

Depopulation by Day

Commuting and Population Change

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Introduction

- What I am going to do today is as follows;
 - Outline what we are interested in and the primary research questions we are considering,
 - Talk about some of the literature – mainly Partridge (2010) that inspired this work,
 - Have a look at some of the descriptive work we have undertaken so far,
 - Discuss the modelling that we are conducting at the moment.

What is this about?

- The underlying proposition being that the population in areas that are readily accessible, via commuting, to metropolitan labour markets will see less decline, or even growth,
- The amelioration of decline is largely driven by in migration of individuals/households who place a premium on rural amenity but still wish to access the metropolitan labour market and some urban amenities,
- A secondary effect of the influx of commuters on population growth can arise as the increase in demand in an area induced by the “commuters” leads to relative increases in employment and hence population.

What is this about?

- These largely positive impacts are not the only possible outcomes,
 - Roads, as they say, go both ways. People in jobs in rural communities and areas surrounding metropolitan areas may choose to avail themselves of the amenities of the metropolitan area by locating there and commuting to their jobs in the peri-urban area,
 - Close commuting ties can also be the first step in a downward spiral in which rural residents first out-commute to an urban area then relocate to the urban area to reduce commuting costs.

Primary research questions

- Do communities in close proximity to metropolitan areas benefit, in terms of population growth, from this proximity ?
- Conversely do communities distant from metropolitan areas suffer, again in terms of population growth rate, as a result of their isolation?
- Is the impact of demographic decline tempered by commuting?

Selected Recent Literature - Partridge et al (2010)

- A lot of the inspiration for this research comes from Partridge et al (2010)
- They investigate whether out-commuting is beneficial to the growth and viability of the rural communities through the job growth-commuting relationship they estimate a simple model of job growth including various spatially lagged and distance related variables ,
- They then estimate a commuting model (under a number of differing specifications) in which current commuting rates are regressed on past economic, demographic, pre-determined location factors, and province dummies,
- Partridge et al found a strong positive relationship between initial out-commuting rates and local job growth over the ensuing 15-year period,

Partridge et al (2010)

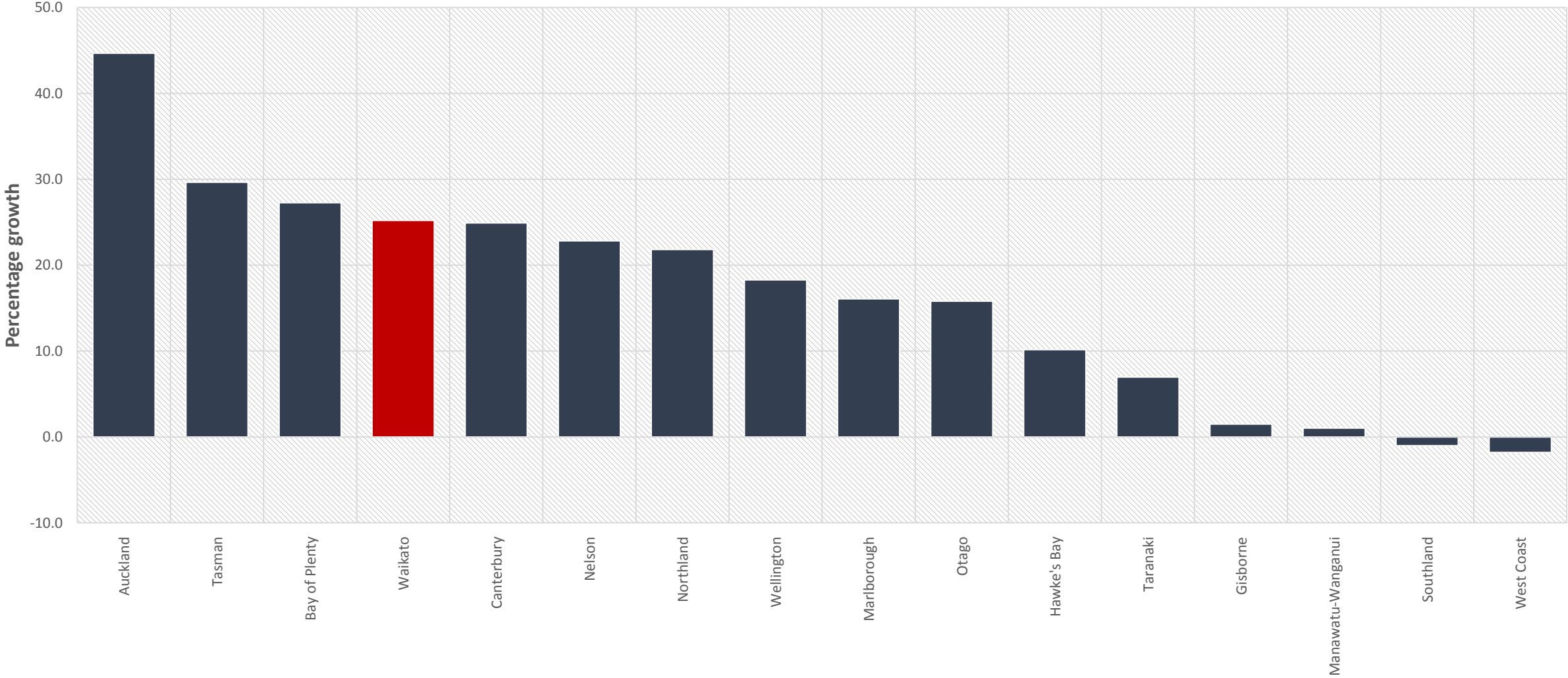
- This is consistent with out-commuters enhancing local incomes that support additional local retail and business establishment
- In addition their estimations provide evidence that supports the view that larger rural communities are more likely to see the relocation of population to them, i.e. people willing to commute from them to a major urban area, than small rural communities,
- Finally, positive employment and population growth outcomes for rural areas are not just related to the distance to the nearest urban area but rather to the nearest large urban area.

