**Executive summary**

This paper aims to improve our understanding of the underlying factors that impact rents in New Zealand. The findings will allow us to forecast rents at both the national and regional level, which is beneficial for three main reasons.

Firstly, rent provides a clearer signal of the balance of supply and demand for dwellings than house price as it does not include expectation for future gains. Secondly, providing an outlook on rents can lead to better policy towards wellbeing as renters typically pay a larger proportion of their incomes on housing costs and are more vulnerable to large price movements. Finally, forecasting rents can also improve the accuracy of house prices forecast.

Over the past 20 years, we find that wages and relative housing supply and demand are the two key drivers of rental inflation at both the national and regional level, through impacting tenants’ ability and willingness to pay and the availability of rental properties respectively. All else equal, an increase in wages leads directly to a 1-to-1 ratio increase in rents while a 1 percent increase in people per dwelling, a proxy for relative supply and demand, leads to a 1.5 percent increase in rents. These results also hold using Stats NZ’ estimate of rental inflation for all tenancies, albeit with lower magnitudes, as rents for existing tenancies are typically less volatile than new ones.

We also find a positive impact of mortgage rate and a negative impact of unemployment rate on rental inflation at national level, although their contributions are less significant than wages and physical supply and demand. Rising cost of finance reduce the attractiveness of owning or building a house while decreasing unemployment and better job security can encourage people to form new and smaller households, both in turn can increase the gap between demand and supply for rental properties. However, we do not find any statistically significant evidence of the impact of general inflation on rents.

[Placeholder for Alan’s regional results]

# Outline for the national drivers of rents

# Key findings

1. **Understanding the key drivers of rents is important to monitor and assess the supply response in the housing market, identify potential hot spots at regional level, and improve the accuracy of house price forecasts.**
2. **Wages and relative housing supply and demand (measured by people per dwelling) are the two key drivers of rental inflation (for new tenancies) at the national level.**

All else equal, an increase in (real) wages leads directly into a 1-to-1 ratio increase in (real) rents while a 1 percent increase in people per dwelling, a proxy for relative supply and demand, leads to a 1.5 per cent increase in rents.

There is limited evidence suggesting that the higher the increase in the supply/demand gap, the stronger the wage-rent relationship, as competition for rental properties allow landlords to capitalize on renters’ wage gains.

[Discuss the positive interaction term of people per dwelling and wage inflation]

1. **The impacts of population and dwellings growth on rental inflation are equally important.**

[Discuss the model separating population growth and dwellings growth]

1. **Rising unemployment rate may lead to lower rental inflation, however the impact is more limited compared to wages and physical supply and demand.**

[Discuss magnitude and sign of the coefficient of unemployment]

1. **There is no statistically significant evidence of the impact of general inflation on rents.**

Strong impact of real wages on real rents.

Cost to landlords from rising inflation have limited impact.

1. **The mortgage (interest) rate elasticity of rents is positive. However, it is quite small and not always statistically significant across different model specifications.**

[Discuss the magnitude and sign of the coefficient of mortgage rate]

Possible explanations include:

* Restricted land market (inelastic supply response to lower cost of financing)
* First home buyers’ delayed decision to buy due to rising mortgage unaffordability.
* Balancing feedback loops exist in the banking sector, which can limit supply response to lower interest rate. As supply begins to increase relative to demand this will increase vacancy rates and reduce yields without reducing construction costs, lessening the appetite of banks to lend for further development.

1. **All key drivers have similar impacts on the rental inflation of existing tenancies, which is estimated by the stock measure of Stats NZ’s Rental Price Index, albeit with lower magnitudes.**

[Discuss the model with stock RPI as dependent variable]

1. **The vacancy rate, an alternative measure of relative supply and demand, is negatively correlated with rental inflation. This is consistent with the findings of Saunders and Tulip (2019) for the Australian housing market.**

[Discuss the model with vacancy rate/vacant time instead of people per dwellings]

# Detailed results

1. **Data**

**Key variables**

* + Rents: Flow Rental Price Index, which is a quality adjusted index of rental inflation, derived from bond data from Tenancy Services
  + Wages: Average weekly earnings from the Quarterly Employment Survey (QES)
  + Population: Quarterly national population estimates from Stats NZ
  + Dwellings: Quarterly dwelling estimates from Stats NZ, in which intercensal estimates are derived from consents data
  + Mortgage rate: Floating mortgage rate or 2-year special rate from RBNZ
  + Inflation: Consumer Price Index Less Rentals for housing – Stats NZ
  + Unemployment rate from Stats NZ
  + House prices: CoreLogic’s House Price Index.

**Period of study**

The data is available from Q3-2003 to Q2-2022. All variables enter the equation as the change from previous quarter.

1. **Methodology**

We use a simple model of rental inflation on the potential determinants.

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We use OLS and the general-to-specific approach to estimate the models. We test both the contemporaneous and lagged values of the covariates.

