



**Workforces on the move:
An examination of commuting patterns to the cities of Auckland, Wellington
and Christchurch**

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Abstract

In the last 20 years, a combination of factors such as high house prices and the desirability of small town and rural lifestyles have resulted in the development of more flexible and varied commuting patterns. There has been a transformation in the New Zealand countryside with the development of lifestyle blocks around cities and the extension of coastal communities. This development has led to a significant shift in the characteristics of the rural population, as areas close to cities became increasingly linked to urban areas. Smaller towns close to cities have also expanded as people have chosen to move there for reasons of cost and lifestyle. The impact of these decisions has had major implications for transport systems and affects community resources and cohesion. Although these developments have

occurred throughout New Zealand, they have had the most visible effect in the Auckland region, which has experienced the largest numerical increase in population, but have been replicated to some extent in Wellington and Christchurch.

This paper explores and compares commuting patterns around the largest cities in New Zealand: the four cities of Auckland (the Auckland metropolis), the four cities in the Wellington region (the Wellington metropolis) and Christchurch city. While focusing on information from the 2006 Census, this paper will also include an historical perspective, examining the change in the proportion of people commuting to these cities. It will also examine whether there were any differences in aspects of human capital between long distance commuters and the general employed population.

Introduction

Figure 1: Nose to tail, traffic approaches Auckland's harbour bridge.



Source: Knightson and Associates

Congestion charges must be introduced to dampen our insatiable appetite for cars, a transport expert has warned.

Lee Schipper, a United States academic whose research focuses on transport congestion, told a transport forum in Wellington this week that cities such as Auckland and Wellington were prime candidates for congestion.¹

I once imagined Auckland lacked the planning gene in its civic DNA. Where other cities, including Wellington and the Hutt Valley, had managed to make sense of growing populations and their needs, here the dominant merchant gene (Auckland is first and foremost a port) simply over-rode any nascent instincts for rational urban planning and social cohesion.

But there was once a plan for Auckland, in the post-war years, involving state housing development and a self-funding light rail network that, theoretically, might have helped create a city more efficient and user-friendly than the maze of endless roadworks that grew up instead.²

Transport and congestion form a perennial subject of concern for New Zealanders as can be seen by the number of articles and news stories on the subject. Auckland's traffic woes have perhaps had the greatest press with the sad state of public transport in the cities of Auckland being the subject of much lament. For example, Finlay Macdonald, writing about Auckland traffic in the *Sunday Star Times*, noted that a study had revealed that "between 1955 and 2000, per capita public transport patronage in Auckland plummeted by 89% – as far as can be ascertained, the largest decline in public transport patronage recorded over this period in any large city in the world."³ But in the capital as well, although it has a much higher public transport patronage, congestion has also become an increasing concern. The city has debated whether more public transport or extra roading, including another tunnel through Mt Victoria, is needed to improve the flow of traffic and people in the city. *The Dominion Post* claimed that the "regional issue that most concerns Wellingtonians is transport, be it public transport, the capacity of the roading network or private cars" with over 4,600 submissions on the proposals to ease traffic congestion on the Ngauranga-to-airport corridor.⁴ Although Christchurch traffic has not received as much media attention, traffic concerns there to also the subject of debate. The city's mayor, Bob Parker, recently came out in support of a proposal to develop light rail in and around Christchurch as a way to ease congestion.⁵ Transit New Zealand's Travel Time Survey (March 2007) showed that in Auckland, Wellington and Tauranga actual travel speeds had remained steady but in Christchurch they had decreased slightly since the 2005 survey.⁶ Rising traffic congestion has a number of causes: such as increased population and more motor vehicles, but commuting remains a major contributor, in particular placing pressure on roads at peak times in the morning and the late afternoon.⁷ The simple choice that people make about where they should live and work has far reaching consequences. The desire for rural living, or cheaper properties on the edge of cities, or to remain in a small town while obtaining a better job in Auckland, for example, all have a consequence for transport systems and subsequent congestion. Smaller towns close to cities have also expanded as people have chosen to move there for reasons of cost and lifestyle. These decisions have had major implications for transport systems and may also affect community resources and cohesion. Although these developments have

¹ P Easton. Congestion charges 'needed in NZ cities', *The Dominion Post*, Saturday, 17 November 2007

² FINLAY MACDONALD: Super-size us lean and friendly, *Sunday Star Times*, Sunday, 27 April 2008, <http://www.stuff.co.nz/4498134a25940.html>.

³ Finlay Macdonald, "Where do Auckland's traffic jams start? Wellington," *Sunday Star Times*, 30 April 2006.

⁴ Editorial: The difficult road to a livable city, *The Dominion Post*, Friday, 02 May 2008. See also A Chalmers, "Support for extra city road tunnels", *The Dominion Post*, Wednesday, 30 April 2008.

⁵ \$245m revamp in road and rail plan, Robyn Bristow, *The Press*, Tuesday, 04 December 2007. Preservation of the rail corridor is seen as one solution for managing commuting south of the city.

⁶ Transit New Zealand, Media release, 31 August 2006. Transit New Zealand, "Transit Travel Time Indicators Report – March 2007", Christchurch Results.

⁷ Paul Mees and Jago Dodson argue that the decline of public transport in Auckland resulted from a road bias in planning to the detriment of public transport. Paul Mees and Jago Dodson, "Backtracking Auckland: Bureaucratic rationality and public preferences in transport planning", Urban Research Program, Griffith University, Issues Paper 5, April 2006.

occurred throughout New Zealand, they have had the most visible effect in the Auckland region, which has experienced the largest numerical increase in population, but have been replicated to some extent in Wellington and Christchurch

This paper explores and compares commuting patterns around the largest cities in New Zealand: the four cities of Auckland (the Auckland metropolis), the Wellington metropolis (Porirua, Upper and Lower Hutt and Wellington city) and Christchurch.⁸ These cities have some quite distinct differences from the other main urban areas in New Zealand: they have larger populations, substantial international links and a strong labour market influence on surrounding areas. An OECD definitional paper suggested major international links are essential when defining a metropolitan area or region. “Not only do they [metropolitan regions] play their traditional role of growth poles in their countries but they function as essential nodes of the global economy.”⁹ This study builds on an earlier paper that examined commuting patterns in Auckland from 1991 to 2001. While focusing on information from the 2006 Census, this paper will also include an historical perspective, examining the change in the proportion of people commuting to these cities. The paper will examine the dynamics of these commuting patterns and explore aspects of the human and social capital of long distance commuters to these cities. Are long distance commuters to these cities similar or are there significant differences between people commuting to the cities of Auckland, Wellington and Christchurch? Are these long distance commuters different from people who work in the same area? Previous work has indicated that long distance commuters show some differences from other employed people for the census variables of highest qualification gained, incomes and occupation. Research overseas has shown that the highly skilled are more likely to be geographically mobile.¹⁰ This paper aims to explore these concepts further and see whether the patterns that emerged previously in relation to Auckland apply to people that commute to Wellington and Christchurch. Census information about workplace and usual residence address is the main source of information.

