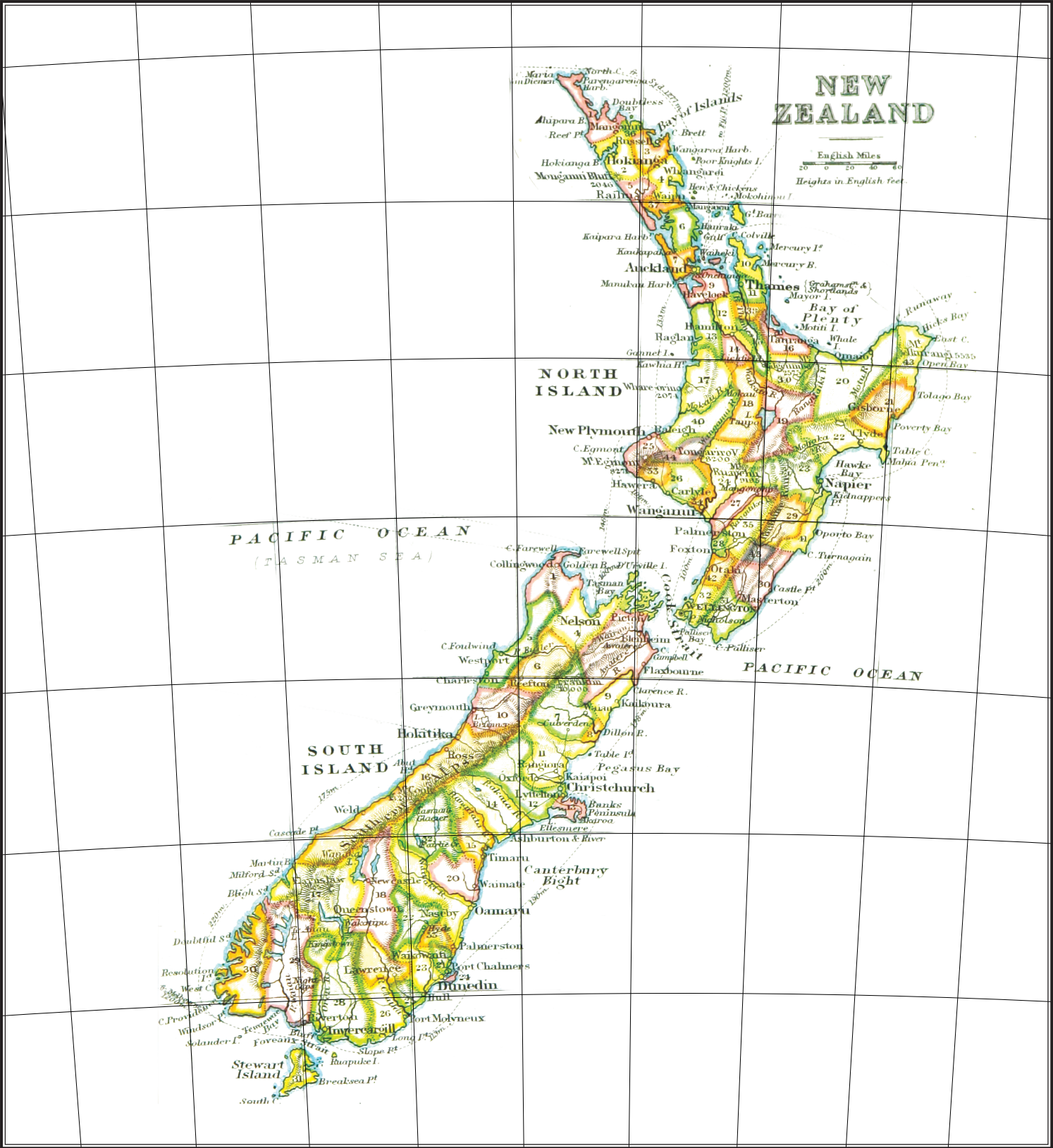# A New Zealand
Local Population Database
July 2017

By John Polkinghorne

A New Zealand Local Population Database

John Polkinghorne

July 2017 (version 1.0)

Front cover image: adapted from an 1899 map, initially published in "British Possessions and Colonies. [With maps.]" and retrieved from https://www.flickr.com/photos/britishlibrary/11254066744

Abstract

This paper builds on an approach first used by Grimes and Tarrant (2013). It relies primarily on digitised editions of the *New Zealand Official Yearbook,* building a local population database which covers the entirety of New Zealand.

Where Grimes and Tarrant (2013) cover 60 major towns and cities over an 80-year period, the New Zealand Local Population Database (NZLPD) covers more than 260 defined urban areas and rural centres over a 120-year period from 1891 through to 2013.

Unlike previous work, this paper also provides information for administrative regions and territorial authorities. As such, it represents a new wealth of information on long-term population trends, for both urban and rural areas. New Zealand's population grew from 670,000 to 4.35 million over the timeframe studied.

The database reflects economic and social changes across New Zealand since the late 19th century, and the differing patterns of development across different regions.

Acknowledgements

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1.   Introduction

New Zealand has experienced uninterrupted population growth over the last 125 years, growing from fewer than 700,000 people in 1891 to nearly 4.7 million today. The rate of growth has fluctuated through the years, with changes in birth and death rates, migration, and two world wars all playing a part.

Although long-term population statistics are available at the national level, they are very hard to obtain for more local areas. Stats NZ (2015) notes that "over time, New Zealand has had many different geographical classifications, which makes it difficult to compare population change at a regional level". The New Zealand Local Population Database (NZLPD) aims to address this difficulty.

Our work collects information on 'urban areas' – towns and cities – as well as local government boundaries, i.e. territorial authorities and regions. In many cases, information can be provided as far back as 1891 on a reasonably consistent basis.

Our hope is that the NZLPD will be useful to researchers in a range of fields, as well as to councils and New Zealanders generally. In the last century, New Zealand has changed and grown more than almost every other developed country. Population changes, such as urbanisation and the "northward drift" of the 20th century, give a window into how life in New Zealand has changed. In the absence of detailed regional economic information,[1] they provide a starting point for looking at how our economy has changed in different parts of the country. Over long time periods, differences in population growth are likely to reflect differences in economic growth, at least in part.

We intend to further expand and revise the NZLPD in the future. It will be updated as new censuses are undertaken, with the next one scheduled for March 2018. The files published together with this paper constitute version 1.0 of the database, and any future updates will also be publicly available.

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[1] It is only recently that 'official' regional GDP estimates have been produced, but a wide variety of other economic indicators are available at the regional level. Even so, it is difficult to find consistent regional data going back more than 20 years or so.

2. Prior Literature and Data Series

2.1. Population Growth in the North and South Islands

Stats NZ (2015) bring together some long-term population data in their *A Century of Censuses* database. The focus is on national-level data, but some information is also available for the North and South Island and for 13 statistical districts.

Figure 2.1: Census Night Populations for the North and South Islands, 1891-2013
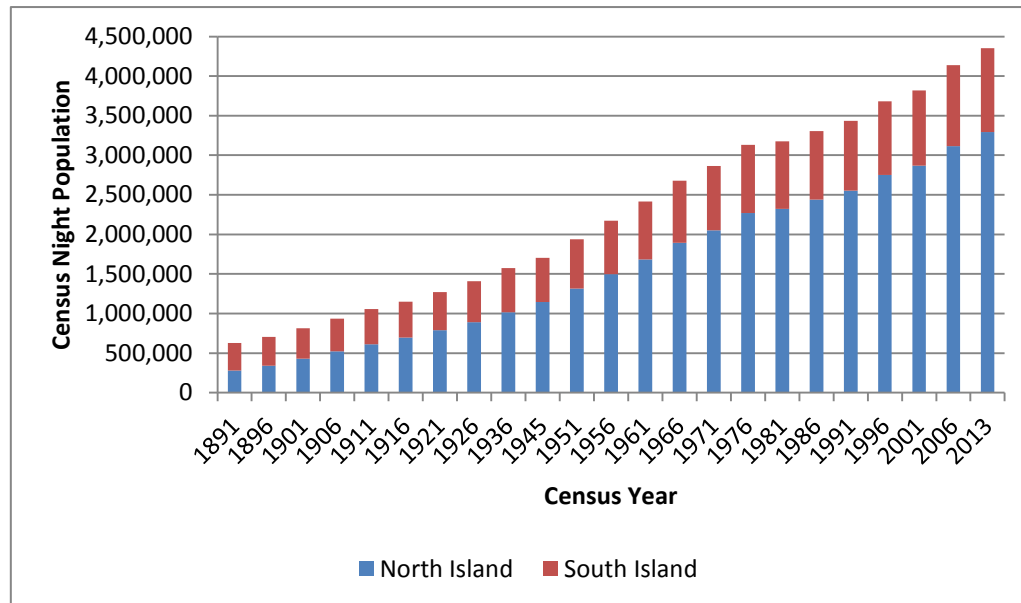
Source: Stats NZ (2015)

This database, containing census information back to 1858, shows that the South Island had a larger population than the North Island until the last years of the 19th century. However, in percentage terms, the North Island grew more rapidly than the South in the 1880s and 1890s. It continued to outpace the South Island's growth throughout the 20th century.