1. **Discussion of results**
   1. **Baseline model**

[Placeholder for regression table 1 and 5 and interpretation of results]

* 1. **Alternative measure of rental inflation**

[Placeholder for regression table 2 and interpretation of results using stock RPI and real RPI]

**Stock RPI**

The results are consistent. All regression coefficients retain their expected signs and significances. However, the magnitudes are smaller, which is potentially because rental inflation for existing tenancies is typically less volatile than rental inflation for new tenancies, i.e sticky rents.

**Real RPI**

Both rents and wages are deflated by the CPI excluding rents. All regression coefficients retain their expected signs and significances which suggest that the impact of wages on rents is direct rather than through inflation.

* 1. **Alternative measures of explanatory variables**

[Placeholder for regression table 3 and interpretation of results using stock RPI and real RPI]

**Separating population and dwelling growth**

We test the model using population growth and dwelling growth separately instead of the change in people per dwelling. The signs and magnitude of the regression coefficients are as expected. All else equal, an increase in population is positively correlated while an increase in dwellings is negatively correlated with rental inflation. We find that the contributions of population and dwellings growth towards rental inflation are equally important, thus combining both into the people per dwelling variable is sensible as in the baseline model is sensible (The Wald test cannot reject the null hypothesis of equal coefficients)

**Adult per dwellings**

As demands for rental properties are formed at household level, it is commonly agreed that the growth in the number of adults is more important in explaining rental inflation than general population growth. We find that our results are consistent with both measures.

**Vacancy rate**

Although people per dwellings is a frequently used measure of relative supply and demand, there are certain shortcomings which prevented it from capturing the short-term impact:

* The numerator is not the number of renters.
* The dwelling growth is estimated from building consents for all properties, not just rental properties.

We use unit record bond data to create a measure of time between tenancies at property level, which is a proxy for the vacancy rate. The results using the vacancy rate instead of people per dwelling to capture the relative supply and demand are consistent with the baseline model. An increase in the vacancy rate signals the easing of pressure in the rental market and leads to a decrease in rental inflation.

* 1. **Alternative frequency**

[Placeholder for regression table 4 and interpretation of results using stock RPI and real RPI]

We use quarterly data in order to boost the sample size and maintain sufficient degrees of freedom. However, there are concerns that for rental inflation and several covariates, quarterly data may include too much noise and hide the underlying signal. In this section, we test our model with annual change instead of quarterly change. In order to keep the sample size but also avoid serial correlation, we include the lag of four periods for all variables.

The results are consistent and provide evidence for an annual frequency approach for the regional model.

1. **Regression tables**

**Table 1: Baseline model**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Rent inflation**  **(****nominal, flow)** | **Rent inflation**  **(****nominal, flow)** | **Rent inflation**  **(****nominal, flow)** | **Rent inflation**  **(****nominal, flow)** |
| *Predictors* | *Estimates* | *Estimates* | *Estimates* | *Estimates* |
| Rent inflation (lagged) | -0.19  (0.12) | -0.19 \*  (0.11) | -0.17  (0.11) | -0.15  (0.11) |
| Wage growth | 0.54 \*\*\*  (0.11) | 0.56 \*\*\*  (0.08) | 0.54 \*\*\*  (0.09) | 0.54 \*\*\*  (0.09) |
| Wage growth (lagged) | 0.35 \*\*\*  (0.12) | 0.36 \*\*\*  (0.11) | 0.39 \*\*\*  (0.12) | 0.39 \*\*\*  (0.12) |
| People per dwelling | -0.51  (0.78) |  |  |  |
| People per dwelling (lagged) | 1.97 \*\*  (0.86) | 1.73 \*\*\*  (0.52) | 1.63 \*\*\*  (0.53) | 1.51 \*\*\*  (0.53) |
| Mortgage rate | 0.02  (0.02) |  |  |  |
| Mortgage rate (lagged) | 0.02  (0.02) | 0.03  (0.02) | 0.03  (0.02) |  |
| Inflation excluding rents | -0.12  (0.20) |  |  |  |
| Inflation excluding rents (lagged) | 0.15  (0.20) | 0.14  (0.17) | 0.13  (0.17) | 0.15  (0.17) |
| Unemployment rate | 0.01  (0.01) |  |  |  |
| Unemployment rate (lagged) | -0.02  (0.01) | -0.02  (0.01) | -0.02  (0.01) | -0.02 \*  (0.01) |
| House price inflation | -0.01  (0.06) |  |  |  |
| House price inflation (lagged) | 0.08  (0.07) | 0.08 \*  (0.04) |  |  |
| Observations | 73 | 73 | 73 | 73 |
| R2 / R2 adjusted | 0.489 / 0.376 | 0.470 / 0.404 | 0.440 / 0.380 | 0.423 / 0.371 |
| *All variables enter the model as percentage change from the previous quarter*  *\* p<0.1 \*\* p<0.05 \*\*\* p<0.01* | | | | |

