

The effects of STRA on local housing markets **for Airbnb**

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Authorship

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Executive summary

This report outlines the results of an econometric analysis of the effect that short-term rental accommodation (STRA) has on the long-term residential rental and owner-occupied property markets in Queenstown-Lakes District, Auckland, Wellington City, and Christchurch City. The economic analysis is supplemented with a descriptive analysis of trends in short-term rentals and in the long-term residential rental and owner-occupied property markets in these four regions and nationally.

STRA has little influence on the housing market

Overall, our analysis found that STRA has little to no effect on rental prices and no significant effect on house prices. Our model looked at house prices and rental prices over time relative to the number of STRA listings. By controlling for population growth, interest rates, government policy, dwelling stock, and construction costs, our model demonstrates that the main drivers of rental and house price increases are population growth and interest rates.

- In Queenstown-Lakes District, STRA contributes negligibly to monthly rental price increases with the average amount being an additional 35 cents per month.
- This result means that between January 2018 and September 2023, the cumulative effect of STRA is to add \$11 to the average weekly rent in Queenstown-Lakes District, compared with population growth which added \$101.
- In Christchurch City, STRA contributes even less to weekly rental price increases, at only nine cents per month.
- This result means that between January 2018 and November 2023, the cumulative effect of STRA is to add \$1 to the average weekly rent in Christchurch City, compared with population growth which added \$64.
- In Auckland City and Wellington City, there were no significant rent increases attributable to STRA.
- STRA has no significant effect on house prices in any of the markets analysed.

Population growth and interest rates drive housing market

Because STRA listings have grown over time alongside rent and house price increases, STRA has been singled out as exacerbating housing and rental affordability challenges. Our econometric model demonstrates that when controlling for other factors, the main drivers of house and rental price increases are population growth and low interest rates.

Our explanation for why STRA does not affect the housing market as much as population growth and interest rates is as follows.

1. STRA listings and rental properties are not always the same. Many entire space STRA properties are actually granny flats, private rooms that are separate but contained within a main dwelling, holiday homes, or owner-occupied dwellings rented out for short periods of time. Some of these properties might have never been, and might never be, made available on the long-term market.
2. In areas with an historically high proportion of holiday homes such as Queenstown, the rise of STRA platforms does not necessarily mean there has been a significant increase of properties that would have been long term rentals but are now being used as STRA. With 28% of dwellings being unoccupied on 2018 census night (30% as far back as 2006), many homes are potentially holiday homes that might have never been long term rentals.
3. With an historic shortage of new properties coupled with record migration, low borrowing costs, and increasing construction costs, New Zealand's housing market fundamentally suffers from a lack of supply.

In conclusion, rental and housing price increases are overwhelmingly caused by population growth and interest rates, with STRA having little to no significant effect.

Introduction

To what extent do STRA platforms influence long-term rents and property prices? The purpose of this report is to address this question by examining the relationship between the STRA market and the housing market in New Zealand.

Do STRA platforms such as Airbnb constrain the availability of residential properties either for long-term rental or purchase to the extent that long-term rents and property prices are inflated as a result, or are STRA platforms just one of many factors that influence long-term rents and property prices?

Our analysis of the STRA market uses AirDNA data. The AirDNA data is 'scraped' from the various STRA platforms such as Airbnb and VRBO. Algorithms are used to identify reservation nights and dual-listed properties. Therefore, the AirDNA data isn't necessarily entirely accurate and should not be interpreted as providing a definitive number of listings or reservation nights in any region. However, it is a close enough proxy for STRA listings for this analysis.

This report outlines the results of an econometric analysis of the effect that STRA rentals have on the long-term residential rental and owner-occupied property markets in Queenstown-Lakes District, Auckland, Wellington City, and Christchurch City. The econometric analysis is supplemented with a descriptive analysis of trends in STRA rentals and in the long-term residential rental and owner-occupied property markets in these four regions and nationally.

Given the complexity of economic factors that influence house values and rents, such as population growth relative to growth in the number of dwellings, employment rates, household incomes, and changes to housing market regulations, it's important that the effects of these other factors are isolated. The econometric analysis does exactly that.

To understand the effect that STRA has on the housing market, both the descriptive and econometric analyses use data on the number of entire space STRA listings. Entire space listings refer to self-contained properties rather than private or shared rooms within a broader dwelling. We note that entire space listings also capture listings such as granny flats, apartments attached to a main dwelling, private rooms that are separate to but contained within a main dwelling, holiday homes, or owner-occupied dwellings rented out for short periods of time.

Residential listings exclude commercial properties such as hotels and hostels. We focus our analysis on entire space STRA listings because these properties are sometimes perceived to be available for sale or long-term rental. However, not all of them will be available for sale or long-term rental because they include listings that would not otherwise be considered rentable, such as granny flats and self-contained units attached to a main dwelling.

STRA in New Zealand

This section looks at how the number of entire space listings on STRA platforms has varied over time from its initial growth phase to a relatively brief plateauing phase, to the upheaval brought about by the COVID-19 pandemic. It is important to note that growth in the number of STRA listings doesn't necessarily imply growth in the number of properties being made available for short-term rental. In the past, properties could have been rented out via non-digital platforms (eg newspaper advertisements, community flyers, etc), or properties such as holiday homes might not have been rented out at all and used solely their owners.

STRA listings dip during the pandemic

Entire space listings in New Zealand grew rapidly in number between 2016 and 2018 (Chart 1). In 2019 there were signs that the market was reaching an equilibrium with available¹ entire space listings starting to plateau. The COVID-19 pandemic saw both total and available entire space listings fall away somewhat, as demand for short-term accommodation from international tourists effectively ceased with the closing of New Zealand's border in 2020.

Throughout 2021 and 2022, available entire space listings rose to peaks in the summer months as growth in domestic tourism partially made up for the absence of international tourists. However, neither of these peaks were as high as the peak of the 2019/20 summer. With the reopening of the border in mid-2022, both total and available entire space listings began to recover, and currently they are on course to surpass the 2019/20 summer peak. Available entire space listings were 19% higher in November 2023 than they were in November 2019. Total entire space listings were 7.6% higher.

Chart 1

NZ STRA entire space listings dip during the pandemic

Source: AirDNA, monthly listings

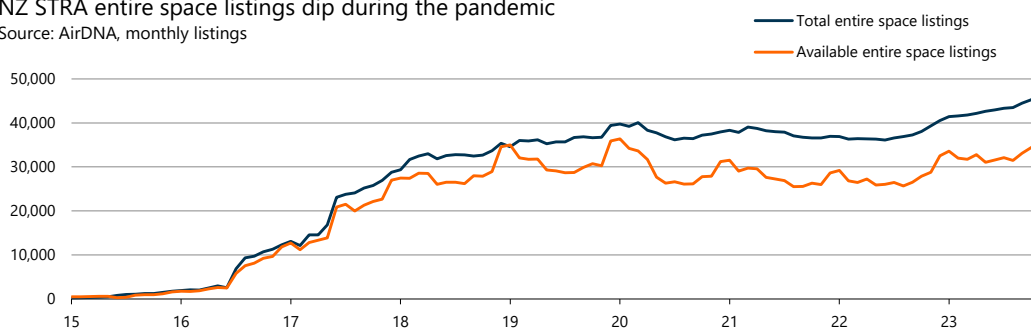


Chart 12 in the *Regional overview* section (p17) shows that the national trend of pre-pandemic growth followed by a plateauing, followed by a pandemic dip then recovery, was similar across Auckland, Queenstown-Lakes District, Wellington City, and Christchurch City.

¹ Available listings are properties that are available for rental for at least one night in the reporting period. The reporting periods used in this analysis are either annual (as above) or monthly. Total listings include properties registered with the platform but not available for rental for any night in the reporting period.

The dip in demand for short-term entire space rentals during the pandemic can also be seen in the number of reservation nights (see Chart 26 in *Appendix A: Selected Data Series* – p31). Reservation nights peaked at almost 4.2 million in 2019, fell 29% to almost 3.0 million in 2021, then increased 34% to almost 4.0 million in 2022. Reservation nights in 2023 are well on course to surpass the 2019 annual total (see Chart 28 in *Appendix A: Selected Data Series*).

To better understand what happened to domestic and international tourism (and therefore the demand for STRA properties) prior to and during the pandemic, we can look at guest nights in commercial accommodation as a proxy measure. Chart 29 in *Appendix A: Selected Data Series* shows the seasonality in both domestic and international guest nights.

The growth in international tourism prior to the pandemic is evident as the summer peaks get higher and higher. This growth would most likely have encouraged the growth in STRA listings during this time. Growth in affordable tourism accommodation capacity might also have encouraged more tourists to visit New Zealand, bringing with them the economic benefits of tourism spending to local economies.

International guest nights fell away almost to zero in 2020 with the closing of the border. Domestic guest nights took up some of the slack, rising above pre-pandemic levels in the summers of 2021, 2022, and 2023, as New Zealanders were unable to travel abroad, but were largely able to travel freely within New Zealand (outside of lockdowns).

New Zealand's housing market

The years between the Global Financial Crisis (GFC) and the COVID-19 pandemic saw rapid population growth in New Zealand, fuelled by international migration, which put upward pressure on house prices and rents. The past five years have been even more tumultuous for New Zealand, particularly with the onset of the COVID-19 pandemic. The housing market has been buffeted perhaps more than most other sectors as residential building supply chain disruptions, significant changes to Government housing and immigration policy settings, changes in interest rates, and Reserve Bank lending regulations led to rapid increases then declines in house prices, which led to a worsening then improvement in housing affordability. Against this complex backdrop, the number of STRA listings is just one of many factors that influence the housing market.

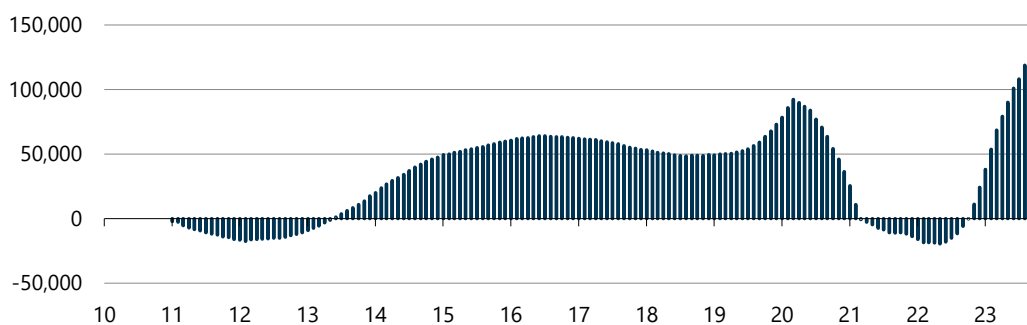
Migration fuelled population growth

From 2011, the years leading up to the COVID-19 pandemic saw the New Zealand housing market come under increasing pressure from rapid population growth driven by high net inward international migration (Chart 2), initially in Auckland, then in other parts of the country.

Chart 2

Population growth driven by international migration

Source: Stats NZ, annual net migration (arrivals to NZ minus departures)



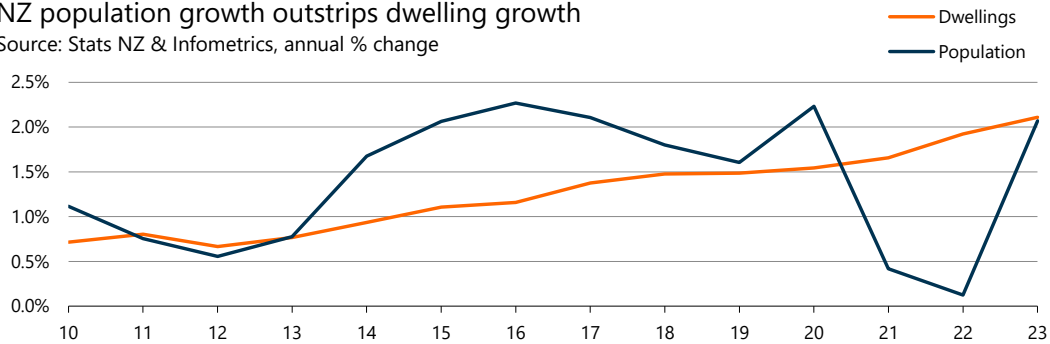
Growth in dwellings takes time to gather pace

The construction sector was unable to respond quickly enough to the increasing population, putting upward pressure on house prices and rents in many parts of the country. Between 2014 and 2020, population growth easily outstripped growth in the number of dwellings (Chart 3). Population growth began to weaken when the Labour Government introduced more restrictive immigration policies in 2017 (see *Appendix B: Policies & Regulations* for details –p36). The closing of New Zealand's border in 2020 to restrict the spread of COVID-19 saw population growth fall almost to zero, enabling some catch-up by residential construction.

Chart 3

NZ population growth outstrips dwelling growth

Source: Stats NZ & Infometrics, annual % change



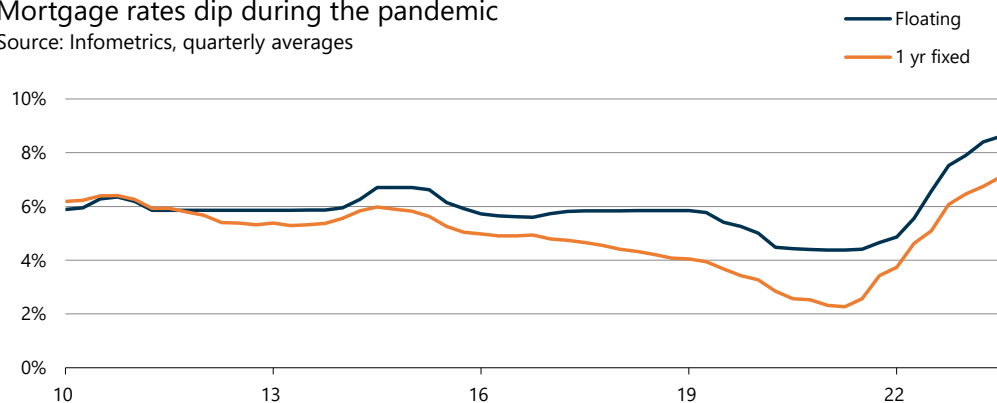
Low interest rates add fuel to the fire

In addition to population growth, house price rises prior to the pandemic were encouraged by relatively low and stable mortgage interest rates. House prices surged during the pandemic, driven largely by even lower mortgage rates (Chart 4), changes to bank lending regulations (see *Government policy reacts* – p12), elevated construction costs (see *Cost of building a house accelerates* – p11), and New Zealand’s relatively benign economic and public health conditions. A lack of COVID-19 in the community also encouraged expat Kiwis to return home and buy property.

