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Modelling transport accessibility impacts on housing affordability and firm productivity using a quantitative spatial model and land use transport interaction

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Abstract

This paper analyses the impacts of transport accessibility on housing affordability and firm productivity using a quantitative spatial model (QSM). The study employs a simplified spatial general equilibrium (SGE) model grounded in microeconomic and urban economic theory to assess the attractiveness of zones as residential and employment locations following a transport shock, such as a new transport project. The model provides insights into adjusted population and employment at the zone level. A case study is then presented the results of which highlight the decentralising impact on population and centralising effect on employment due to improved accessibility. The study also examines the implications for housing affordability and firm productivity, demonstrating that integrated transport and land use planning supported by modelling approaches can lead to insights into broader social and economic outcomes. The findings underscore the importance of considering the implications of transport investments on land use and economic activity to inform more effective urban planning and policy decisions.

1. Introduction

1.1 The importance of integrated transport and land use planning to address key issues of our time

A better understanding of the connections between transport and land use and integration in how the two are planned can lead to a range of economic, social, and environmental benefits (ATAP, 2016). Key social issues like housing affordability and economic productivity are deeply linked to how we plan and manage our cities and their transport networks and land use. Housing affordability remains a significant challenge in Australia, with rising costs impacting both buyers and renters (AIHW, 2024). Economic productivity, particularly in urbanised areas of Australia where around 80% of the population resides, is a key issue for governments (Australian Government, 2024). Cities contribute around 80% of Australia's GDP, underscoring their importance to the Australian economy (AHURi, 2020).

1.2 Modelling transport and land use

Strategic transport planning and modelling are essential tools for assessing investments in transport network changes, such as infrastructure improvements. Modelling can help estimate travel patterns, demand for infrastructure, and the potential impacts on traffic and transport flows and congestion. However, the assessment of investments using traditional strategic transport models often adopts a 'partial equilibrium approach', which focuses solely on the transport network without considering the broader implications on land use and economic activity (Graham & Hörcher, 2024). This approach can overlook the significant effects that transport interventions have on the spatial distribution of economic activities and market failures in other sectors. To address these limitations, Land Use Transport Interaction (LUTI) modelling offers a more comprehensive solution by integrating transport and land use into a

full 'general equilibrium' system. LUTI models capture the dynamic interactions between transport infrastructure and land use, providing a holistic view of how changes in one area can influence the other. This integrated approach enables more accurate assessments of the long-term impacts of transport investments, leading to better-informed planning decisions and improved social and economic outcomes

1.3 Quantitative spatial models and our model presented in this paper

The study by Ahlfeldt et al. (2015) was groundbreaking, drawing a parallel to the famous expression about Helen of Troy, "the face that launched a thousand ships," by being "the paper that launched a thousand spatial general equilibrium (SGE) models." The study looked at how accessibility changes before and after the collapse of the Berlin Wall influenced household and firm location choices using highly detailed datasets on block level land prices, income, and production costs. By examining the shocks with the establishment and subsequent demolition of the Berlin Wall on the city's economy, workforce, and land use, the study established a reproducible approach to modelling the how accessibility impacts can impact location choices in any city. Graham & Hörcher (2024) describe the Ahlfeldt and subsequent SGE models in the literature as 'quantitative spatial models' (QSMs). Notable examples of such models in Australasia include Lennox & Sheard (2020), Donovan et al. (2020), and Lennox, J (2020) amongst others.

In this paper we present our QSM which is a simplified version of the Ahlfeldt model. It models the attractiveness of zones as home and work locations after a resulting shock to accessibility (e.g. the completion of a new transport project) using core microeconomic and urban economic concepts. Its main steps are:

1. Estimate local sensitivity to transport accessibility using exogenous data and then using base vs project case accessibility differences from a strategic transport model. Then calculate the resulting impact from the transport shock on commuting flows between residential locations and employment using a gravity model.
2. Estimate the impact of changed location choices implied by (1) on residential and commercial rents using simple elasticity models on a 'closed city' model.
3. Calculate the attractiveness of zones with changed accessibility from (1) and resulting impacts on density, wages, and residential and commercial rents from (2).

The resulting outputs from the model are adjusted population and employment at the zone level, as well as insights into the impact on residential land prices (proxied by the economic value of land via land rents), wages in employment zones, as well as firm productivity impacts. In this paper we present results in the form of location choice (workers and firms) as well as present metrics on housing affordability and firm productivity change.

Our QSM can be used as a LUTI feedback model when integrated with any strategic transport model. Adjusted population and employment can be used as a subsequent input back into a strategic transport model for further LUTI iteration. When used in this way the QSM can provide an equilibrium solution between transport and land use that accounts for congestion feedback and overcome the 'partial equilibrium problem' noted in Graham & Hörcher (2024). The results in this paper are from a single pass from strategic transport model to QSM but future studies will look to perform multiple LUTI feedback iterations.

2. Methodology

2.1 Step one: calibrated gravity model to local transport shocks

The first stage of the model focuses on how changes in transport costs influence people's choices about where to live and work. It uses a gravity-style framework, which assumes that commuting flows between any two areas depend on how attractive each location is for living and working, and on the generalised cost of travelling between them.

To estimate how sensitive people are to these costs, we combined data on commuting flows from the 2016 Australian Census with average travel costs from the South East Queensland strategic transport model (Zenith). The result is a parameter that captures how much a small change in travel time affects the number of commuters between zones.

In practice, this means we can predict how improvements in accessibility—such as a new rail line—reshape commuting patterns. For example, if a project reduces average travel times between two areas, the model estimates how many more workers would now be willing to make that trip.

Several refinements were made to ensure the estimation reflects true transport effects rather than unrelated factors like distance or local amenities. These include adjusting for the influence of distance directly, controlling for any unobserved local characteristics that might affect commuting (such as school quality or neighbourhood desirability), and allowing for natural variation in trip volumes across larger and smaller areas.

This calibration step ensures that the model responds realistically to transport shocks. It captures how accessibility improvements shift commuting behaviour at a detailed level, forming the foundation for later steps that estimate changes in population, employment, rents, and wages across the city.

2.2 Step two: estimating impacts on residential and commercial rents

This step takes place in the usual framework of a strategic transport model coupled to the QSM. We can predict the effect of a change in commuting costs—for example, due to a new railway line —on workers' choice of home and work locations when we feed the project case costs into our QSM as differences to a base case run (without the transport change).

Using simple economic models of the optimal production of housing and floorspace under perfect competition, we derive expressions for the change in residential and commercial rents for each zone. We assumed a residential rent elasticity value of 0.25, and a commercial rent elasticity of 0.10. These fall within the ranges of values discussed in Ahlfeldt et al. (2015) and Glaeser & Gyourko (2005).