Data and Spatial Frame

- The data set we are using is a panel of census data 1986 -2013,
- The level of spatial aggregation we are using is the area unit as mesh blocks would give us a fine grained but very noisy model (even with data lab data) while territorial authorities lack the necessary resolution when dealing with commuting,
- The main innovations in the dataset are the provision of variables for aggregate commuting inflows, aggregate commuting outflows, mean direction of commute and various measures of employment availability, i.e. things such as employment density in nearby areas at various distances – 5/10/20 km radius

Why Use The Waikato as an Example? Solid Population Growth

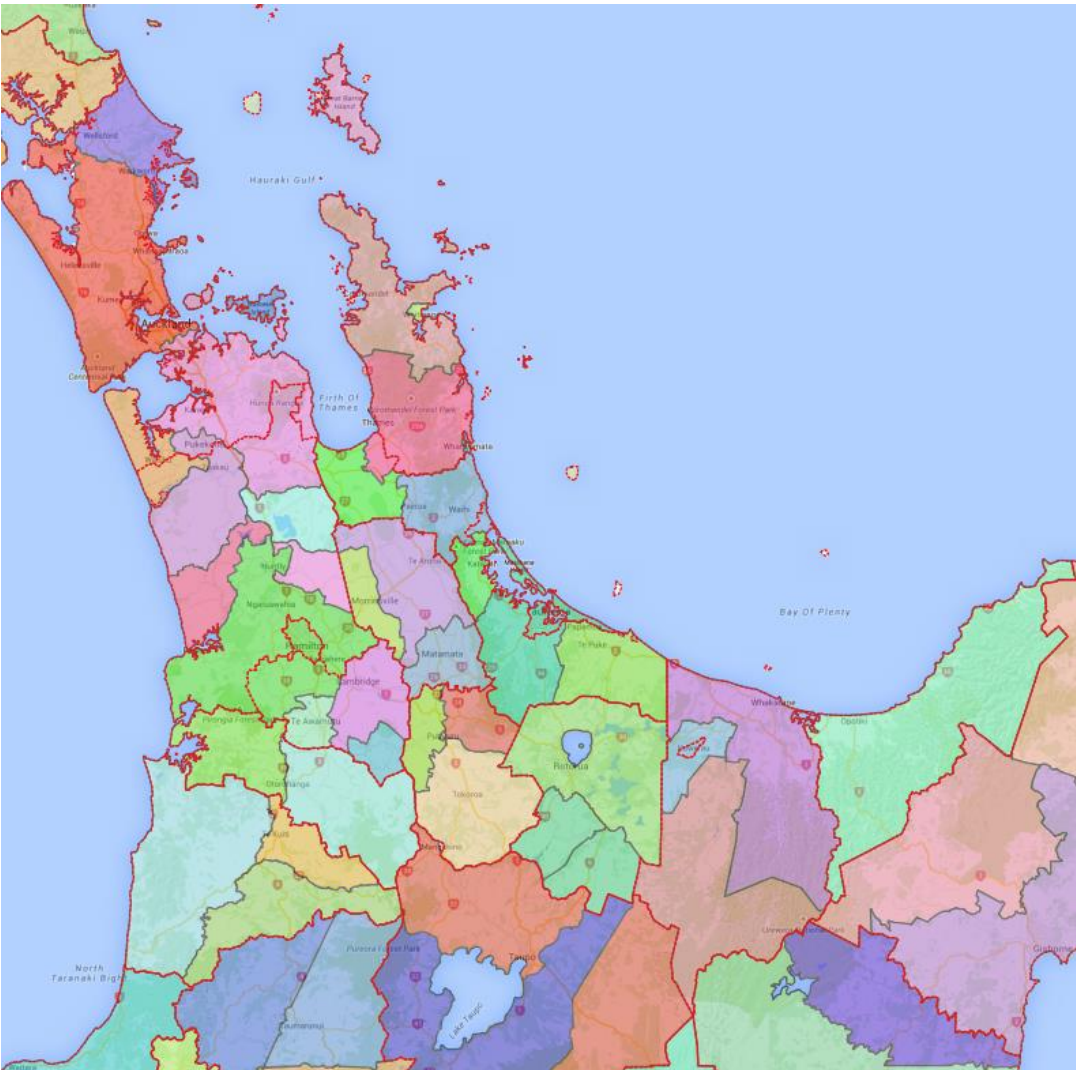
Population Growth 1996-2016



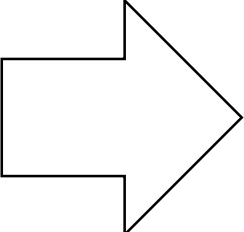
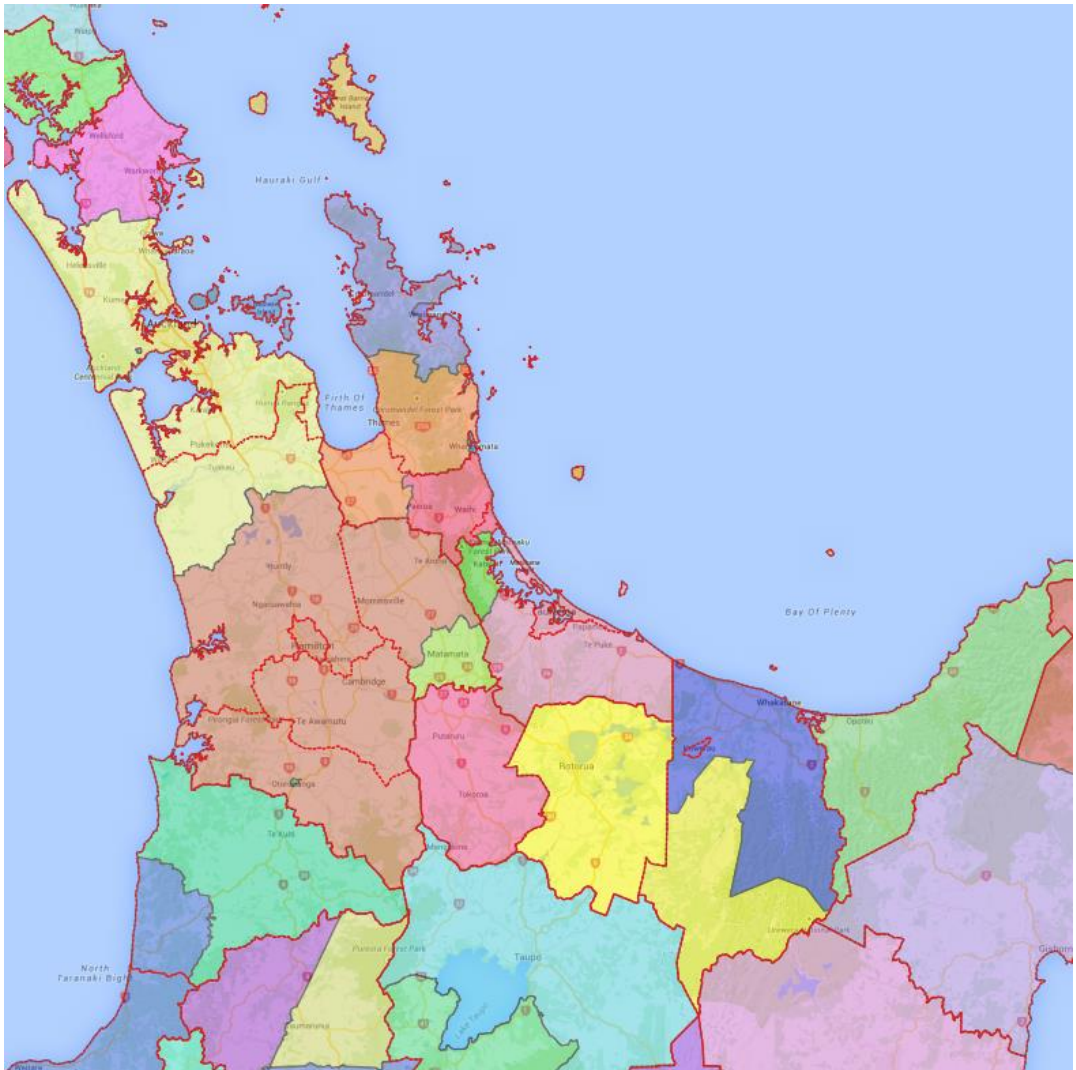
Subnational population estimates at 30 June 1996, 2001, 2006-16 (2017 boundaries)