The "statistical districts" described in Stats NZ (2015) are based on New Zealand's old provincial boundaries. Although the provincial system was only in force from 1853-1876, information continued to be collected on the populations for these former areas – for convenience, rather than for any administrative function. To provide more detail, some of the areas were split. For example, the Auckland province, which had covered most of the upper North Island, was split into four: the Northland, Central Auckland, East Coast and South Auckland–Bay of Plenty statistical districts.

These statistical districts are often similar to modern administrative regions. However, the information available is very limited. Stats NZ (2015) only show rounded population densities for the statistical districts, so it is only possible to get a

rough idea of their actual populations. Data is only available back to 1926 for the districts which were split, such as the Auckland ones above, and supporting data such as maps of the statistical districts' boundaries is difficult to locate.

2.2.   International Migration

Migration has always been a key factor in New Zealand's population growth. New Zealand has comprehensive long-term statistics on migration (Statistics New Zealand, 2010), and articles such as Philips (2005) provide extra context: migration flows over the years have depended on government policy as much as economic factors. This has included policies which explicitly favoured certain countries and nationalities over others, and government-assisted immigration for certain groups.

The figure below shows New Zealand's annual "natural increase", or births minus deaths, and "net migration", or international immigration minus emigration, for 1860-2009:

Figure 2.2: Components of Population Growth, 1860-2009
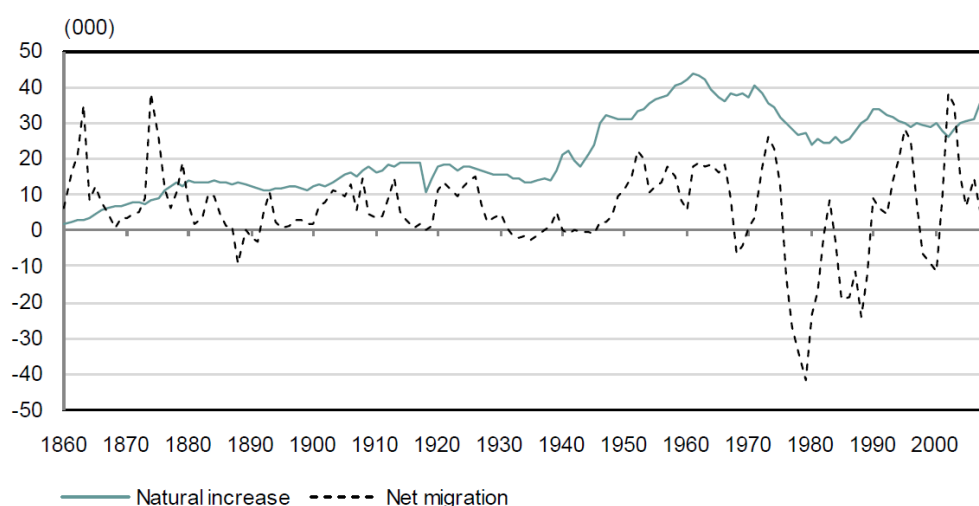
Source: Statistics New Zealand (2010)

Net migration has been positive for most years since 1891. It turned negative in the 1930s as the Depression hit, but was strongly positive for almost all years between 1949 and 1975. However, the "baby boom" which was happening at the same time meant that migration only accounted for a little over a quarter of New Zealand's growth in this period.

Net migration was negative over 1976-1989, to such an extent that New Zealand as a whole actually experienced population decline for one or two years. Immigration was liberalised in the late 1980s and early 1990s, to focus "selection of immigrants on personal merit rather than national or ethnic origin" (Philips, 2005). Since 1990, net migration has again been generally positive.

2.3.   Urban Population Growth

During the 20th century, cities emerged as the growth engines of most developed economies. They also dominated population growth, and continue to do so as discussed in section 6.2.

Grimes & Tarrant (2013) compiled population series for 60 of New Zealand's largest towns and cities over 1926-2006, in *A New Zealand Urban Population Database*. This paper was a major step forward for showing how populations had grown in different parts of the country. Although no nationwide comparisons are made in the paper, New Zealand is primarily an urban nation, and the Grimes & Tarrant (2013) database covers around 75% of New Zealand's population in 2006, and 87% of its growth over 1926-2006.

Grimes et al (2014) built on this earlier work to explore the links between urban population growth and other factors. These included infrastructure, wages and amenity. They concluded that "four dominant factors have impacted positively on urban growth, especially since 1966: local land use capability, sunshine hours, human capital and proximity to major population centres, especially Auckland". The paper suggests that policymakers could boost urban population growth through investing in human capital, and investing in transport links to major cities. It also noted that "policy should at least facilitate, and certainly not overly constrain, the size of New Zealand's most productive city; otherwise the risk is that growth will increasingly be located in Australia's four largest cities rather than in Auckland and its surrounding region".

3.   Methodology and Important Notes

The studies cited above give some information on how local populations have changed over time, but they do not provide detailed nationwide coverage. The New Zealand Local Population Database (NZLPD) aims to fill this knowledge gap.

To create their population series for towns and cities over 1926-2006, Grimes & Tarrant (2013) utilised the *New Zealand Official Yearbook* produced by Stats NZ and its predecessor the Department of Statistics. These yearbooks have been digitised for the entire period from 1893 to 2012, making data extraction reasonably straightforward. The yearbooks are an incredibly rich data source, for demography and a wide range of other topics.

When the current study began, the intent was to simply update Grimes & Tarrant (2013) to incorporate information from the 2013 census. However, we decided early on to use different methods of compiling and scaling the data.

More importantly, it became apparent that Stats NZ's yearbooks also contained a wealth of other population information, and census publications held even more information. We have drawn on some of this additional data to create the NZLPD. As well as showing the changing populations of towns and cities across New Zealand back to 1891, the NZLPD also provides information for various other local areas: past and present administrative areas, "provincial districts", and so on.

Although this study was inspired by Grimes and Tarrant (2013), it has been carried out as a completely separate piece of research. As with the earlier paper, we have gone directly to Stats NZ yearbooks and other publications for the data. In particular, key differences from Grimes and Tarrant (2013) include:

- Data is provided for all censuses between 1891 and 2013, i.e. generally at five-year rather than ten-year intervals;

- Data is based on 2013 boundaries wherever possible;

- We have taken a different approach to scaling and addressing discontinuities;

- "Census night population" figures have been used throughout, rather than the "usually resident population" which now forms New Zealand's official population measure;

- We include council areas (regions and territorial authorities) to provide complete coverage across New Zealand, not just towns and cities.

3.1.   The New Zealand Local Population Database

This paper discusses the background to the NZLPD, as well as some interesting results from the database. However, it should be read in conjunction with the data files themselves, which are the main output of this work. The NZLPD data file is in Microsoft Excel XLSX format and includes the following sheets or tabs:

- *Intro.* This sheet includes version details, important notes and comments on data sources;

- *Figures.* This sheet includes figures which have been reproduced in this paper, along with the raw data behind them;

- *Urban Areas.* This sheet includes our "final" data for towns and cities across New Zealand;

- *Regions and TAs.* This sheet includes our "final" data for regions and territorial authorities across New Zealand;

- *Raw data – Urban Areas.* This sheet includes raw data from yearbooks and census publications, covering defined "urban areas" only;

- *Raw data – Pre-1989 Towns.* This sheet includes raw data from yearbooks and census publications, covering all towns which were administratively defined prior to 1989;

- *Raw data – Pre-1989 Counties.* This sheet includes raw data from yearbooks, covering all counties which existed prior to 1989;

- *Raw data – Maori 1896-1911.* This sheet includes raw data from yearbooks, showing the geographic spread of the Maori population during these years;

- *Concordance.* This sheet shows how modern region and territorial authority boundaries relate to former county boundaries.

We note that the spreadsheets have not been formatted for printing.

We also note that the "final" data often contain formulas which refer back to cells in the raw data sheets. This has been done to make it easier to see where data has come from, any adjustments that have been made, etc. If moving or transferring the data into other spreadsheets, we suggest pasting "values" or text, rather than "formulas".

Essentially, the NZLPD includes information on two different types of areas: urban areas, and council areas. These two types of area have quite different data characteristics and issues. Urban areas are much more straightforward. The main issue is how to scale the population figures. As a secondary issue, information for many smaller towns is only available for the last 30 or 50 years.