2.3 Step three: calculate the attractiveness of zones resulting from impacts on density rents and wages

2.3.1 Home location attractiveness

Turning first to home location attractiveness, the model assumes that a location's appeal to residents depends on three key elements: an overall scale factor capturing inherent characteristics of the area, the level of local amenities, and the cost of housing. Amenities in turn are shaped by two main factors — the strength of local employment (which supports agglomeration benefits for consumers) and the ease of making non-work trips.

In simple terms, locations become more attractive when they offer better access to jobs and amenities, or when everyday travel becomes easier. Conversely, higher housing costs reduce attractiveness, particularly when households spend a large share of income on consumption outside housing.

In this version of the model, transport cost changes are the main driver of how attractiveness evolves across locations. Other local characteristics, such as fixed effects used in earlier steps of the model, are not yet reintroduced but could be incorporated in future versions to capture persistent, place-specific appeal.

2.3.2 Work location attractiveness

Turning to work location attractiveness, the model assumes that a workplace becomes more appealing to firms when it offers access to a large pool of workers and when the costs of

operating there are favourable. Two main factors drive this: agglomeration economies in production and commercial rents.

Agglomeration effects arise because firms in denser employment areas can share resources, exchange knowledge, and access a wider range of specialised labour — all of which raise productivity and wages. At the same time, higher commercial rents increase business costs and can make a location less attractive unless those costs are offset by higher productivity or better worker access.

The model represents this balance by allowing wages to respond to both employment density and rent levels. As employment clusters grow, wages tend to rise due to productivity gains, but increasing floor-space costs can temper this effect. Overall, locations with strong worker accessibility and manageable rent levels become more desirable to firms.

As before, the strength of these relationships depends on parameters representing how sensitive firms and workers are to such changes. In this study, we assume values consistent with established literature, meaning the model captures realistic trade-offs between the benefits of clustering and the costs of congestion or high rents.

2.4 Outputs from the QSM

2.4.1 Adjusted population and employment:

Adjusted land use results for population and employment are outputs of the QSM once equilibrium is reached. These can be applied to strategic transport model land use input files when the model is used as an integrated LUTI model.

All trip origins and destinations are modelled in the QSM, not just commuting trips to and from the CBD. “Reverse commuting” by residents that may live centrally in a city and choose to commute out of this area to employment are also modelled. Commuting flows in the QSM are based on ABS census data which includes information about observed origin and destination flows for commuting.

2.4.2 Housing affordability:

Changes in residential rent at the zonal level are available directly from the elasticity models as $\Delta \ln r_{i,r}$ which can be applied to known weekly rents to represent changes in zone level housing costs and rental payments. Changes in wages at employment locations are provided as outputs of the work location attractiveness model and can be applied to known wages paid in employment zones and weighted by total jobs. We link incomes at work locations to where commuters live and calculate incomes at home locations.

Using the above we can calculate the proportion of weekly income spent on rental payments at the zonal level and at the city-wide level before and after a transport shock. We present results as the percentage change in this proportion.

2.4.3 Productivity:

Under the Cobb-Douglas production technology approach, firm productivity can be measured through the marginal product of labour (MPL), i.e. output from an additional labour unit. At equilibrium, wages equal MPL. The MPL therefore reflects productivity as firms hire labour until wages match the MPL. We obtain wages in employment zones and compute productivity changes at the city level by weighting by employment in each zone and sum this city-wide to compute the global productivity % change with a transport shock.

2.5 Modes of operation

The QSM is able to model the following states:

- Standard plus residential ‘upzoning’ at the zonal level to simulate higher densities of development. We implement this by applying a lower rent price elasticity in these areas. Standard residential price elasticities of 0.25 are reduced to 0.10 for these areas.

- Standard plus residential population capping at the zone level (to simulate the impacts of planning restrictions on residential development) for specific zones. We apply this by capping location choice in these areas to not allow new residents to move in.

These facilitate the ability to test policy interventions as well as overlay realism to the location choice model where location choice is constrained by supply and/or land use policy.

3 Results

3.1 Transport cost semi-elasticity estimation results

The transport cost semi-elasticity (ν) was estimated on the model system that was used below in the case study. To inform the estimation, base year travel costs were derived from the 'Zenith' Strategic Transport model for South East Queensland[1]. ABS census data on commuting trips by home and employment location from 2016 was obtained from Census Table Builder.

The estimated value for ν was -0.004 with respect to generalised travel time significant at the one percent level. This estimate implies that each additional minute of generalised travel time reduces the flow of commuters by around 0.4 percent.

3.2 Case study details

We tested the QSM on the metropolitan region around Brisbane Australia and used the case study of the currently under-construction Cross River Rail (CRR) project as the transport shock to drive the location choice model. This section outlines the results from the QSM modelling.

The CRR project aims to improve rail capacity and crowding, as well as improve regional connectivity. Its main feature is a new underground rail line through Brisbane city centre which untangles several railway lines and facilitates higher service frequencies. Several new stations are also part of the project.

To seed the QSM's transport costs, the 'base' and 'project' case (scenarios with and without CRR in 2031 respectively) were first run in the Zenith model.

We provide location choice, housing affordability change, and productivity metrics results from the following cases:

- Standard scenario
- Upzoned scenario (upzone residential land use around improved access areas)
- Capping scenario (cap/disallow residential location choice in improved access areas)

3.3 Standard scenario

3.3.1 Location choice

For the Standard scenario, the QSM provides insights into population and employment percentage changes with the CRR, illustrated in Figure 1 and Figure 2 respectively.

Figure 1 shows that the CRR has a strong decentralising impact on population. This is driven by the improved accessibility from commuting origins in outer metropolitan areas in the south west (areas approaching Ipswich) and north with the CRR (clustered around Redcliffe and North Lakes). These locations all see increased rail frequency with the CRR. The commensurate increase in land values (via rent) with higher population do not offset these accessibility gains so workers see improved net welfare.

The picture for employment (Figure 2) is almost the opposite of what is shown in the population results. There is strong centralisation in jobs around the central business district (CBD) of

[1] For more information on VLC's Zenith model, refer to: https://veitchlister.com/our-solutions/zenith/

Brisbane as well as areas in the inner areas of the city where access to the biggest pool of workers is maximized. The distracting increase in employment in Dayboro (large zone north of the city) is due to a relatively small change to a base low employment value. The area does see improved accessibility as it is tangent to a railway line that has improved rail frequencies.