Why Use The Waikato as an Example? Lots of Change in Commuting

1991 = 31 Commuting Zones in WRC



2013 = 11 Commuting Zones in WRC

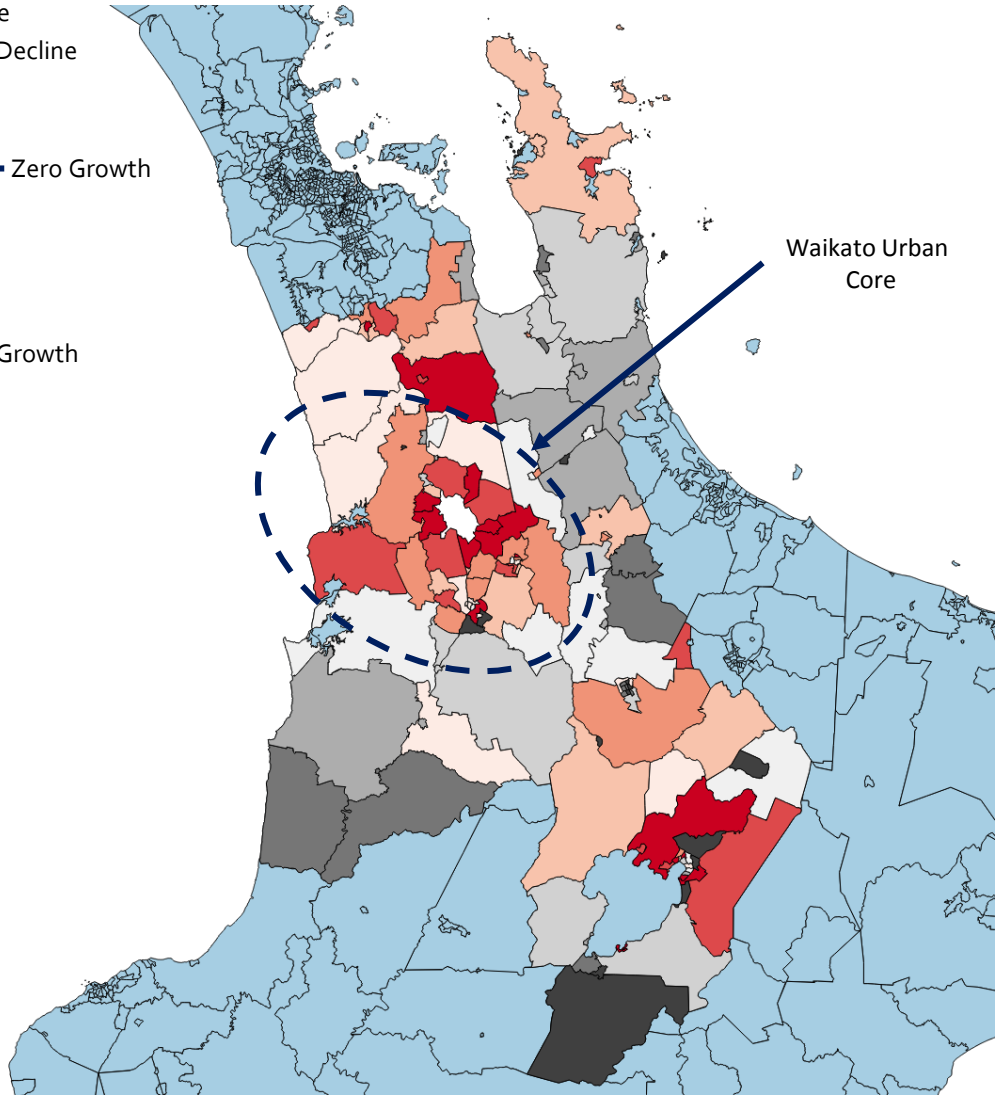
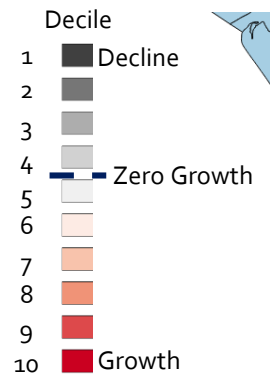