Council areas – regions and territorial authorities – are more complex. The main issue is how to apportion populations to modern-day council areas, using county information which in some cases is based on drastically different boundaries, as well as mergers, splits and boundary changes over more than a century (1891-1989) for

which we have data. Fortunately, our data is generally accurate to least at the regional level, which is the most likely level for economic analysis. For many territorial authorities, we believe the data is quite accurate over the entire timeframe of this study. We have noted where this is not the case.

3.2.   Data Sources

All information in the NZLPD is ultimately sourced from censuses, carried out by Stats NZ and its predecessor agencies. Generally, our data has come from four different kinds of publication:

- Most data for years prior to 1986 is compiled from editions of the *New Zealand Official Yearbook*;
- We have also referred to some census publications directly in order to extend data for some smaller towns;[2]
- Data for 1986-1991 has been retrieved from 1996 census tables (Stats NZ, 1997). These use 1996 area unit boundaries, which we have approximated to 2013 boundaries as closely as possible;
- Data for 1996-2013 has been retrieved from NZ.Stat tables (Stats NZ, 2014). These use 2013 area unit boundaries.

Many of these data cover overlapping years, which provides an opportunity to check their consistency. The "raw data" sheets in the NZLPD show our efforts to compare overlapping data.

We have also relied on other Stats NZ information, including urban/ rural concordances and land areas. As an excellent starting point for viewing current boundaries, we recommend Stats NZ's Geographic Boundary Viewer.[3] This interactive map includes all urban areas, territorial authorities and regions.

The Geographic Boundary Viewer does not extend to the counties, boroughs and other areas which existed prior to 1989, and we have reviewed a number of historic maps to align pre-1989 boundaries as closely as possible with current ones. This is especially important for our work on territorial authorities and regions.

Ironically, some long-term data was more accessible in the pre-digital era than it is today. For example, a key data source for the NZLPD is a table published as part of the 1981 census, and containing population information for 37 urban areas over the 55-year period between 1926 and 1981 (Department of Statistics, 1982). These tables and others like them have never been digitised; part of our work for this paper

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[2] 1986 census publications include 'area unit' population figures for 1976-1986, and those from the 1976 census include figures for 1966-1976 (Department of Statistics, 1977/ 1987). We have used these to extend the data series for towns not covered in editions of the *New Zealand Official Yearbook.*

[3] http://www.stats.govt.nz/StatsMaps/Home/Boundaries/geographic-boundary-viewer.aspx

has been collating similar pre-digital data, and matching them as closely as possible with urban area and local authority boundaries as they are defined today.

3.3.   Data Breaks and Discontinuities

We have endeavoured to provide consistent data wherever possible. However, some data breaks and discontinuities have been impossible to avoid. In the NZLPD data tables, we have signalled this by putting numbers prior to the data break in italics, or highlighting them in yellow for more significant breaks. These older figures should be treated with caution.

All data can be affected by changes in area definitions. For example, counties and boroughs often had boundary changes during the 1876-1989 period where this system of local government was used. Boroughs were typically expanded over time, whereas counties amalgamated, split or were subjected to other shifts. The "raw data" sheets in the NZLPD include information on land areas (in square kilometres) to aid in identifying discontinuities.[4]

New Zealand's current system of regions and territorial authorities is quite different from the previous system of counties and boroughs. For some parts of the country, substantial data breaks arise in the process of switching from the old to the current system, affecting data prior to 1986. We have endeavoured to apportion population to the current areas as closely as possible.

One issue affecting all data prior to 1926 (and some data for 1926) was that Maori were excluded, as explained in section 3.6 below.

For urban areas specifically, data breaks can arise from switching from 'borough' to 'urban area' data, or when the urban area is redefined. These breaks typically relate to expansions. For most towns, we consider them to be reasonably insignificant over the longer term.

3.4.   Scaling and Adjustments

Given the presence of data breaks as explained above, there is a need to 'adjust' some raw data to approximate today's boundaries. We have attempted to be as transparent as possible about this, providing "raw data" and concordance sheets, and using formulas in our final data which link back to the raw data.

For urban areas, the process is generally one of "scaling", usually scaling older figures upwards. We have not scaled the figures where the data breaks seem to be negligible, and we have not scaled the figures for smaller urban areas.

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[4] It appears that many of the differences in land area from one census to the next are the result of measurement differences, rather than changing boundaries. The land area data should be used with caution, and only major changes in the area figures should be seen as indicative of boundary changes.

For regions and territorial authorities, the process is generally one of "apportionment". This is inherently more difficult, and means that the data for some council areas may become less accurate the further back it goes.

For example, the former Vincent County is now split between the Central Otago and Queenstown-Lakes Districts. There were two boroughs within the (geographic) county, Alexandra and Cromwell, both of which are now part of the Central Otago District and have had their populations allocated accordingly. Of the remaining population, we estimate that 90% of the population in 1986 was within the Central Otago District, and assume that that ratio remained the same as far back as 1891. This is likely to be a reasonable assumption for 1981 say, but the uncertainty increases for older years.

3.5. Population Measures

Since the 1996 census, the standard population measure for New Zealand has been the "usually resident population": people who were in New Zealand on census night and who usually reside there.

Prior to the 1996 census, the standard population measure for New Zealand was 'de facto' or 'census night' population. This is a count of all people in New Zealand on census night, including both residents and overseas visitors.[5]

Stats NZ (2015) shows both the census night population and the usually resident population for New Zealand over 1986-2013. The gap between the two measures has gradually increased over this period, due to the growing importance of tourism. In 1986, the night population was just 1.0% larger than the usually resident population, but by 2013 the gap had grown to 2.6%.

Since information on the usually resident population is only available for the last thirty years, and census night population is available for the entire 1891-2013 period covered by this study, we have elected to use census night population throughout our database.

This approach contrasts with Grimes and Tarrant (2013) who use usually resident population for more recent years. Their approach involves a small 'data break' in the process of switching from census night population to usually resident population, although as outlined above, the differences are small.

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[5] People who live in one part of New Zealand but are staying in another part on census night are allocated to their area of usual residence. As such, census night population figures for any area are always at least as large as the usually resident population for that area. The difference between the two measures is generally small.

3.6.   Maori

For all censuses up to and including 1945, separate censuses were carried out for the Maori and non-Maori population. The two censuses would be carried out in the same year, and usually in the same month, so in theory they should be reasonably comparable – but Stats NZ do note difficulties in enumerating the Maori population, especially in earlier censuses.

Editions of the *New Zealand Official Yearbook* prior to 1927 provide detailed geographic information for the non-Maori population, but only limited information for the Maori population. Editions from 1928 onwards show figures for the total population, including Maori.

Unfortunately, the 1927 edition is the only one to provide 1926 census results, and it does so only for the non-Maori population. The 1928 edition instead shows "population estimates" for 1927, which do include Maori. Unlike modern population estimates, these figures did not adjust for census undercount, and are essentially what Stats NZ would have expected to find if they had carried out a census on this date.

To give a more complete picture, we have shown both the 1926 census results (excluding Maori) and the 1927 estimates (for the total population). More complete data may be available from other sources, but this will have to wait for future research.

As such, NZLPD population figures for earlier years (1891-1921, and 1926 in many cases) exclude Maori. All figures for more recent years include both Maori and non-Maori. This causes a 'data break' in the series. However, as explained in section 6.4 below, the Maori population prior to 1926 was concentrated in a few parts of the country, such that Maori made up only a small share of the population in other places (and most urban areas).

3.7.   Census Frequency

With very few exceptions, censuses have been carried out in New Zealand every five years since 1881, which of course includes the entire *Database* period. Censuses are generally undertaken in March or April, so in most cases the time between them is very close to five years (Statistics New Zealand, 2013a).

The most significant breaks in this pattern were two cancellations due to depression and world war (in 1931 and 1941), and the recent 2013 census, postponed from 2011 due to the Canterbury earthquakes. Censuses were held in April 1926, March 1936 (a 10-year gap), and September 1945 (a 9.5-year gap, with what would have been the 1946 census essentially brought forward by six months to provide more timely information).

4.   Urban Areas

4.1.   Urban Areas

Towns and cities can be defined in a number of ways. Definitions can be based on administrative (local government) boundaries, but these have gone through many changes over New Zealand's history. Furthermore, administrative boundaries often include significant rural areas, and – especially since 1989 – towns can be quite sizeable without actually having their own local governments.

As such, Stats NZ defines urban areas, "designed to identify concentrated urban or semi-urban settlements without the distortions of administrative boundaries" (Statistics New Zealand, 2013b).

