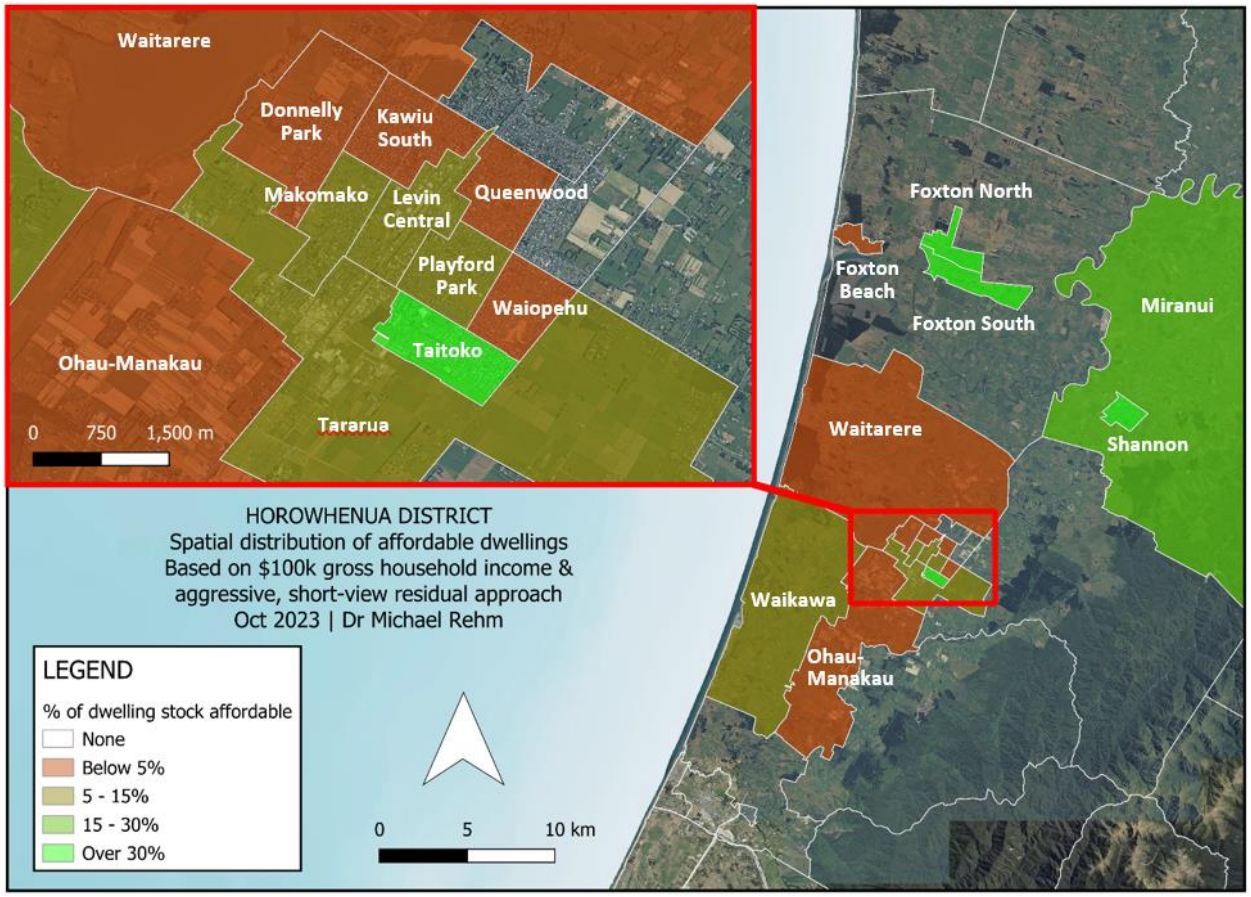
Suburb (SA2)	Total suitable dwellings	Affordable dwellings	% Affordable
Shannon	267	135	50.6%
Foxton North	256	93	36.3%
Foxton South	303	106	35.0%
Taitoko	300	94	31.3%
Miranui	167	30	18.0%
Waikawa	166	14	8.4%
Makomako	352	26	7.4%
Tararua	214	13	6.1%
Levin Central	238	14	5.9%
Playford Park	410	23	5.6%
Queenwood	472	20	4.2%
Foxton Beach	553	13	2.3%
Kawiu South	604	12	2.0%
Ohau-Manakau	203	4	2.0%
Waitarere	416	3	0.7%
Donnelly Park	181	1	0.5%
Waiopehu	314	1	0.3%
Fairfield	212	0	0.0%
Kawiu North	380	0	0.0%
Kere Kere	47	0	0.0%
Kimberley	39	0	0.0%
Makahika	68	0	0.0%
TOTAL	6,162	602	9.8%