Figure 1: Standard Scenario location choice results: population percentage change relative to base case

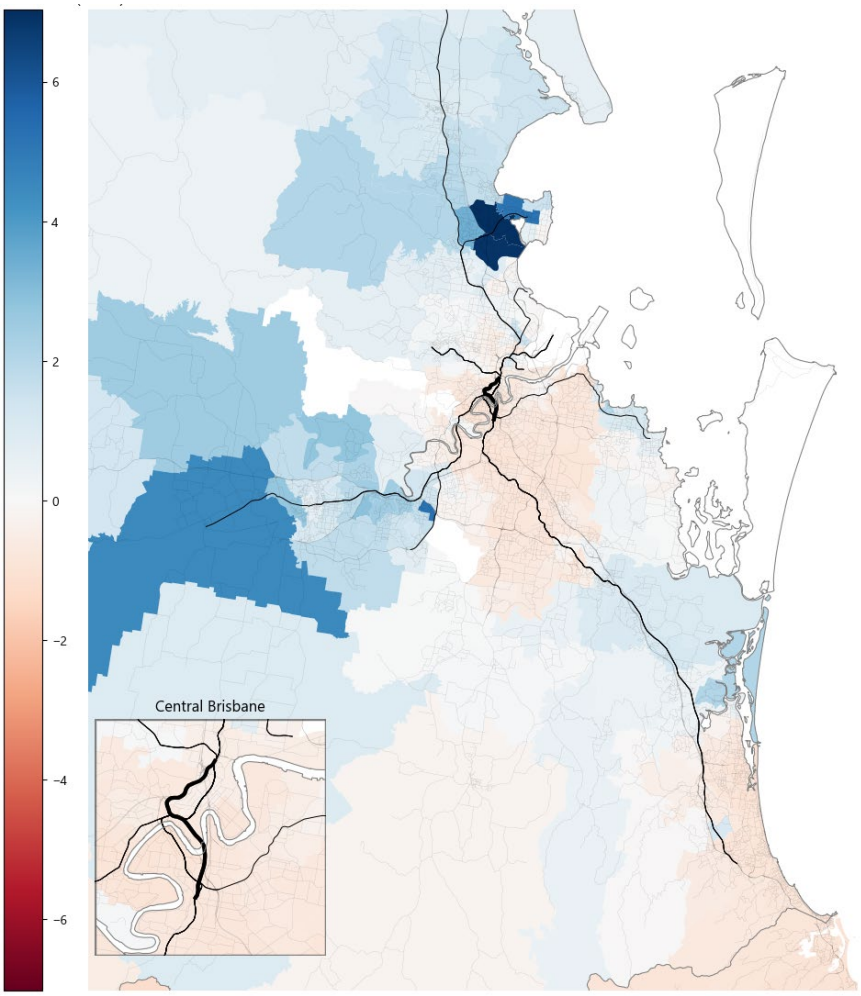
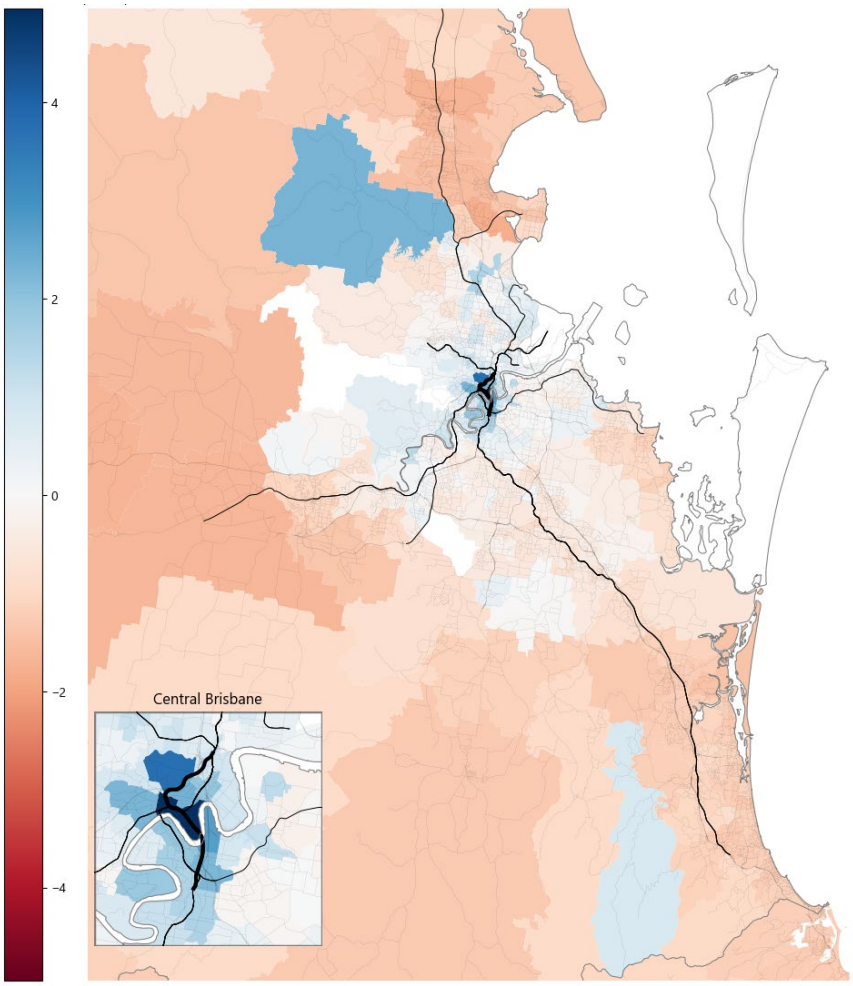


Figure 2: Standard Scenario location choice results: employment percentage change relative to base case



3.3.2 Housing affordability impacts

Housing affordability results shown spatially for the Standard Scenario are shown in Figure 3. This figure shows the percentage change in housing affordability taken as the percentage change in weekly income spent on rental payments (where rent is the economic value of land).

Figure 3 shows that for much of the region housing has become relatively cheaper. This makes sense from an urban economics perspective for the following reasons:

- Firstly, the transport shock (the CRR project) has made access to employment easier across the region, effectively helping to bring into the fold previously far-flung areas which are now marginally more connected to the metropolitan area. Connecting workers with higher paying jobs.
- Relocating residents leave established areas (reducing demand for housing and therefore rents in these areas) to newly opened up areas now more accessible due to the CRR. Whilst rents increase in these areas due to the higher demand, in most cases these rises are less than the relative lift in wages due to the ability for relocating workers to maintain or further gain access to higher paid employment resulting from the centralising effects the CRR has on employment (shown in Figure 2).