"Urban areas" were first defined in 1917. Stats NZ intended to review urban area boundaries only very occasionally, so they drew them to include some neighbouring rural areas which could conceivably become urbanised in the future. Urban area boundaries were reviewed in 1951, 1971 and 1991, and any revisions in intervening years were minor. With a couple of exceptions as described later, there have been only very minor changes to these boundaries since 1991.

Today, Stats NZ defines a hierarchy of urban areas, as follows:

* 17 main urban areas, with populations of more than 30,000;
* 14 secondary urban areas, with populations of 10,000-30,000;
* 103 minor urban areas, with populations of 1,000-10,000.

Some main urban areas are further subdivided into "urban zones":

* Auckland is subdivided into North, West, Central and South zones;
* Wellington is subdivided into the Wellington, Lower Hutt, Upper Hutt and Porirua zones;
* Hamilton is subdivided into the Hamilton, Cambridge and Te Awamutu zones;
* Napier-Hastings is subdivided into the Napier and Hastings zones.

We focus on the overall urban areas in this paper, although the NZLPD does also provide population information for the urban zones.[6]

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[6] In two cases, the zone boundaries were shifted in 1989. In Auckland, Otahuhu was formerly considered to be part of the South Auckland zone, and is now part of the Central Auckland zone. In Wellington, Tawa was formerly part of the Porirua zone and is now part of the Wellington zone.

4.2.   Rural Centres

New Zealand also has a number of even smaller towns which are not considered to be urban areas. 133 of these towns are, however, identified as "rural centres". These have a population of 300-1,000 people, and their identification "enables the separation of rural dwellers living in true rural areas from those living in rural settlements or townships" (Statistics New Zealand, 2013b).

Although rural centres are not considered to be truly urban today, many of them did have some administrative status in the past, as boroughs, town districts etc. As such, long-term population information is available for a number of rural centres.

We have presented the population data for New Zealand's towns and cities on the same basis used by Stats NZ. The "Urban Areas" sheet in the NZLPD groups main and secondary urban areas together, followed by minor urban areas, and then rural centres. We note again that rural centres are not technically urban.

The "Raw data - Pre-1989 Towns" also contains information on towns which are too small to even be considered rural centres today, although the data is quite incomplete.

4.3.   Scaling Urban Area Populations

Urban areas are defined in terms of "area units", which are typically suburb-sized. Larger cities can be made up of a large number of area units, whereas small towns can consist of one or several area units. As outlined in section 3.2, we have data for all urban areas using current 2013 area unit boundaries, for 1996-2013. We also have data using 1996 area unit boundaries, for 1986-1996. With very few exceptions, this gives complete and consistent population information for all urban areas and rural centres over 1986-2013.

Tables from the 1981 census (Department of Statistics, 1982) include population information for 37 urban areas over the 55-year period between 1926 and 1981. By comparisons with other data, we were able to confirm that these tables used consistent 1971 boundaries for the entire time period.

These tables eliminated the need to scale population figures for most of New Zealand's main and secondary urban areas, at least for 1926-2013. With three exceptions (Hamilton, Tauranga and Napier-Hastings), there do not seem to be significant differences between the 1971 boundaries and those used today, at least for the purpose of estimating populations.

For minor urban areas, and for years prior to 1926 in the case of main and secondary urban areas, our "final" data typically gives the populations for each census year based on the population in the corresponding borough (or other administratively defined area). We have not scaled any of the populations for minor urban areas.

It is evident from some *Yearbook* editions that a number of smaller urban areas have been defined in the past, although their populations were not published in the *Yearbooks*.[7] We have not been able to locate data for these smaller urban areas as yet, but this is an area for future investigation.

There are some more significant discontinuities for some urban areas, highlighted below:

- A major discontinuity for Hamilton in 1986 – the Hamilton urban area was substantially enlarged, with adding an extra 13.7% to the population in 1986;

- A major discontinuity for Queenstown in 1986 – the Queenstown borough had a population of 3,659 in 1986, with the Frankton community adding another 634. As defined today, the Queenstown urban area had a population of 6,510 in 1986, 52% higher;

- A discontinuity for Rangiora in 1986 – the borough had a population of 6,674 in 1986, whereas the urban area had a population of 8,200 in 1986, 23% higher;

- There are discontinuities for some minor urban areas, which we have not scaled or attempted to correct;

- These include altered boundaries between 1996 and 2013, affecting Rolleston, Wanaka, Amberley and several smaller towns. These are shown in column BN of the "Raw data - Urban Areas" sheet;

- These discontinuities also include altered boundaries between 1986 boroughs (or other administratively defined areas) and urban areas, affecting Kerikeri, Motueka, Coromandel and other small towns. These are shown in column BM of the "Raw data - Urban Areas" sheet.

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[7] For example, the 1982 *Yearbook* gives the populations for all 'main' and 'secondary' urban areas, and shows their combined population at 2,361,044 in 1981. 'Minor' urban areas had a combined population of 289,860, but their individual populations are not shown.

5.   Administrative Areas

5.1.   Local Government Boundaries since 1989

New Zealand's system of local government was radically overhauled in 1989. The structures that were put in place during these reforms are largely intact today. These include the "two tier" system of regions and territorial authorities, and council boundaries which, with a few exceptions, have not changed since 1989.

2017 Local Government Boundaries for the North Island
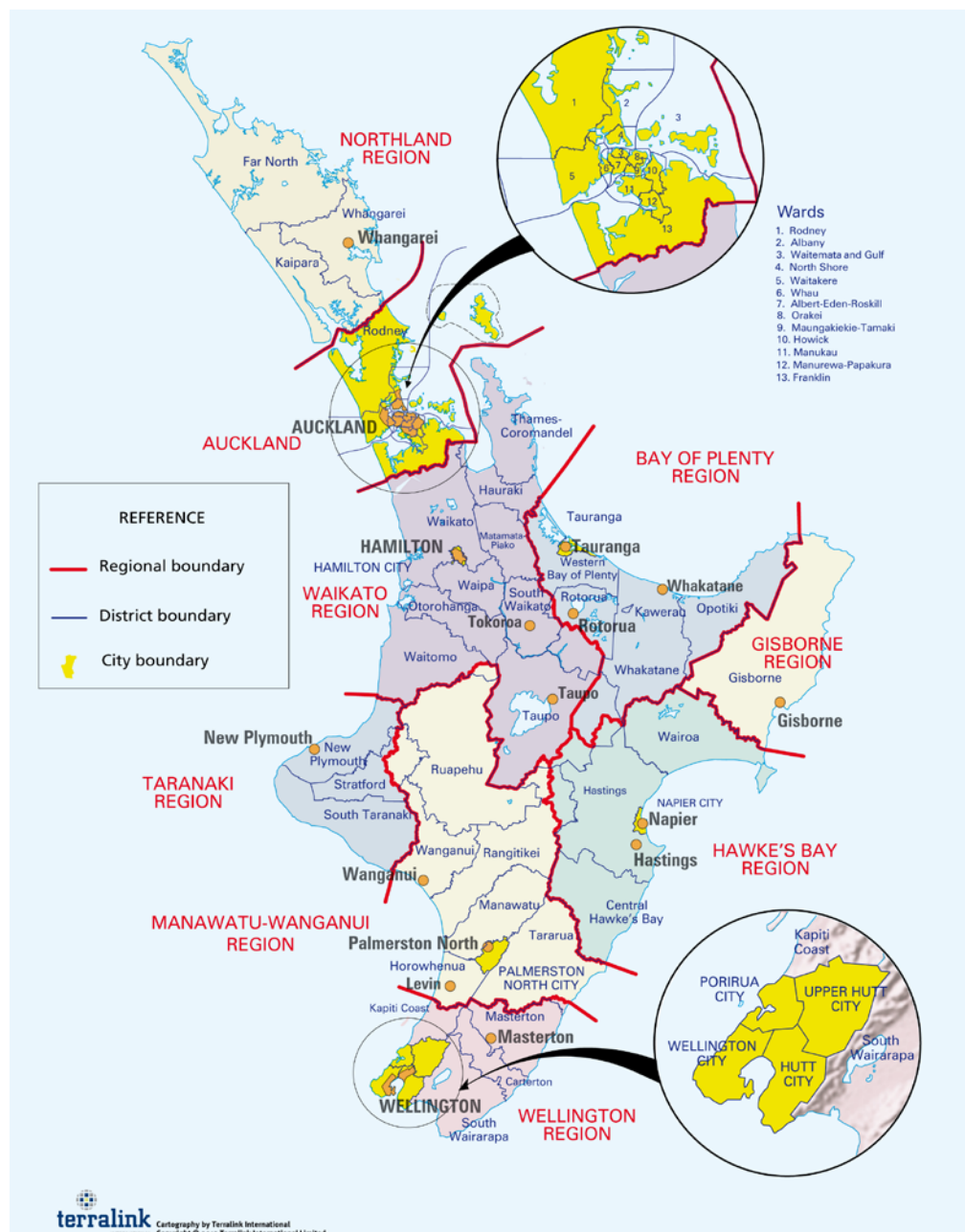
Source: http://www.lgnz.co.nz/nzs-local-government/new-zealands-councils/. A South Island map is also available from this link.