In the census, all employed adults in New Zealand are asked to give “the full name of the business or employer that you worked for in that job” and where that workplace was located.¹¹

34 In that job, did you mostly:

work at home? Go to **35**

work away from home? Print the full address of the place you mostly worked at. Include, if possible, all of these:

- name of building
- street number and street name, or name of shopping centre
- suburb or rural locality
- city, town or district

⁸ One definition of a metropole, for example, claims that it “acts distinctively as a node in external networks as well – in other words there are contrastive characteristics between these and other contiguous areas as well as between themselves and other metropolises – more clearly seen in primate cities but less so with agglomerations of metropolitan areas such as we see in the Ruhr or in the US and Japan.” R Didham, senior demographer, Statistics New Zealand. R. Goodyear, ‘Defining Metropolitan regions’, unpublished draft paper for OECD working group on defining metropolitan regions. 2006.

⁹ OECD definitional paper for workshop on Defining Metropolitan regions. See: http://www.oecd.org/document/28/0,2340,en_2649_34413_37837660_1_1_1_1,00.html for workshop papers.

¹⁰ In the United Kingdom researchers have noted that ore highly skilled individuals move more often, both for jobs and other reasons. S Dixon, “Migration within Britain for job reasons, *Labour Market Trends*, April 2003, ONS, 191.

¹¹ In 2006, respondents were asked the name of their business and employer, the main activity of that employer, and whether they worked at home or worked away from home. They were only asked for their workplace address if they worked away from home. Workplace address for those working at home is coded to their usual residence address. Workplace address refers to the main job held last week, which in a small number of cases may not be the main job.

This information, combined with their usual residence, forms the basis for this paper.¹² It also builds on work carried out by geographers within New Zealand.¹³

Until recently, there has been little spatial analysis of labour markets in New Zealand. The United Kingdom developed a functional travel to work area (TTWA) classification, which has been in use since 1998.¹⁴ Recently, however, geographers within New Zealand have attempted to define functional labour markets within New Zealand.¹⁵ They based the first set on 1991 data and then revised them with 2001 Census data. Researchers James Newell and Kerry Papps noted that more long distance commuting appeared to be occurring in 2001 than in 1991, but largely ruled out these long distance commutes when developing labour market catchment areas. They noted the importance of future research to examine the occupational structure of people involved in long distance commuting in order to determine whether this was an actual increase or due to inconsistencies in data.¹⁶ This paper uses local authority boundaries to examine commuting. It focuses on numbers of commuters in order to explore the implications for transport planning as well as examining some of the characteristics of commuters.

Change in workplace patterns between 1996 and 2006: Commuting to Auckland Cities outside Auckland

Newell and Papps' work on labour markets revealed that the proportion of people who listed a workplace address outside their local authority area within the upper North Island changed extensively between 1991 and 2001. Auckland dominated that growth, which is not surprising since the four cities of Auckland form the largest concentration of population in New Zealand and also constitute the largest labour market.¹⁷

¹² The possibilities of using census data for commuting patterns has been explored by geographers. See >F. Schore, "Three Sources of Data on Commuting: Problems and Possibilities", *Journal of the American Statistical Association*, Vol 55, No. 289, 8-21. Census data has the widest coverage and allows analysis by a number of variables.

¹³ See James O. Newell and Kerry L. Papps, "Identifying Functional Labour Market Areas in New Zealand: A Reconnaissance Study using Travel-to-Work Data", New Zealand Department of Labour, Occasional Paper 2001/6. Also James Newell and Martin Perry (2003), "Functional Labour markets revealed by travel to work data 1991 and 2001", Monitoring and Evaluation Research Associates, PO Box 2445, Wellington and Department of Management and Enterprise Development, Massey university (Wellington). These studies developed the functional work areas using area unit data. There have been some interesting studies carried out by geographers using GIS, which have examined issues such as travel times and access to amenities. Jamie Pearce, Karen Witten, Phil Bartie, Neighbourhoods and health: a GIS approach to measuring community resource accessibility', *Journal of Epidemiology and Community Health* 2006, 60:389-395, <http://jech.bmj.com/cgi/content/full/60/5/389>.