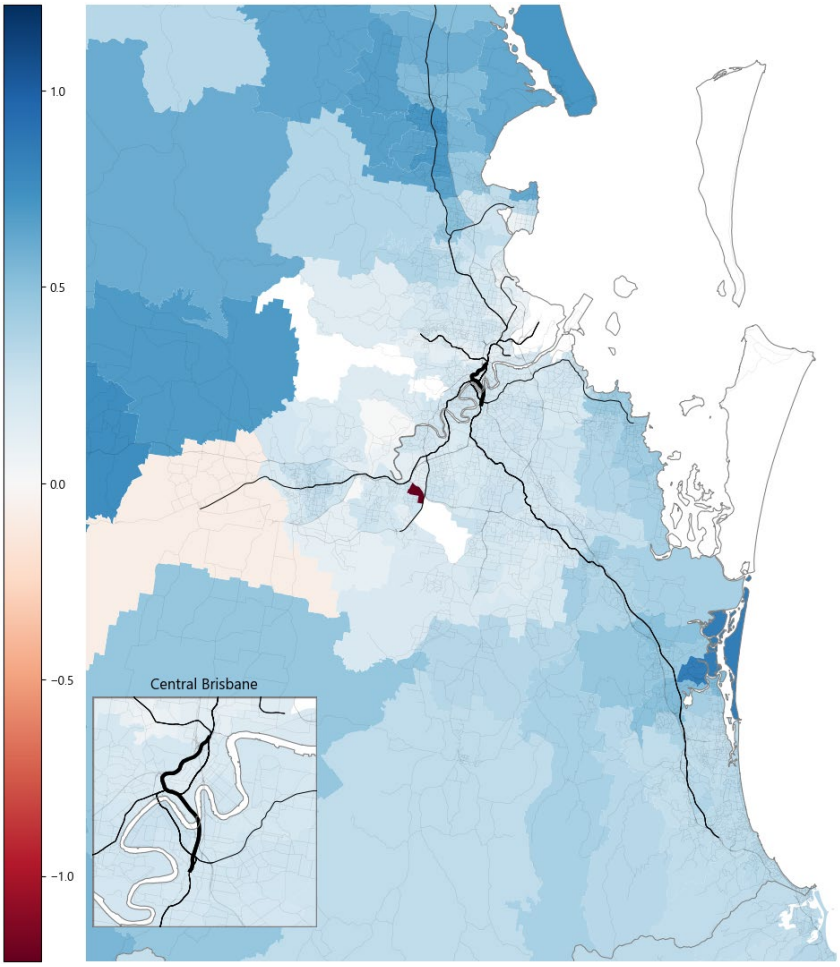
We find that the increase in incomes accounts for most of the uplift in affordability. This is partly because rental payments constitute a relatively small portion of household incomes (approximately 30%), and changes in rents are relatively small (ranging between -1.2% and

+0.8%). The CRR project also drives a strong centralisation of jobs into the CBD, which is the area of Brisbane with the highest wages.

Two locations stand out as having declining affordability results (SA2s Carole Park and Rosewood). These locations see strong population inflows resulting from their improved accessibility. Rises in rent values at these locations offset any gains in incomes for these locations.

The change in the housing affordability metric city-wide (weighted by population) is +0.31%. This means that overall rental payments relative to incomes are lower by 0.31% in the CRR case relative to the base case.

Figure 3: Standard Scenario housing affordability metric results: percentage change relative to base case



3.3.3 Productivity impacts

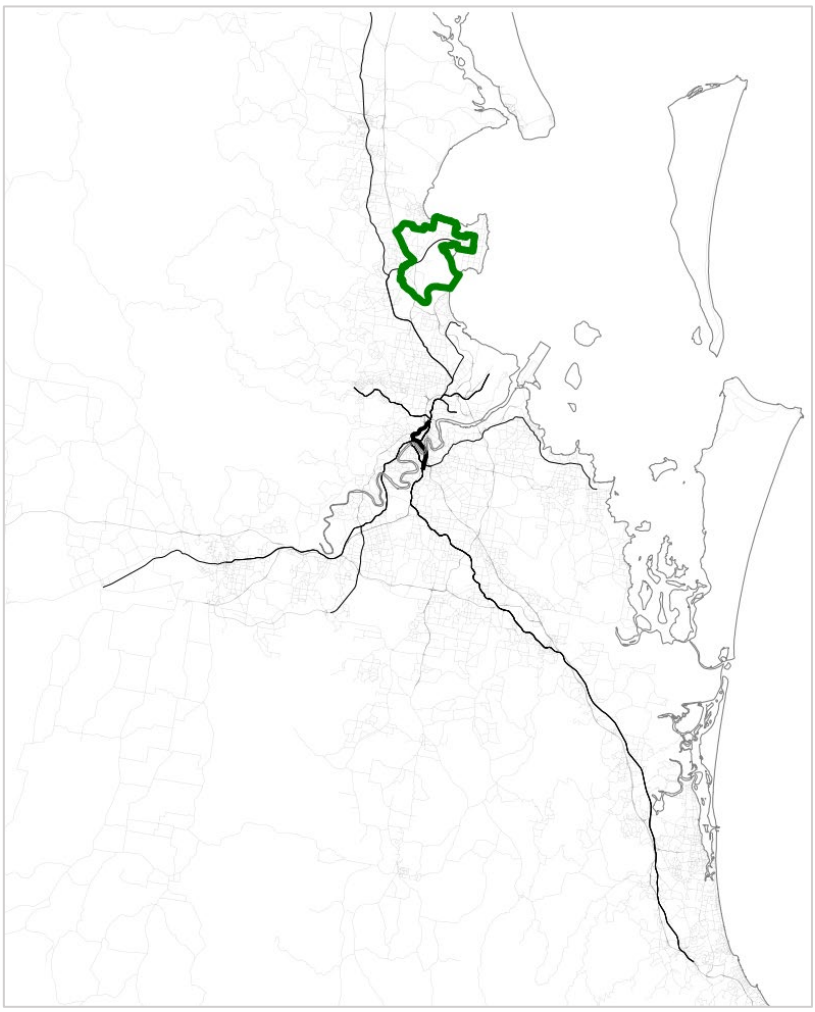
Using the approach described above to calculate city wide productivity change we calculate the change in productivity with the CRR project in the Standard Scenario to be +0.28%.

3.4 Upzoned scenario

3.4.1 Upzoned areas

ABS Level 2 Statistical Areas (SA2s) 'Rothwell - Kippa-Ring' 'Murrumba Downs - Griffin' 'North Lakes - Mango Hill' were selected to be ‘upzoned’ in the QSM, based on the population location choice results in the Standard Scenario. Figure 4 shows the outline of this cluster of SA2s spatially.

Figure 4: Areas that have upzoned residential policies



3.4.2 Location choice

Results for the Upzoned Scenario are shown as differences to the Standard Scenario results (Upzoned Scenario minus Standard Scenario). These are presented as incremental changes in percentage point results, for example, a change of 0.5% should be thought of as additional to the Standard Scenario result of 5.0%.

The location choice results for the Upzoned Scenario are shown in Figure 5 (population change) and Figure 6 (employment change) respectively. In these figures an increase (blue hue) means that the Upzoned Scenario has a higher value than the Standard Scenario for the metric shown, red hues indicate lower values.

Figure 5 shows that the Upzoned Scenario leads to increased population relocation to the Upzoned areas. This result is intuitive because with a rent price response that is less sensitive to population growth, more residents can move into these areas and still take advantage of the increased accessibility resulting from the CRR and not have these gains offset by higher housing costs.

Figure 6 shows the employment location choice results for the Upzoned Scenario. These show that the upzoning has increased employment clustering around the upzoned areas. This result is intuitive because the increased pool of local workers in these areas makes them more attractive to firms, enabling businesses to take advantage of this larger workforce.