Spatially, the affordable dwellings in Horowhenua are not randomly distributed as seen in Table 5.3 and Figure 5.2. Submarket analysis, based on a household with a gross income of $100k, whose dwelling needs can be described as a house (RD), flat (RF) or apartment (RA) between 100 and 200 square metres in floor area, reveals that outlying areas such as Foxton and Shannon provide the highest concentration of affordable options available to such families looking to enter owner occupation. The only suburb in Levin featuring a sizable proportion of affordable dwellings is Taitoko.

It is worth noting that of the 602 affordable dwellings identified for a nominal $100k income household, 28 of these dwellings are owned by Housing New Zealand (now Kāinga Ora). This raises an important point that the housing stock being analysed is total stock rather than

dwellings available for sale. Information on current real estate listings is not available to the authors.

Figure 5.2: Map of Horowhenua showing proportions of affordable dwellings suburb-level (SA2s)



Case Study 2: Auckland

Having explored the housing affordability situation in Horowhenua, a provincial district, the focus now turns to analysing New Zealand's largest city: Auckland. Table 5.4 provides a summary of the affordability price point analysis for Auckland across the same six nominal gross household incomes ($50k to $300k). Given that the non-housing cost benchmark is the same cohort of 40-to-64-year-old, mortgaged owner-occupiers the proportion of income earmarked for non-housing costs is the same as in the Horowhenua case study. Furthermore, since contents insurance is a renter's only holding cost and the residual income model assumes a nominal $500 per year premium irrespective of the housing market, the affordable weekly rents will be the same per household income band.

Table 5.4: Summary housing affordability analysis for a couple with children in Auckland

		Gross household income (2023 - $000)						
		50k	**75k**	**100k**	**125k**	**150k**	**200k**	**300k**
	Disposable income quintile	2	2	3	4	4	5	5
	Income for non-housing costs	62%	62%	67%	71%	71%	71%	71%
	Number of suitable dwellings[14]	192,592	192,592	192,592	192,592	192,592	192,592	192,592
Rent	Affordable price point (weekly)	$301	$449	$514	$547	$641	$823	$1,189
Purchase	Long-view price point	145,474	244,401	287,883	309,347	372,090	494,230	738,511
	Price-to-Income	2.91	3.26	2.88	2.47	2.48	2.47	2.46
	Affordable dwellings	0	23	55	64	149	524	16,133
	% of stock that is affordable	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	8.4%
	Short-view price point	167,285	281,044	331,045	355,727	427,877	568,330	849,236
	Price-to-Income	3.35	3.75	3.31	2.85	2.85	2.84	2.83
	Affordable dwellings	0	41	99	122	252	1,530	41,422
	% of stock that is affordable	0.0%	0.0%	0.1%	0.1%	0.1%	0.8%	21.5%

When determining the affordable purchase price points, these will differ slightly by housing market as the rates burden tends to differ and some markets may be subject to higher home insurance premiums as the New Zealand insurance industry has gradually shifted to risk-based insurance pricing. This initial modelling features static, nominal assumptions rather than dynamic figures for individual dwelling property taxes or insurance premiums. Therefore, both the Horowhenua and Auckland residual models both assume the cost of home insurance is $1,500 per year. As a result, the affordable purchase price point figures are very similar across both markets.

Where the differences lie is in the proportion of dwellings that are genuinely affordable. The initial intention was to replicate the same set of analysis across the two case studies but whereas a family with children on a $100k income in Horowhenua has nearly 10% of that market's stock that is affordable to them, the same household in Auckland would find only 0.1% of dwellings in that city affordable.