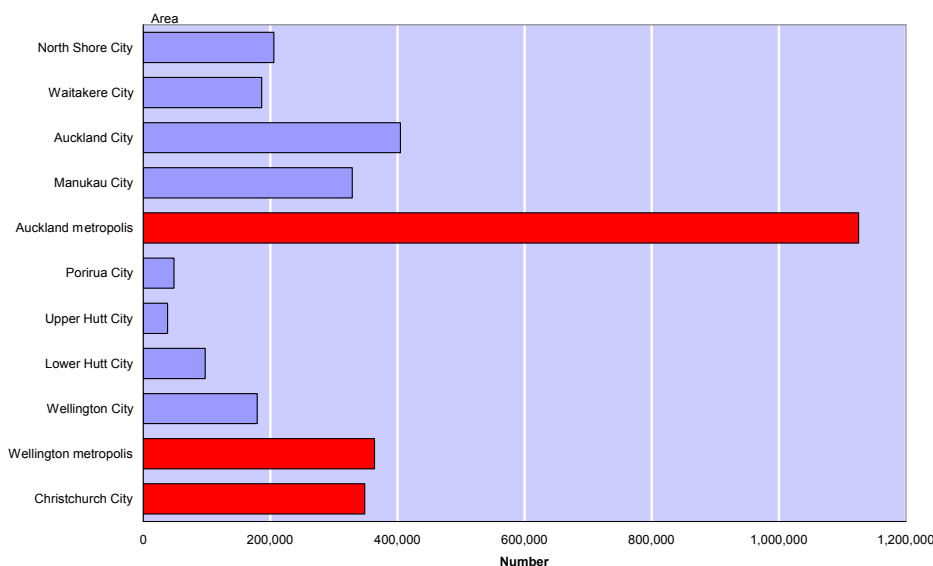
¹⁴ The fundamental criterion is that, of the resident economically active population, at least 75 percent actually work in the area, and also, that of everyone working in the area, at least 75 percent actually live in the area. The resulting pattern is that, although the definitive minimum working population in a TTWA is 3,500, many are much larger - indeed, the whole of London and surrounding area forms one TTWA. The 308 current TTWAs were defined in 1998, using 1991 Census information on home and work addresses, and are based on complete 1991 wards. Office of National Statistics website, <http://www.statistics.gov.uk/geography/ttwa.asp>. [May 2006].

¹⁵ See James O. Newell and Kerry L. Papps, "Identifying Functional Labour Market Areas in New Zealand: A Reconnaissance Study using Travel-to-Work Data", Also James Newell and Martin Perry (2003), "Functional Labour markets revealed by travel to work data 1991 and 2001",.

¹⁶ Newell suggested that an analysis of occupation by those commuting over a long distance would provide a useful check on the data. James Newell and Martin Perry (2003), "Functional Labour Markets Revealed by Travel to Work Data 1991 and 2001", Monitoring and Evaluation Research Associates, PO Box 2445, Wellington and Department of Management and Enterprise Development, Massey University (Wellington).

¹⁷ James Newell and Martin Perry (2003), "Functional Labour markets revealed by travel to work data 1991 and 2001, Monitoring and Evaluation Research Associates, PO Box 2445, Wellington and Department of Management and Enterprise Development, Massey University (Wellington).

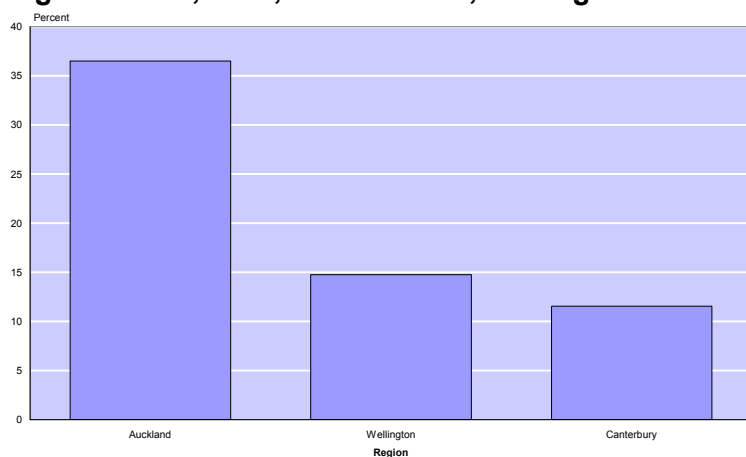
Figure 1
Usually resident population of Auckland and Wellington metropolises and Christchurch city, 2006



Source: *Census of Population and Dwellings, 2006.*

Because of their sheer size and economic importance the cities of Auckland attract workers from well outside the basic administrative boundaries. The experimental regional Gross Domestic Product (GDP) estimates produced by Statistics New Zealand showed that in 2003 Auckland’s share of the country’s GDP was 36 percent and constituted almost half (46 percent) of the North Island’s GDP.¹⁸

Figure 2
Regional GDP, 2003, for Auckland, Wellington and Canterbury



Source: *Statistics New Zealand*

In 1996, there were eleven districts outside Auckland where more than 100 people listed their workplace address in an Auckland city, in 2001 this had increased to 17 districts and by 2006 this had grown to twenty in the North Island.¹⁹ In addition, 498 people in Christchurch City and 207 people in Dunedin City gave an Auckland territorial authority as a workplace address, making a total of 22 districts and cities.²⁰

¹⁸ See <http://www.stats.govt.nz/NR/rdonlyres/BE5F3426-1CB8-4450-84B3-B4587181907E/0/RegionalGDPTables.xls>.

¹⁹ This figure was a large increase on six districts in 1991.

²⁰ With more distant territorial authorities it is unclear what the working patterns might be and there is a possibility that people may have moved temporarily to Auckland but still regard their usual residence to be in another territorial authority. People may maintain a flat in Auckland City and travel there and back once a week, in which case they would have a second residence which

Table1
Numbers of People Who Listed their Workplace Address in One of the Four Cities of Auckland, for selected territorial authorities, 2006

Usual residence	Number of Employed population that listed an Auckland city as a workplace address				
	North Shore City	Waitakere City	Auckland City	Manukau City	Total, Auckland
Far North District	36	12	108	42	201
Whangarei District	60	36	174	51	321
Kaipara District	33	9	72	24	138
Rodney District	6,822	1,701	5,706	624	14,856
Papakura District	177	84	3,891	5,079	9,228
Franklin District	171	99	3,117	3,720	7,110
Thames-Coromandel District	21	12	105	60	195
Hauraki District	15	..C	57	48	123
Waikato District	30	21	261	234	546
Matamata-Piako District	9	..C	36	21	69
Hamilton City	75	24	345	126	573
Waipa District	24	9	84	39	156
Western Bay of Plenty District	15	9	72	24	120
Tauranga City	60	27	195	78	363
Rotorua District	27	15	81	39	165
Hastings District	21	12	72	9	114
Napier City	18	6	60	15	105
New Plymouth District	18	12	66	24	117
Palmerston North City	48	12	66	24	153
Lower Hutt City	27	15	141	24	204
Wellington City	63	24	351	45	483

Source: *Census of Population and Dwellings, 2006.*

Note: These figures include all people who specified a workplace address. Between 12 and 21 percent of the employed population in these areas are excluded, either because they had no fixed abode, did not list a workplace address, or the address was not of sufficient quality to be coded accurately to a territorial authority.