Chart 4

Mortgage rates dip during the pandemic

Source: Infometrics, quarterly averages



Cost of building a house accelerates

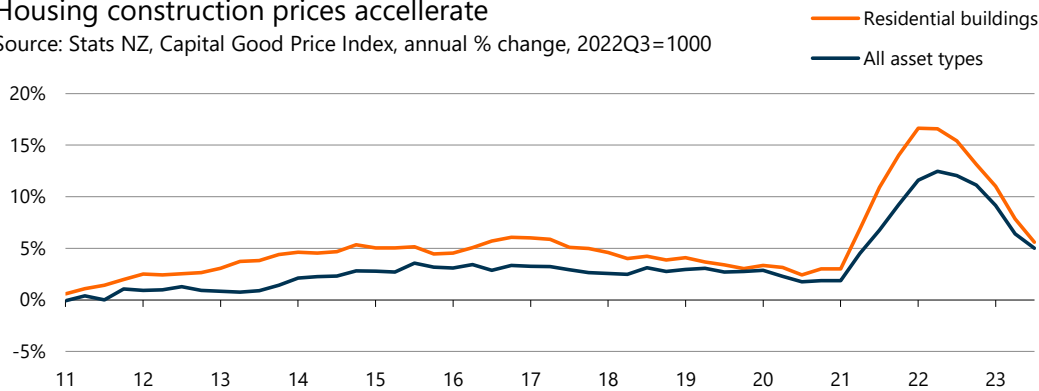
The pandemic led to price increases across the whole economy, particularly in the construction sector. A combination of supply chain disruptions, which curtailed the supply of key building products, and a surge in demand for housing and housing renovations brought about by low interest rates and money saved during lockdowns saw residential construction cost inflation accelerate to 17%pa in the June 2022 quarter, compared with a

12%pa increase across all asset types (Chart 5) and a 7.3% increase in prices across the whole economy (measured by the Consumers Price Index).²

Chart 5

Housing construction prices accelerate

Source: Stats NZ, Capital Good Price Index, annual % change, 2022Q3=1000



Government policy reacts

In the years prior to the pandemic, the New Zealand Government introduced several policies to address the rising unaffordability of housing such as a foreign buyer ban, KiwiBuild, and the First Home Grant. In the early months of the pandemic, the Reserve Bank loosened Loan-to-Value (LVR) restrictions amid concerns about the economic effects of COVID-related lockdowns, then subsequently tightened LVR restrictions again to address the surge in house prices. The Government also introduced policies to address the surge in house prices in 2021, such as extending the Bright Line Test and phasing out negative gearing. The current Government has committed to policies that will encourage investment in residential real estate. A more detailed list of Government and Reserve Bank policies and regulation that influenced the housing market can be found in *Appendix B: Policies & Regulations* (p36).

House price inflation is the result

Prior to the pandemic, the combination of strong population growth, low mortgage interest rates, and insufficient supply of new housing saw house price inflation in New Zealand peak at 15%pa in the June 2016 quarter compared with a 1.9% increase in household incomes (Chart 6). House price rises started to moderate in 2017 following the introduction of tighter LVR restrictions by the Reserve Bank, particularly for property investors.

At the time, the pre-pandemic house price increases seemed excessive, and there was widespread concern about New Zealand's worsening housing affordability. But during the pandemic, even lower mortgage interest rates, higher building cost inflation, and looser housing market regulations resulted in previous house price increases being dwarfed by a 31%pa rise in the September quarter 2021 quarter, compared with a rise in average household incomes of just 4.7%.

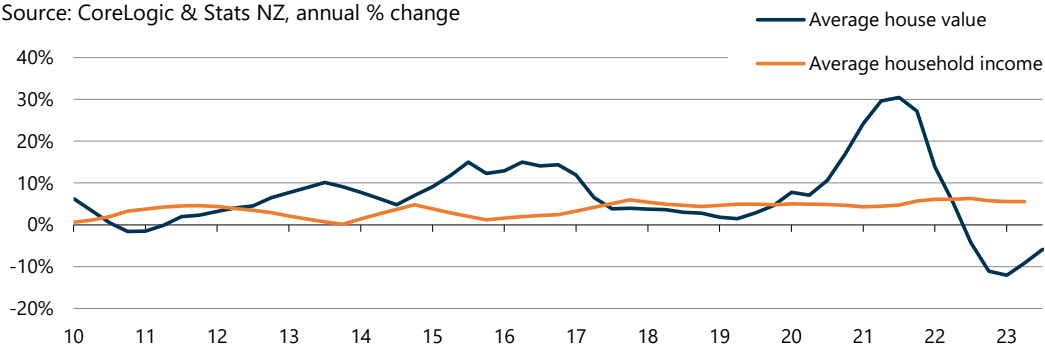
² Source: Stats NZ

In 2022, house prices fell because of rising interest rates, as well as a raft of changes to housing market regulations designed to quell demand such as tighter loan-to-value requirements, an extension of the bright-line property rule, and tax changes for property investors (see the *Government policy reacts* section). According to the Law Association, tighter credit regulations relating to the Contracts and Consumer Finance Act also had the unintended consequence of making it more difficult for some house buyers to secure a mortgage.³ Between the December quarter 2021 and the September quarter 2023 house prices fell 15% (see Chart 6).

Chart 6

NZ house prices surge relative to incomes in 2021 then retreat

Source: CoreLogic & Stats NZ, annual % change



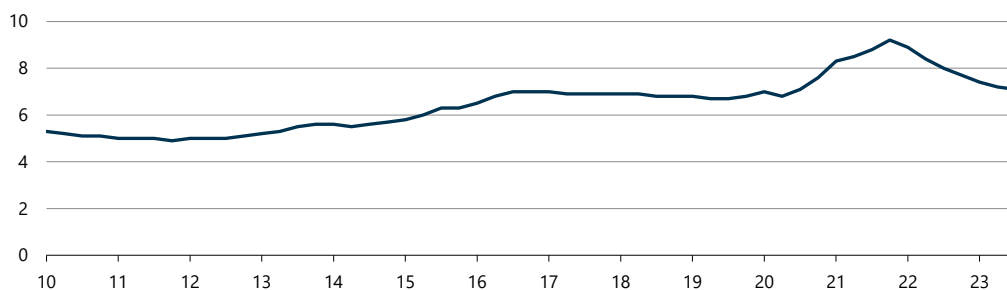
Housing affordability worsens then improves

Housing affordability in New Zealand worsened between 2012 and 2017 (Chart 7) as house prices rose faster than incomes (Chart 6). Affordability plateaued between 2017 and 2020, but the COVID-19 pandemic saw another sharp deterioration in New Zealand's housing affordability. Prior to the pandemic, the ratio of the average house value to the average household income had settled at around 7:1, having risen steadily between 2012 and 2016. During the pandemic, the ratio of the average house value to the average household income peaked at 9.2:1 in the December 2021 quarter.

Chart 7

NZ housing affordability worsens in 2022 then improves

Source: Corelogic & Infometrics, ratio of ave house value to ave household income



³ Source: <https://thelawassociation.nz/how-the-ccfa-crashed-the-property-market/>

Since December 2021, housing affordability has improved as house prices have declined, albeit not back to pre-pandemic levels. A recent surge in net inward international migration since the New Zealand border opened in mid-2022 has more than likely prevented any further house price falls. From April 1, 2024, the Government reintroduced mortgage interest deductibility for rental properties, which could encourage property investment, putting upward pressure on prices. However, broader economic conditions such as interest rate hikes and a weakening economy are expected to moderate any house price rises for the foreseeable future.

Long-term rents increase ahead of incomes

Rental growth rates have been less volatile than house price growth rates, but they were nonetheless consistently ahead of growth in household incomes. Between 2015 and 2021, annual growth in the average rent in New Zealand hovered around 5%pa. During the pandemic, annual growth in the average rent peaked at 7.1%pa in the June 2022 quarter before falling back to 5.0%pa in the September 2023 quarter (Chart 8).

Chart 8

NZ rent growth peaks in 2021 then falls back

Source: MBIE, average rent, annual % change



Rental affordability plateaus during the pandemic

Looking over the course of the past two decades, relatively modest but consistent increases in the average rent mean there has been a sustained worsening in rental affordability, driven by population growth and an insufficient supply of long-term rental properties.

Rental affordability in New Zealand worsened between 2012 and 2018 for many of the same reasons that housing affordability worsened. During the pandemic, rental affordability plateaued, with the average rent making up 22% of the average household income, up from a low of 19.7% in 2011 (Chart 9).

Chart 9

NZ rental affordability plateaus during the pandemic

Source: MBIE, Stats NZ & Infometrics, ave rent as % of ave household income



Household formation behaviours change

As population grew faster than the number of dwellings, the average household size increased from 2.60 people per household in 2012 to 2.69 in 2018 (see Chart 30 in *Appendix A: Selected Data Series* – p31). This rise was partly the result of people needing to form bigger households because of an affordable housing shortage. Another consequence of worsening housing and rental unaffordability was growth in the number of people on the Housing Register. In the September 2015 quarter just under 3,400 applicants were on the Housing Register. By the March 2022 quarter, the number had increased seven-fold to almost 26,900 (see Chart 31 in *Appendix A: Selected Data Series*).

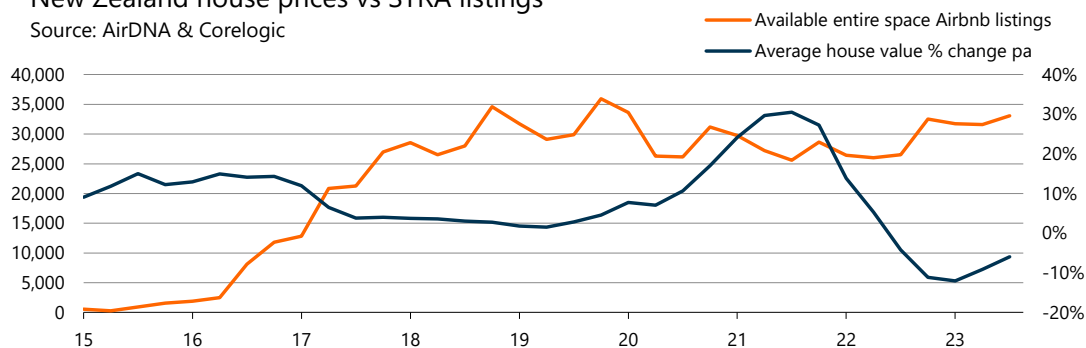
STRA is just one of many factors influencing the housing market

To examine whether STRA listings influence house prices and rents, we start by looking at available entire space listings alongside growth in house prices (Chart 10) and long-term rents (Chart 11). If STRA does have a strong influence on the housing market, we would expect to see periods when STRA listings are growing coincide (perhaps with a time lag) with house prices rises and rises in long-term rents. Similarly, any falls in listings would coincide with weaker house price and long-term growth, or even falls in prices and rents.

Chart 10

New Zealand house prices vs STRA listings

Source: AirDNA & Corelogic



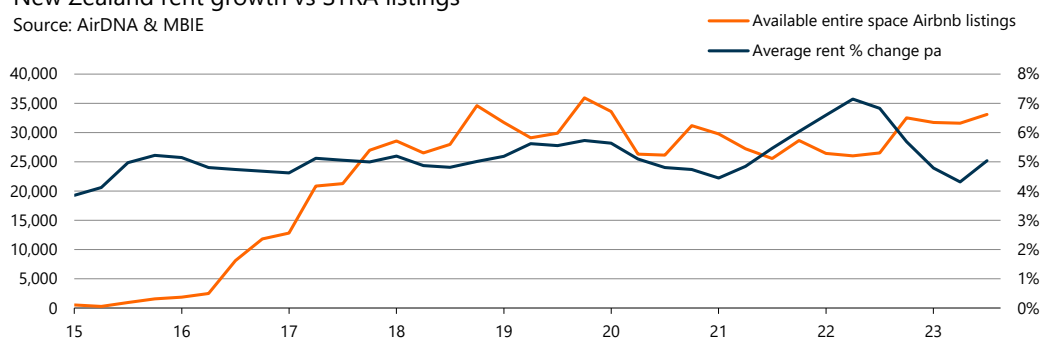
In terms of STRA listings, three distinct time periods are evident in the charts. In 2016 and 2017, available entire space listings were growing, but house price growth was steady or weakening, and growth in long-term rents was steady. House price inflation and growth in long-term rents may have been influenced more by net inward migration coming off its peak and more houses being built.

In 2020 and 2021, available entire space listings dipped, but house price growth surged and growth in long-term rents weakened then increased. Low interest rates, changes to lending regulations and other housing market policies, a strong economy, and previously high levels of net inward international migration, most likely had significant impacts on house prices and rents.

Chart 11

New Zealand rent growth vs STRA listings

Source: AirDNA & MBIE



In 2022 and 2023, available entire space listings recovered, but house price growth weakened, then prices fell and growth in long-term rents weakened. Rising interest rates were arguably having the greatest effect on the housing market at this time.