Therefore, the Auckland modelling results follow an assumption of $200k gross household income. Despite the doubling of household income, the results remain poor in terms of affordability. Of Auckland's roughly 200,000 suitable dwellings (apartments, units and houses), which are between 100 and 200 square metres in floor area, less than 1% (1,530 dwellings) are genuinely affordable to a family with a combined income of $200k. If a conservative, long-term view is taken, that falls to only 524 dwellings throughout Auckland Region, including outlying islands. It's useful to note that the 1,530 dwellings deemed affordable for a household with $200k

[14] Homes, flats and apartments with floor areas between 100 and 200 square metres

gross income include 68 that are owned by Housing New Zealand (now Kāinga Ora). Most of these state houses are in Otahuhu – the most affordable, centrally located suburb (see Table 5.5 and Figure 5.3).

Table 5.5: Tenancy Services August 2023 market rents for 3-bedroom dwellings in Auckland

Suburb	Dwelling type	Lower quartile rent	Median rent	Upper quartile rent
Otahuhu	House	$600	$650	$680
New Lynn	Flat	$540	$580	$590
	House	$600	$630	$658
St Lukes/Morningside	House	$700	$800	$895
Auckland Central	Apartment	$600	$820	$980
	House	$500	$610	$944
Ranui	House	$623	$650	$659

Table 5.5 provides the low quartile, median and upper quartile market rents for six centrally located suburbs that offer first-time buyers meaningful concentrations of affordable dwellings for purchase. Returning to consider a household with a nominal $100k gross income, the only suburb with a lower quartile rent that would be affordable to such a family is Auckland Central. However, that stated rent is for a 3-bedroom house which may be somewhat of an anomaly. Aside from this sole example, such a family would need to tighten their belts and dedicate more of their income to housing costs than the benchmark cohort of 40- to 64-year-old mortgaged owner-occupiers. The belt tightening is increasingly severe for lower income households in Auckland therefore the prospect of them affording a home (rental or purchase) is quite low.

Even an Auckland household commanding a combined income of $150k per year would be pressed to secure an affordable 3-bedroom rental. Only at an annual income of $200k does the residual income model's determined affordable rent of $823 per week exceed Table 5.5's selected 'affordable' Auckland submarkets' median rents.

Table 5.6 lists the 44 suburbs (SA2s) with the highest concentration of affordable dwellings in Auckland for a couple with children on a $200k combined gross income, if the entire housing stock were to be offered for purchase at the time-adjusted CV. The only three submarkets with one-quarter or more of their suitable (100 to 200 square metre) dwellings deemed affordable are located well away from the city centre with the Barrier Islands holding the top spot. Despite its remoteness, over half of Great Barrier Island's suitable homes are not affordable to a $200k per year household.