Figure 5: Upzoned Scenario location choice results: population percentage change relative to Standard Scenario

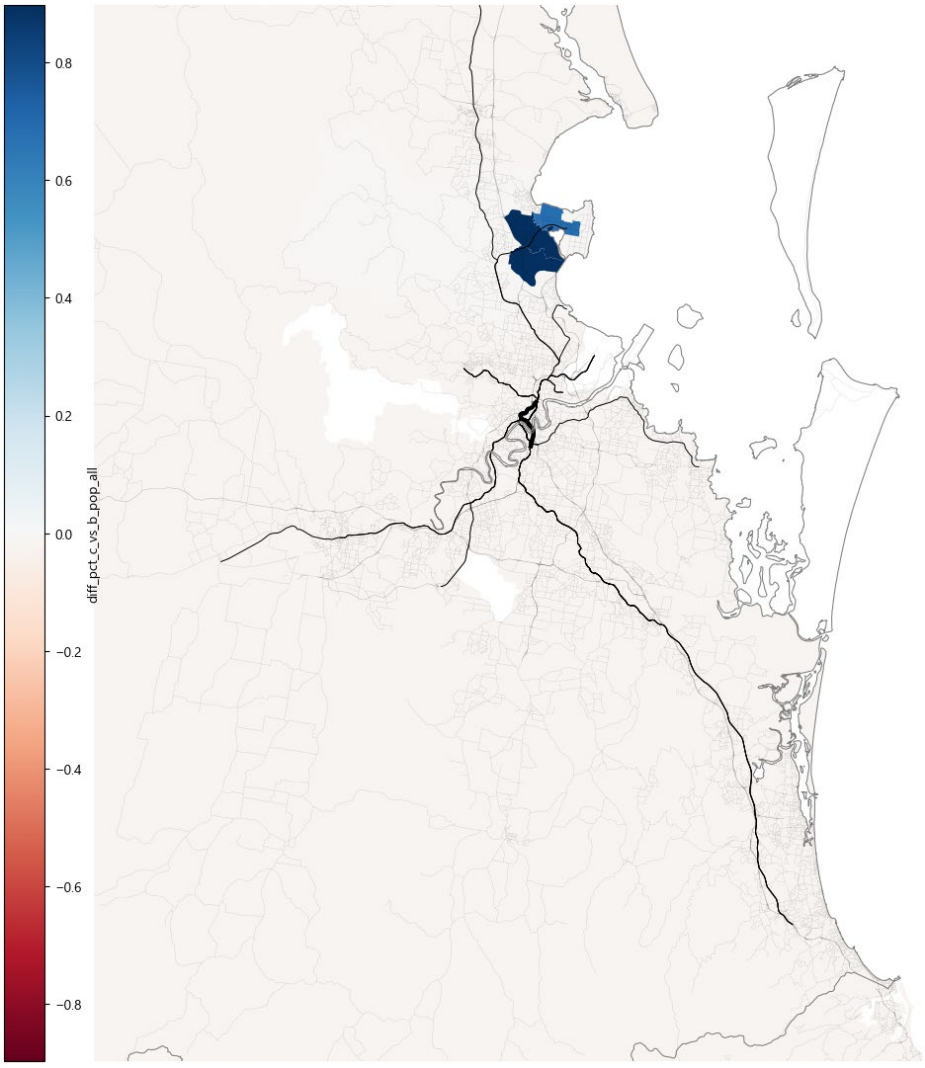
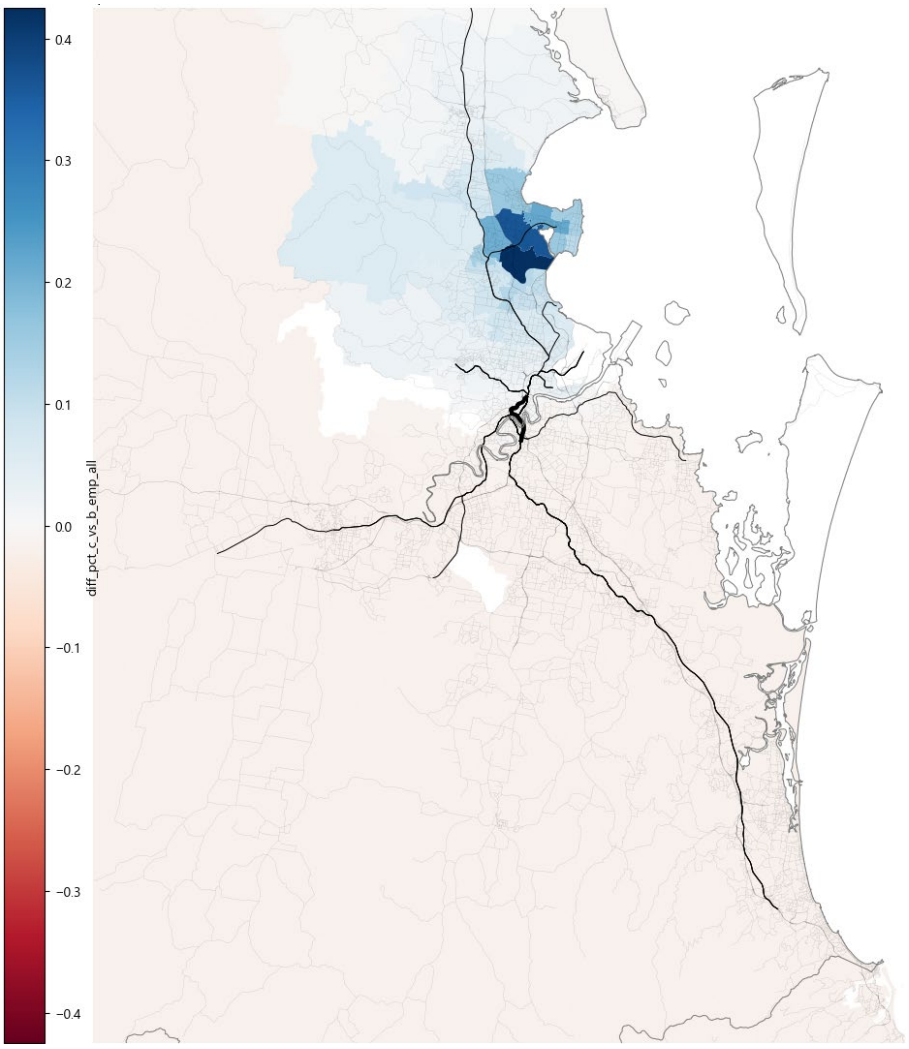


Figure 6: Upzoned Scenario location choice results: employment percentage change relative to Standard Scenario