On the face of it, the effects of STRA on the national housing market appear to be muted compared to more fundamental economic forces such as population growth and mortgage interest rates. The remainder of this report looks at STRA listings and housing markets in key visitor markets.

Regional overview

This section provides an overview of the STRA and housing markets of the four regions covered in our analysis. We focus on key differences across the four regions as well as similarities. Similarities demonstrate how national forces tend to underpin regional trends. Further unique aspects of each region's STRA sector and housing market are covered in the regional sections further on in this report.

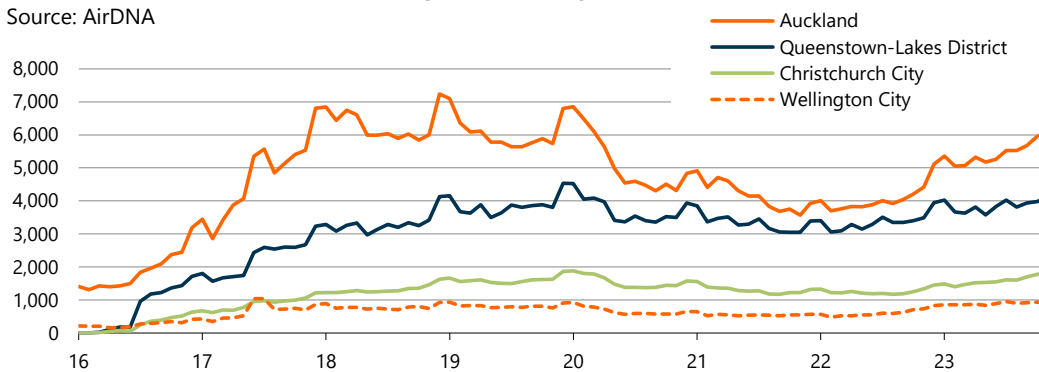
The scale of the STRA sector differs across regions

At a peak of just over 7,000 in 2019, the number of STRA listings is greatest in Auckland, reflecting the fact that Auckland makes up a third of the New Zealand population (Chart 12). All four regions have experienced similar trends in STRA listings over the past eight years: a growth phase in 2016 and 2017, a plateauing in 2018 and 2019, then a dip followed by a recovery during the pandemic. Within years, there is seasonality, with summer peaks particularly noticeable in Auckland and Queenstown-Lakes District. These similarities are unsurprising given that demand for short-term accommodation tends to be influenced by national trends such as the demand from international and domestic tourists.

Chart 12

STRA available entire space listings dip during the pandemic

Source: AirDNA



House price trends over time are broadly similar

The four regions covered in this analysis have common features in terms of house price changes. House price growth accelerated in 2015 and 2016 (except for Christchurch). Growth then weakened, plateaued, then spiked in 2021 during the pandemic, before house prices fell in 2022 and 2023 (Chart 13).

Historically, house prices have been higher in Queenstown-Lakes District compared with the other three regions and with the national average. As far back as the March 2010 quarter, the average house price in Queenstown-Lakes was \$600,180, compared with \$518,921 in

Auckland, \$502,004 in Wellington City, \$361,392 in Christchurch City and \$400,111 nationally.⁴

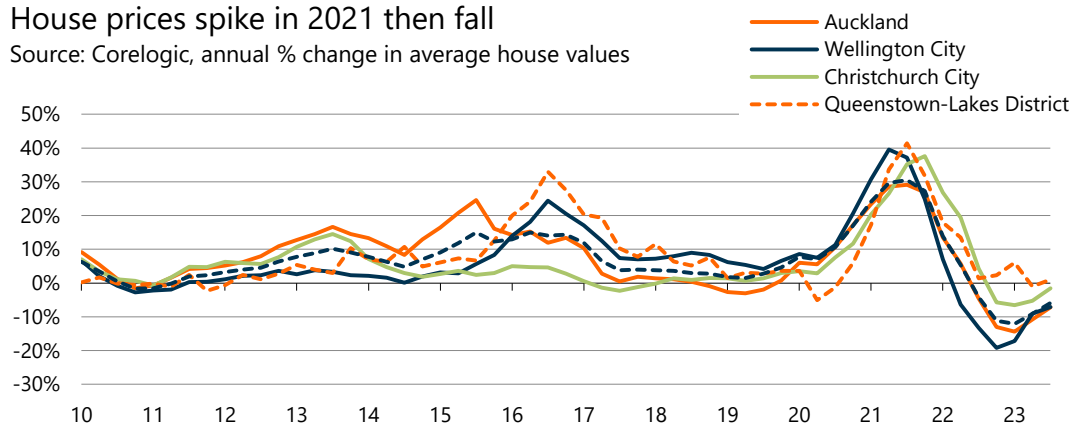
Queenstown-Lakes District is different to the three urban centres of Auckland, Wellington City, and Christchurch City, in that there are significantly more visitors relative to ratepayers in Queenstown. This difference has had two effects, both of which contributed to higher house prices long before STRA listings began to grow. Firstly, the large number of visitors has meant that there has been a large number of temporary seasonal workers in Queenstown-Lakes, which has pushed up demand for housing. Secondly, the large number of visitors has resulted in holiday homes comprising a significant proportion of the housing stock for many years. Census data from 2018 tells us that roughly 28% of all homes in the district were unoccupied on Census night (6 March 2018). In the 2006 Census, the proportion was very similar, at 30%.

Our econometric analysis will examine whether the STRA sector has contributed to rising long-term rents and house in Queenstown-Lakes District, or whether the trend we see in Chart 13 is driven more by other factors such as interest rate movements or population growth outpacing growth in the number of dwellings.

Chart 13

House prices spike in 2021 then fall

Source: CoreLogic, annual % change in average house values



⁴ Source: CoreLogic

Queenstown-Lakes District

This section looks at the relationship between STRA and the Queenstown-Lakes District housing market.

Our conclusion is that the Queenstown-Lakes District housing market has been subject to a number of localised forces such as population growth and the economic effects of the pandemic, as well as national forces such as changing interest rates, lending regulations, and government housing policy.

Against this backdrop, the STRA effect on the local housing market is small. STRA has increased long-term residential monthly rents by only 35 cents in an average month. This means that between January 2018 and September 2023, the cumulative effect of STRA is to add \$11 to the average residential rent, which is a mere 1.6% of the average weekly rent in September 2023. This result compares with population growth, which added \$101 to the average weekly rent over the same period.

We also find that STRA listings have no significant effect on house values.

Our interpretation as to why STRA has little effect on the Queenstown-Lakes housing market is that STRA listings and long-term rental properties are not always the same. Many entire space STRA properties are granny flats, apartments attached to a main dwelling, private rooms that are separate to but contained within a main dwelling, holiday homes, or owner-occupied dwellings rented out for short periods of time. Some overlap does exist between STRA and the long-term rental market, but the two markets are mostly discrete, even though they have some common demographic and economic drivers.

The prevalence of holiday homes is a key feature of Queenstown. With 28% of Queenstown dwellings being unoccupied on 2018 census night (30% as far back as 2006), it suggests that many homes are potentially holiday homes, which may have never been long term rentals and never will be. Therefore, the rise of STRA platforms in Queenstown does not necessarily mean there has been a significant increase in properties that would have been long term rentals, but which are now being used as STRA.

Listings dip during the pandemic

Entire space listings in Queenstown-Lakes District grew rapidly in 2016 and 2017. Available entire space listings plateaued in 2018 and 2019 as the market reached a state of equilibrium between tourist demand and the supply of both STRA and commercial accommodation (see Chart 12 in *Regional overview* – p17).

The number of available entire space listings dropped in 2020, as international tourism ground to a halt with the closing of the New Zealand border. Summer peaks in available entire space listings are evident throughout 2021 and 2022, as growth in domestic tourism and the short-lived Trans-Tasman travel bubble gave the local tourism sector a boost, especially during school holidays. However, neither of these peaks were as high as the 2019/20 summer peak. Available entire space listings began to recover with the reopening of the border in mid-2022 and are on course to surpass the 2019/20 summer peak, with available entire space listings 8.2% higher in November 2023 than they were in November 2019.

Reservation nights in Queenstown-Lakes District for entire space listings peaked at almost 584,000 in 2019, declined 43% to almost 334,000 in 2021, before increasing 60% to 534,000 in 2022 (see Chart 27 in *Appendix A: Selected Data Series* – p31).

STRA and the Queenstown-Lakes housing market

Broadly speaking, trends in the Queenstown-Lakes District housing market reflect trends in the wider New Zealand housing market. However, both house prices and rents in Queenstown-Lakes District are much higher than the national average.

Notwithstanding the fact that Queenstown-Lakes District's house prices have been higher than the national average since Infometrics began measuring prices in 2005, in the post-Global Financial Crisis period, prices rose only moderately in Queenstown-Lakes between 2012 and 2015, despite population growth running well ahead of growth in the number of dwellings (Chart 14) during this time.

Chart 14

Queenstown population growth outstrips dwelling growth

Source: Infometrics, annual % change

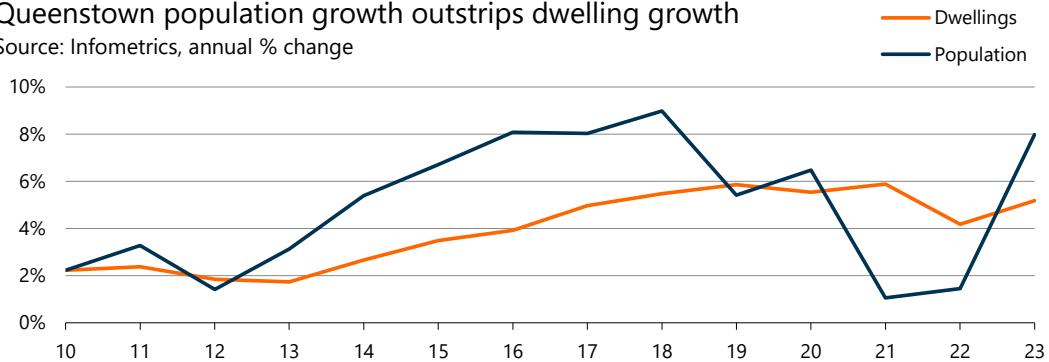
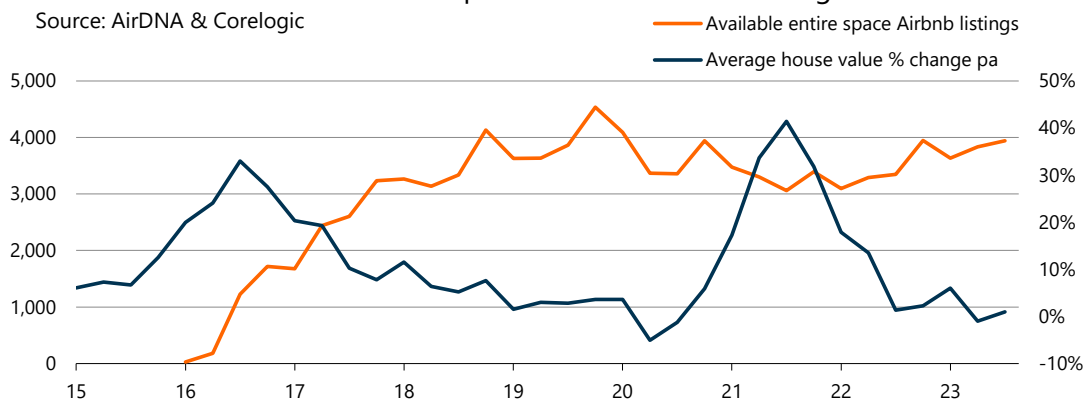


Chart 15

Queenstown-Lakes District house price inflation vs STRA listings

Source: AirDNA & Corelogic



House price inflation started to accelerate in 2015, peaking at 28%pa in the December 2016 quarter. Available entire space STRA listings were also growing strongly during this time (Chart 15). But in 2017, house price inflation fell away as listings remained high. During this period, population growth in Queenstown-Lakes District was running faster than growth in the overall number of dwellings, which arguably added much stronger upward pressure on house prices.

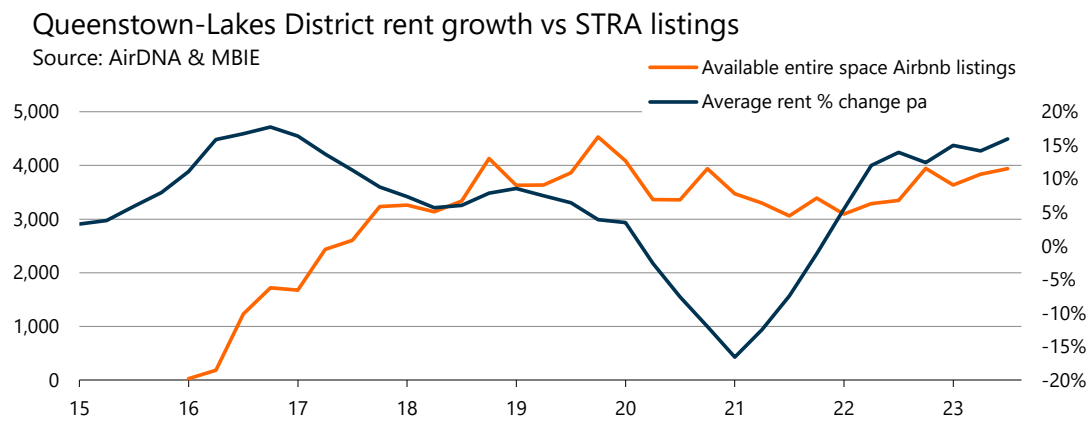
House prices in Queenstown-Lakes increased considerably during the pandemic, rising 41%pa at their peak in the September 2021 quarter. The spike in house prices was driven largely by national factors such as very low interest rates, New Zealand's relatively good public health conditions, a lack of COVID-19 in the community, expat Kiwis to returning home and buying property, and relaxations in Loan-to-Value lending requirements between 2018 and 2021. STRA listings had declined during this time.