The first tier of local government is the region, administered by regional councils. As at 2016, New Zealand is divided into 16 regions. Regional councils are primarily responsible for environmental management, although their role includes input into urban planning, public transport, civil defence and various other matters.

New Zealand is divided into 67 cities and districts, administered by territorial authorities. These form the second tier of local government. Territorial authorities are known as district or city councils as appropriate, with no difference in function. They are responsible for local roads, water infrastructure, reserves, building consent, resource management and consents, and a range of other matters.

Almost all parts of New Zealand are part of both a region and a territorial authority, with some minor exceptions such as the Chatham Islands. We also note that a small number of councils, including Auckland, are "unitary" and perform both regional and territorial functions.

There have been a small number of boundary shifts and amalgamations since 1989 – most notably, the 2010 amalgamation of the Auckland region and seven territorial authorities into the unitary Auckland Council.

5.2.   Local Government Boundaries 1876-1989

Between 1876 and 1989, most parts of New Zealand were administered by city, borough or county councils. Generally, this was a one-tier system, although administrative responsibility could be shared in some small towns.

Geographically, New Zealand was divided into more than 100 counties, which covered the entire country except for some offshore islands. However, administratively, counties did not have responsibility for all parts of New Zealand. Most towns and cities were independently administered by borough (or city) councils, while smaller towns could be partly or fully administered by other types of councils.

The distinction between administrative and geographic counties is therefore an important one. *Yearbooks* typically provided population results for the administrative counties only. To derive populations for geographic counties, we have taken the administrative figures and added the populations of boroughs and independent town districts within those counties. Population figures for both administrative and geographic counties are shown in the "Raw data - Pre-1989 Counties" sheet of the NZLPD data tables.

Boroughs were the most common and longest lasting form of town governance, with some surviving for more than a century from 1876-1989. Larger boroughs could become "cities", although this was a change in name only.

As outlined in the Department of Statistics' 1902 yearbook:

> *The several stages in the growth of a New Zealand town may be marked thus: The village, taxed by the parent county, and dependent upon the latter for all public works; then the legally constituted town district, still subordinate to the county in some matters, its affairs administered by a Board presided over by a Chairman. When its population exceeds 500 the town district may become independent of the county, and control the whole of its revenues. If the population reaches 1,000, full municipal powers may be obtained [as a borough], with the dignity of a Council presided over by a Mayor, and finally, if the number of inhabitants should reach 20,000 or over, the title of "city" may be assumed, although the constitution remains unaltered. (Department of Statistics, 1902)*

Villages, commonly known as 'townships', were not clearly defined and had no administrative function. While population data is available for many townships over time, it may not be consistent given the lack of a clear boundary. We have generally excluded townships in the NZLPD, although they may be added in the future.

Townships later received a more formal statistical definition, as "non-administrative population centres". In many cases, the NZLPD has information for these towns over 1966-1986. They include towns which had lost their administrative function, as well as some which were quite sizeable but had never been administratively defined.

The *Yearbook* quoted above refers to "independent" town districts, which like boroughs had full administrative responsibility. Dependent town districts only had partial responsibility.

The situation for smaller towns was less stable than that for boroughs. By the 1970s, few independent town districts or dependent town districts remained. Many of them transitioned to one of the other types of local body below.

The Counties Act 1956 provided for the establishment of "county towns", which only had very limited responsibility within their overall county. Around 100 county towns were defined, and the NZLPD has information for most of these carrying through to 1986 and indeed to 2013.

The Local Government Act 1974 changed the system again, abolishing county towns but allowing for "communities" within counties. The county council could delegate some responsibilities to community councils, at its discretion. Most county towns became communities, and there were more than 100 across New Zealand.

The 1974 reforms also established a new form of local government, the district. These districts were usually created when counties amalgamated with the boroughs within them – a hint at the 1989 reforms to come – and they reflected areas which

were neither fully urban nor rural in character. Only a small number were created prior to 1989, and their boundaries do not necessarily coincide with modern district boundaries.

6.   Discussion

6.1.   New Zealand's Urban Population in 2013

New Zealand is primarily a nation of urban residents. Of the 4.35 million people in New Zealand on census night 2013, 3.73 million (85.7%) were within the 134 defined urban areas.[8]

According to the 2013 census, 30% of New Zealand's population (1.33 million) was in Auckland, with another 17% were in Wellington or Christchurch. Hamilton, Napier-Hastings, Tauranga and Dunedin are smaller again, and were the only other urban areas with a population of at least 100,000 each.

The populations of these urban areas, our seven largest, are shown in Figure 6.1 below:

Figure 6.1: 2013 Census Night Populations for the Seven Largest Urban Areas
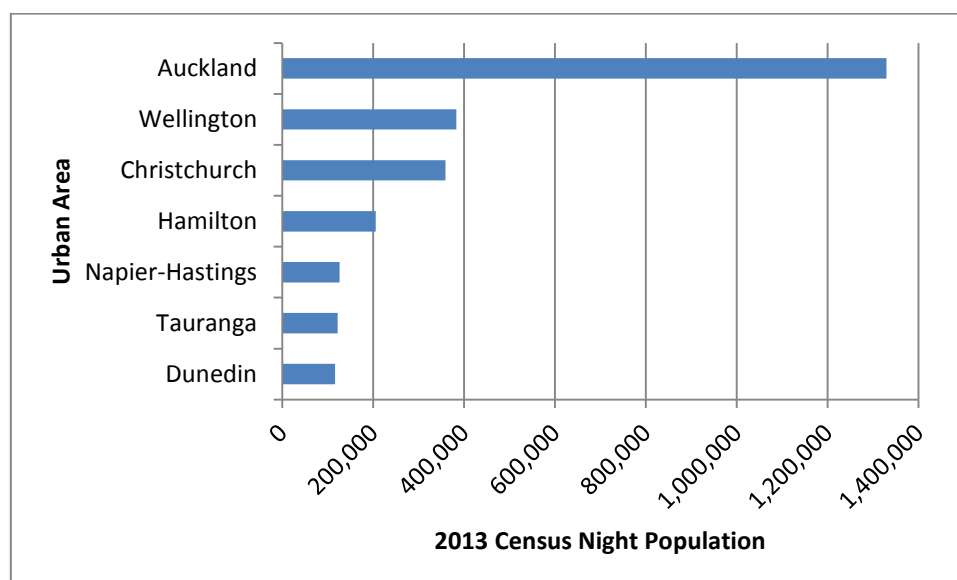
There are another ten urban areas which have a resident population of at least 30,000 as at 2013, and meet the criteria for "main urban areas". Their populations are shown in Figure 6.2 below:

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[8] This is the 'census night' population, as used throughout this paper and data set.

Figure 6.2: 2013 Census Night Populations for Other Main Urban Areas
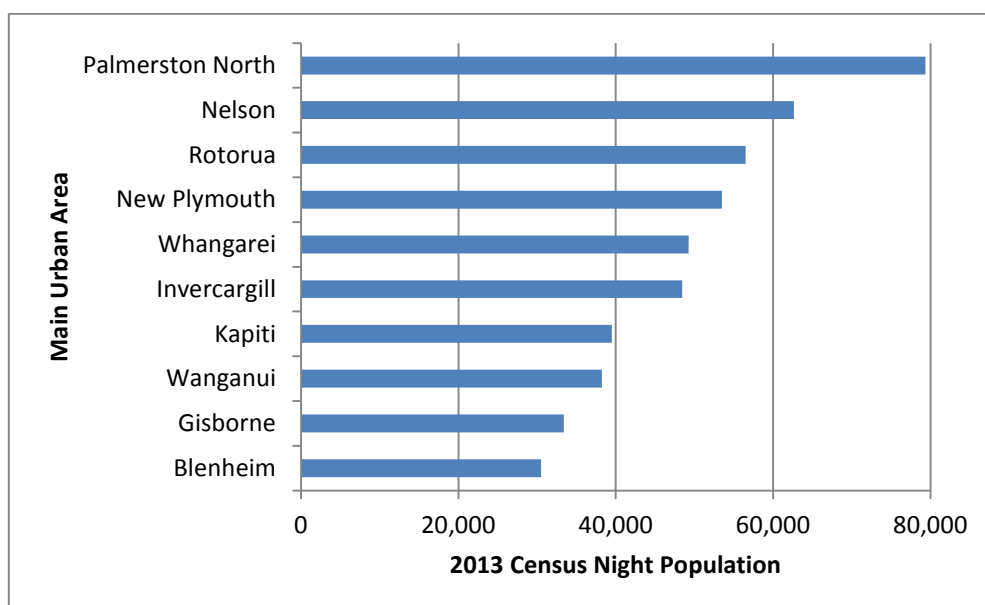
72.0% of New Zealand's population was in the 17 main urban areas listed above, with another 5.7% in secondary urban areas and 8.0% in minor urban areas.