2013 Territorial Authority Boundary

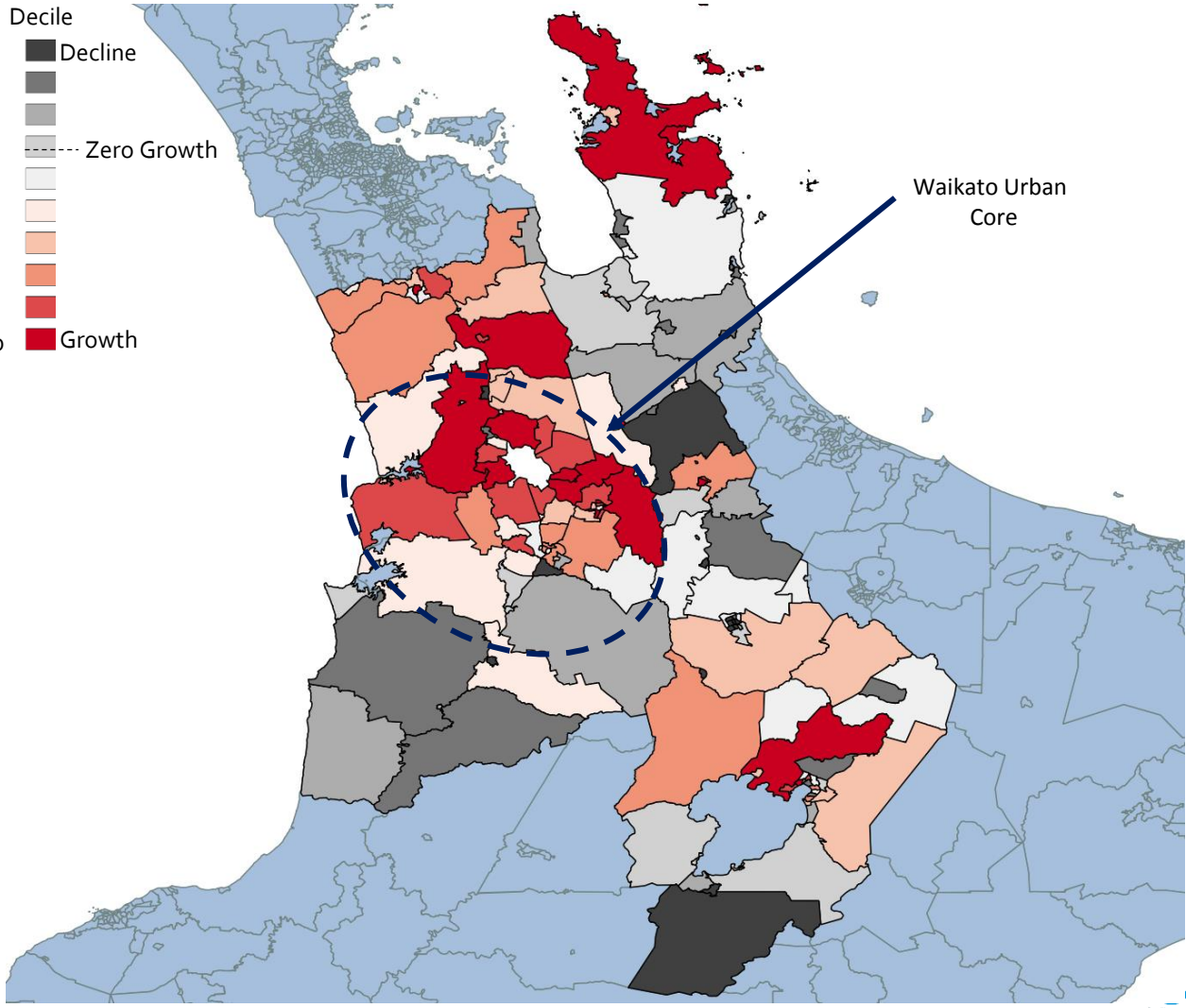
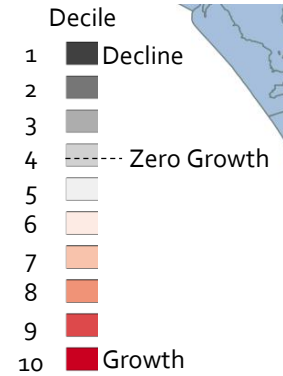