Across New Zealand, the strong economy also contributed to house price growth, but the same cannot be said for Queenstown-Lakes District, whose tourism-dependent economy contracted sharply in 2020 because of the closure of New Zealand's border to international tourists.

Rents in Queenstown-Lakes District have been much more sensitive to local economic conditions, rising during the later stages of the migration-fuelled population boom in 2015 and 2016 as STRA listings were increasing. However, population growth was also running faster than growth in the overall number of dwellings during this time, which arguably added much stronger upward pressure on rents (Chart 16).

Rents then declined steeply by 17%pa in the March 2021 quarter during the pandemic as STRA listings fell away. However, at the same time an exodus of relatively mobile workers released from the Queenstown-Lakes tourism industry during the pandemic resulted in a steep drop in demand for rental accommodation and therefore rents.

Chart 16



We need to determine the relative strength of the various influences on the Queenstown-Lakes District property market. How does the influence of the STRA sector compare to national factors such as interest rates and housing market regulations, and local factors such as the strength of the local economy, population growth, and growth in the overall supply of new dwellings? The second half of this section reports on an econometric analysis of the effects of STRA on the Queenstown-Lakes District housing market.

Analysing the STRA effect

This section outlines the results of an econometric analysis that addresses the following research question: to what extent are rents for long-term accommodation in the Queenstown-Lakes District affected by the supply of entire space properties?

Given the complexity of economic factors that influence long-term residential rents, a key benefit of econometric analysis is that it can control for influences such as incomes, population growth, mortgage costs, tourism growth, and housing market regulations, and isolate the effect of properties being listed on platforms such as Airbnb.

As the time period covered by the available STRA data spans 2016–2023, our analysis also allows for restrictions related to COVID-19. Local government property rates and central government tax rates also vary between long-term rental properties and short-term visitor accommodation (such as provided through Airbnb). However, as far as we can determine, the differences have not changed markedly over the sample period.

The results both for Queenstown-Lakes District and its constituent suburbs are outlined in the next section. A detailed outline of how the econometric model was developed and modelling issues that needed to be addressed can be found in *Appendix C: model development* (p39).

Results: STRA and long-term rents

We find that the effect of the number of STRA listings on long-term residential rents in Queenstown-Lakes District is small, increasing residential monthly rents by only 35 cents in an average month. This means that between January 2018 and September 2023, the cumulative effect of STRA is to add about \$11 to the average residential rent, which is a mere 1.6% of the mean rent in September 2023. This result compares with population growth, which added \$101 to the average weekly rent over the same period. Detailed results can be found in Table 3 in *Appendix C: model development*.

The lag of rents has by far the strongest effect. As explained in *Appendix C: model development*, the presence of the lagged rent term is consistent with partial adjustment under which rents may take some time to adjust to changes in population and mortgage costs (and to the first lockdown), or with adaptive expectations under which landlords adjust rents according to their expectations about those factors.

Results: subdistricts within Queenstown-Lakes District

Queenstown and Wanaka dominate the STRA supply in Queenstown-Lakes District, accounting for over 80% of total available entire space listings. Our analysis indicates that there is little location-specific variability in STRA supply over time, except for Glenorchy. Glenorchy has a very small number of listings and constitutes only 1% of the total.

We estimated a model for each Queenstown-Lakes District subdistrict. Each subdistrict model had the same variables as the Queenstown-Lakes District model above, but the number of available STRA listings for each subdistrict is used in place of the number of available Queenstown-Lakes District listings, and subdistrict rents replace Queenstown-Lakes District rents as the dependent variables. A time series for rents in Glenorchy was not available.

For all subdistricts, we found that at subdistrict level an effect of STRA supply on long-term residential rents cannot be seen in the data.

Results: STRA and house values

Our subsidiary research question is: to what extent are house prices in Queenstown-Lakes District affected by the supply of STRA properties?

We found that STRA listings do not influence house values in Queenstown-Lakes District. As an explanation of house values, our model is not entirely satisfactory. We expected population to be a significant explanatory variable, but it failed to feature, perhaps because population growth was weakening during the sample period just as the local residential construction sector was building more houses. The mortgage interest rate does appear, with the expected negative relationship. An increase in the mortgage interest rate of one percentage point is associated with a decline in house values of almost 0.4%. See *Queenstown-Lakes District house value model development* (p44) in *Appendix C: model development* for a more detailed outline of the model's development and final results.

Auckland

This section looks at the relationship between STRA and the Auckland housing market. The STRA sector in Auckland is the largest in the country in terms of the number of listings. In terms of listings as a proportion of the dwelling stock, Auckland’s proportion is like other urban centres such as Wellington City and Christchurch, and it is much smaller than tourism destinations such as Queenstown-Lakes District.

Like many other regions in New Zealand, the past 10 or so years have seen an increase in the number of available entire space listings in Auckland, followed by a small decline then recovery during the pandemic. Increases then declines in the number of listings in Auckland often coincide with increases and moderation/declines in rents and to a lesser extent house prices. On the face of it, these trends suggest that the STRA sector could be influencing the local housing market. However, our econometric analysis has found that STRA listings in Auckland had no significant effect on long-term rents or house values.

STRA and the Auckland housing market

Chart 17 shows the number of available entire space STRA listings alongside growth in long-term rents in Auckland. Rents rose sharply in 2015 as population growth was running faster than growth in the number of dwellings (Chart 18).

Chart 17

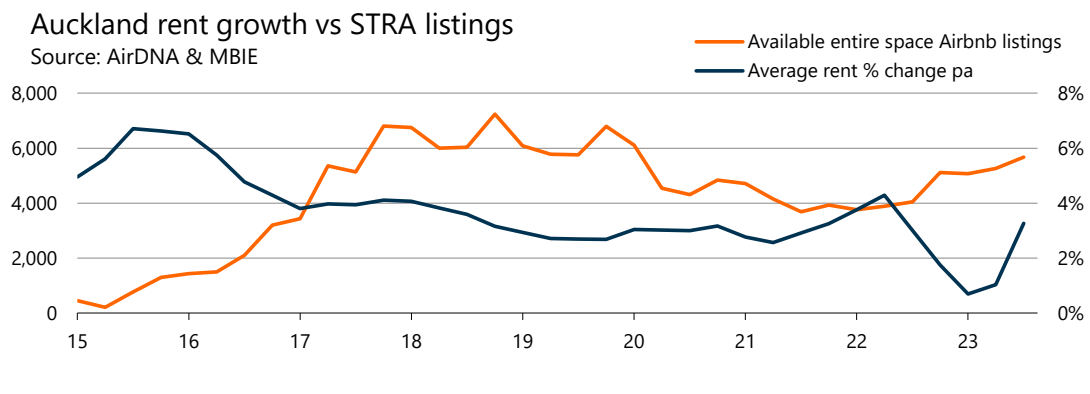
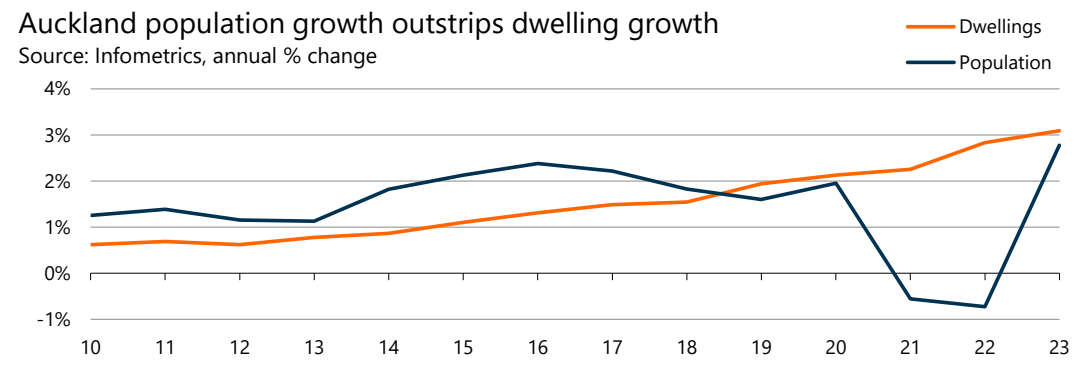


Chart 18

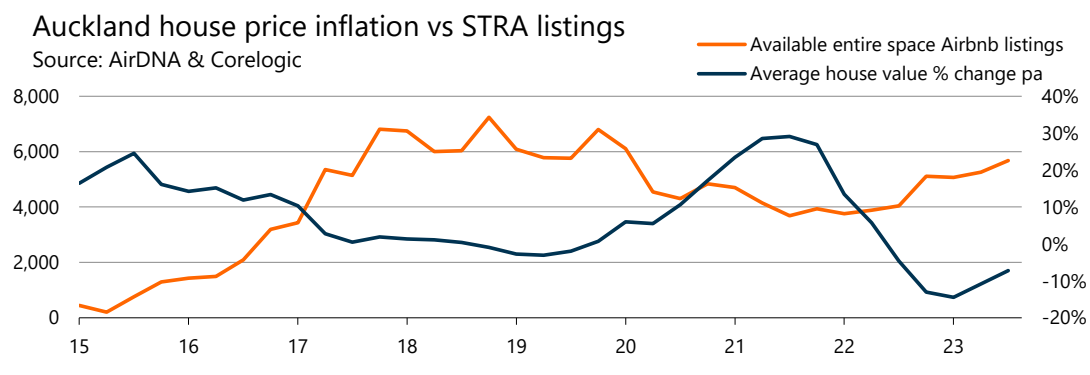


Since 2016, rent increases have been maintained at a fairly moderate pace due to low interest rates (which kept property investors' costs down), improving housing supply, and weakening population growth brought about by a moderation then cessation in net inward migration and an exodus of Aucklanders to more affordable regions (some of whom were presumably renters who felt they could more easily get on the property ladder elsewhere). The moderation in rent increases coincided with growth in the number of STRA listings.

The pandemic saw weak growth in Auckland's average rent at the same time as STRA listings fell away because international tourism ground to a halt with the closed border. The Auckland population also declined during this period, which would have also put downward pressure on long-term rents. In 2023, the average rent in Auckland declined at the same time as available entire space listings were growing, which suggests that Auckland rents were being influenced by other factors.

Chart 19 shows the number of available entire space STRA listings alongside growth in house prices in Auckland. In 2015 and 2016, house price inflation in Auckland briefly accelerated as available entire space STRA listings were growing strongly. But with available entire space STRA listings equivalent to just 3% of the Auckland owner-occupied housing stock even at their peak, the potential for STRA to influence prices is limited.

Chart 19



During the pandemic, available entire space STRA listings fell away as house price inflation was pushed even higher – principally by low interest rates, New Zealand's relatively good economic and public health conditions, a lack of COVID-19 in the community, expat Kiwis returning home and buying property, and relaxations in Loan-to-Value lending requirements between 2018 and 2021. Arguably, Auckland fared worse than other parts of the country in terms of COVID-19 outbreaks and resulting lockdowns, which had implications for the local economy.

Low interest rates and rising house prices created profitable conditions for residential construction. As a result, growth in dwellings continued to gather pace in Auckland despite a small decline in the size of the Auckland population, which contributed to house price inflation moderating in 2022.

The limited influence of STRA is borne out in the next section, which shows that STRA entire space listings had no significant effect on house values in Auckland.

Analysing the STRA effect

We applied the models developed for Queenstown-Lakes District to examine the effect of STRA listings on long-term rents and house values in Auckland, with minimal changes in specification. We did not investigate the effect of possible explanatory variables that were discarded in the Queenstown-Lakes District models, such as GDP and tourism spending. We also concentrated on the period from January 2018 to avoid the structural break with the earlier period during which STRA was in an establishment phase (as we did for Queenstown-Lakes District).

Chart 12 in the main body of the report shows available STRA entire space listings in Auckland. The average monthly rent in Auckland is shown in Chart 36 in *Appendix A: Selected Data Series* (p31).

The STRA listings profile in Auckland is similar to those of Wellington and Christchurch Cities. However, the rent profile is quite different. There are no January-February spikes in Auckland, but there is a noticeable drop in rents over the period February 2022 to November 2022.

Results: STRA, residential rents, and house values

Our modelling found that the number of available STRA entire space listings had no significant effect on either long-term residential rents or house values in Auckland. A fuller explanation of the residential rents model development and final results can be found in *Auckland residential rents model results* (p45) in *Appendix C: model development*.

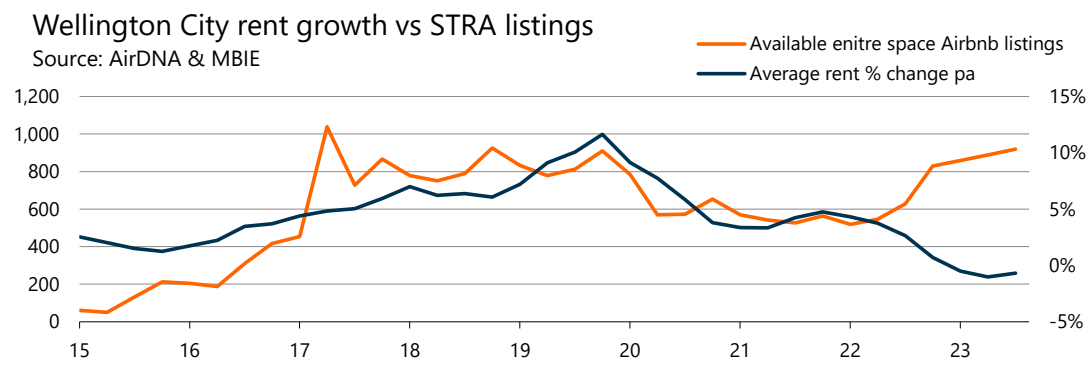
Wellington City

This section looks at the relationship between STRA and the Wellington City housing market. Like many other regions in New Zealand, the past 10 or so years have seen an increase in the number of available entire space STRA listings in Wellington City, followed by a small decline then recovery during the pandemic. The STRA sector is relatively small in Wellington compared with tourism destinations such as Queenstown-Lakes District. Our econometric analysis found that STRA had no influence on rents and house prices in Wellington City.