Most of the remaining population is truly rural: the 133 defined rural centres had a combined population of just 78,000 people (1.8% of the New Zealand total).

6.2.   Urban Drift

"Urban drift", the tendency for populations to grow faster in cities than in rural areas, has been a long-established trend in New Zealand. The Department of Statistics noted in their 1928 yearbook that:

> *The increasing proportion of urban population in recent years is plainly manifest. It is noteworthy that the "urban drift," either non-existent or quiescent up to 1906, in that year commenced a swift rise, which is rapidly gaining in momentum... New Zealand is not alone in experiencing the modern tendency towards urban aggregation: it is, in fact, occurring in almost all countries. (Department of Statistics, 1928)*

Stats NZ have made various attempts to quantify the shift from rural to urban population, although these have been complicated by changing definitions of what constitutes an urban area.[9] Figure 6.3 below shows the strong growth in urban population between 1886 and 2001:

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[9] International comparisons are also somewhat difficult, as countries use a variety of definitions.

Figure 6.3: Number of People Living in Urban and Rural Areas, 1886-2001
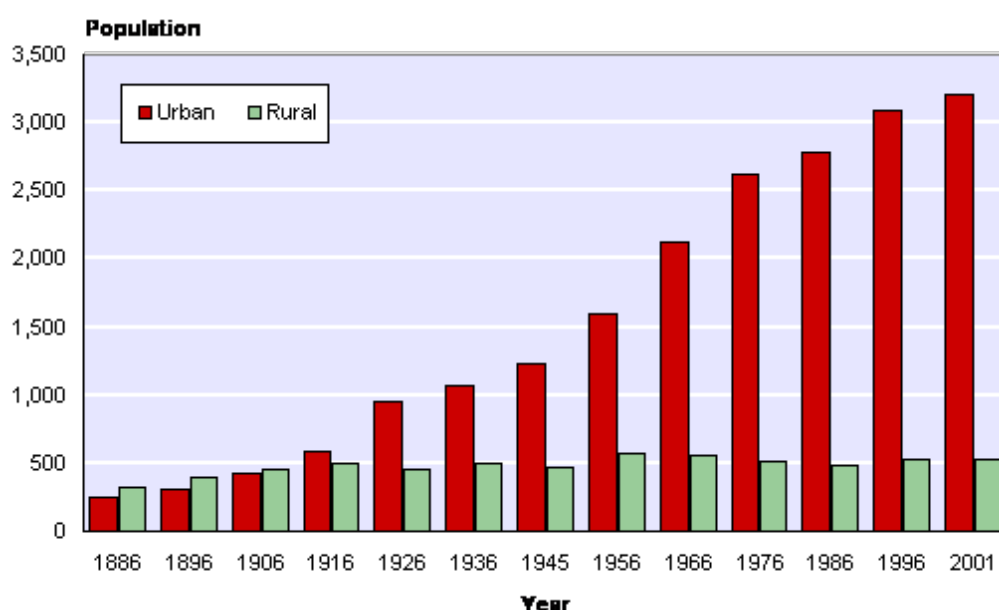
Source: Stats NZ (2004)

This graph shows the rural population remaining essentially constant from 1916 to 2001. Interestingly, this has not been the case in more recent years: the rural population has now grown to more than 600,000, with more intensive dairying perhaps one of the major contributors.

Another graph from Stats NZ (2004) shows that more than 55% of New Zealand's population was rural in 1886, with this percentage declining rapidly to a little over 30% by 1926, and falling more gradually thereafter. As noted earlier, only 14% of New Zealand's population is rural today.

6.3.   Urban Area Consistency and Population Density

There is some subjectivity around how urban areas are defined, and where their boundaries are drawn. As noted above, Stats NZ has always defined them to include some surrounding non-urbanised land, to allow for expansion and avoid the need to redraw the boundaries too frequently.

Demographia (2017) take a different approach, defining an urban area as "a continuously built up land mass of urban development that is within a [single labour] market", or conceptually "the lighted area that can be observed from an airplane (or satellite) on a clear night".

As such, Demographia (2017) define the Auckland urban area as covering 544 km², whereas the 2013 Stats NZ definition covers 1,092 km². The Stats NZ definition is shown in Figure 6.4 below, and includes areas which could be thought of as semi-

urban – for example, lower density lifestyle blocks, steeply hilly areas (including the Waitakere Ranges). These areas have low population density, but are highly influenced by their proximity to built-up areas of Auckland. For example, residents are likely to work and access services within the more established parts of the city.

The ratio of "built up" to "semi-urban" space varies significantly between different urban areas as defined by Stats NZ. As such, the NZLPD data is not well suited to comparing population densities.[10] However, it is useful for comparing total populations, as the semi-urban areas on the fringes tend to be relatively unimportant to the overall population.

Hamilton is the most broadly defined urban area, containing the Hamilton, Cambridge and Te Awamutu zones. As at 2013, it covers a larger land area than any other urban area defined by Stats NZ. At 1,100 km², this is marginally larger than the Auckland urban area, although Auckland has more than six times the population.

Figure 6.4 below shows the Auckland and Hamilton urban areas (and their component zones) at the same scale. We also note that Pukekohe, to the south of Auckland, is defined as its own urban area and not considered to be part of the Auckland urban area:

Figure 6.4: Auckland and Hamilton Urban Areas (2013 Definitions)

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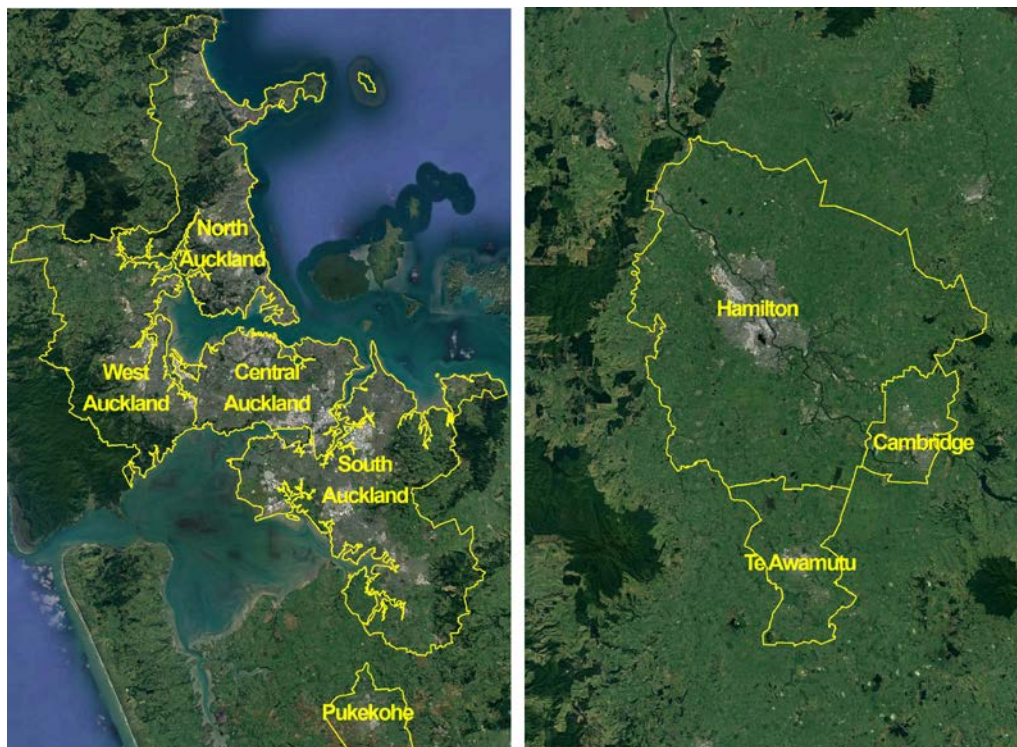
[10] Nunns (2014) investigates population density for major Australasian cities, using a "population-weighted density" measure. This is likely to be more informative than a simple average density calculation.

Hamilton is an outlier in terms of this very broad definition. It is also significantly different from the 1971 definition for Hamilton, which was much more tightly drawn around Hamilton itself and excluded Cambridge and Te Awamutu. This is the cause of the major 'data break' for Hamilton in 1986.

