What is the effect of tram network expansion on housing prices in Greater Manchester?

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Paper in a Nutshell

This thesis investigates whether proximity to newly opened tram stops in Greater Manchester affects housing prices.

It uses housing transaction data from 1995 to 2024, identifying treatment based on whether a home falls within 0–1000 meters of a tram stop that opened between these dates.

Homes located 1000–1500 meters from the nearest stop serve as a control group and are never considered treated.

A staggered Difference-in-Differences event study is used to estimate changes in log housing prices before and after tram stop openings.

Results show no statistically significant average effect of tram proximity on prices. Some positive effects appear in later years post-treatment, but with wide confidence intervals.

These findings question the strength of the assumed relationship between new transport infrastructure and property value appreciation.

Motivation

• UK metropolitan areas, especially London and Greater Manchester, have seen major transport investments since the 1990s.

• These developments offer benefits but also raise concerns such as gentrification and displacement due to rising housing prices.

• Greater Manchester is an ideal case study: its tram network grew from 26 stops in 1995 to 99 in 2024, reshaping urban connectivity

• The city's experience represents a key example of locally driven transport-led regeneration in the North of England.

Literature Review

• Meta-analyses (Rennert 2022; Mohammad et al. 2013) show highly varied effects of rail access on housing prices, ranging from strong premiums to negative impacts due to noise or congestion.

• Methodological differences (e.g. continuous vs. buffer distance) and local context (e.g. income, urban form) explain much of the heterogeneity.

• Positive price effects are strongest in walkable, mixed-use neighborhoods; isolated or low-income areas often show weaker or negative outcomes (Park et al. 2016).

Contribution

• Introduces a staggered Difference-in-Differences event study to estimate the causal effect of tram expansion on housing prices in Greater Manchester using a long-time horizon (1995–2024).

• Defines treatment using geospatial distance bands (0–1000m vs. 1000–1500m) and aligns treatment timing to each tram stop's specific opening year.

• Finds no statistically significant average treatment effect, contrasting with many UK studies and suggesting that tram-driven price gains may be overstated at the aggregate level.
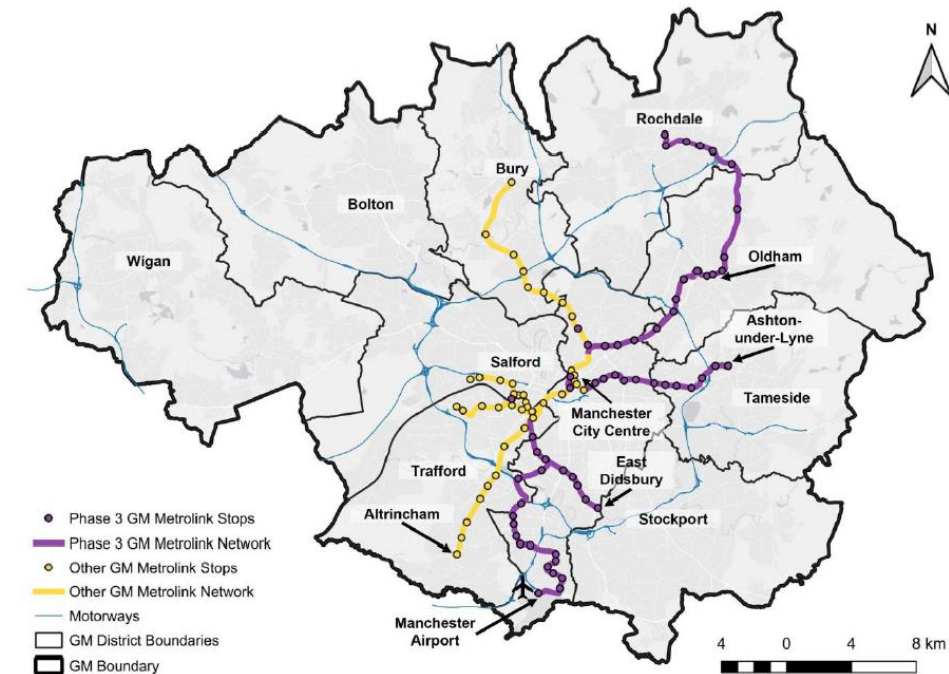
Theoretical Framework

• Bid-rent theory suggests that households are willing to pay a premium for housing closer to the city center or public transport stops to reduce commuting time and transport costs (Alonso 1964; Muth 1969).

• Transit proximity may also raise property values by attracting commercial activity, amenities, and agglomeration effects—creating localized hubs of desirability (Bowes & Ihlanfeldt 2001).

• However, negative externalities such as noise, crime, and congestion can reduce property values near stations, especially in disadvantaged neighborhoods (Hess & Almeida 2007; Diao et al. 2016).