would not be recorded in the census. Other possibilities are that there could also be some small inconsistencies in the data, however, data patterns appear fairly consistent between census years. The census usual residence rules are as follows:

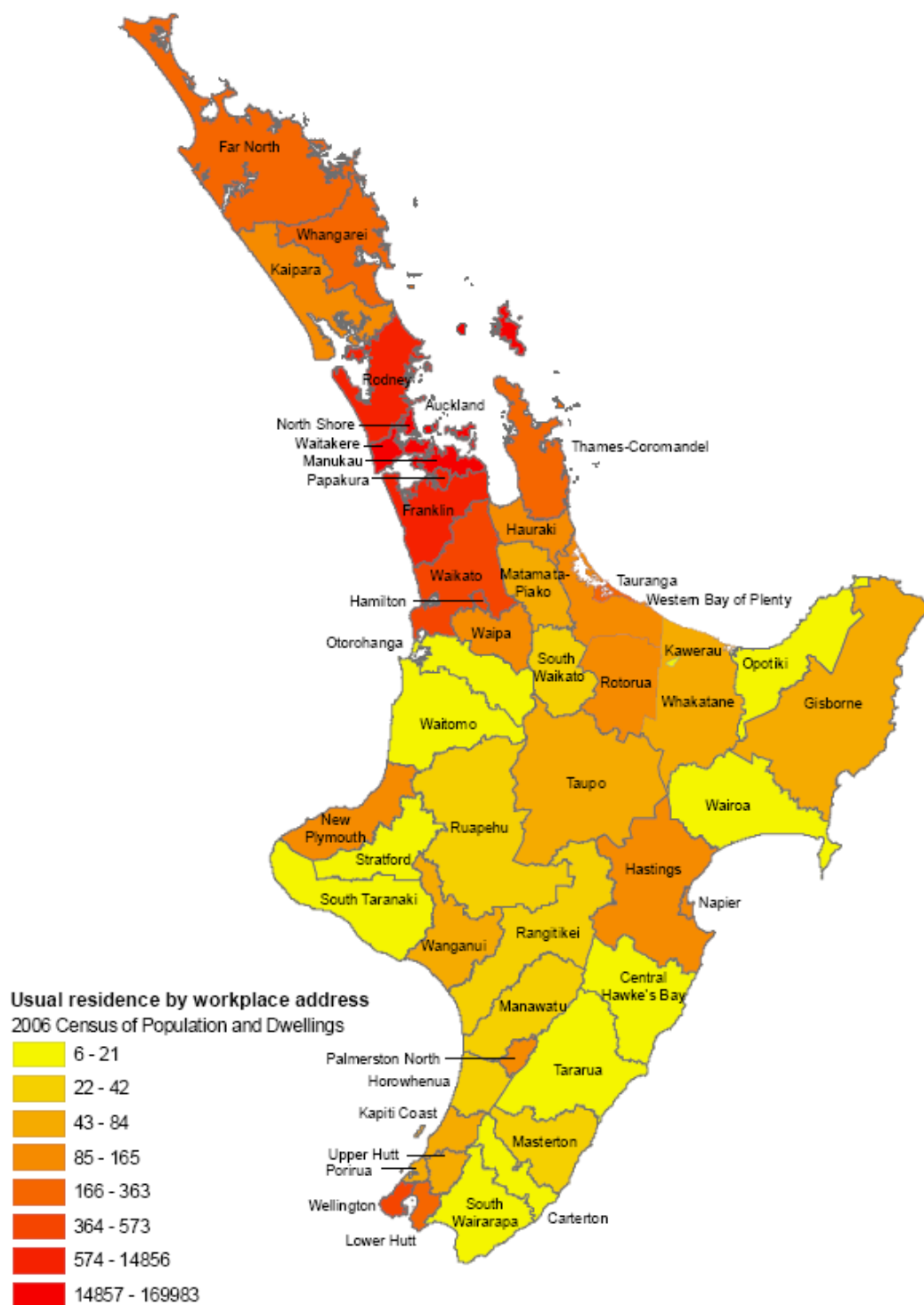
Usual residence is the address of the dwelling where a person considers himself or herself to usually reside, except in the specific cases listed below.

1. People who board at another residence to attend primary or secondary school, and return to their parent's(s') or guardian's(s') home for the holidays, usually reside at the address of their parent(s) or guardian(s). Post-secondary students usually reside at the address where they live while studying.
2. Children in joint custody usually reside at the place where they spend more nights, or if they spend equal amounts of time at each residence, they usually reside at the place where they are at the time of the survey.
3. People who are in rest homes, hospitals, prisons or other institutions, usually reside where they consider themselves to live, and this may include the institution.
4. A person whose home is on any ship, boat or vessel permanently located in any harbour shall be deemed to usually reside at the wharf or landing place (or main wharf or landing place) of the harbour.
5. A person from another country who has lived, or intends to live, in New Zealand for 12 months or more usually resides at his or her address in New Zealand (as in external migration).
6. People of no fixed abode have no usual residence.
7. People who spend equal amounts of time residing at different addresses, and can not decide which address is their usual residence, usually reside at the address they were surveyed at.
8. If none of the above guidelines apply, the person usually resides at the address he or she was surveyed at.

The rules do not specifically deal with the situation when a person works at a different location from their usual residence. A United Nations paper on commuting between households states that official guidelines recommend "a) Persons who work away from home during the week and who return to the family home for the weekend should consider the family home as their place of usual residence regardless of whether their place of work is elsewhere in the country or abroad; we will see that this rule is not followed in all countries." Toulemon, Laurent, "Multi-residence: Commuters Between Households", United Nations Economic Commission of Europe Task force on families and households, Draft 29 April 2008.

Of the four cities, Auckland city itself had the greatest labour market pull, particularly on non-contiguous territorial authorities; attracting over half of people employed in the Auckland metropolis in areas such as the Far North and Hamilton city.