6.4. Maori Population Geography

In the late 19th century and early 20th century, most Maori lived in rural parts of the country, i.e. outside defined urban areas. Maori only made up a small proportion of New Zealand's urban population.

The Department of Statistics' yearbooks list the number of Maori living in each geographic county for the 1896-1911 censuses. We have included this information in a "raw data" sheet of the NZLPD.

More than 20% of Maori lived in what is now the Northland Region, where they made up around half the total population. Almost another 20% of Maori lived in Gisborne or the Hawkes Bay. Most others lived in the Waikato or Bay of Plenty areas, and fewer than 6% lived in the South Island.

The data confirms the largely rural nature of the Maori population at that time. During this period, there were only a few hundred Maori in the Auckland isthmus (Eden County) or in Wellington (Hutt County). Based on these figures, Maori only made up 0.3% to 0.5% of residents in the Auckland isthmus, or in urban Wellington, in these censuses.

The Department of Statistics write in their 1962 yearbook:

> "*As late as the 1936 census only 8,249 [Maori (10.02 per cent of the total Maori population)] dwelt in cities, boroughs, or independent town districts. By the 1961 census the comparative figure was 57,411 (34.4 per cent). The largest concentration is in Auckland Urban Area, where 19,847 [Maori] were enumerated.*" (Department of Statistics, 1962)

By comparison, the total population in cities, boroughs, or independent town districts was 926,166 in 1936 and 1,549,790 in 1961. Maori made up 0.8% of the urban population in 1936, and 3.7% in 1961.

There are two separate trends which underlie this change: firstly, the migration of Maori to towns and cities as evidenced by the Stats NZ quote above; and secondly, the growing size of the Maori population generally.

Information is also available on the Maori and total populations for 14 urban areas in the 1926, 1936 and 1945 censuses. As shown in Figure 6.5 below, Maori made up a growing percentage of the urban population over this period, for most cities:

Figure 6.5: Maori % of Total Population in Urban Areas, 1926-1945
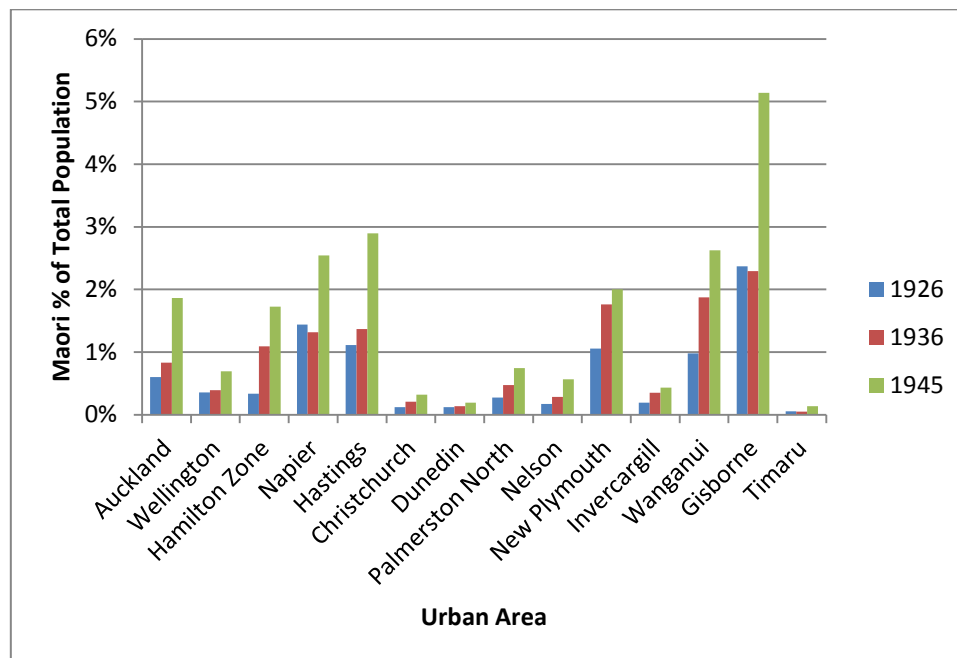
In 1926, Maori made up less than 1% of the population in most urban areas, with Gisborne the main outlier – and even there, the Maori population was only slightly over 2% of the total. The 1936-1945 period saw much larger changes than the 1926-1936 period, and seems to have marked the start of large-scale Maori urbanisation.

As such, although most of the NZLPD's population figures prior to 1926 exclude Maori, this is unlikely to have much bearing on our estimates of urban area populations. However, populations for some regions and territorial authorities, especially those in the upper North Island, will be underestimated prior to 1926.

Today, the Maori population is approximately as urbanised as the non-Maori population. According to the 2013 census, 505,000 of the 599,000 New Zealanders identifying with Maori ethnic groups lived in urban areas, a rate of 84.3% compared with 85.7% for the total population. Maori made up 13.8% of the total urban population in 2013.[11]

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[11] Note that this data is based on the 'usually resident population' concept, rather than census night population as elsewhere in our paper. Modern concepts of ethnicity have also evolved from those used in the days of separate European and Maori censuses.

6.5.   Auckland's Prominence

New Zealand is unusual internationally in having a major city with a third of the country's population. However, Auckland was not always seen as being unusually prominent. In their 1902 yearbook, the Department of Statistics wrote:
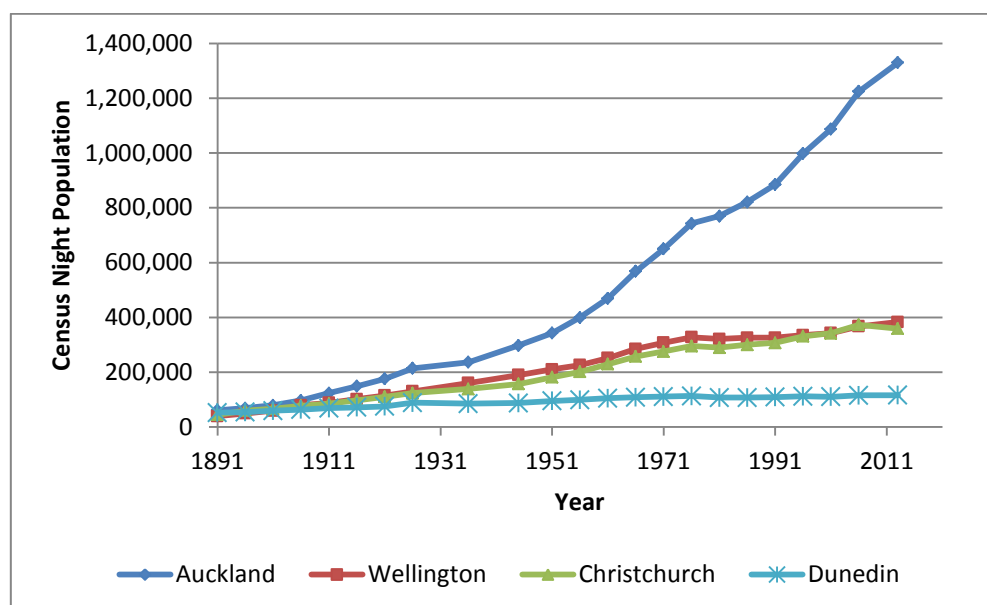
> *While New South Wales and Victoria present what is termed by the statistician of the former colony "the disquieting spectacle of capital towns growing with wonderful rapidity, and embracing in their limits one-third of the population of the territory of which they are the centre," New Zealand is saved from this by the configuration of the country, which has resulted in the formation of four chief towns, besides others of secondary importance but nevertheless trading centres of considerable consequence. (Department of Statistics, 1902)*

The "four chief towns" were Auckland, Wellington, Christchurch and Dunedin. The Department of Statistics continued to write about Auckland as being of similar size to these other cities in its 1937 yearbook:

> *An important characteristic of the distribution of urban population in New Zealand is what may be termed its decentralization. In place of one great metropolis containing a huge proportion of the population as in the case of the Australian States—e.g., Victoria, whose capital city, Melbourne, contains over 50 per cent, of the total population of the State—the more highly urbanized portion of the community is localized in four widely separated centres. These four centres have always existed more or less on the same plane, a fact which has played no small part in the development of the country. (Department of Statistics, 1937)*

Auckland was the largest of the four cities in 1891 – we estimate its population at 61,000, followed by Dunedin at 53,000, Christchurch at 45,000 and Wellington at 40,000. However, Dunedin grew much more slowly throughout the 20th century, and its population has essentially been flat since the 1970s.

Wellington and Christchurch continued to grow strongly, and generally maintained their size relative to Auckland in the first half of the 20th century. However, a very different picture began to emerge in the post-war period.

Prior to the Second World War (for intercensal periods up until 1926-1936 inclusive), Auckland had tended to grow at a similar rate to the remainder of New Zealand, and to the smaller cities of Wellington and Christchurch.