STRA and the Wellington housing market

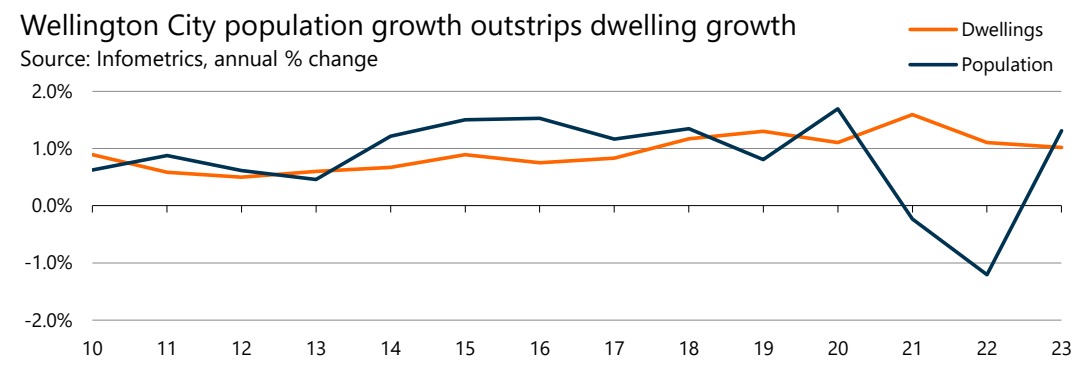
Chart 20 shows the number of available entire space STRA listings alongside growth in the average long-term rent in Wellington City. Between 2016 and 2020, growth in the average rent in Wellington City was gathering pace, as STRA listings were either rising or at a high level.

Chart 20



For much of this period, population growth in Wellington City was running faster than growth in the number of dwellings, which would have also put upward pressure on rents (Chart 21).

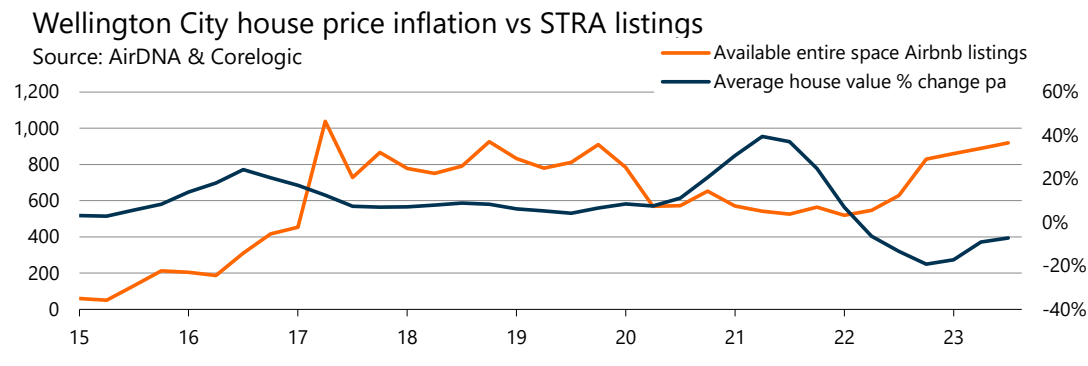
Chart 21



The pandemic saw growth in the average rent weaken as STRA listings were falling away. The Wellington population also declined during this period, putting downward pressure on long-term rents. In 2023, Wellington City's average rent declined as available entire space listings were growing steeply, which suggests that Wellington rents are influenced by other factors.

Chart 22 shows the number of available entire space STRA listings alongside growth in the average house price in Wellington City. In 2016, house price inflation in Wellington City briefly accelerated as available entire space STRA listings were growing strongly. With available entire space STRA listings equivalent to less than 3% of the Wellington City owner-occupied housing stock even at their peak, the STRA effect is arguably small compared with other economic drivers. During the pandemic, available entire space STRA listings declined as house price inflation was pushed even higher, principally by low interest rates.

Chart 22



Analysing the STRA effect

We applied the models developed for Queenstown-Lakes District to examine the effect of STRA listings on long-term residential rents and house values in Wellington City with minimal changes in specification. We also concentrated on the period from January 2018 to avoid the structural break with the earlier period during which STRA was in an establishment phase (as we did for Queenstown-Lakes District).

Chart 12 in the main body of the report shows available STRA entire space listings in Wellington City. The average monthly rent in Wellington City is shown in Chart 37 in *Appendix A: Selected Data Series – p31*.

Results: STRA, residential rents and house values

Our modelling found that the number of available STRA entire space listings had no significant effect on either long-term residential rents or house values in Wellington. A fuller explanation of the residential rents model development and final results can be found in *Wellington City residential rents model results* (p46) in *Appendix C: model development*.

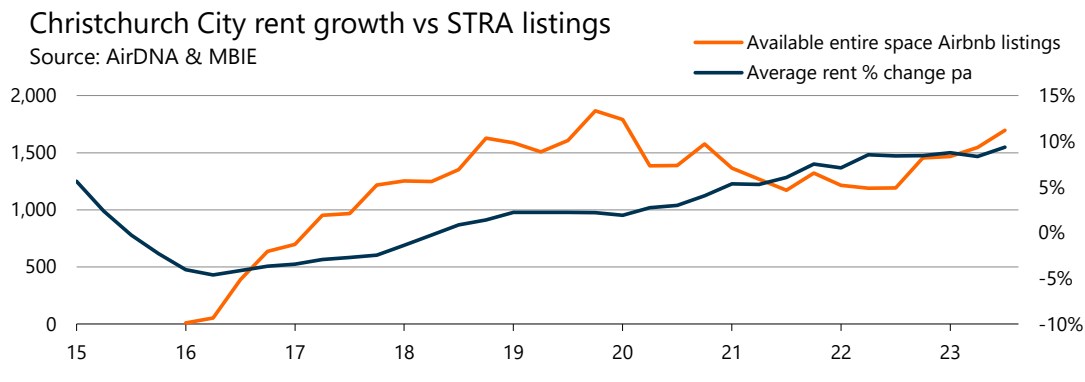
Christchurch City

This section looks at the relationship between STRA and the Christchurch City housing market. Like many other regions in New Zealand, the past 10 or so years have seen an increase in the number of available entire space STRA listings in Christchurch City, followed by a small decline then recovery during the pandemic. The STRA sector is relatively small in Christchurch compared with tourist destinations such as Queenstown-Lakes. Our econometric analysis of STRA in Christchurch finds an even smaller influence on long-term rents compared with Queenstown-Lakes, and no influence of STRA on Christchurch City house prices.

STRA and the Christchurch housing market

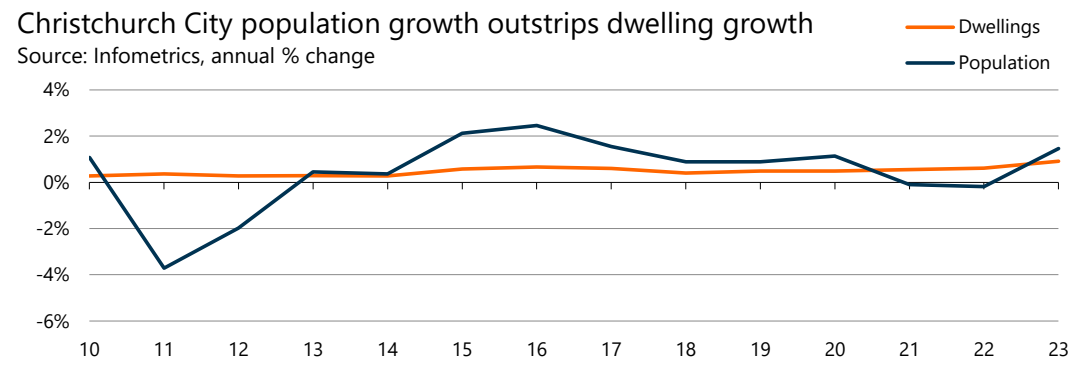
Chart 23 shows the number of available entire space STRA listings alongside growth in the average long-term rent in Christchurch City. Between 2016 and 2020, increases in the number of STRA listings coincide with strengthening growth in the average rent.

Chart 23



However, the Christchurch population was also growing at this time, which would have put upward pressure on rents (Chart 24).

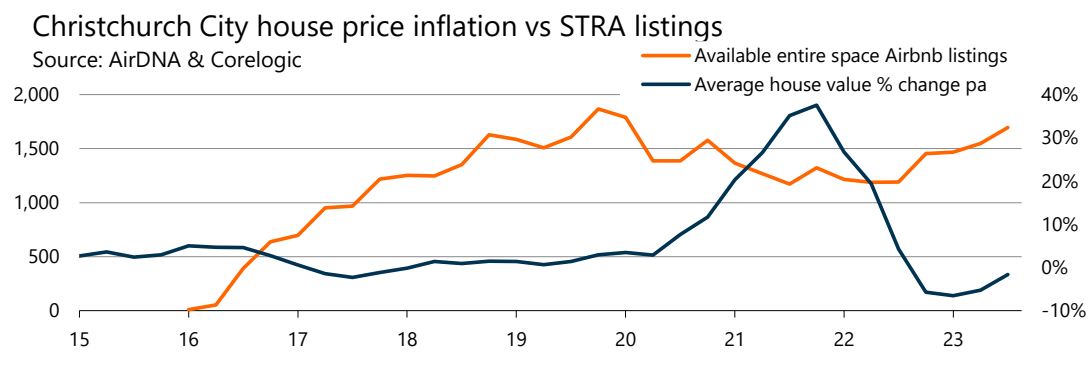
Chart 24



During the pandemic, growth in long-term rents continued apace at a time when STRA listings fell away, which suggests other forces were responsible for increasing rents.

Chart 25 shows the number of available entire space STRA listings alongside growth in the average long-term rent in Christchurch City. Between 2016 and 2020, house prices in Christchurch were either static or declining due to the after-effects of the 2011 earthquake. The strong increase in STRA available entire space listings during this time clearly put little upward pressure on house prices. During the pandemic, house price inflation spiked as STRA listings were falling, which is further evidence that other factors were influencing house prices.

Chart 25



Analysing the STRA effect

We applied the models developed for Queenstown-Lakes District to examine the effect of STRA listings on long-term residential rents and house values in Christchurch City with minimal changes in specification. We also concentrated on the period from January 2018 to avoid the structural break with the earlier period during which STRA was in an establishment phase (as we did for Queenstown-Lakes District).

Chart 12 in the main body of the report shows available STRA entire space listings in Christchurch City. The average monthly rent in Christchurch City is shown in Chart 38 in *Appendix A: Selected Data Series* p31).

Results: STRA, residential rents and house values

Our modelling found that the number of available STRA entire space listings had very little effect on long-term residential rents in Christchurch City, amounting to only \$0.09 per week in an average month. The cumulative effect is \$1, which is 0.2% of the mean rent at the end of the sample period (here extended to November 2023). This result compares with the cumulative effect of population growth of \$64.

The number of available STRA entire space listings had no significant effect on house values in Christchurch City. A fuller explanation of the residential rents model development and final results can be found in *Christchurch City residential rents model results* (p47) in *Appendix C: model development*.

Appendix A: Selected Data Series

The following charts add further detail to the descriptive analysis in the main body of the report.

