Investigating the influence of cycleway infrastructure on residential property prices

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Executive summary

Introduction

Homeowners have opposed the building of cycleways on their street as they claimed the loss of on-street parking will negatively impact property prices. This project explored the relationship between cycleways and residential property prices to evaluate the validity of this claim.

Method

A Hedonic model was used to analyse the city-wide effects of cycleways. The hedonic model estimates the relative influence of multiple variables, including cycleway density, on market value. The street level impact of cycleways was found using a street level model. This used properties on and close to a cycleway sold before and after the cycleway was built. Interviews with property developers and real estate agents were undertaken to understand stakeholder perception of cycleways.

Results

The hedonic model found a statistically significant positive correlation between cycleway density and market value at a rate of $\$55.06/m/km^2$. Cycleway density attributed a 0.2% ($997 NZD) increase in property prices. $1.52M of the 2024/25 rates collected by the Christchurch City Council can be attributed to cycleways. The street-level analysis found no statistically significant relationship. Stakeholder interviews found cycleways were not considered in the decision-making process as other factors, on-street parking, took priority.

Limitations

The applicability of these results to other New Zealand cities is unknown. The hedonic model did not consider spatial autocorrelation, and its predictive power was limited for higher market values. The street-level analysis had a small sample size (~200 sales). Selection bias and limited participants may have skewed the stakeholder interview findings.

Conclusion

Cycleway density has a positive effect on house prices city-wide. This opposes the view of local homeowners who oppose cycleway infrastructure development. However, the same effect is not perceived at the street level. These results can inform local decision makers and key stakeholders.

Introduction

As people become increasingly interested in environmentally friendly actions, many city planners and officials are required to address problems such as traffic congestion, housing availability, and urban sprawl with more sustainable solutions (FAO, 2020). A proposed solution for reducing traffic congestion is increased bicycle infrastructure. Increased commuter access to alternative transport methods to driving are intended to improve community liveability and green score, while reducing carbon emissions (Gotschi, 2011). Developing greener cities have a positive effect on biodiversity, climate, community wellness, and air quality (Williams, 2010). These are large infrastructure investments and understanding the economic impact of these investments is vital for city planners when evaluating the economic viability of these projects.

An important concern for council officials and property owners alike is the impact infrastructure projects have on property values. The building of on-street bicycle infrastructure (cycleways) has received complaints from residents on the streets that cycleways are being built on due to the perceived negative influence of cycleways on property value (Field, 2018). Most available literature on the relationship between residential property prices and bicycle infrastructure are focused on American cities (Conrow et al., 2020; Welch et al., 2016). Christchurch, New Zealand was chosen to apply research methods of existing studies to evaluate how property prices are influenced by bicycle infrastructure in New Zealand. Christchurch is a suitable choice

Method

Cycle infrastructure on housing prices were broken

characteristics and market value were derived from house sale data between 2012-2024 provided from the Christchurch City Council (CCC). Household variables were land area, floor area, age, and year of sale. The decade of construction was provided, the middle of the decade was used as the year of construction. This dataset was filtered to keep market sales of single-family houses in Christchurch city. The CCC data included section sales. These sales can be identified by having a large capital value relative to market value. This corresponded to a house built on

The neighbourhood characteristics accounted for socio-economic factors influencing property prices around the house sale. Distance to nearest bus stop was used as a measure of access to public transport, and distance to greenspace and waterways were included as a measure of an individual's access to nature. These datasets were provided by the CCC. The suburb level median household income (fig. 7) in 2018 was provided by StatsNZ. Quality of education was

The correlation of each independent variables with market value was considered. Non-correlated variables were removed, and market value outliers (±3σ) were removed.

Repeat-Sales Model (Effects of removing on-street parking)

Our second model focused on analysing any direct effects of protected cycleways on property values. To do this we used a longitudinal model to compare property values before and after the existing Christchurch MCR (Major Cycle Routes) were constructed. The model used was a repeat-sales model, adapted to fit the spatio-temporal difference-in-differences model format. The repeat sales model is a method used primarily in real estate and housing economics to estimate price changes over time by analysing properties that have sold multiple times. It is

Figure 9: Location of cycleways of interest (on-street dedicated cycleways that have removed on-street parking)

Property sales were filtered to single-unit properties with a capital value less than $10m, within 250 meters of a cycleway of focus, a land area of less than 0.1km and with index market sales. Addresses could then be filtered to those which had at least one sale between July 2012 and January 2017 and at least one subsequent sale between December 2021 and August 2024 (fig. 10).