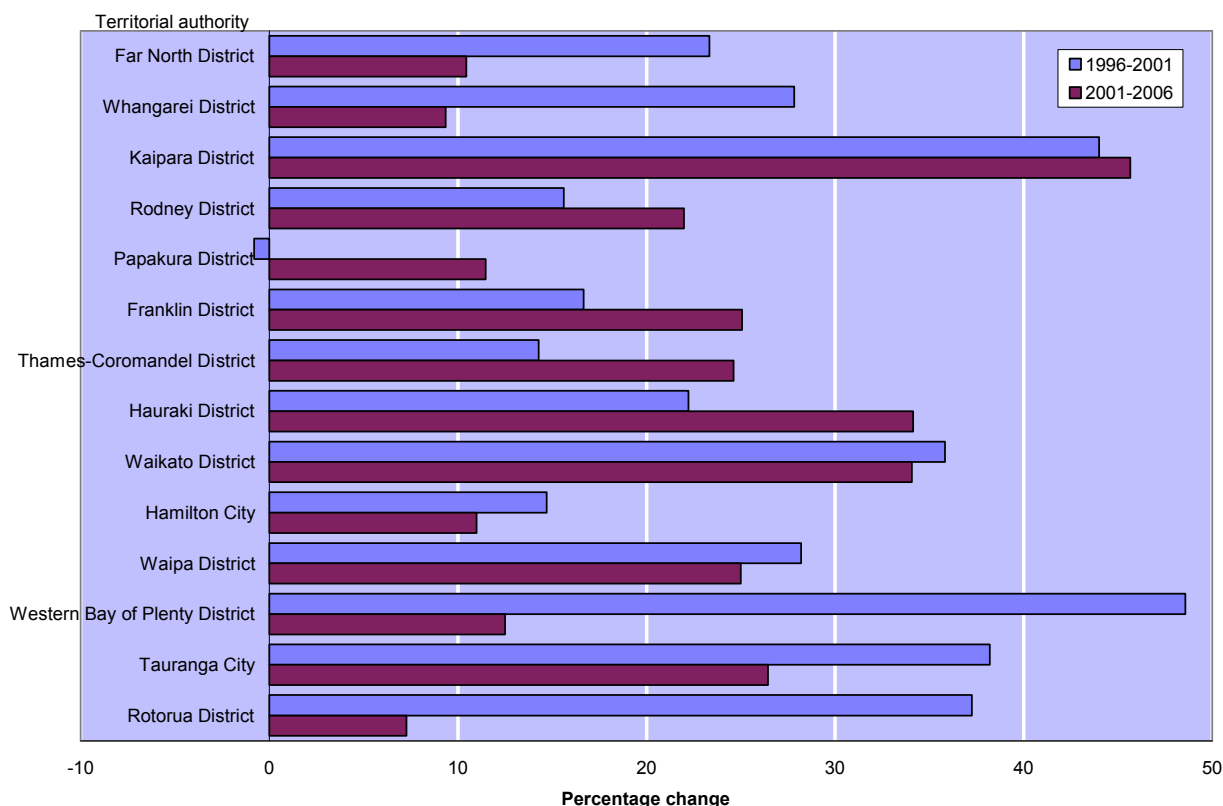
Map 1
Number Listing a Workplace Address in One of Auckland's Four Cities By Territorial Authority
2006



Source: *Census of Population and Dwellings, 2006.*

There has been a consistent increase over time in the number of people that listed an Auckland city as a workplace address. In some areas there has been a very sharp increase. In Franklin district in 1996, there were 4,440 people who gave an Auckland workplace address, which had risen to 7,110 people in 2006, a 37.6 percent rise compared with a rise in the usually resident population of 18.8 percent. Numbers in Rodney District grew by a similar proportion with 5,076 more people in 2006 than 1996 saying that their workplace address was in one of the Auckland territorial authorities.²¹

Figure 3
Change in number of people listing a workplace address in the Auckland metropolis
1996 – 2006



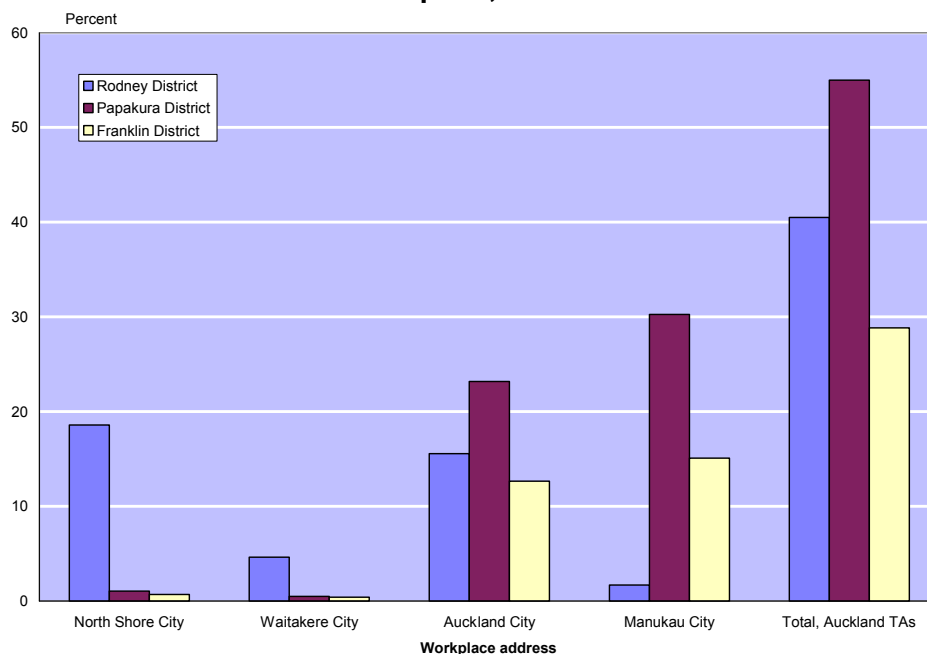
Source: *Census of Population and Dwellings, 1996, 2001, and 2006.*

Note: These figures include all people who specified a workplace address. Between 12 and 21 percent of the employed population in these areas are excluded, either because they had no fixed abode, did not list a workplace address, or the address was not of sufficient quality to be coded accurately to a territorial authority.