Population Growth in the Waikato 1996-2013 (Deciles, Excluding Hamilton)

Percentage



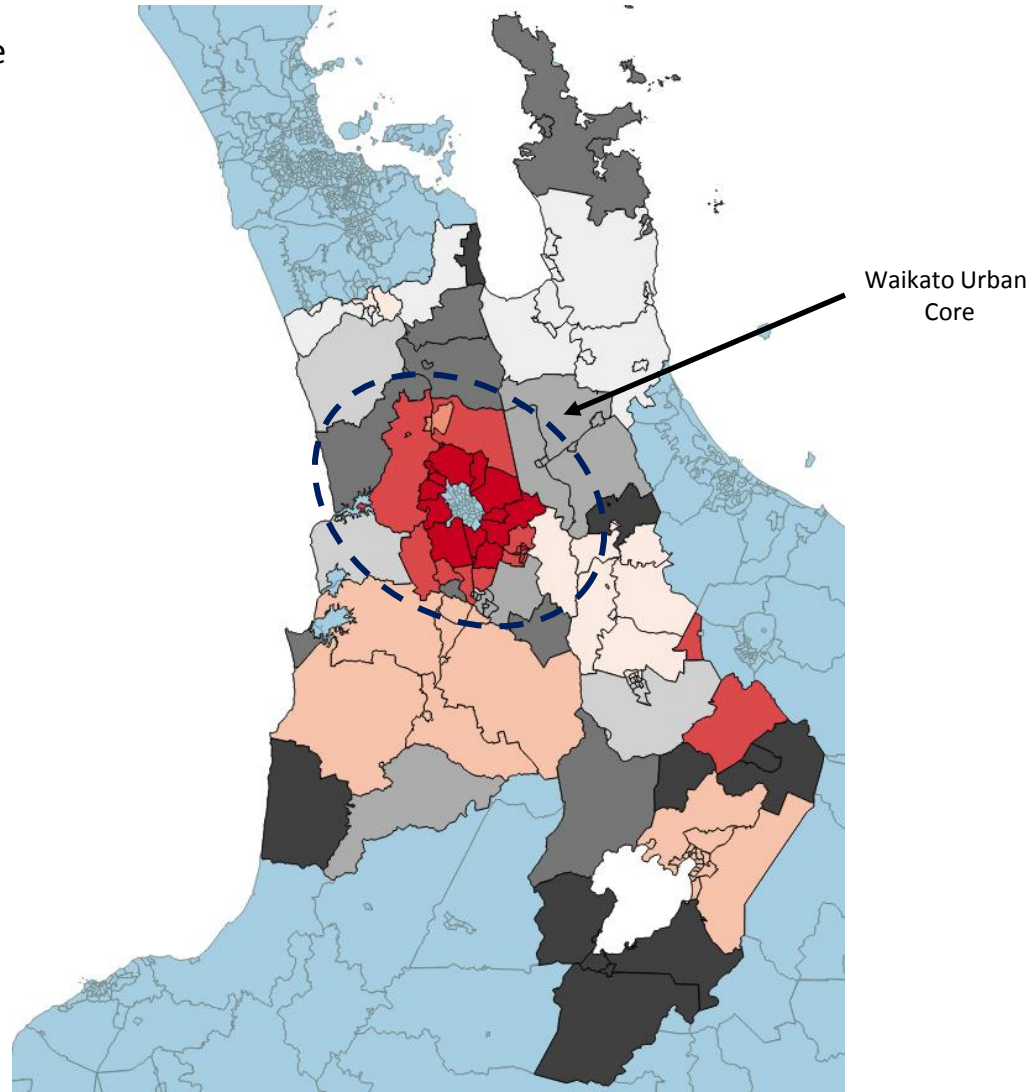
Absolute Change



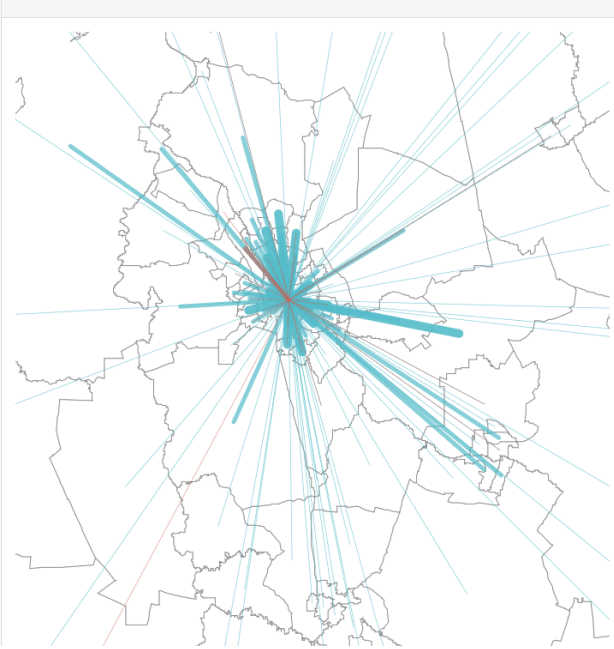
Maximum Employment Density – Waikato (excluding Hamilton)

Density Decile

- 1 Low
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9 High



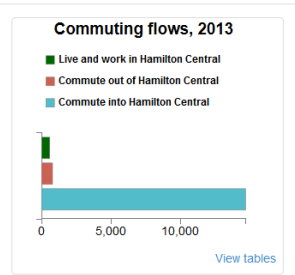
Where did New Zealanders commute to in 2013?



Hamilton Central