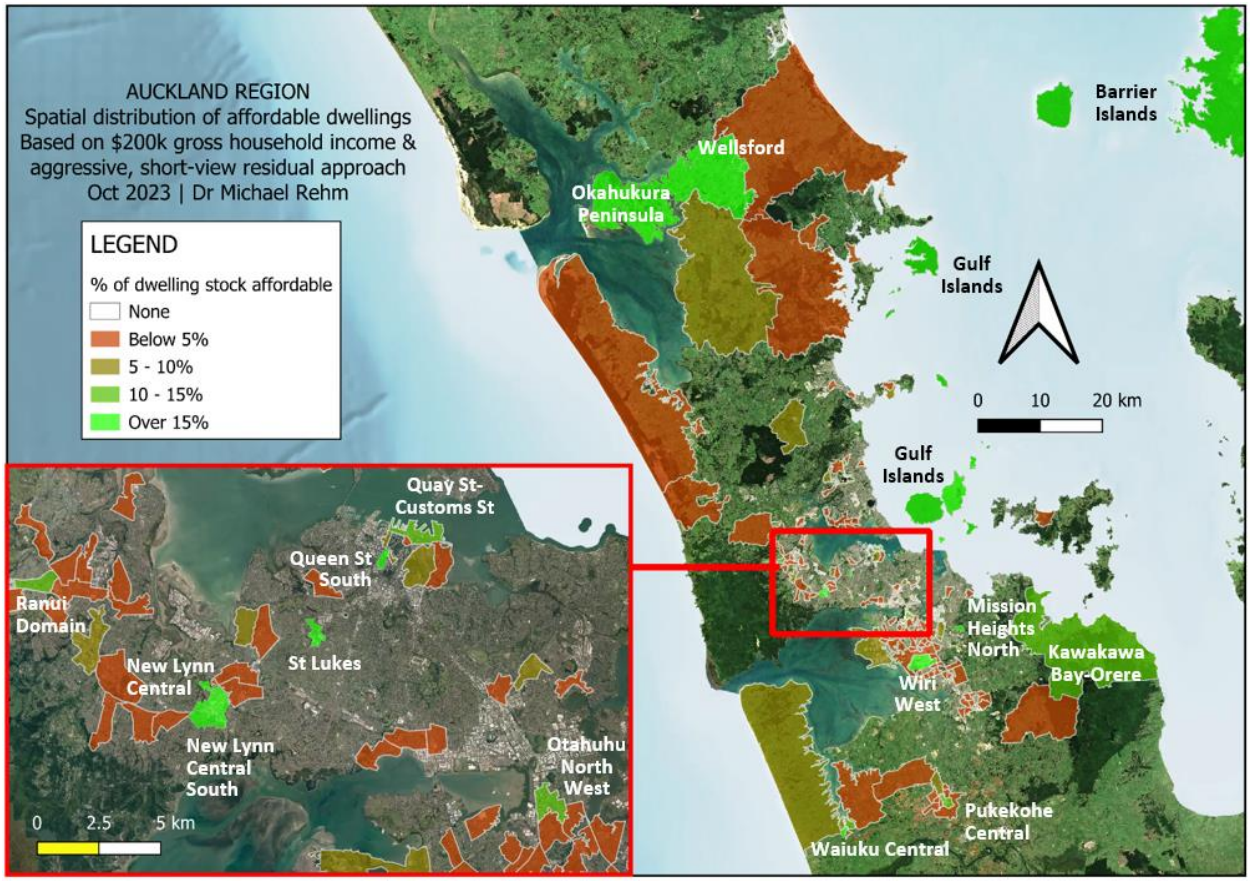
Table 5.6: Number of affordable, suitable dwellings by select suburb for a $200k gross income couple with children in Auckland based on aggressive, short-view residual approach

Suburb (SA2)	Total suitable dwellings	Affordable dwellings	%	Suburb (SA2)	Total suitable dwellings	Affordable dwellings	%
Barrier Islands	139	58	41.7	Rongomai East	149	13	8.7
Okahukura Peninsula	77	28	36.4	Symonds St NW	104	9	8.7
Wellsford	403	104	25.8	Botany Junction	12	1	8.3
Otahuhu North West	135	32	23.7	Albany West	169	14	8.3
New Lynn Central S.	455	97	21.3	Awhitu	219	17	7.8
Mission Heights North	134	26	19.4	Pukekohe NW	455	34	7.5
St Lukes	272	52	19.1	Tamakae	568	42	7.4
Gulf Islands	91	17	18.7	Grafton West	82	6	7.3
Waiuku Central	266	48	18.0	Auckland Airport	28	2	7.1
Wiri West	73	13	17.8	Waterview	518	36	6.9
New Lynn Central	29	5	17.2	Waiuku East	407	28	6.9
Queen St South West	69	11	15.9	Gulf Harbour South	618	42	6.8
Quay St-Customs St	101	15	14.9	Hobson Ridge N	106	7	6.6
Ranui Domain	427	62	14.5	Parnell West	580	32	5.5
Papatoetoe Central E.	426	61	14.3	Henderson Central	37	2	5.4
Kawakawa Bay-Orere	192	26	13.5	Mt Wellington NW	408	22	5.4
Otahuhu Central	41	5	12.2	Alfriston	553	26	4.7
Hamilton Estate	499	58	11.6	Ferguson	87	4	4.6
Oteha West	156	17	10.9	Panmure West	23	1	4.3
Pukekohe Central	39	4	10.3	Karangahape East	74	3	4.1
Dairy Flat West	10	1	10.0	Pukekohe West	785	31	3.9
Kaipara Hills	21	2	9.5	Rosa Birch Park	483	18	3.7

The next highest concentration of affordable dwellings is Okahukura Peninsula and Wellsford, both located at Auckland's northernmost periphery. Not all relatively affordable suburbs are located at Auckland's periphery. Table 5.6 includes several centrally located suburbs with over 10% affordable dwelling stock. These submarkets include a portion of Otahuhu, Ranui, New Lynn, St Lukes and parts of the city centre.