Auckland's growth trend began to diverge in the middle of the 20th century. On a percentage basis, the Auckland region has grown significantly faster than the rest of New Zealand in every intercensal period since 1951-1956. Auckland's fastest growth was during the 1950s and early 1960s, when it grew by more than 3% per year.

In every intercensal period from 1976-1981 onwards, Auckland's absolute population growth has been higher than or similar to the rest of New Zealand. Over the entire 37-year period from 1976 to 2013, Auckland's population has grown by around 650,000, and the rest of New Zealand has grown by around 575,000.

Stated another way, Auckland has consistently added more people than the rest of New Zealand combined, for the last 40 years. Recent population projections, which show this pattern continuing, are in line with a very long-established trend.

Figure 6.7: Auckland and Rest of New Zealand Population Growth,1927-2013
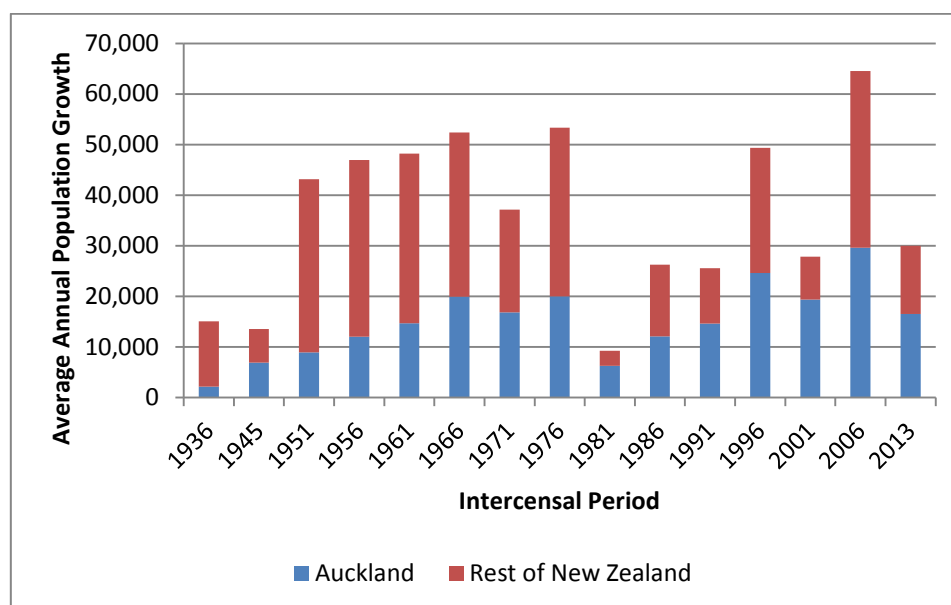
Note: the "intercensal period" to 1936 is actually based on growth between the 1927 estimated population and 1936 census population.

One interesting topic for future research would be to investigate whether Auckland has received an equivalent share of New Zealand's investment in growth-related infrastructure over this time.

6.6.   The Southland and Taranaki Turnarounds

Most regions and territorial authorities have had their own reasonably consistent growth paths over the last 50 years. This has included exponential growth in some areas, slower growth in others, and in some cases population which has flattened or even begun to decline. At the regional level, Gisborne, West Coast, and Manawatu-Wanganui have all reached a position of flat or declining population, and the trends for some territorial authorities are even more marked.

However, two regions which have actually turned around a position of decline are Southland and Taranaki. Their populations are shown in Figure 6.8 below:

Figure 6.8: Southland and Taranaki Populations
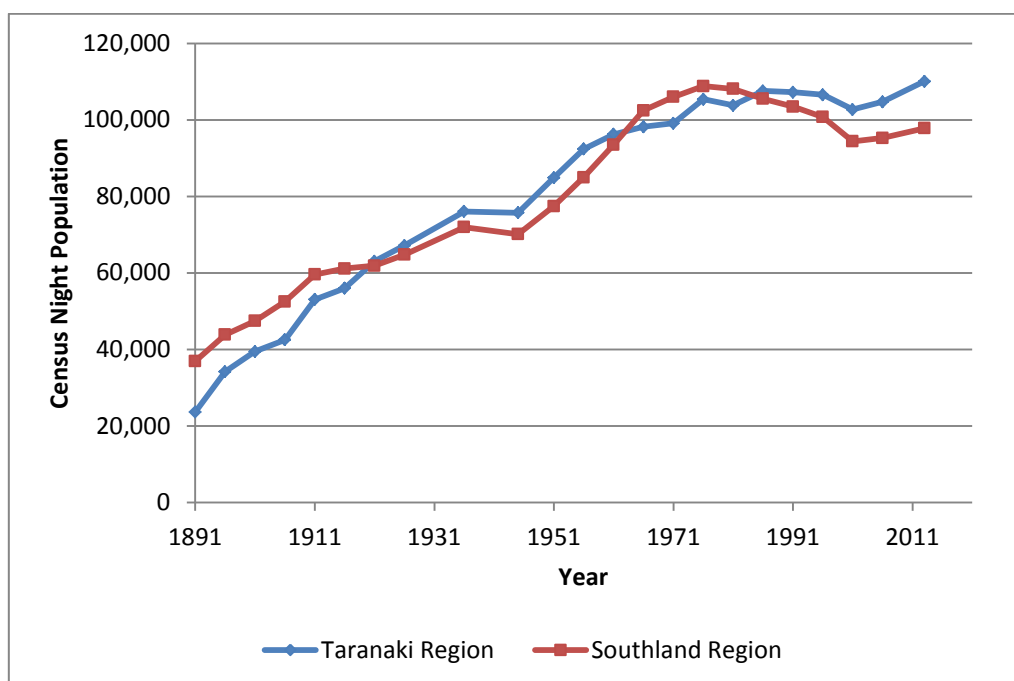
Southland in particular had a population which peaked in 1976 and went into decline in the following years. This decline has turned around quite sharply since 2001, with the population growing in each of the last two censuses – although it remains well below the levels of the 1970s.

Taranaki's turnaround was perhaps less stark, but even so its population had begun to decline by 2001. Similarly to Southland, Taranaki reversed this trend and grew over 2001-2013, with its regional population reaching a new high.[12]

Both regions are now important centres of dairying, and Taranaki has also emerged as a centre of oil & gas production. The

6.7.   Conclusions

Auckland's strong population growth, and the turnarounds in Southland and Taranaki, are just some of the stories revealed by the NZLPD. It is our hope that the database will prove useful for many more stories and analyses. In particular, the NZLPD shows the varied patterns of population growth in different parts of New Zealand, but does not give explanations as to why these patterns emerge. This is an area of research which could benefit from further economic or historical insight.

One strand which seems worthy of further study is the idea that structural changes in New Zealand's economy have affected where and why we grow. Over more than a

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[12] This turnaround is entirely due to the New Plymouth District – populations in Stratford and South Taranaki both peaked in the 1960s, and have been flat or declining slightly even since 2001.

century, the economy has of course completely transformed, from a primarily rural and pastoral society to a service-oriented economy. Econometric analysis can be used to identify structural breaks in data, and historical analysis can broaden the picture.

We expect that the rise of the private car had a huge impact on growth patterns. In the first half of the 20th century, cars were rare commodities, and New Zealanders were highly reliant on public transport for travel within and between cities. Active modes such as walking and cycling were also common. In the postwar years, development shifted to a much more car-based model. Tram lines were removed, and motorways were built in the major cities.

The increasing availability of cars may have affected some places much more than others. Tauranga in particular has very little land close to its city centre, which may have limited its growth in the early 20th century. In Auckland, the central isthmus area had a roughly flat population over 1966-1986 as the city rapidly suburbanised to the north, west and south.

Auckland has outpaced most parts of New Zealand in terms of population growth since the 1950s, and this is likely to have had spillover effects on nearby regions such as the Waikato and Bay of Plenty. Population, and economic activity, has increasingly become concentrated in this 'golden triangle' area, although Northland has seen comparatively less growth.

Outside the major cities, we believe the growth patterns of small towns are also of interest. The NZLPD has long-term data for many of these small towns, whether they are considered to be "minor urban areas", "rural centres" or even simply rural for the smallest. Towns within close range of a larger city have tended to exhibit population growth, whereas those further afield have often gone into decline.

Most regions of New Zealand are growing, and expected to continue to do so. However, at the territorial authority level, around 15 out of 67 have a declining population, with another 20 having had quite flat populations – although many of these have seen an uptick in more recent years. These different growth paths mean councils face very different challenges. Some councils will be challenged to fund enough infrastructure to provide for their rapid growth, whereas others face a declining ratepayer base and will struggle to maintain existing infrastructure.

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