Hamilton Central

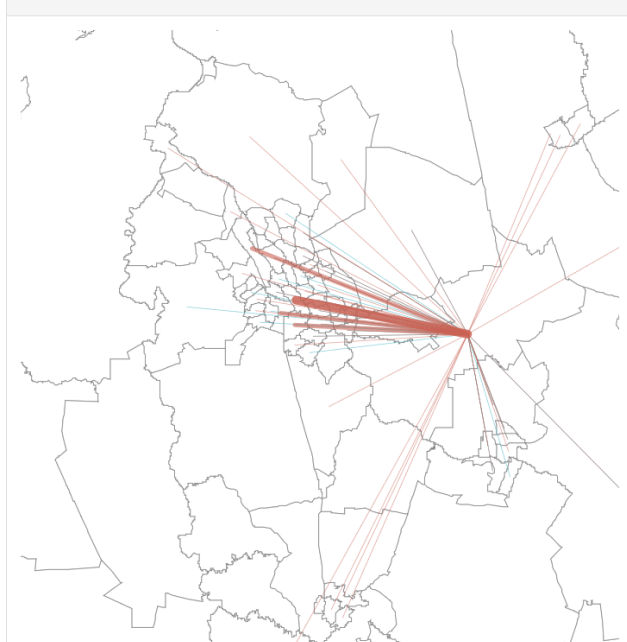
What does this map show?
Click on an area unit on the interactive map, then move your cursor over other area units to see the numbers of people commuting between them



Main means of travel to work

Source: <http://www.stats.govt.nz/datavisualisation/commuterview/index.html>

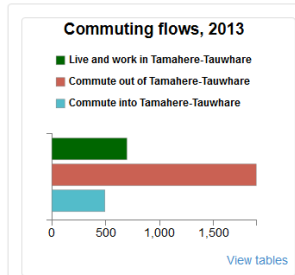
Where did New Zealanders commute to in 2013?