Figure 5.3 presents a thematic map showing the spatial distribution of suburbs that offer some affordable dwellings to first home buyers with $200k household incomes. Immediately striking is the absence of any affordable dwellings across much of Auckland despite an income that is nearly double the region's median. The bulk of the suburbs (SA2s) that do offer some affordable dwellings tend to have concentrations of below 5% of suitable housing stock. The most noticeable affordability voids are in the former Auckland City and North Shore City Councils.

Figure 5.3: Map of Auckland showing proportions of affordable dwellings suburb-level (SA2s)



The prominence of far-flung submarkets provides a reminder that housing affordability goes beyond the purchase price or weekly rent. One aspect of affordability not reflected in the modelling presented here is transportation costs. Wellsford (#3) is a prime example of how the relatively low home values may come with the penalty of high cost in fuel and time to reach employment opportunities and other city amenities. Other noteworthy provincial centres that have been absorbed within the Auckland Supercity include Waiuku and Pukekohe in the extreme south. Such outlying areas would come with high transportation costs if the household's income earners work in Auckland proper.

Another dynamic factor in housing affordability that is not incorporated in this paper's price point modelling is dwelling energy efficiency. It is possible that some lower valued homes and flats are not particularly well insulated and may require greater resident investment in wintertime heating. Future enhancements of the presented affordable price point modelling, particularly on a dwelling-by-dwelling basis for purchase prices, would benefit from an incorporation of transportation and heating costs. As discussed previously, home insurance and property rates are also best determined at the individual dwelling level and considered in modelling housing affordability across a given housing market. This initial modelling effort does not feature dynamic aspects such as these, but future modelling enhancements are planned.

6. Discussion: Housing Affordability, Society and the Economy

A prevailing narrative suggests that young people bear some responsibility for their lack of home ownership and could achieve it through lifestyle adjustments (Cruickshank, 2021). This perspective was popularised by Bernard Salt, a newspaper columnist and conservative social commentator who stated:

> *"I have seen young people order smashed avocado … . at $22 a pop and more. I can afford to eat this for lunch because I am middle-aged and have raised my family. But how can young people afford to eat like this? Shouldn't they be economising by eating at home? … Twenty-two dollars several times a week could go towards a deposit on a house."* (Salt, 2016, p. 34)

The column elicited a global media response, and 'smashed avocadoes' is still referenced in the mainstream media to discuss millennials, their finances and housing. Some contend that this perspective misidentifies housing unaffordability as an individual lifestyle issue (Cruickshank, 2021) rather than a broader societal problem.

Housing unaffordability, inequality and the economy

The connection between housing unaffordability and the economy was studied by Anthony (2023), who analysed the 100 largest cities in the United States during two periods (2000-2010 and 2010-2015) and assessed a market's unaffordability by examining the proportion of households spending over 30% of their gross income on housing costs (renting or owning). Anthony found that housing unaffordability negatively impacts economic growth (GDP).

Apart from the financial and economic consequences of housing unaffordability, emerging evidence suggests that individuals experiencing housing stress tend to have worse mental health outcomes. Arundel *et al.* (2022) examined housing stress in the Netherlands. They identified a clear association between unaffordable housing and poorer mental health scores with renters and younger people particularly susceptible to housing stress-induced mental health issues. This connection between housing unaffordability and poor mental health among younger people may be related to the findings by Lee and Painter (2013) that households often delay forming their households and entering the housing market when dealing with excessive housing costs. Instead, these young adults remain in the family home, whereas previous generations would have ventured out on their own.

The stresses felt by young adults unable to enter owner occupation flows through the rest of these 'trapped individuals' life course and is has broad economic impacts. This growing cohort will apply pressure on retirement income support systems and the welfare system as seniors

need greater income support for their housing costs. Furthermore, HUD (2023, p. 18) notes that growing numbers of long-term renting seniors will impose "*new pressures on residential care and the residential care subsidy. Senior renters are likely to be assessed in need of residential care earlier than owner occupiers because they're more likely to have poorer health. Senior renters are also more likely to be eligible for residential care subsidies due to low incomes and assets*."

In today's acute housing unaffordability context, households with higher incomes seeking owner occupation also experience some forms of deprivation. They may not need to decide between 'heating and eating', but they are forced to reduce their non-housing discretionary spending, negatively impacting the local economy. To emphasise this challenge, this paper introduces a unique 'smashed avocado' approach to define affordable housing as opposed to the more conventional 'rice and beans' practice, which typically only identifies housing affordability stress when a household is pushed towards poverty.