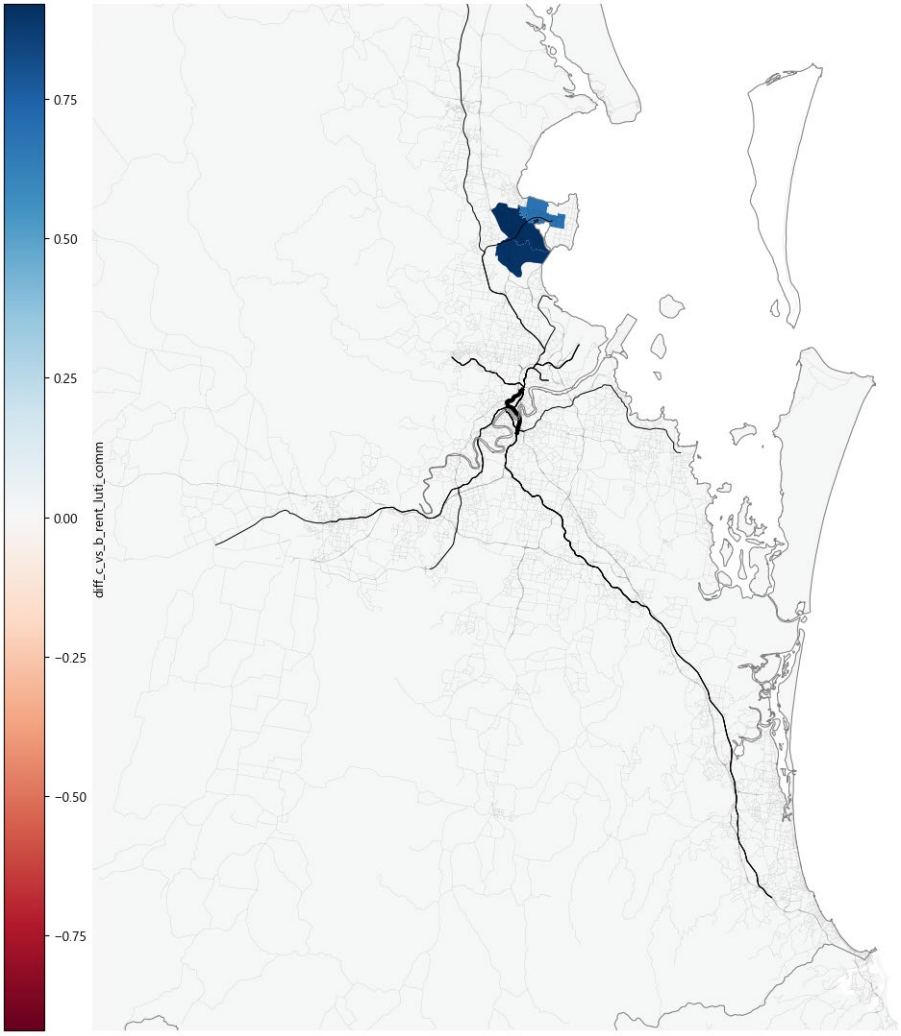


3.4.3 Housing affordability impacts

Housing affordability results for the Upzoned Scenario are shown in Figure 7 relative to the Standard Scenario. The figure shows that housing affordability in the upzoned areas is improved, with no impact on the wider urban area. This is intuitive, as the upzoned areas have a less elastic response to population increases.

City-wide, the impact on housing affordability is +0.33%. This result is slightly higher than the Standard Scenario, indicating that upzoning the areas resulting in a bigger impact on housing affordability city-wide. This is intuitive because the effect of upzoning results in more residents living in the upzoned areas reducing pressures on rents elsewhere.

Figure 7 Upzoned Scenario housing affordability metric results: percentage change relative to Standard Scenario



3.4.4 Productivity impacts

The change in productivity with the CRR project is found to be +0.28%. This is the same result as the Standard Scenario.

3.5 Capping Scenario

3.5.1 Capped areas

For simplicity the areas capped in this Scenario were the same areas that are shown in Figure 4 that were upzoned in the Upzoned Scenario. In the Capping Scenario these areas are prevented from having population inflows in this Scenario.

3.5.2 Location choice

The location choice results are presented for population and employment in Figure 8 and Figure 9 respectively. Figure 8 shows that the capping has prevented population inflows into the capped areas and that the rest of the city has a marginally higher population. This indicates that much of the population inflow into the capped areas would have come from a wide area across the city.

Figure 9 shows the employment location choice results for the Capping Scenario. These results show a complex swapping effect, where employment is slightly higher in the capping areas, but lower along the rail corridor south of these areas and in the central core of the CBD. This indicates that with a lower population in the capping areas, firm location choice does not favour the railway line CBD areas as much as the Standard Scenario. This makes sense as firms are not as able to take advantage of the higher density of potential workers in the capping areas relative to the Standard Case and choose slightly less to locate along the railway line.

Figure 8: Capping Scenario location choice results: population percentage change relative to Standard Scenario