Chart 26

NZ STRA entire space reservation nights dip during the pandemic

Source: AirDNA

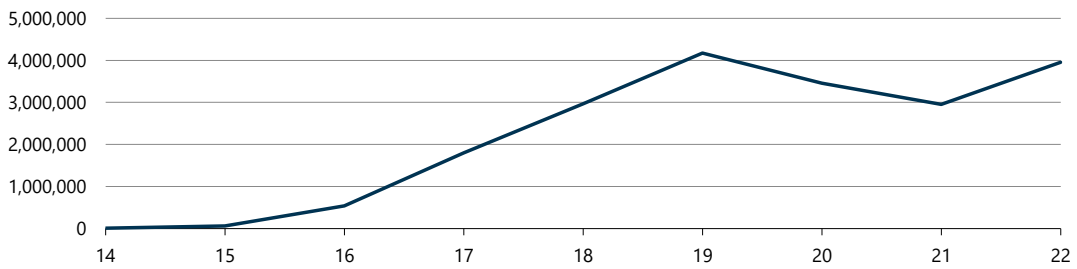


Chart 27

STRA entire space reservation nights dip during the pandemic

Source: AirDNA

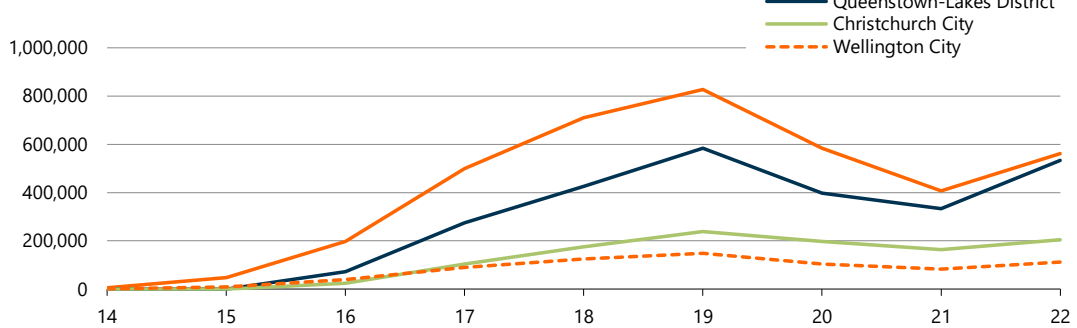


Chart 28

Post-pandemic NZ STRA entire space reservation nights on course to surpass 2019

Source: AirDNA

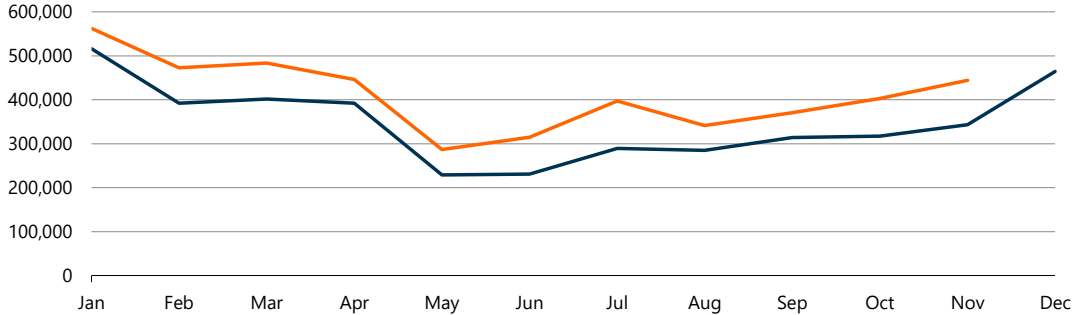


Chart 29⁵

NZ domestic tourism takes up the slack

Source: Stats NZ pre 2020, MBIE from 2020

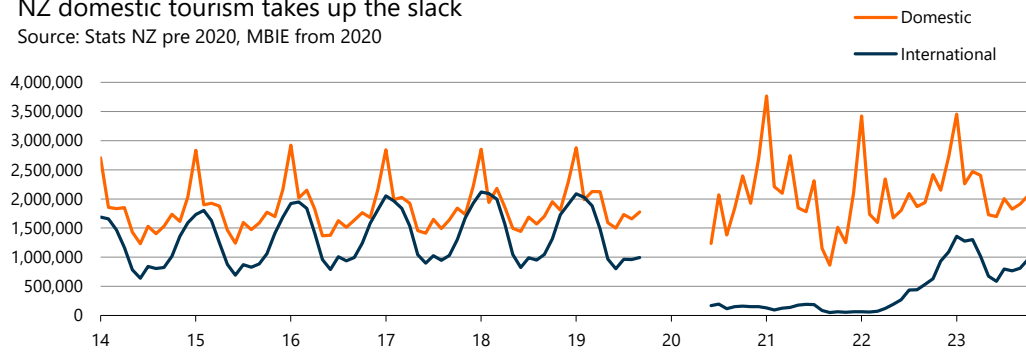


Chart 30

Average household size increases

Source: Stats NZ

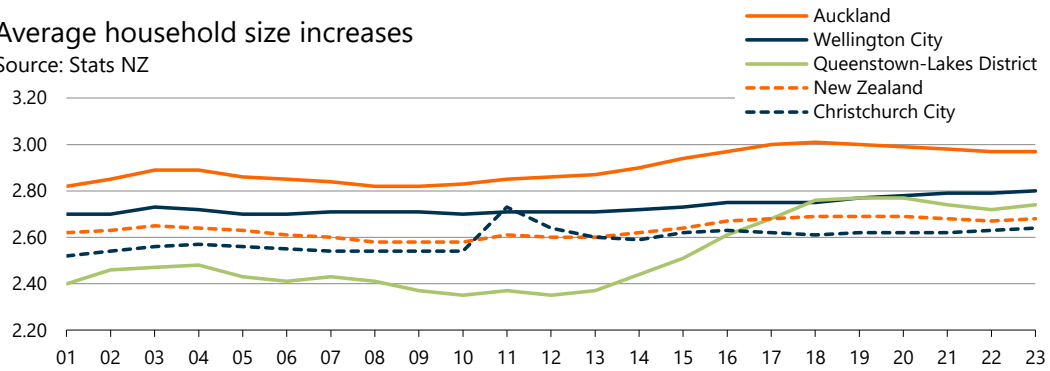
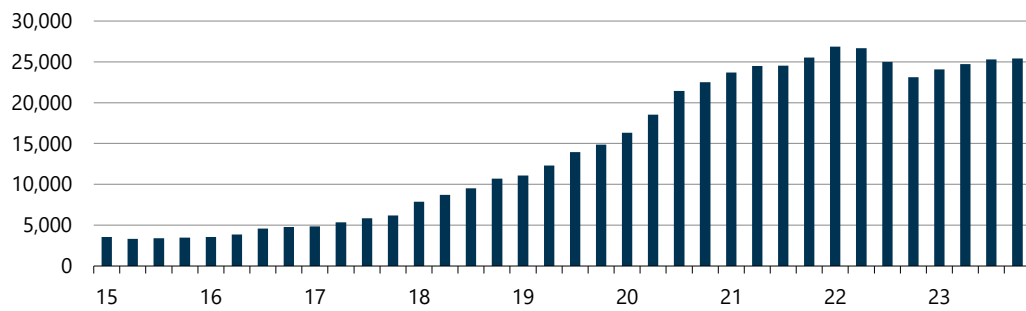


Chart 31

New Zealand state housing applicants grow

Source: Ministry of Social Development, applicants on the Housing Register



The following charts show the main data series used in the econometric analysis.

⁵ No single data source tracks domestic and international tourist guest nights leading up to, and right the way through, the pandemic. Instead, Chart 29 tracks two separate data series with very similar data collection methodologies. There is a break in these two series between October 2019 and May 2020.

Chart 32

Queenstown-Lakes District geometric mean residential weekly rent

Source: MBIE

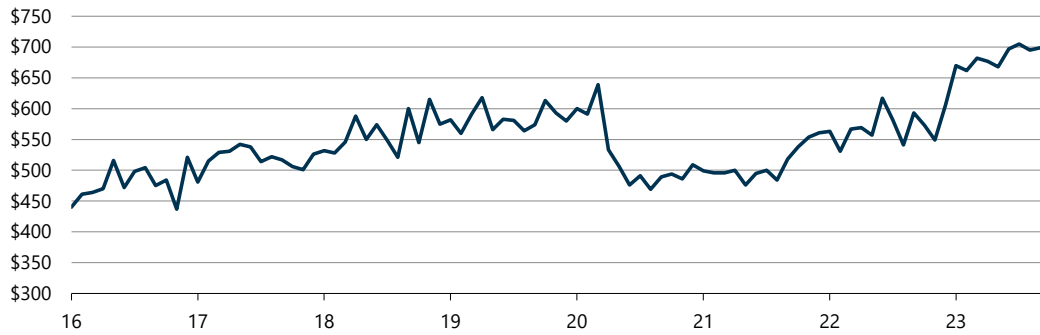


Chart 33

Residuals from 2-stage Queenstown-Lakes District rent equation

Source: Infometrics

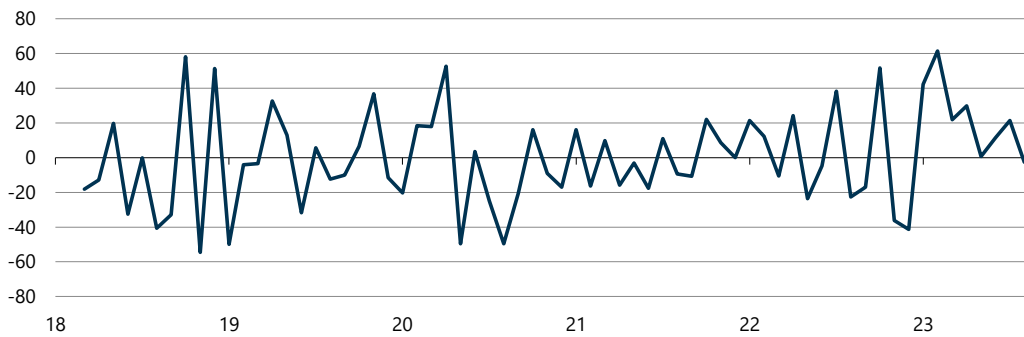


Chart 34

Queenstown-Lakes District house values

Source: CoreLogic, quarterly % change

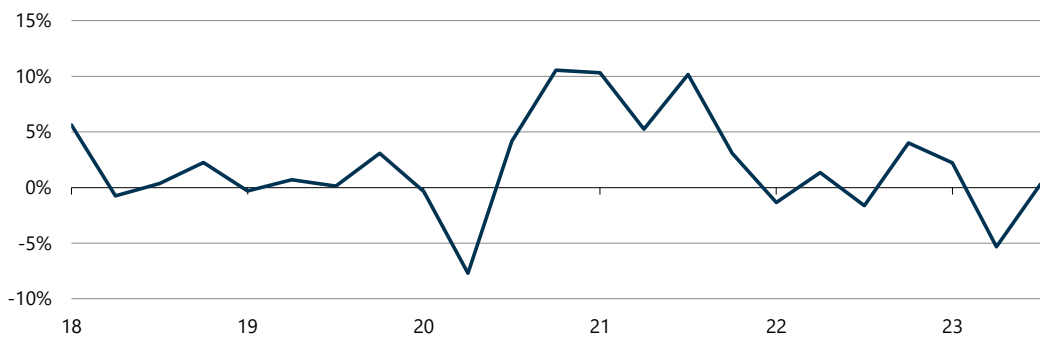


Chart 35

Residuals from Queenstown-Lakes District house values equation

Source: Infometrics

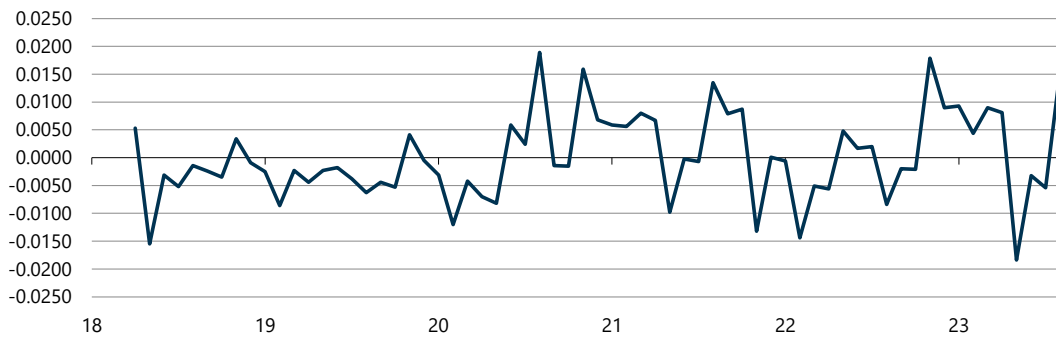


Chart 36

Auckland geometric mean residential weekly rent

Source: MBIE

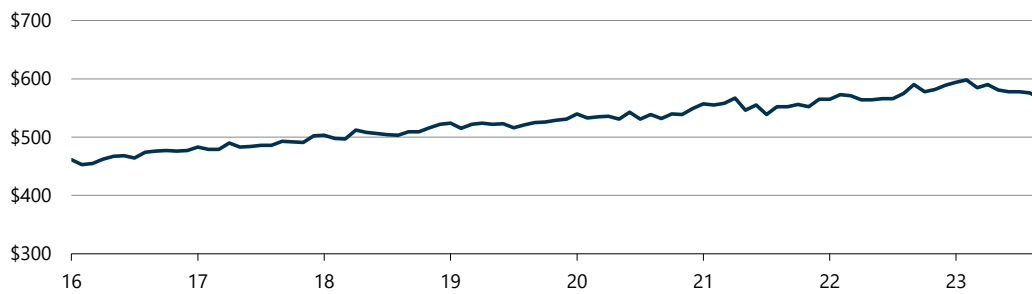


Chart 37

Wellington City geometric mean residential weekly rent

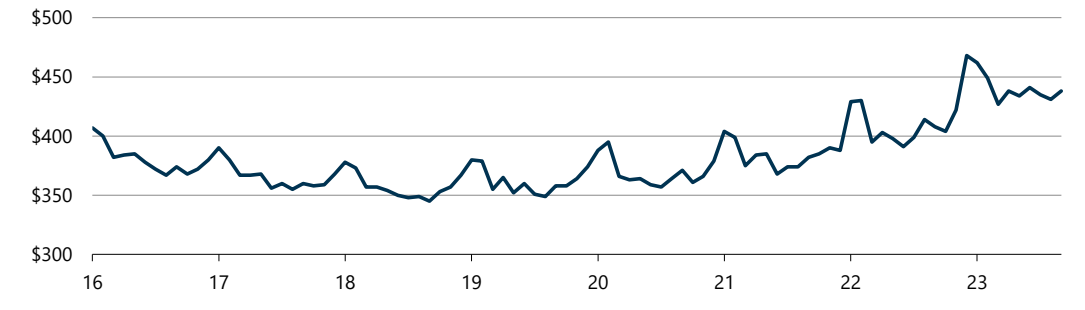
Source: MBIE



Chart 38

Christchurch City geometric mean residential weekly rent

Source: MBIE



Appendix B: Policies & Regulations

Loan-to-Value restrictions

- 1 October 2013, LVR restrictions introduced by the Reserve Bank with banks required to restrict new residential mortgage lending at LVRs over 80% to no more than 10% of the dollar value of their total new residential mortgage lending.
- 1 October 2016, LVR restrictions were tightened to a maximum 5% of new lending at LVRs above 60% for investors.
- 1 May 2020, the Reserve Bank removed LVR restrictions.
- 1 March 2021, LVR restrictions were reinstated at the same level as before the onset of the pandemic: a maximum of 20% of new lending at LVRs above 80% for owner-occupiers and a maximum of 5% of new lending at LVRs above 70% for investors.
- 1 May 2021, LVR restrictions for investors were further tightened to a maximum of 5% of new lending at LVRs above 60%.
- 1 November 2021, LVR restrictions for owner-occupiers were further tightened to a maximum of 10% of new lending at LVRs above 80%.
- 1 June 2023, LVR restrictions eased to a 15% limit for loans with LVR above 80% for owner occupiers, and a 5% limit for loans with LVR above 65% for investors.