Drivers of housing unaffordability

COVID-19 was expected by many to alleviate the New Zealand's housing affordability dilemma (Adkins *et al.*, 2021; RNZ,2020; RBNZ, 2020), but instead repeated lockdowns led to near record-high house price growth in New Zealand, exceeding 20% in 2020, one of the highest surges in the world. This occurred alongside a concurrent decline in GDP (gross domestic product) growth rate to -2.9 percent, the lowest since 1989 (Yiu, 2021).

During the COVID-19 pandemic, prevailing beliefs on the factors driving house prices were challenged. The housing supply hypothesis, which advocates for increased housing supply as the solution to housing unaffordability suffered credibility damage. Ryan-Collins (2018) presented the monetary policy hypothesis, arguing the '*unlimited credit and money flows into an inherent finite supply of property that causes rising house prices*.'

While many governments globally provided COVID-19 fiscal stimulus responses, such as cash transfers to boost household spending that had decreased due to ongoing lockdowns, Makin and Layton (2021) argue these payments were one-time and more likely to be saved or used to pay off debts like mortgages rather than spent on products, goods and services.

Financialisation of housing and the wealth effect

Some scholars argue that the financialisation of housing and the resulting wealth effect are the root causes of the affordable housing crisis (Adkins *et al.*, 2021). The 'wealth effect' defined by Belsky and Prakken (2004) involves consumers spending more in the consumptive economy when their housing wealth increases. They assert that strong house price appreciation and borrowing against home equity played a significant role in personal consumption expenditure growth in 2001, 2002, and 2003, accounting for at least one-quarter of the growth.

Former Federal Reserve Board Chairman Alan Greenspan has also credited the wealth effect with supporting the US economy in the aftermath of the stock market collapse of 2000 and the 2001

recession, primarily through increased consumer spending (Greenspan, 2003). This has led to an economy dependent on ever-increasing house prices, often referred to as the 'asset economy' (Adkins *et al.*, 2021).

The asset economy has emerged due to wage stagnation and asset inflation over the past four decades, shifting social structure from being defined as occupational positions to relationships to wealth-generating assets, especially housing. While owner occupiers benefit from the wealth effect, rising house prices can price people out of the market, leading to growing wealth inequality between owner occupiers and non-owner occupiers.

In New Zealand, unaffordable rents and home prices result in income going towards inflated principal and interest payments to banks, with a significant portion of that money expatriated to Australia as dividends rather than remaining in the local economy.

In many countries, including New Zealand, the 1980s marked a deliberate era of deregulation, including the mortgage market. While the government had previously occupied a substantial role in the housing market, offering subsidised loans and constructing state houses, the 1980s saw a shift towards private markets for lending (Kohl, 2021). This change promoted the treatment of housing as a financial asset rather than a social good.

Aalbers and Halia (2018, p. 9) note that:

> "*… the lion's share of bank's lending activities these days is in real estate … housing is not simply yet another domain of financialization. In terms of size and impact, it is the key domain of financialization.*"

Since the 1970s in many advanced economies, there has been a decoupling of housing's financial aspects from actual economic activity, such as new construction. According to Kohl (2021), increasing mortgage levels boost building activity up to a certain point. Beyond that, expanding credit becomes linked to house price inflation and the suppression of new construction. This shift is highlighted in their research, which identifies the 1970s as a turning point in the relationship between mortgage debt and construction activity.

Kohl contends that the significant decoupling of mortgages from construction development is a critical concern. Urban economists, like Glaeser and Nathanson (2015) demonstrate that the more inelastic the housing supply is in relation to prices, the larger and deeper house-price bubbles can become. In the New Zealand context, Pavlidis *et al.* (2021) observed that exuberant house prices and housing unaffordability are linked to higher levels of systemic risk in the financial system. It is therefore important to ensure an accurate definition of housing affordability and housing stress.

New Zealand's unique banking sector

As lending is inextricably linked to the financialisation of housing and housing unaffordability in general, it pays to consider the banking sector. New Zealand banking is unique within the anglosphere in that a high proportion of banks are foreign-owned. Cull *et al.* (2017) reported that 95% of New Zealand bank assets are held by foreign banks and the vast majority of these are domiciled in Australia. In contrast, Australia featured only 2% foreign ownership and the United Kingdom 15% as of 2013.