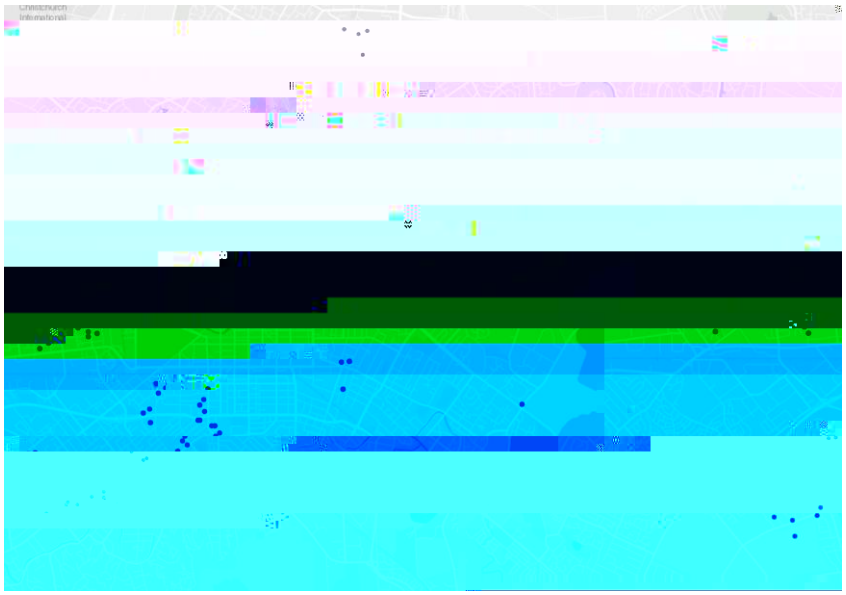

Figure 10: Location of addresses of interest

The resulting sales were joined with LINZ address data, which was then spatially joined with LINZ NZ property title data, so that the extent of the property could be known. If the property was adjacent to a street with a protected cycleway, it was placed in the treatment group.

used to find out whether property values have increased more for the control group than for the treatment group.

The regression was implemented as a linear regression with treatment group status as the focal independent variable. Non-housing characteristics were included as covariates. The sales data included the covariates year property was built, total floor area and land area, while street type was provided from the hierarchy data.

Stakeholder Interviews

Interviews to garner qualitative data on stakeholders' views on cycleways and the loss oC 792 r 0 0 1 213.65 60

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Figure 13: Value of coefficient associated with each hedonic model. Final column is the regression coefficient of x on y of the third OLS model. *=p<10%, **=p<5%, ***=p<1%

Y

Figure 14-15

Repeat-Sales Model (Effects of removing on-street parking)

Figure 17: Results of the street level regression model.

Single variable regression on independent variables showed that the most significant predictors of a higher resell value in the period of December 2021 – August 2024 compared to July 2012 –

Stakeholder Interviews

The interviews produced varying answers. One realtor said no clients had mentioned the need or consideration to be in proximity or adjacent to a cycleway. Discussions with another realtor showed an increase in the number of people cycling to open homes and auctions with the understanding that some clients are more likely to cycle, such as those who work in the CBD. A main theme of the interviews was that realtors used access to amenities (school zones, parks, shops, on street parking etc.) to create competition and increase prices. These amenities are a priority to buyers and have more influence on price and strength of competition when valuing a property. These amenities are prioritised over cycleways as they influence a greater percentage of property buyers' lives.

A realtor mentioned that cycleways are commonly built on

cycleways were generally not considered by realtors as other amenities are prioritised by home buyers. However, figure 18 showed that cycleways are used as a marketing tactic in property listings, which goes against the results of our stakeholder interviews.

The best hedonic model had a cycleway density coefficient of $55.6/m/km^2 and a median household increase due to cycleways of $997 or 0.19%. The city council set rates collected to $760.8 million NZD in 2024/25 (CCC, 2024). $1.52million of the

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