Although people all over the North Island may have listed an Auckland workplace address, not surprisingly the numbers were highest in those territorial authorities that were geographically contiguous to one of the four Auckland cities. Both numbers and proportions of people commuting to an Auckland city from these areas have increased since 2001.

²¹ This was a 34.2 percentage increase in numbers of the employed population working in the Auckland metropolis compared with a 25.8 percent increase in population from 1996 to 2006.

Figure 4
Proportion of people in Rodney, Papakura or Franklin districts who listed their workplace address in the Auckland metropolis, 2006



Source: *Census of Population and Dwellings, 2006*.

In 2006, over half the employed population in Papakura District (who specified a workplace address) listed a workplace address in an Auckland territorial authority (55.0 percent or 9,228 people). Just under a third of these people (30.3 percent) commuted to Manukau City while 23.2 percent went to Auckland City. Very few listed Waitakere or North Shore cities as a workplace address. These patterns make logical sense considering traffic flows: travelling to the North Shore from Rodney district may be easier than attempting to get to the North Shore from Manukau or Papakura. North of Auckland, over a third of the employed population in Rodney District who specified a workplace address commuted to an Auckland territorial authority. These figures split fairly evenly, with 15.6 percent going to Auckland City and 18.6 percent to North Shore City.

Commuting and small urban areas around Auckland

Some of the smaller urban areas around Auckland had significant percentages of their populations listing an Auckland workplace address, particularly Pukekohe, Waiuku and Helensville. More than 12,000 people from rural areas also listed an Auckland address as their workplace. Pukekohe, a secondary urban area, located in Franklin District, has long been known as one of the country's prime horticultural areas, with Pukekohe potatoes and carrots featuring in the supermarkets and green grocers of the nation. However, at only 52 kilometres from Auckland central, and 97 kilometres from Hamilton, it has also become part of the Auckland commuting zone. Statistics from previous censuses reveal increasing pressure on this area. Between 1996 and 2006, the census usually resident population count increased by a quarter, from 16,917 to 22,515 people. This was the largest increase experienced by any secondary urban area. Some of this increase has undoubtedly resulted from the pressures of nearby Auckland, as in the same period the percentage of the employed workforce in Pukekohe commuting to Auckland cities increased (as can be seen in the following table). The other small urban areas listed here that had substantial proportions of their employed populations working in Auckland experienced similar growth rates.

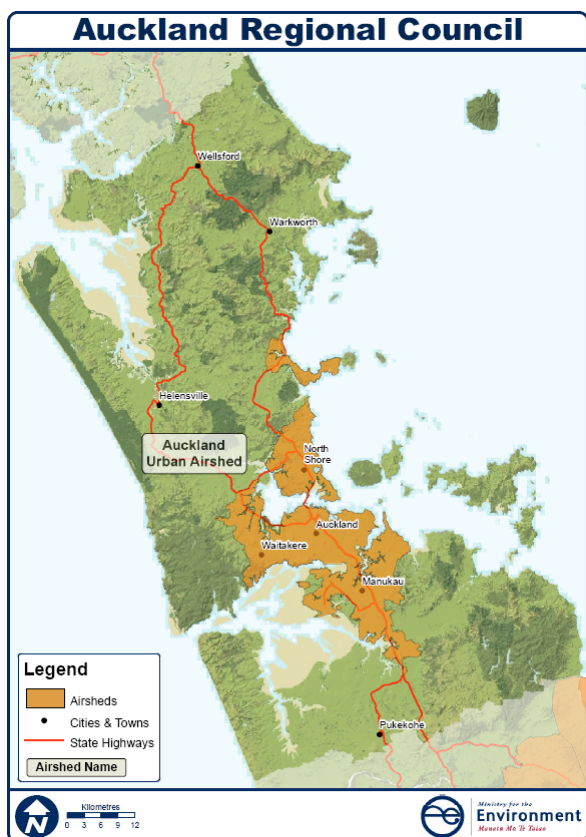
Table 2
Numbers and percent of employed population in smaller urban areas that gave the Auckland metropolis as a workplace address, 2006

Usual residence	Percent of employed population	Numbers employed in Auckland metropolis
Hamilton Zone	1.1	720
Cambridge Zone	1.1	69
Whangarei	1.1	189
Pukekohe	26.7	2,316
Wellsford	4.6	27
Warkworth	12.3	147
Snells Beach	12.3	147
Helensville	38.6	360
Waiheke Island	97.8	2,994
Waiuku	28.0	843
Huntly	5.1	99
Whitianga	1.2	18
Coromandel	2.2	12
Whangamata	1.2	15
Tairua	2.7	12
Thames	2.0	51
Paeroa	3.0	36
Waihi	1.1	15
Te Aroha	1.2	15
Katikati Community	1.1	12
Turangi	1.1	18

Source: Census of Population and Dwellings, 2006.

Note: urban areas have different boundaries to territorial authorities and so figures for Hamilton zone are not the same as for Hamilton city.

Map 2
Auckland urban airshed



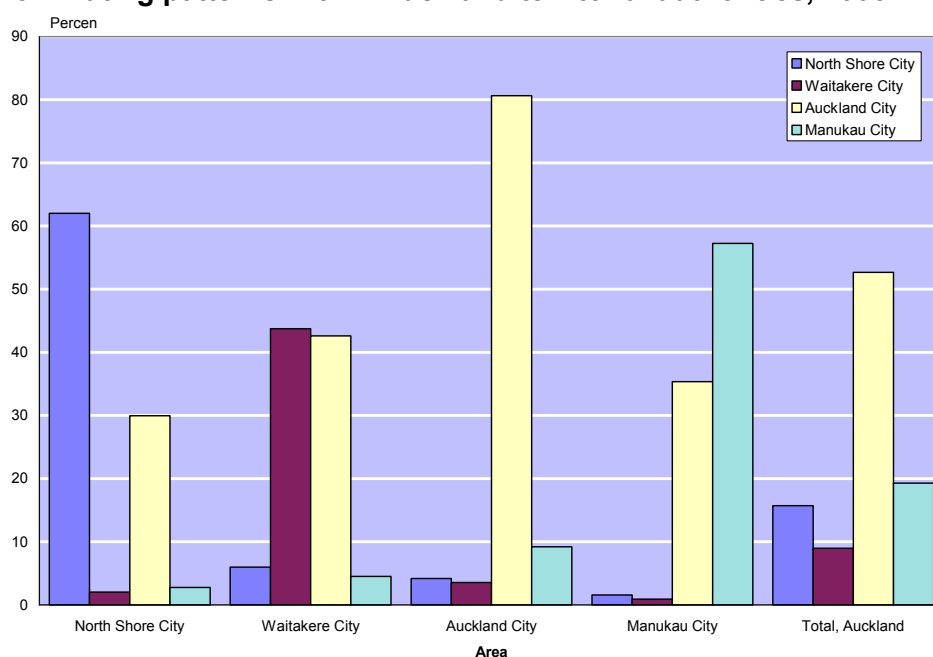
Source: ARC and Ministry for the Environment