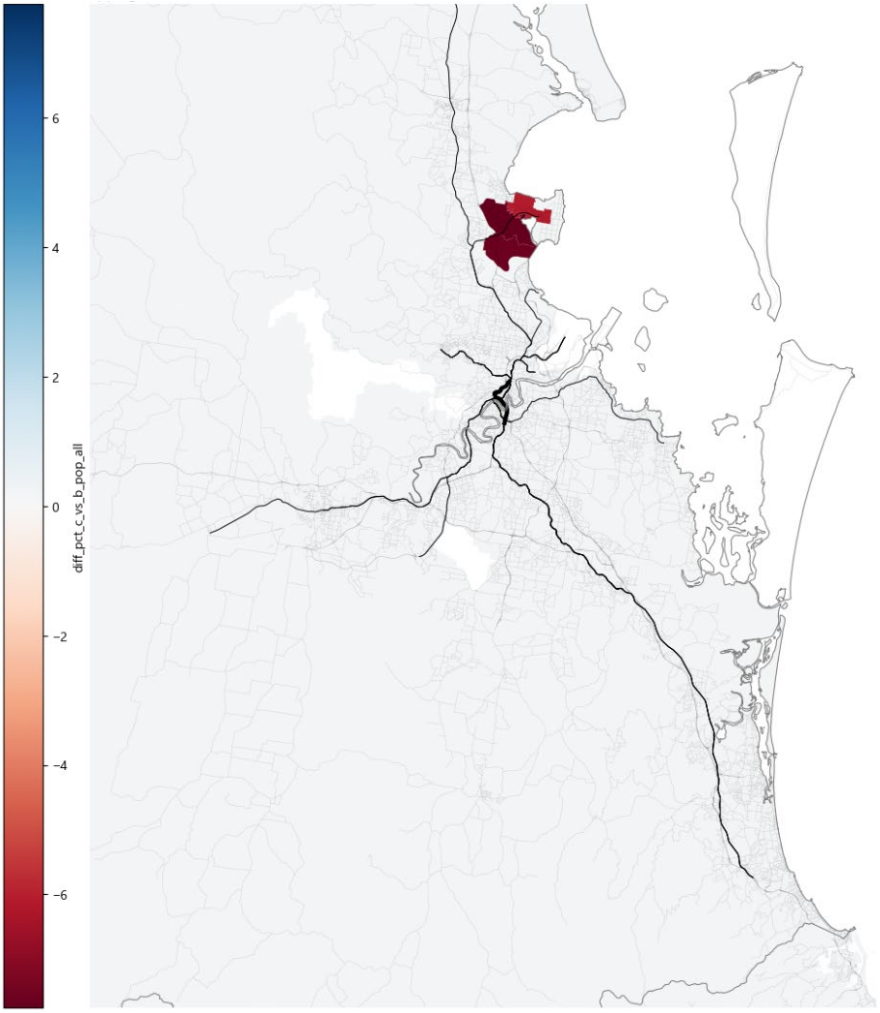
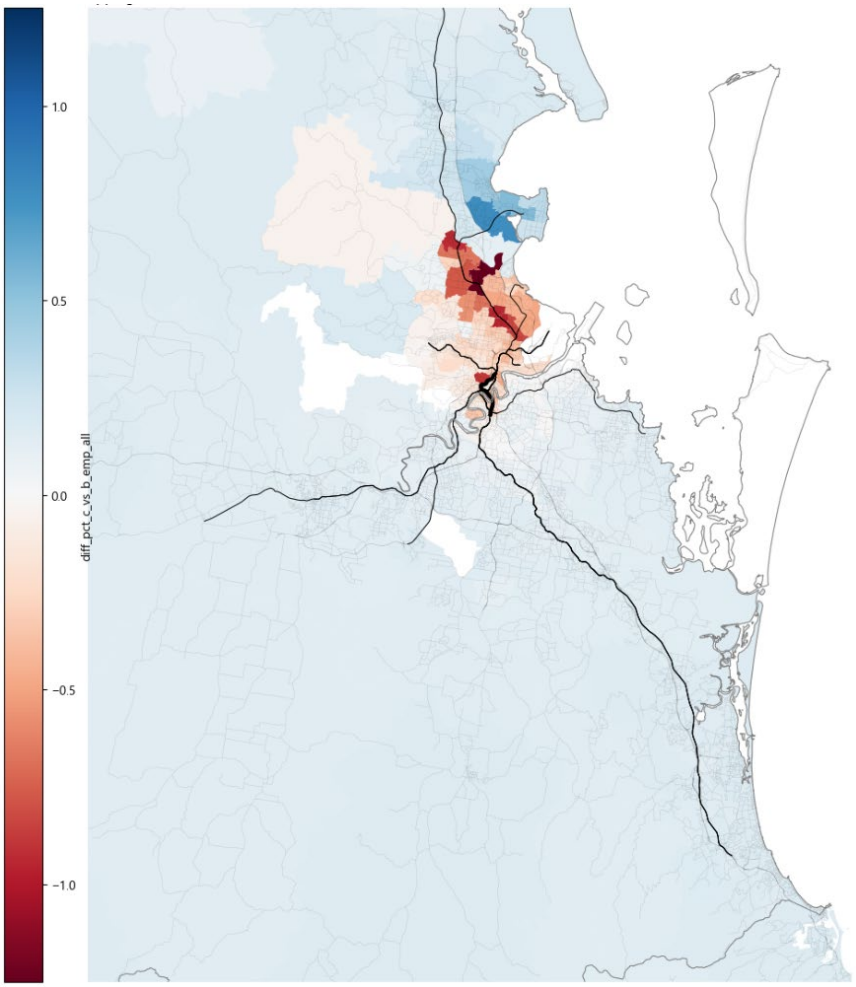


Figure 9: Capping Scenario location choice results: employment percentage change relative to Standard Scenario

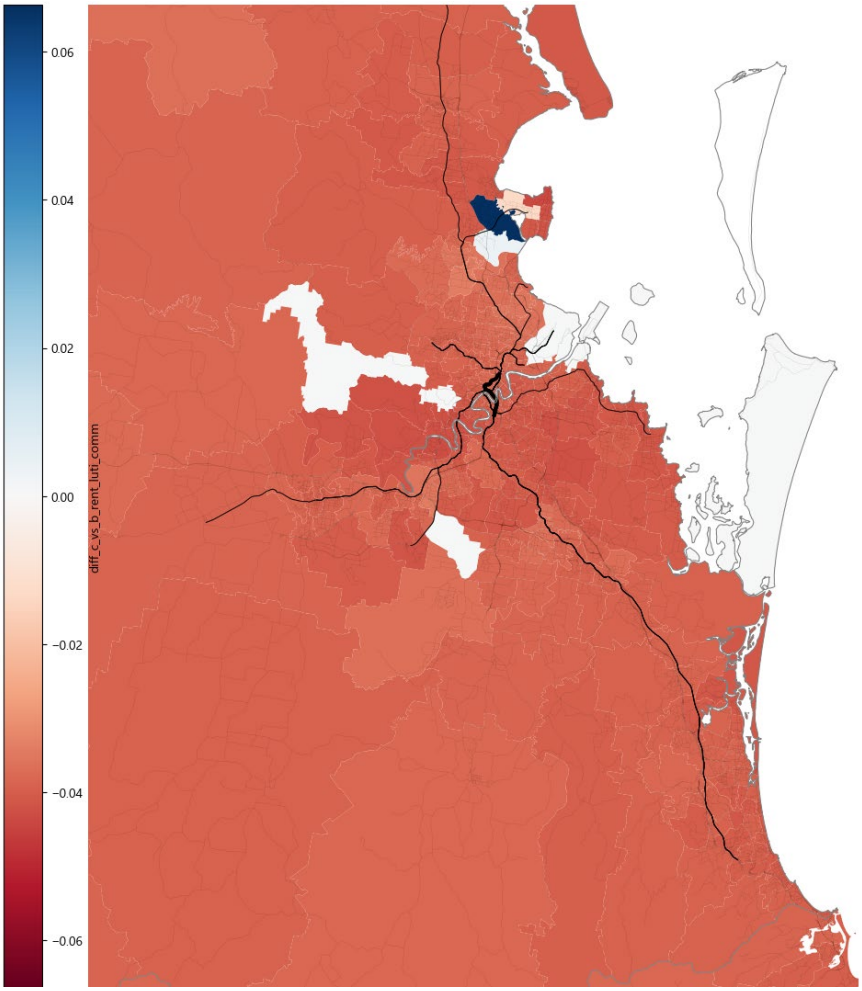


3.5.3 Housing affordability impacts

The housing affordability results for the Capping Scenario are shown in Figure 10 which shows results relative to the Standard Scenario. The figure shows that housing affordability in one of the SA2s within the capping area (North Lakes - Mango Hill) is improved, whilst all other areas of the city have poorer affordability. North Lakes – Mango Hill in the Standard Scenario sees significant population inflows with the transport shock of the CRR project. The higher rents resulting from these inflows are not experienced in the Capping Scenario because no population inflows occur.