As nearly the entire banking sector In New Zealand is foreign-owned, bank profits are generally repatriated offshore as shareholder dividends. In other markets, profits tend to be retained in the local economy. With elevated interest rates, bank profits are at record levels and, in 2022 exceeded $7 billion per annum. To put into perspective, this is more than the nation's 2023/24 defence budget. In summary, the continued financialisation of the New Zealand housing market will be more damaging to the New Zealand economy than countries less dependent on foreign banks.

Housing speculation, unaffordability and the role of banks

A key driver of house price bubbles and unaffordability is housing speculation where home purchasers are effectively gambling on future house price appreciation. This hope for future capital gains forms the basis for bidding up house prices even though the current values are not supported by fundamentals such as household incomes and market rents. Rehm and Yang (2021) studied the Auckland housing market and found that 97 per cent of all residential investment purchases between 2002 through 2016 were speculative as they achieved modelled rental yields below the fair rate of return at the time of purchase.

Rehm and Yang (2021) expand upon this and implicate lenders:

> *Aside from direct market participants, lenders also actively speculate in the housing market. These finance professionals are fully aware when approving new investment mortgages that these rental properties are incapable of generating adequate rental yields and that many assets, they lend on operate at a loss. According to the Reserve Bank, only 8 per cent of households' own investment properties, but they account for 40 per cent of housing debt (RBNZ, 2018, p. 7). This small minority of households forms a disproportionate share of banks' business and their profits. Accentuating their own speculative behaviour, lenders have shown an acute eagerness to extend interest-only mortgages on these so-called investments. These interest-only loans account for over half of new lending on rental property and roughly one-third of owner-occupier home loans (RBNZ, 2016, p. 3).*

Housing speculation is not limited to residential investors. As the family home has been redefined as an object of speculation and credit (Martin, 2002, p. 195), the choice to shift from renter to owner-occupant is partially an investment decision.

At the centre of most home purchase decisions is bank leverage. The earlier-mentioned banking deregulation has drastically expanded housing unaffordability in New Zealand and globally. According to an OECD study, "*financial deregulation is estimated to have increased real house prices by as much as 30% in the average OECD country over 1980 to 2005*" (Andrews, 2010, p. 18). Furthermore, Anenberg *et al.* (2016, p. 25) concluded that "*changes in credit availability can explain about 30 percent of the recent [U.S.] boom in house prices and 40 percent of the bust*." Lastly Favara and Imbs (2015, p. 984) found that "*the increase in credit due to deregulation can explain up to one half of the changes in house prices observed [between 1994 and 2005]*."

Banks are not neutral players in housing markets. Their activities have a direct impact on house prices and housing affordability.

Australia's Household Expenditure Measure and the Royal Commission

In Australia banks use the Household Expenditure Measure (HEM) as a benchmark for estimating people's annual living expenses when evaluating home loan applications. They apply the HEM to assess borrowing capacity and determine if applicants can afford a home using residual income approach to defining housing affordability.

Originally, the HEM was based on data from the Australian Bureau of Statistics' Household Expenditure Survey (2009-2010) and is now updated quarterly with the consumer price index. It categorises expenses into absolute basics (i.e. most food items, children's clothing, utilities, transport costs and communications), discretionary basic (i.e. take-away food, restaurants, confectionery, alcohol and tobacco, adult clothing, and entertainment) or non-basic expenditure (i.e. luxury services such as gardeners and overseas holidays) considering factors like geographic location, marital status, number of dependents but not income (Pearson, 2019). Rents and mortgage payments are excluded as the HEM is net-of-housing costs.

In essence, the HEM represents the median spend on absolute basics plus the 25th percentile spend on discretionary basics without accounting for non-basic expenditures (Melbourne Institute, n.d.). It calculates modest expenditure for eight types of households offering indicative living expenses for categories, not specific individuals.

The use of HEM by lenders has sparked controversy, with concerns that it may lead to loans being approved for individuals who cannot afford them due to underestimating actual household expenditure. The issue was investigated by the Hayne Royal Commission, which emphasised the importance of assessing a borrower's requirements and objectives. The Commission found widespread use of the HEM with three out of four home loans examined by the Australian Prudential Regulation Authority (APRA) used the HEM and made the assumption that the

borrower's living expenses were the same as the "modest level" in the relevant HEM with little consideration to borrower's actual spending patterns (Pearson, 2019).