The census does not allow for the exploration of the drivers that prompt people to commute rather than migrate although some researchers have argued that commuting may be in part driven by lower house prices in surrounding areas. A British study suggested that “Inter-regional migration is influenced by relative employment and earnings opportunities. But strongly offsetting forces operate from relative house prices. Commuting, at least to contiguous regions, is often an alternative to migration.”²²

Commuting within Auckland

Within the four cities of Auckland itself fairly consistent commuting patterns emerge, with Auckland city employing the greatest proportion of the Auckland population. Waikare City had the smallest proportion of people that lived and worked in the same territorial authority.

Figure 5
Commuting patterns within Auckland territorial authorities, 2006

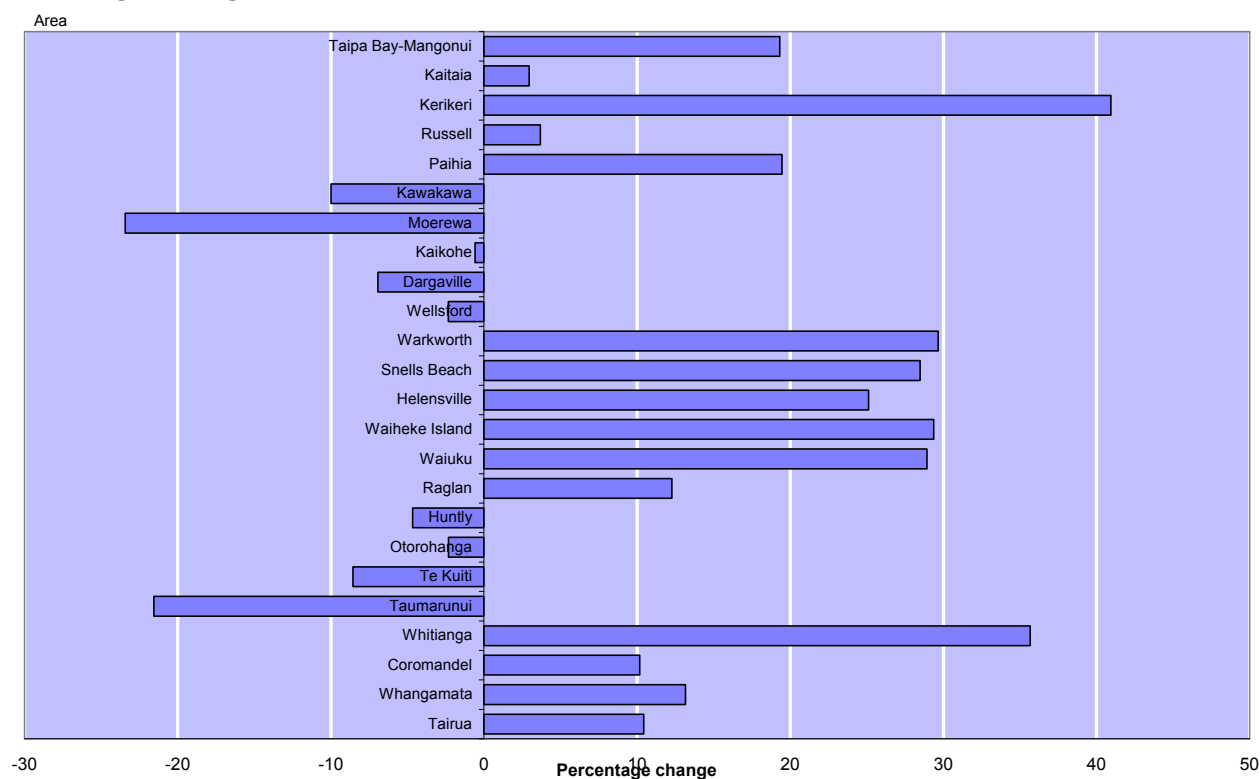


How reliable are these commuting figures? James Newell suggested that an analysis of the occupations of people who commuted over a long distance would indicate whether this increase in long distance commuting was valid, or caused by confusion over the census question. It is probable that people who worked in the more highly paid and qualified occupational groups would be more likely to have the income and the flexibility to engage in long distance commuting to a place of work. Certainly an analysis of the data shows consistent patterns emerging in Auckland commuting patterns over the years. There has been a steady increase in numbers and proportion of people outside Auckland who list Auckland as a workplace address and the numbers have increased in the same areas. Population figures would seem to reinforce these findings as there has been a consistent increase in the population of areas close to Auckland. These findings reinforce information from “New Zealand – An Urban Rural profile”, published by Statistics New Zealand in 2004 that showed that rural areas close to cities and satellite urban areas had experienced the highest growth rates.²³

²² Cameron, Gavin & Muellbauer, John, 1998. "The Housing Market and Regional Commuting and Migration Choices," CEPR Discussion Papers 1945, C.E.P.R. Discussion Papers.

²³ See Statistics New Zealand, “New Zealand: An Urban/Rural Profile”, <http://www.stats.govt.nz/urban-rural-profiles/default.htm>

Figure 6
Percentage change in selected North Island urban areas between 1991 and 2006



Source: *Censuses of Population and Dwellings, 1991 and 2006.*

In and around Auckland there has obviously been an increase in both the number and proportion of people who lived outside an Auckland territorial authority and commuted to the Auckland metropolis. Over 96 percent of the employed population that lived in Auckland worked in an Auckland city, but in neighbouring territorial authorities between a half and two thirds lived and worked in the same territorial authority, revealing the importance of the Auckland labour market.