Bright Line Test

- October 2015, the National Government introduced a two-year bright-line period for residential property investment, meaning that investment properties sold within two years of purchase after this date were subject to tax on any increase in value.
- March 2018, the Labour government increased the bright-line period from two years to five years.
- March 2021, the Labour Government announced it intended to extend the bright-line period from five years to 10 years for residential property acquired on or after 27 March 2021.
- March 2024, the National Government reduced the bright-line test for residential property to two years.

Foreign buyer ban

- October 2018, the foreign buyer ban was introduced by the Labour Government to prevent persons from overseas (excluding Australia and Singapore) from buying residential land, after international buyers were perceived to be buying homes ahead of local buyers.
- The current National Government is considering allowing foreign buyers to invest in any residential land.

Debt-to-income ratios

- The Reserve Bank introduced debt-to-income ratios in July 2024. The ratios restrict bank lending to borrowers with a debt-to-income ratios of over six for owner-occupiers and over seven for investors.

Negative gearing

- October 2021, the Labour Government started to phase out mortgage interest as a tax-deductible expense for residential property investors.
- In March 2024, the National Government announced that investors would be able to claim 80% of their interest expenses as a cost for tax purposes from 1 April 2024, and 100% from 1 April 2025.

Schemes to support people to buy homes

- First Home Grant is available to people who have been contributing to their KiwiSaver for at least three years, depending on other eligibility factors.
- Kāinga Ora – Home and Communities offers a range of home ownership options when buying a house or land to build on.
- First Home Loans are issued by selected banks and other lenders and underwritten by Kāinga Ora. First Home Loans allow the lender to provide loans that would otherwise sit outside their lending standards.
- Kāinga Whenua Loans are for individuals who have a right to live on multiple-owned Māori land to build, purchase, or relocate a house on that land. The loan can also be used for repairs and maintenance for an existing house on multiple-owned land.
- The KiwiBuild real estate development scheme was pursued by the Labour Government in 2018.

GST

- From 1 April 2024, online marketplace operators (such as Airbnb) will collect GST at the standard 15% rate on listed services that are performed, provided, or received in New Zealand. They will pay 6.5% to Inland Revenue Department and will pass on 8.5% to people and businesses providing listed services.

Immigration policy

The Labour Government introduced more restrictive immigration policies in 2017. These policies included:

- the introduction of a maximum duration of three years for Essential Skills workers in lower-skilled employment, after which these workers needed to spend 12 consecutive months outside New Zealand, and
- requiring partners and children of Essential Skills workers in lower-skilled employment to meet the requirements for a visa in their own right.

- In May 2022, the Labour Government introduced the Green List to help streamline the residence pathway for migrants working in skilled occupations. The Green List contains highly skilled roles that have been identified as being in high demand globally and in ongoing shortage in New Zealand. Employers don't need to provide proof of advertising for these occupations when progressing a work visa job check application. Eligible migrants working in these occupations have clear pathways to residence.
- In July 2022, the Labour Government introduced the Accredited Employer Work Visa (AEWV). The AEWV is now the main temporary work visa in New Zealand. The AEWV replaced six work visas with a single visa process. Employers must be accredited to employ migrants on this visa. Migrants can stay for up to five years on this visa if they are paid at or above the median wage rate. The current National Government has indicated it will be making changes to the AEWV to balance getting more highly skilled workers into New Zealand against the need to support them with adequate infrastructure.

Appendix C: model development

Queenstown-Lakes District residential rent model development

In seeking to isolate the possible effect of the supply of STRA listings on residential rents, we need to allow for other factors that could influence rents. Typical factors might include:

- population
- some measure of real income or spending such as GDP
- house prices and interest rates, or the supply of dwellings
- general price inflation, and
- tourism numbers or spending.

Given the sample period, we should also allow for restrictions related to COVID-19 and the changes to mortgage interest deductibility for rental property. Local government property rates and central government tax rates also vary between long-term rental properties and short-term residential visitor accommodation provided on STRA platforms. However, as far as we can determine, the differences did not change markedly over the sample period.

Our sample period begins in January 2016. The AirDNA data is monthly, which provides benefit in terms of the number of observations, but some of the other data series are not monthly and so require interpolation. The selected variables are as follows.

- The supply of STRA properties, as measured by available entire space listings in Queenstown-Lakes District, which is a more useful variable than total entire space listings, because the latter is measured over 12 months, whereas available listings are monthly.
- Queenstown-Lakes District average (geometric mean) rent on residential property, sourced from Ministry of Business, Innovation and Employment (MBIE).
- The effects of COVID-19 restrictions (synthetic variables for April-May 2020, or April 2020 to September 2021, and for the opening of the border in July 2022).
- A synthetic variable for the phase out of mortgage interest deductibility for rental property (100% to 30 September 2021, 75% from then to 31 March 2023, and 50% from then to the end of our sample period).
- Tourism (measured by electronic card spending in Otago, sourced from MBIE).
- Queenstown-Lakes District population (interpolated from Stats NZ data).
- Consumers' Price Index (CPI) as a general measure of inflation (interpolated from quarterly Stats NZ data).

- Queenstown-Lakes District real Gross Domestic Product (GDP), interpolated from quarterly Infometrics data.
- As a proxy for mortgage servicing costs: mean dwelling values in Queenstown-Lakes District multiplied by the two-year mortgage interest rate (from RBNZ and Infometrics data).
- Chart 12 in the main body of the report illustrates the data for the number of STRA listings in Queenstown-Lakes District, and in *Appendix A: Selected Data Series*, Chart 32 shows the geometric mean rent, and residuals from the regression analyses are shown in Chart 33 and Chart 35.

Many of the variables listed above are correlated with each other; for example, GDP, tourism spending, and COVID-19 restrictions, potentially giving rise to multicollinearity. Of particular concern is that the number of STRA listings could be partially determined by some of the same factors that influence rents. Thus, in order to identify whether STRA supply independently affects rents, we need to strip out the effect of the common factors. The multicollinearity issue is dealt with in *Multicollinearity and other issues* (p41).

Queenstown-Lakes District initial results

The model was put through three stages of development. Table 1 presents initial results for the entire sample period. The effect of the number of STRA listings on rents, while statistically significant and positive as expected, has a small effect. Over the sample period its mean effect on weekly rents was to increase them by \$1.21 per month. Changes in mortgage costs had a slightly more pronounced effect, but the effect of population growth was an order of magnitude larger. Both are also statistically significant.

Table 1

Econometric analysis initial results, effect of STRA on Queenstown-Lakes District long-term rents

	Coefficient	p-value	Interpretation
Long-term rent lagged	0.749	0.000	75% of previous period's value carries forward
1st Covid lockdown	-47	0.025	The lockdown reduced rents by \$47/week
Population change	287.9	0.004	Mean effect on rents was \$58.16
Mortgage cost change	6.1	0.01	Mean effect on rents was \$1.89
Available entire space Airbnb listings	0.028	0.002	Mean effect on rents was \$1.21
Constant	-6.5	0.868	

R²=0.80, Errors: JB Normal statistic = 0.29

Source: Infometrics

The lag of rents has by far the strongest effect. As explained in *Appendix D: Lagged Effects* (p49), the presence of the lagged rent term is consistent with partial adjustment under which rents may take some time to adjust to changes in population and mortgage costs (and to the first lockdown), or with adaptive expectations, under which landlords adjust rents according to their expectations about those factors.

The end of 2017 constitutes a structural break in the series, which is not surprising given the rapid growth in listings before then. Excluding 2016 and 2017 from the data but making no changes to model specification yields the results shown in Table 2.

Table 2

Econometric analysis results, 2018 onwards

	Coefficient	p-value	Interpretation
Long-term rent lagged	0.691	0.000	69% of previous period's value carries forward
1st Covid lockdown	-44.2	0.04	The lockdown reduced rents by \$44/week
Population change	478.5	0.005	Mean effect on rents was \$77.17
Mortgage cost change	6.33	0.1	Mean effect on rents was \$2.67
Available entire space Airbnb listings	0.035	0.006	Mean effect on rents was \$0.45
Constant	-27.2	0.527	

R²=0.80, Errors: JB Normal statistic = 0.57

Source: Infometrics

The results are as expected. The effect of population growth increases, while the effect of STRA listings declines markedly (beyond its rapid expansion phase). Compounding the \$0.45 over the 68 months of the sample period produces a total effect at the end of the period of \$31, or about 4.4% of the mean rent in September 2023.

Excluded from both models is the synthetic variable for the changes in interest deductibility, as it has no measurable effect on rents. It is possible, however, that the variable is too crude, as any effect will vary with when properties were purchased and how much debt landlords have on rental property. A study of rents based on unit records might reveal greater insights, but that is beyond the ambit of this research.

Multicollinearity and other issues

The results in Table 1 and Table 2 do not present any strong evidence of multicollinearity, nor of correlation between the error term and STRA listings. Yet it is good practice to be sure, therefore we adopted a two-stage approach. Firstly, regressing STRA supply against lagged supply, Otago tourist spending, Otago Gross Domestic Product (GDP), and a synthetic variable for the month of December when STRA listings tend to peak, which is the only statistically significant monthly effect. The Otago population proved to be insignificant, as its effect is likely captured by GDP.

STRA supply probably responds more to tourism market trends than to population pressure (and vice versa for rents), but tourism might also induce more migration into the Queenstown-Lakes District of people who support the tourism industries – restaurant and bar staff, hotel cleaners, drivers, and so on – all of whom need accommodation. Another explanatory factor that ideally would be included is hotel occupancy, but the relevant series from Stats NZ was discontinued in 2019. However, contacts in the industry note that substitutability between hotels and short-term residential stays is not particularly high. In any case, general pressure on guest accommodation would be picked up by aggregate tourist spending.

Queenstown-Lakes District final results

The residuals from the equation for STRA supply, stripped of the effect of the above factors that could possibly affect rents as well, are then used in a second regression for rents. The estimated model also incorporates lagged effects. Table 3 presents the results

for the 2018-2023 sample period. The effect of the filtered number of STRA listings (denoted as STRA* in Table 3) is again small, only \$0.35 per week in an average month.

Table 3⁶

Summary of 2-stage rent model results

	Coefficient	p-value	Interpretation
Long-term rent lagged	0.861	0.000	86% of previous period's value carries forward
1st Covid lockdown	-53.2	0.016	The lockdown reduced rents by \$53/week
Population change	74.8	0.044	Mean effect on rents was \$14.08
Mortgage cost change	2.95	0.047	Mean effect on rents was \$2.80
STRA*	0.061	0.007	Mean effect on rents was \$0.35
Constant	63.8	0.127	

R²=0.77, Errors: JB Normal statistic = 0.63

Source: Infometrics

The similarity of results in Table 2 and Table 3 confirms that multicollinearity is not severe. The two-stage approach suggests that about 22% of the total effect of STRA listings on rents (which is already small) is actually coming through the effect of variables such as Otago GDP and tourist spending.

Subdistricts within Queenstown-Lakes District

Data on STRA listings and (geometric) mean rents is available for a number of subdistricts within the Queenstown Lakes District. Table 4 shows the correlation of the number of listings and mean rent for each subdistrict with those variables for the whole Queenstown-Lakes District area, and the shares of each subdistrict's listings in the total.

Clearly Queenstown and Wanaka dominate the STRA supply, accounting for over 80% of the total. Most of the correlation coefficients are high, indicating little location-specific variability in STRA supply over time, except for Glenorchy. The latter has a very small number of listings and constitutes only 1% of the total. It might be considered a rather unique location.

Potential Queenstown area residents may well consider all the subdistricts as within commuting distance of one another, although Wanaka, Lake Hawea, and Albert Town are somewhat separated from the others. To the extent that the various locations are residential substitutes for each other, pressure from a growing population on rents in one location will spread to the others. That substitutability might also apply to demand for STRA accommodation.

⁶ The population and mortgage cost series are normalised differently for this model. That changes the coefficients in the equations, but not the effect sizes.

Table 4

Queenstown-Lakes District subdistrict correlation analysis

	Correlation with QLD listings	Mean number of listings	Share of QLD listings	Correlation with QLD rent
Queenstown-Lakes District	1	2822	100%	1
Albert Town	0.9	122	4.3%	0.73
Arrowtown	0.85	165	5.9%	0.6
Glenorchy	0.47	29	1.0%	N/A
Kawarau Falls	0.69	82	2.9%	0.6
Lake Hawea	0.87	65	2.3%	0.47
Lake Hayes	0.74	37	1.3%	0.63
Queenstown	0.93	1550	54.9%	0.67
Wanaka	0.92	773	27.4%	0.63

Source: AirDNA, MBIE & Infometrics

Similarly, for mortgage costs (which are based on national interest rates and Queenstown-Lakes District house values), the levels may vary across subdistricts, but the trends would likely be parallel. With regard to tourism spending in Otago, one would expect that to be dominated by spending in Queenstown-Lakes District, again with similar trends across the subdistricts.

Accordingly, we estimate a model for each subdistrict that has the same variables as the Queenstown-Lakes District model, but the number of available STRA listings for each subdistrict is used in place of the number of available Queenstown-Lakes District listings, and subdistrict rents replace Queenstown-Lakes District rents as the dependent variables. A time series for rents in Glenorchy was not available.

For all subdistricts the models collapsed, and the STRA variable had statistically insignificant effects, except for Lake Hawea, which had a negative coefficient on STRA listings. Therefore, it seems that even, or especially, at a fairly fine spatial level, an effect of STRA supply on rents cannot be seen in the data. That outcome also supports the theory that the wider Queenstown-Lakes District area should be seen as a single market as far as rents are concerned.

Looking again at Table 4, although mostly still quite high, the rent correlations are lower than the listings correlations, reflecting locational and property-specific differences such as the number of bedrooms, accessibility, and length of tenure.