Tamahere-Tauwhare

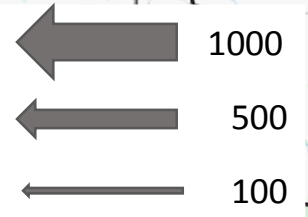
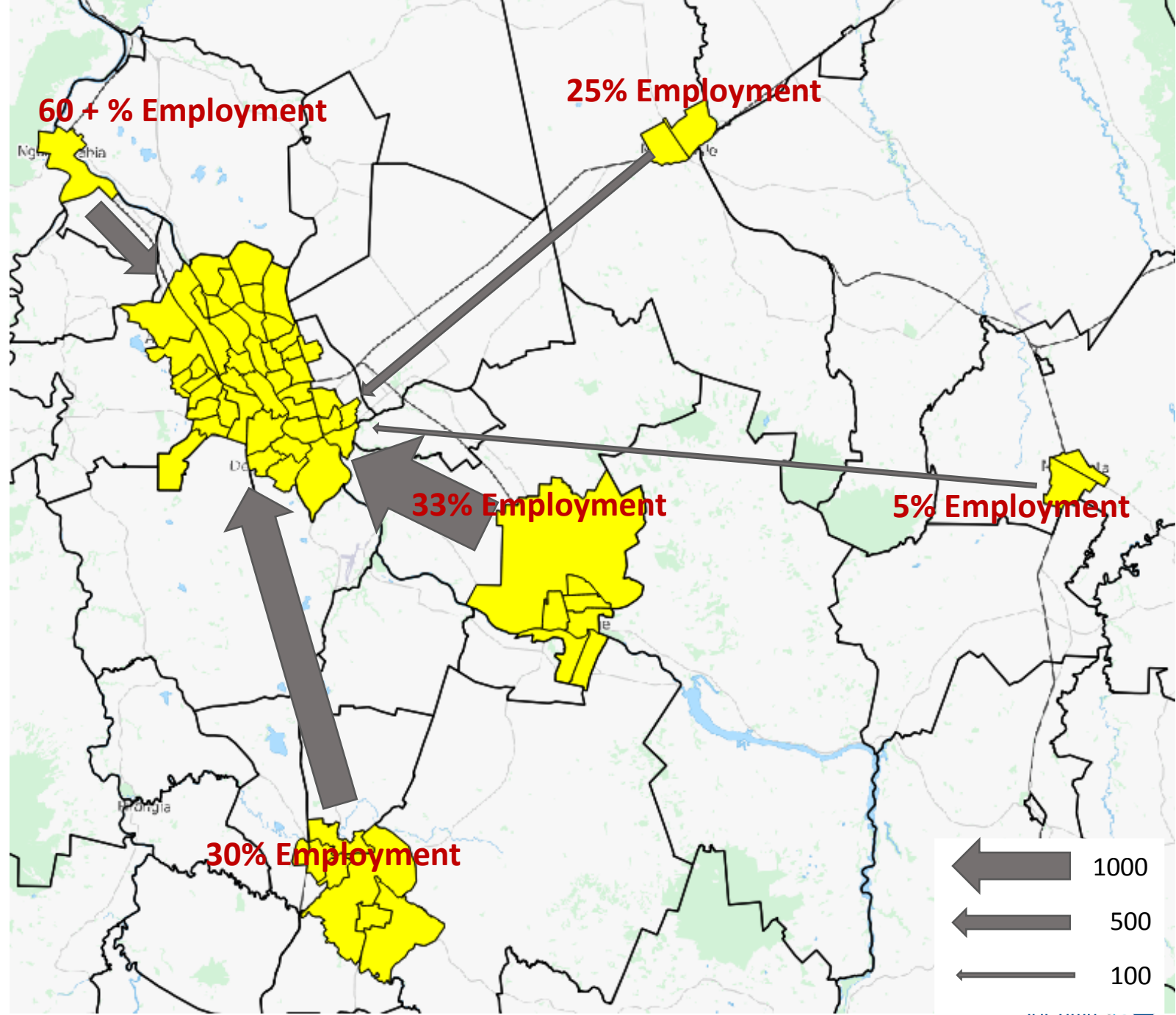
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The Model

Following Partridge et al (2010) we consider 2 models;

Job Growth

$$\%Jobgr_i = \alpha + \beta Geog_i + \gamma Demog_i + \lambda Reg + \epsilon_i$$

Commuting rate

$$\%Com_i = \alpha + \beta Geog_i + \delta Econ_i + \gamma Demog_i + \lambda Reg + \epsilon_i$$

Where;

$Geog_i$ a set of distance related variables reflecting area i 's place in the urban hierarchy,

$Demog_i$ a group of variables covering demographic structure, population size, human capital endowments and past commuting behaviour,

$\delta Econ_i$ some variables capturing past economic performance,

λReg some additional regional fixed effects.

An interaction term between the distance to the nearest urban centre and population growth is also included – the parameter on this interaction gives us an indication of the rate at which the population growth effects on out commuting attenuate with distance.

Estimation

- The models are being estimated using the panel variant of the Spatial Durbin Error Model for the following reasons,
 - A spatial model is indicated as the units of analysis form part of a contiguous spatial system in which these units are highly likely to experience spill-overs from surrounding areas,
 - The spill-overs between areas are unlikely to be purely reducible to commuting – other forms of interaction will show up as spatially correlated errors unless explicitly modelled,
 - As a rule of thumb in regional science most spill-overs are local in character, i.e. only the characteristics of an areas immediate neighbours exert an influence on the outcomes for that area – SDEM subsumes all over models of spatial spill-overs if the spill-overs are local in nature (SLX and SEM are special cases of SDEM)

Conclusion

- The estimation will be completed in the next couple of weeks
- We hope to be able to quantify the impact of commuting on population growth along with the speed at which this attenuates with distance from a metropolitan area,
- Having addressed the upside i.e. the positive effects of proximity to an urban area for population growth, we will turn to explicitly modelling the downside, the impact of isolation on population growth.