Australian banks, compelled by the Royal Commission's findings, shifted away from relying on HEM estimates and began considering people's actual spending habits, focusing on whether their expenses exceeded their incomes and scrutinising discretionary spending (Hayne, 2019).

In response, the Australian Securities and Investment Commission (ASIC) brought a landmark legal case against Westpac Banking Corporation for applying HEM in their loan underwriting. This case, colloquially dubbed the 'wagyu and shiraz' case, was ultimately decided in favour of the lender. The court placed the responsibility for responsible lending on borrowers rather than lenders, emphasising that borrowers can adjust their spending to meet loan requirements (see Burstall, 2023).

Amendments to the Credit Contracts and Consumer Finance Act (CCCFA)

The pressures on Australian banks to assess borrowers' real spending habits when approving home loans have also influenced New Zealand banks. While there was no Royal Commission, Parliament passed amendments to the Credit Contracts and Consumer Finance Act (CCCFA). These changes were enforced in December 2021 and had an immediate, restrictive effect on consumer and home lending, as detailed in MBIE's June 2022 report (MBIE, 2022). Notably, this credit tightening aligns with the peak housing market price peaks across various New Zealand submarkets. In summary, the path to housing affordability is not primarily through freeing up land and building houses and apartments but through the regulation of credit into the housing market, which is driving up the price of land and dwellings.

7. Conclusions

This paper advocates a novel application of the residual income approach to (re)define housing unaffordability thresholds. Rather than take housing costs as given and then assess whether households can survive (i.e., rice and beans lifestyle), we argue that the affordability assessment should acknowledge that it is desirable for social and economic reasons for families to live beyond sustenance and to avoid becoming slaves to a mortgage or tenancy agreement.

Our approach elevates the wellbeing of families and the health of the economy. Specifically, housing costs must be subordinate to non-housing expenditures like food, clothing, energy, transportation, and entertainment. Should a household's residual income meet or exceed market housing costs, they have achieved housing affordability. Conversely, the housing would be deemed unaffordable if their residual income falls short of market rents or ownership expenses, a household would need to curtail its non-housing spending to afford their desired housing services.

As the findings indicate, a wide gulf exists between market rents, house prices and what typical households can afford without curtailing non-housing expenditures relative to their income level. Undertaking austerity in order to enter owner occupation does not only jeopardise the wellbeing of household members but it also reduces spending in the local economy.

Given the prominent role of bank credit in supporting house prices, our affordable price point modelling hinges on lending capacity. Rather than start with market property values which are disconnected from fundamentals, namely household incomes, we have flipped the traditional residual income approach. Importantly, the benchmark for determining whether a household can afford a given level of rent or purchase price has purposefully been benchmarked to 40- to 64-year-old mortgaged owner-occupiers drawn from across the country. Doing so highlights the inter-generational division between this older cohort and many post-baby boomers unable to enter owner occupation.

The modelling exercise is not complex. Although improvements can be made to account for dwelling-level insurance, property tax, transportation and household energy costs, the fundamental findings will not differ from what is presented here. If anything, the results will become even more dire as what appears to be a genuinely affordable home in this present, simplistic modelling may prove to be unaffordable given the property is located at a considerable distance from employment opportunities OR is potentially overly expensive to heat in the winter.

This paper presents a method of establishing affordable price points and applies those methods to a provincial district (Horowhenua) and the nation's largest metropolitan (Auckland). Both case studies demonstrate the extreme nature of housing unaffordability in New Zealand. Without cross tabulating socioeconomic data from these markets against the affordable dwelling figures by income quintile it is difficult to judge which population is worse off.

However, the analysis of Auckland is particularly troubling given households commanding incomes of $200k are limited to less than 10% of the suitable housing stock, much of which is located at the periphery of the region. Of course, households with such incomes do successfully become first home buyers in Auckland, but these households are unlikely to enjoy the same non-housing family budget as the benchmark cohort of 40- to 64-year-old mortgaged owner-occupiers pooled from around the country. The first home buyer in Auckland earning $200k has trade-offs to make in terms of which suburb to call home and how much of their income is consumed by providing their family with shelter.

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