The other inference from the results in Table 4 is that aggregate measures, notably Queenstown-Lakes District population, mortgage costs, and even COVID-19 restrictions, are too crude to capture the heterogeneity in rents that exists at the subdistrict level.

Caveats

Although it seems that over the last five years there has been a very small effect of STRA listings on long term rents in the Queenstown Lakes District (and perhaps none at all at finer spatial levels), it is possible that the model is not sensitive enough to pick up a consistent effect from STRA listings to rent. Notably:

1. There may be considerable heterogeneity across property owners, types of accommodation (such as rooms versus entire dwellings, with or without a

swimming pool) and locational attributes that are hidden by averages, even at the subdistrict level.

2. We have no explicit measure of unmet rental demand to assess how that is affected by STRA listings. We cannot use the number of active bonds as a measure, as all it tells us is where realised demand and supply intersect. Still, the modelling results confirm that regional population growth has a consistently strong effect on rents, which will also capture unmet rental demand if that leads to higher rents – as one would expect. Nevertheless, there could be some aggregation bias from the changing age (and locational) composition of the population.
3. The short time period, initial rapid growth in STRA, and interruptions from the effects of COVID-19 mitigation policies, make it difficult to firmly establish long-run relationships.
4. Extending the time series beyond the end of 2023 may enable a better understanding of how property owners trade off income from long- or short-term (STRA) rental against flexibility of the use of dwellings (own use versus use by others) and regulatory hassles and compliance (tax obligations, property rates differentials and so on), as depicted in Table 5.

Table 5

Property use trade offs

Options	Income	Flexibility	Tax & regulations	Admin/upkeep
Long-term rental	Good	Low	High, mostly central government	Medium
STRA	Good per night	Good	High, mostly local government	High
Own use	Zero or very low	Full option value	Relatively few	Low

The likely effect of aggregation bias in points 1 and 2 above is to attenuate the coefficients on mortgage costs and population, but how that might change the coefficient on STRA listings is unknown.

With regard to points 3 and 4, a longer time period may see some substitution between short- and long-term accommodation offerings in response to changes in taxes and regulations, but again the likely effect on the estimated relationships is not clear.

Queenstown-Lakes District house value model development

As discussed above there is a structural break in the STRA listings series at the end of 2017, so the house value model uses data from January 2018. Potential explanatory variables (in addition to STRA listings) include population, mortgage interest rates, and synthetic variables for COVID-19. Unfortunately, we do not have variables that directly capture constraints on housing supply such as local regulations and building material shortages, although we would not expect their absence to materially influence any measured effect of STRA listings on house values.

Chart 34 in *Appendix A: Selected Data Series* depicts the quarterly change in Queenstown-Lakes District house values. Stationarity considerations mean that house values, population and STRA listings are in percentage change form, and mortgage interest rates are differenced. The best model we could obtain is presented in Table 6.

Queenstown-Lakes District final results

As an explanation of house values, the model is not entirely satisfactory. One would have expected population to be a significant explanatory variable, but it failed to feature. The mortgage interest rate does appear, with the expected negative sign. An increase in the mortgage interest rate of one percentage point is associated with a decline in house values of almost 0.4%.

It is also clear that the effect of STRA listings on house values is statistically indistinguishable from zero (3.8E-06 means 0.00038%).

Table 6

Econometric analysis results, effect of STRA on Queenstown-Lakes District house values

	Coefficient	p-value	Interpretation
House values lagged	0.5234	0.000	52% of previous period's value carries forward
1st Covid lockdown	-0.0238	0.000	The lockdown reduced rents by \$2.4 per month
Mortgage rate change	-0.0038	0.001	1 percentage point => -0.38% change
Change in available entire space STRA listings	3.80E-06	0.366	Not statistically significant
Constant	0.0221	0.000	

R²=0.69, Errors: JB Normal statistic = 0.74

Source: Infometrics

There is a degree of heteroskedasticity in the residuals (see Appendix A), which might be caused by monetary and fiscal policies during the latter stages of COVID-19. This finding could mean that the p-values in Table 6 are understated, although that would support the finding of no significant effect of STRA listings on house values.

Auckland residential rents model results

The model results estimating the effect of available STRA entire space listings on long-term residential rents in Auckland are summarised in Table 7. Key results are as follows.

- The STRA listings variable is statistically insignificant – it had no significant effect on rents.
- The lag of rents is the largest contributor to the model's explanatory power, so it is possible that potentially key variables are missing. On the other hand, the lagged term might be capturing the dynamics of partial adjustment or adaptive expectations (as discussed in *Appendix D: Lagged Effects – p49*) in connection with population and house values.
- The synthetic variable for the first Covid lockdown is excluded as it was not statistically significant.
- The mortgage cost variable, which is a combination of house prices and the two-year mortgage interest rate, has been split into its two components, but

only the former is statistically significant. Note, however that is in level form,⁷ so the effect is presented as an elasticity. In this case, a 10% change in house values is associated with a 0.7% change in rent.

Table 7

Econometric analysis results, effect of STRA on Auckland long-term rents

	Coefficient	p-value	Interpretation
Long-term rent lagged	0.866	0.000	87% of previous period's value carries forward
Population change	1.43	0.058	Mean effect on rents was \$2.36
House values	0.033	0.001	Elasticity at the mean is 0.07
STRA	0.003	0.192	Zero, because not statistically significant
Constant	34.2	0.189	

R²=0.92, Errors: JB Normal statistic = 0.81

Source: Infometrics

The heterogeneity of the Auckland area is undoubtedly contributing to smaller coefficients than those for Wellington and Christchurch (see below), most notably on that for the (filtered) number of STRA listings.

Wellington City residential rents model results

The Wellington City STRA listings profile is like that of Auckland and Christchurch. The long-term residential rent profile is like that of Christchurch but different to Auckland. Both Wellington and Christchurch Cities have January-February spikes in long-term rents (perhaps corresponding to the start of the academic year), whereas Auckland doesn't. This spike in rents has been included in the Wellington City model. The results for Wellington are presented in Table 8. Key results are as follows.

- As for Auckland, the STRA listings variable is statistically insignificant – it had no significant effect on rents. In the single equation version of the model (and over the full sample period), STRA listings and the change in population cannot be simultaneously included. Therefore, any effect of STRA on rents seems to be entirely explained by changes in population.
- A new synthetic variable corresponding to January and February is included to pick up the spikes in rents at this time of year.
- The elasticity with respect to house values is 0.23.

The lack of normality in the residuals is not serious. It is caused by the model underestimating rents in November 2019, 2021, and 2023. The reason for this underestimation is not immediately apparent.

⁷ The drop in house prices in 2021 makes the series I(0).

Table 8

Econometric analysis results, effect of STRA on Wellington City long-term rents

	Coefficient	p-value	Interpretation
Long-term rent lagged	0.56	0.000	56% of previous period's value carries forward
January to February months	34.1	0.000	In Jan-Feb rents are higher by \$34 per week
Population change	48	0.038	Mean effect on rents was \$4.97
House values	0.123	0.001	Elasticity at the mean is 0.226
STRA	0.034	0.517	Zero, because not statistically significant
Constant	106.5	0.002	

R²=0.80, Errors: JB Normal statistic indicates long right tail

Source: Infometrics

Christchurch City residential rents model results

The Christchurch City STRA listings profile is similar to that of Auckland and Wellington. The long-term residential rent profile is similar to that of Wellington City but different to Auckland. Both Wellington and Christchurch Cities have January-February spikes in long-term rents (perhaps corresponding to the start of the academic year), whereas Auckland doesn't. This spike in rents has been included in the Christchurch City model. The results for Christchurch are presented in Table 8. Key results are as follows.

- The effect of the filtered number of STRA listings is very small, at only \$0.09 per week in an average month. The cumulative effect is \$1, which is 0.2% of the mean rent at the end of the sample period (here extended to November 2023). This figure compares with the cumulative effect of population growth of \$64.
- The elasticity with respect to house values is 0.23, the same as for Wellington.
- In the single equation model that includes the raw number of STRA listings, the effect on weekly rents is higher at \$0.36/month, while the effect of population change is 27% lower than in Table 9. Hence population growth had a direct effect on rents, but also an indirect effect via STRA listings.
- Running the single stage model for the entire period (from January 2016 for Christchurch) produces very similar results, with the effect of STRA listings on weekly rents being lower at \$0.25/month.

Table 9

Econometric analysis results, effect of STRA on Christchurch City long-term rents

	Coefficient	p-value	Interpretation
Long-term rent lagged	0.598	0.000	60% of previous period's value carries forward
January to February months	14.1	0.004	In Jan-Feb rents are higher by \$14 per week
Population change	25.8	0.009	Mean effect on rents was \$5.90
House values	0.152	0.000	Elasticity at the mean is 0.227
STRA	0.08	0.002	Mean effect on rents was \$0.09
Constant	64.7	0.001	

R²=0.92, Errors: JB Normal statistic = 0.15

Source: Infometrics

Appendix D: Lagged Effects

To circumvent the problem of multicollinearity and preserve degrees of freedom when the right-hand side of an equation needs to incorporate lagged effects, the lag structure is frequently approximated by some polynomial function. The Almon distributed lag structure is given by:

$$Y_t = \beta_0 X_t + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \dots + \mu_t \quad (1)$$

- where the β may be linked via a polynomial function.

In particular, Koyck extended the idea of linking the β by postulating a geometrically declining lag function, giving rise to an equation of the form:

$$Y_t = \beta(w_0 + w_1 L + w_2 L^2 + \dots) X_t + \mu_t$$

- where L is the lag operator such that $L^i X_t$ denotes X_{t-i} , and where $w_i = (1-\lambda)\lambda^i$.

The equation then condenses to:

$$Y_t = \beta(1-\lambda)X_t + \lambda Y_{t-1} + \mu_t - \lambda\mu_{t-1} \quad (2)$$

However, a lagged dependent variable in an equation similar to (2) would also arise in a situation of *partial adjustment* or *adaptive expectations*. Under the former for example, rents may take some time to adjust to changes in population, which fits well with the generally slow pace of population change.

$$Y_t^* = \alpha + \beta X_t$$

- where Y^* represents the optimal value of Y in response to given X . Y^* cannot be observed, but a relationship between it and the observed Y might be given by:

$$Y_t - Y_{t-1} = \gamma(Y_t^* - Y_{t-1}) + \mu_t \quad 0 < \gamma \leq 1$$

Amalgamating these equations yields:

$$Y_t = \alpha\gamma + \beta\gamma X_t + (1-\gamma)Y_{t-1} + \mu_t \quad (3)$$

Under the *adaptive expectations* model property owners adjust rents according to their expectations about factors such as population growth. Expectations X^* of the exogenous variable X are based on past observations. Thus:

$$X_t^* - X_{t-1}^* = \delta(X_t - X_{t-1}^*) \quad 0 < \delta \leq 1$$

Given also $Y_t = \alpha + \beta X_t^* + \mu_t$

- with some algebraic manipulation these can be amalgamated to yield:

$$Y_t = \alpha\delta + \beta\delta X_t + (1-\delta)Y_{t-1} + \mu_t - (1-\delta)\mu_{t-1} \quad (4)$$

Equations (2) to (4) all have the same form, differing only in their error structure, although for estimation purposes this difference is not trivial.

The three situations given by equations are not mutually exclusive. Indeed, they are not even exhaustive of the possibilities. Property owners' behaviour may be based on expectations about population or other factors such as mortgage costs (not just on what is actually observed), their behaviour may be slow to respond to changes in these variables, or the changes may have a memory effect – they need to be seen as more than transitory before they induce a behavioural response.

Regarding equation (3) for example, the effect of X on Y can be determined by estimating σ and θ in the equation below and calculating the desired β from equation (3).

$$Y_t = \omega + \sigma Y_{t-1} + \theta X_t + \mu_t$$

For this equation, OLS yields consistent and efficient estimates for uncorrelated errors. However, the estimates will be biased, although correcting for bias often leads to worse estimates overall (such as in terms of mean squared error) due to an accompanying increase in variance.⁸

Thus, this equation, or with the addition of serially correlated errors, is our preferred specification for a long-term model of rents. We also adjust for possible bias caused by endogeneity.

⁸ Ignoring orders of magnitude smaller than n^{-2} , the bias is approximately equal to $-2/n$.

Appendix E: Miscellaneous Tests

Unit root tests for stationarity reveal the following.

- The STRA listings series is $I(0)$.
- The Queenstown-Lakes District rent series is $I(1)$.
- STRA listings and Queenstown-Lakes District rents are not cointegrated.
- Population, GDP, and the proxy for mortgage costs are $I(1)$. Therefore, these series are differenced before entering any regression equation.
- Tourist spending (measured from 2018) is $I(0)$, although it would probably be $I(1)$ over a longer period.

Correlation between STRA listings and the error term in an equation for rents (such as caused by STRA listings and rents affecting each other simultaneously) could lead to biased parameter estimates. However, testing revealed no such correlation. We also investigated Granger causality from STRA supply to rents and from rents to STRA supply. In each case, the models incorporate lags 1-3 and 12. On the basis of F-tests, there is no improvement in the rent model by adding lagged STRA supply, nor in the STRA model by adding lagged rents, which reinforces the above finding of little direct influence in either direction.⁹

⁹ The Granger causality test is an important econometric tool used to assess the predictive relationship between two variables. When the test fails to reject the null hypothesis, it indicates that one variable is not useful for forecasting the other. In the context of studying the relationship between rent and Airbnb supply, if the Granger causality (and reverse causality) tests yield results of failing to reject the null, it means that Airbnb supply does not provide useful information for predicting rent, and vice versa. Hence, when conducting Granger causality tests, it is specifically referred to as testing whether Airbnb supply Granger-causes rent, which differs from examining whether Airbnb supply directly causes an impact on rent.