The poorer affordability shown city-wide results from the missed opportunity for residents to locate to the now more accessible areas that have been capped, throttling the impacts these outflows would have had on other areas in reducing rents as well as reducing the ability of workers to shift to higher paying work locations accessible along the upgraded railway corridor. This results in a city-wide impact on housing affordability of +0.28%. This result is smaller than the Standard and Upzoned scenarios i.e. housing affordability improvements are lower in this scenario.

Figure 10: Capping Scenario housing affordability metric results: percentage change relative to Standard Scenario



3.5.4 Productivity impacts

The productivity metric for all zones for the Capping Scenario is +0.25%. This is the lowest productivity result out of the three scenarios. This result makes sense because of the reduced employment clustering effects that this scenario produces. As productivity scales with employment densities in our model, lower levels of employment densification will result in lower productivity.

3.6 Summary of the results

Table 2 below presents a summary of the housing affordability and productivity results for the scenarios described above. The results show that the best performing scenario in terms of improvements in housing affordability was the Upzoned Scenario, followed by the Standard Scenario. The Capping Scenario performed the worst out of the three scenarios tested on this metric.

The productivity results showed that the Standard Scenario performed the best closely followed by the Upzoned Scenario. The Capping Scenario produced the lowest productivity results.

Despite the range in values, all scenarios results returned positive improvements in housing affordability and productivity as the transport intervention itself drives the bulk of the

improvement, but the differences matter. The Capping scenario results in lower social outcomes compared to the other scenarios – highlighting lost potential from restricting the full advantages of the CRR project and supporting land use policies.

Table 2: Summary of housing affordability and productivity results

Scenario	Housing affordability	Productivity
Standard Scenario	+0.31%	+0.28%
Upzoned Scenario	+0.33%	+0.28%
Capping Scenario	+0.28%	+0.25%

3.7 Sensitivity testing

Sensitivity testing was conducted on the Standard Scenario to illustrate the sensitivity of the model to changes in assumptions. Three of the key variables in the QSM were varied in separate tests:

1. Transport cost semi-elasticity parameter, ν (decreased from -0.004 to -0.006)
2. Residential rent elasticity, $\beta_{1,r}$ (increased from 0.25 to 0.6)
3. Agglomeration economies in production, ϵ_A (increased from 0.04 to 0.07)

Table 3 presents the housing affordability and productivity results from these individual sensitivity tests for the Standard Scenario.

These results indicate that the most important parameter for affecting the results is the transport cost semi-elasticity (Sensitivity test 1). Changes to this parameter effectively adjust the amplitude of population and firm the location choice responses in the model due to changes in accessibility from transport shocks (in this case the CRR project).

The second biggest impact resulted from changes to the agglomeration parameter (Sensitivity test 3). This parameter controls the self-reinforcing feedback from employment clustering on attractiveness for employment locations. The sensitivity test increased this value and the result was higher affordability and productivity. The latter increase results in more productive firms, and former can be explained by workers in all regions benefiting from higher wages resulting from these more productive firms.

Sensitivity test 2 tested the impact of a higher residential rent elasticity. This higher value means rents will increase more when population increases but will also decrease more when population decreases. The results for affordability and productivity are small (below the rounding applied to these metrics, so they are not perceptible compared to the Standard Scenario). For housing affordability, this result partly because where rents have increased in more attractive areas due to CRR, they have decreased elsewhere by a similarly amplified rate. The metric is calculated at the city-wide level, so these differences average out. The productivity change finding is similar. Additionally, the changes in rents are small even with the higher rent elasticity. This supports earlier findings (see Section 2.2.2) that wage increases, not rent changes, drive most affordability improvements, especially since rents make up a modest share of household income and their changes are relatively small. The CRR project also leads to greater centralisation of jobs in the CBD, Brisbane's highest wage area which means income changes are strong in the case study.

Table 3: Summary of housing affordability and productivity results from sensitivity tests

Scenario	Housing affordability	Productivity
Standard scenario	+0.31%	+0.28%
Sensitivity test 1	+0.55%	+0.50%
Sensitivity test 2	+0.31%	+0.28%
Sensitivity test 3	+0.35%	+0.34%

4 Discussion

4.1 Summary and policy implications

This paper introduced two important issues front of mind in cities today: housing affordability and economic productivity and suggested that addressing these issues can be aided by taking an integrated approach to transport and land use planning. This paper introduced QSMs and how these tools can provide a more robust foundation for transport project appraisal by overcoming the problem of the 'partial equilibrium approach', i.e. focusing solely on the transport network without considering the broader implications for land use and economic activity. We then introduced a simple QSM grounded in microeconomic and urban economic theory which we used in scenario testing to show that it can provide a readily implementable mechanism for LUTI modelling feedback to overcome the partial equilibrium approach problem, as well as provide insights to city planners on housing affordability and productivity.

We then presented results from the QSM by running the model on a set of scenarios that reflect responses to a transport shock. The results from the scenario testing highlighted that the best performing scenarios in terms of addressing housing affordability and productivity were the scenarios that permitted and encouraged location choice and mobility in response to a transport shock.

Our work adds to a body of research in QSMs that has important policy implications for transport planning. QSMs provide a quantitative framework for understanding the impacts of transport projects and land use policy on social outcomes. When used in an integrated way alongside strategic transport models, QSMs provide a mechanism to more robustly account for how urban areas are shaped by transport infrastructure and policy. This would benefit planners in their goals to address many of the challenges they currently face.

This paper aligns with the body of literature (see Hsieh and Moretti (2019), Glaeser, et al. (2005), and Duranton and Puga (2015)) that suggests that constraining development (e.g. height and housing density limits), particularly in areas that have high transport accessibility (and/or see improved transport accessibility with improved infrastructure or services) leads to poorer outcomes at the society level for equality of access, housing affordability, and economic productivity.

4.2 Limitations and areas of improvement

Currently, the QSM determines rents based on population changes resulting from transport shocks. Considering the possibility that rents might vary with changes in perceived accessibility could enhance how the model represents area attractiveness in cases where locations see improved accessibility but land use is constrained (e.g. like the capping scenario in our case study above). This would allow rents to increase as the supply of housing in the newly more attractive area is constrained but demand increases. To do this, we need to distinguish impacts on rents from actual population changes and perceived changes due to accessibility change. This may be possible through analysis of real-world data such as the Census and rent or land value datasets (e.g. state government land value datasets).

The QSM is currently able to apply a hard cap on residential location choice, i.e. disallow population to shift to an area – but it is currently not able to apply varying supply limits (e.g. based on land use policies like density and height limits). This could be incorporated into the model by intervening in the location choice calculations to progressively cap off population increases as they approach the limit for each zone. Observed data on land supply would need to be sourced from official sources or estimated from compiled local sources (e.g. local governments).

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