**Table 2: Alternative measure of rental inflation**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Rent inflation**  **(****nominal, flow)** | **Rent inflation**  **(****nominal, stock)** | **Rent inflation**  **(****real, flow)** |
| *Predictors* | *Estimates* | *Estimates* | *Estimates\** |
| Rent inflation (lagged) | -0.17  (0.11) | 0.65 \*\*\*  (0.10) | -0.27 \*\*  (0.11) |
| Wage growth | 0.54 \*\*\*  (0.09) | 0.09 \*\*\*  (0.02) | 0.62 \*\*\*  (0.08) |
| Wage growth (lagged) | 0.39 \*\*\*  (0.12) | 0.09 \*\*\*  (0.03) | 0.38 \*\*\*  (0.12) |
| People per dwelling (lagged) | 1.63 \*\*\*  (0.53) | 0.30 \*\*  (0.14) | 1.99 \*\*\*  (0.53) |
| Mortgage rate (lagged) | 0.03  (0.02) | 0.01  (0.00) | 0.03  (0.02) |
| Inflation excluding rents (lagged) | 0.13  (0.17) | 0.02  (0.04) |  |
| Unemployment rate (lagged) | -0.02  (0.01) | -0.00  (0.00) | -0.01  (0.01) |
| Observations | 73 | 61 | 72 |
| R2 / R2 adjusted | 0.440 / 0.380 | 0.573 / 0.516 | 0.560 / 0.520 |
| *All variables enter the model as percentage change from the previous quarter*  *In Model 3, both rents and wages are deflated using CPI excluding rents*  *\* p<0.1 \*\* p<0.05 \*\*\* p<0.01* | | | |

**Table 3: Alternative measure of relative supply and demand**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Rent inflation (nominal, flow)** | **Rent inflation**  **(****nominal, flow)** | **Rent inflation (nominal, flow)** | **Rent inflation**  **(****nominal, flow)** |
| *Predictors* | *Estimates* | *Estimates* | *Estimates* | *Estimates* |
| Wage | 0.56 \*\*\*  (0.08) | 0.52 \*\*\*  (0.08) | 0.54 \*\*\*  (0.09) | 0.34 \*\*\*  (0.09) |
| Wage (lagged) | 0.36 \*\*\*  (0.11) | 0.39 \*\*\*  (0.11) | 0.39 \*\*\*  (0.12) | 0.28 \*\*  (0.12) |
| People per dwelling (lagged) | 1.73 \*\*\*  (0.52) |  |  |  |
| Adults per dwelling (lagged) |  | 1.46 \*\*\*  (0.46) |  |  |
| Population growth (lagged) |  |  | 1.68 \*\*\*  (0.58) |  |
| Dwellings growth (lagged) |  |  | -1.43  (0.97) |  |
| Change in vacant time (lagged) |  |  |  | -0.01 \*\*\*  (0.00) |
| Observations | 73 | 73 | 73 | 73 |
| R2 / R2 adjusted | 0.470 / 0.404 | 0.445 / 0.385 | 0.441 / 0.371 | 0.457 / 0.398 |
| *All variables enter the model as percentage change from the previous quarter*  *\* p<0.1 \*\* p<0.05 \*\*\* p<0.01* | | | | |

**Table 4: Results using annual change**

|  |  |
| --- | --- |
|  | **Annual rent inflation (nominal, flow)** |
| *Predictors* | *Estimates* |
| Rent inflation (t-4) | -0.54 \*\*\*  (0.14) |
| Wage | 0.62 \*\*\*  (0.10) |
| Wage (t-4) | 0.75 \*\*\*  (0.14) |
| People per dwelling (t-4) | 1.18 \*\*\*  (0.38) |
| Floating mortgage rate (t-4) | 0.01  (0.02) |
| Inflation excluding rents (t-4) | -0.37 \*\*\*  (0.12) |
| Unemployment rate (t-4) | -0.03 \*\*  (0.01) |
| Observations | 67 |
| R2 / R2 adjusted | 0.508 / 0.449 |
| *All variables enter the model as change from the same quarter last year*  *\* p<0.1 \*\* p<0.05 \*\*\* p<0.01* | |

**Table 5: Interaction between wage growth and relative supply and demand**

|  |  |
| --- | --- |
|  | **Quarterly rent inflation (nominal, flow)** |
| *Predictors* | *Estimates* |
| Wage (rolling two-period average) | 0.98 \*\*\*  (0.15) |
| People per dwelling (lagged) | 1.57 \*\*\*  (0.54) |
| Wage x People per dwelling | 0.04  (0.62) |
| Observations | 73 |
| R2 / R2 adjusted | 0.430 / 0.368 |
| *All variables enter the model as percentage change from the previous quarter*  *\* p<0.1 \*\* p<0.05 \*\*\* p<0.01* | |