• The net effect of transit access on housing prices depends on factors like distance to the station, neighborhood affluence, and how accessibility benefits compare to disamenities.

Context

Metrolink is the largest light rail network in the UK, expanding from 26 stops in 1992 to 99 by 2024, now covering 7 of Greater Manchester's 10 boroughs.

The system is credited with contributing £1.4 billion to the regional economy, improving access to employment, and reducing carbon emissions as part of a long-term transport strategy.

Figure 1: Existing Metrolink Network

Legend:
- Phase 3 GM Metrolink Stops
- Phase 3 GM Metrolink Network
- Other GM Metrolink Stops
- Other GM Metrolink Network
- Motorways
- GM District Boundaries
- GM Boundary

Source: data.gov.uk (2022)

Methodology

$$\log(\text{Price}_{it}) = \sum_{k \neq -1} \beta_k \cdot \text{EventTime}_{i,t}^k + \gamma_i + \delta_t + \varepsilon_{it}$$

Implements a staggered Difference-in-Differences event study using two-way fixed effects to estimate the causal effect of tram stop proximity on log housing prices across Greater Manchester.

Defines treatment based on Euclidean distance: inner ring (≤1000m) as treated, outer ring (1000–1500m) as control, with treatment timing aligned to each property's nearest tram stop opening.

Exploits variation in tram stop opening years (1995–2020) to estimate dynamic treatment effects relative to the year before treatment (event time -1), while controlling for ring and year fixed effects.

Data

• Combined two main sources: a manually verified dataset of tram stop locations and opening dates (from Transport for Greater Manchester and secondary sources) and a panel of housing transactions (1995–2024) from HM Land Registry, including sale date, price, and property characteristics.

• Geocoded ~100,000 housing transactions in R, retaining ~80,000 with valid coordinates; further restricted to ~25,000 properties within 1500m of a tram stop to define treatment (≤1000m) and control (1000–1500m) groups.

• Merged datasets by assigning each property to its nearest tram stop using straight-line distance and matched each sale with the relevant tram opening year to construct a panel with spatial and temporal variation.

• Limitations include manual imputation of tram stop opening dates, exclusion of sales prior to 1995, and potential bias due to loss of unmatched housing transactions during geocoding.

Data map observations

Greater Manchester: Tram Stop Buffers and Housing Points
Inner ring = 1000m, Outer ring = 1500m
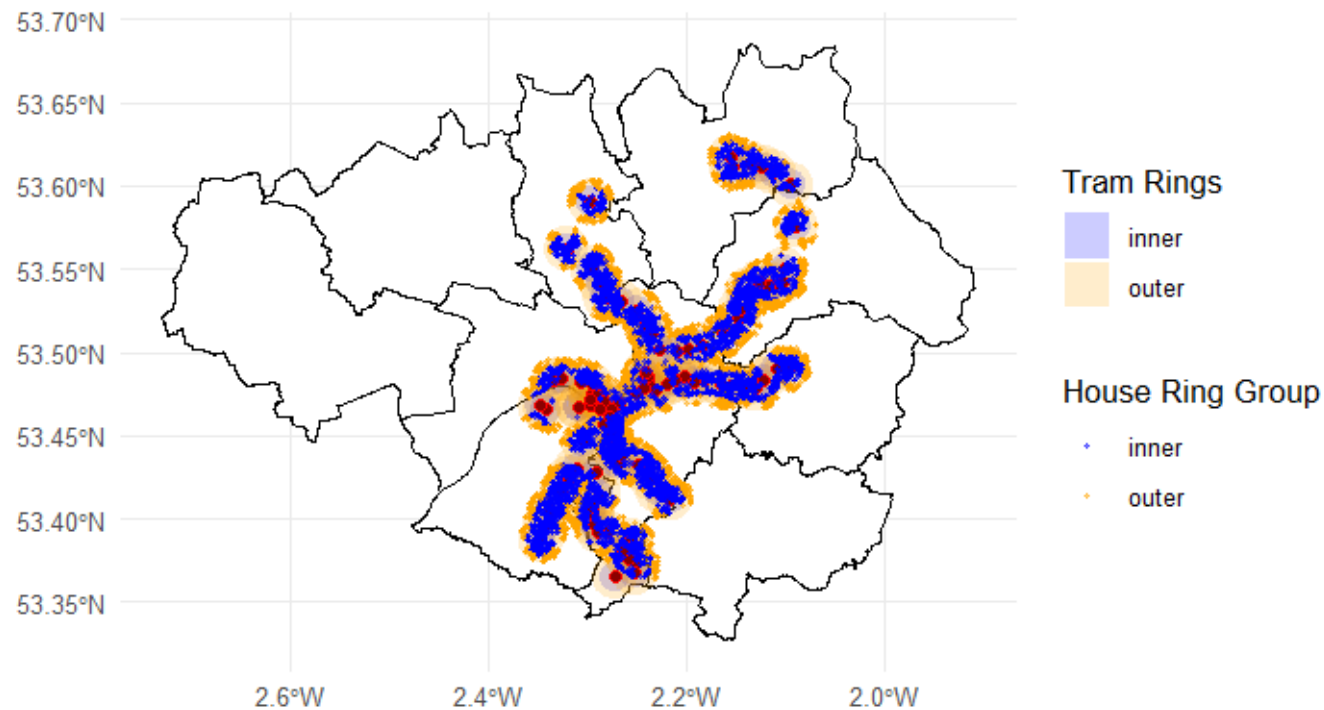
Main Results

- The event study regression confirms the parallel trends assumption, with no significant differences in pre-treatment log housing prices between treated and control groups; year 0 (the year of opening) also shows no immediate effect.

- A statistically significant 9% price decline is observed one-year post-treatment, but the effect does not persist in later years, suggesting a short-term market adjustment rather than a lasting impact of tram proximity on housing values.

Figure 1: Event Study – Effect of Tram Stop Openings
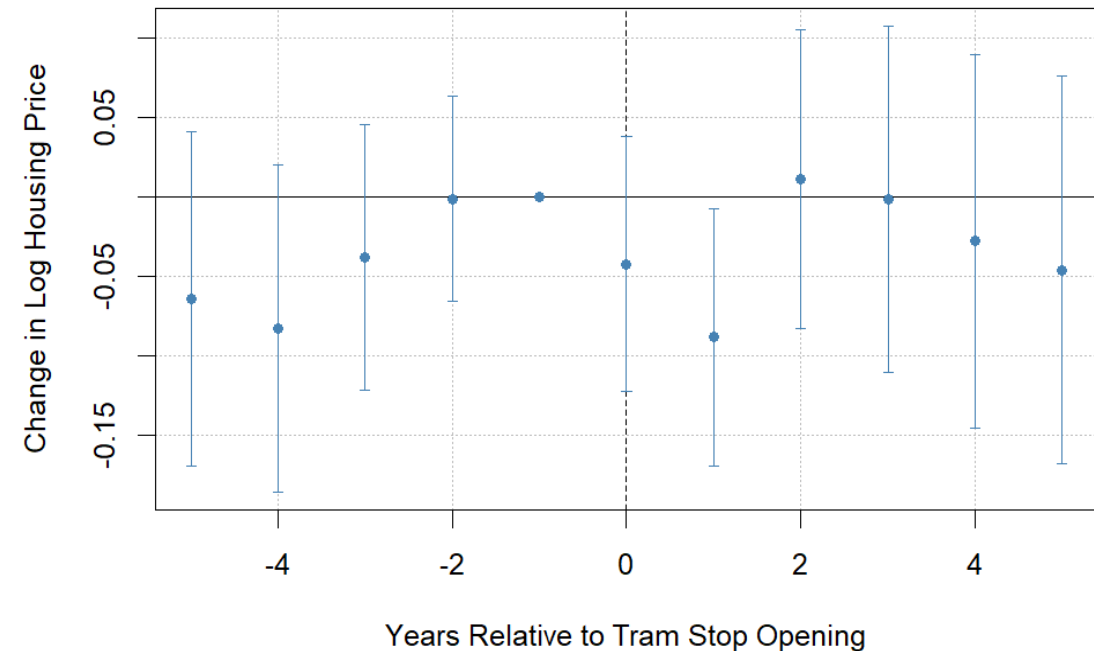
Discussion

• While several UK studies report significant housing price increases near new tram lines, my findings align more closely with international meta-analyses that document heterogeneous or null effects depending on local context.

• The statistically significant decline in year +1 may reflect short-term disruptions due to construction or uncertainty, rather than sustained decreases in property values.

• The absence of long-term positive effects suggests that potential gains from improved accessibility may be neutralized by negative spillovers such as noise, congestion, or market adjustment dynamics.

Conclusion

• The expansion of Greater Manchester's Metrolink tram network did not produce consistent or lasting increases in nearby housing prices, contrasting with some previous UK studies but consistent with broader international evidence of mixed impacts.

• A significant short-term decline in prices one year after tram stop openings suggests temporary market adjustments or potential negative externalities, but no sustained effects were found in the long run.

• These results highlight the importance of using spatially and temporally disaggregated methods when evaluating the housing market effects of transport investments, and caution against assuming universally positive impacts of infrastructure on property values.