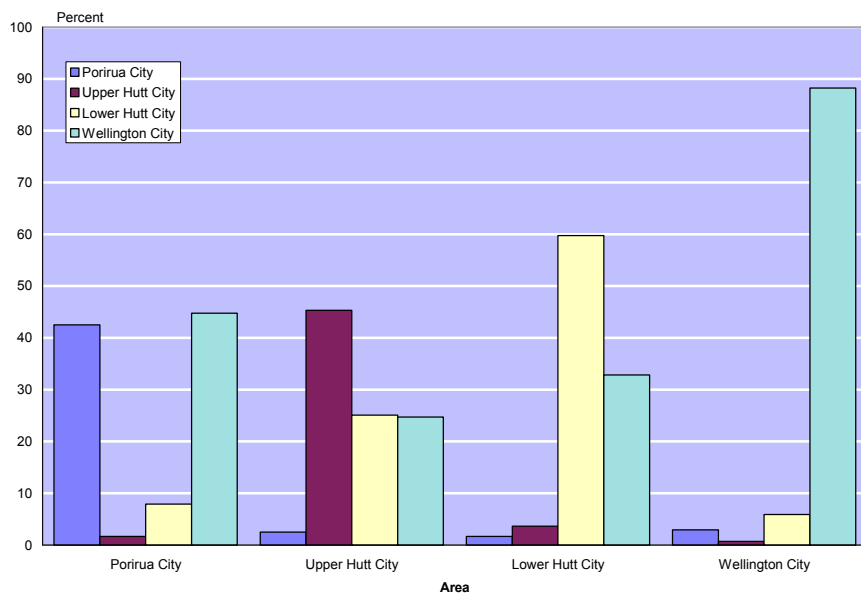
Information from tax data (the Linked Employer Employee (LEED) dataset from Statistics New Zealand shows that the Auckland region had the highest employment growth between 2001 and 2006, which would synchronise with the increased growth in long distance commuting to Auckland. Statistics New Zealand suggests that much of this employment growth came from people migrating or returning from overseas.²⁴

Commuting patterns of Wellington territorial authorities, 2006

Were Auckland patterns replicated to any extent in the cities of Wellington and Christchurch? This paper will examine whether these cities had a similar labour market pull on surrounding areas and areas that were not geographically contiguous. The four cities in the Wellington region have been grouped together for purposes of data analysis as they are geographically contiguous and have enmeshed labour markets. The cities of the Wellington metropolis are similar to the Auckland metropolis since there is a high proportion of commuting between cities, although Wellington City itself has the greatest labour market pull on the surrounding cities.

²⁴ Employment, Earnings and Income Statistics from LEED: 2006 pp.2-4. See <http://www.stats.govt.nz/NR/rdonlyres/7A2054D3-0C98-45DA-B820-0E5C31AC3A7C/0/58262SNZleedlayoutWEB.pdf>

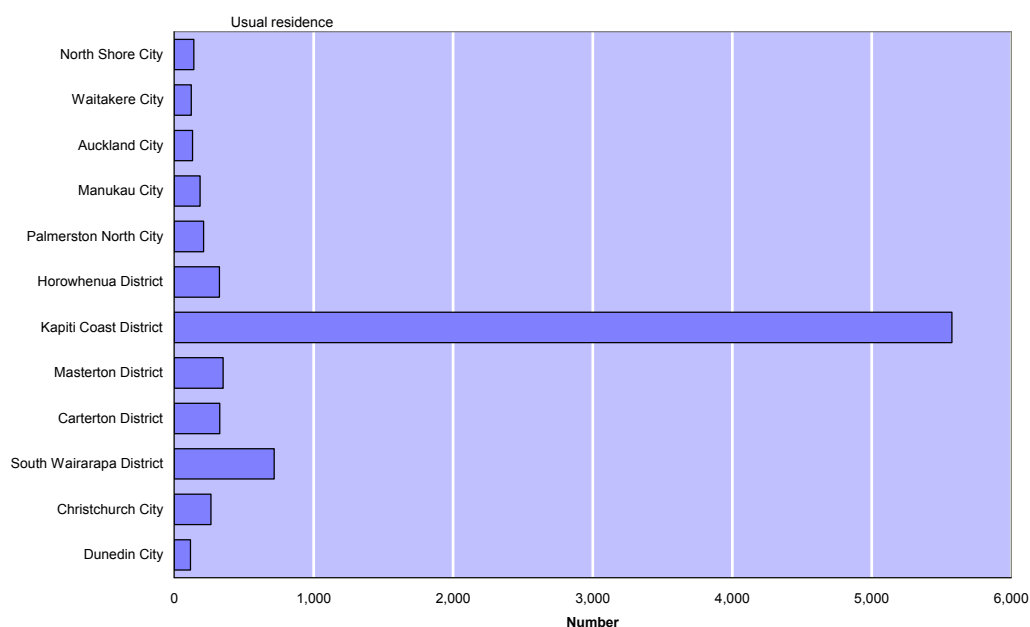
Figure 7
Workplace address and usual residence for cities within the Wellington metropolis



Source: Census of Population and Dwellings, 2006.

An examination of 2006 Census data shows that, for people who specified their workplace address, there were 12 territorial authorities outside Wellington where over a hundred people gave either Porirua, Upper or Lower Hutt or Wellington city as a workplace address. Most of these areas were geographically close to Wellington with the exception of the four cities of Auckland (804 people), Christchurch and Dunedin cities (with 264 and 117 people respectively). These numbers have increased slightly since 1996 (ten territorial authorities) but have not shown the same growth as Auckland. Kapiti Coast district was the major source of the commuter population.

Figure 8
Workplace address and usual residence for selected territorial authorities including Wellington, 2006



Source: Census of Population and Dwellings, 2006.

Wellington City had the greatest labour force attraction for people in the Wellington region. In contrast, Porirua city had one of the lowest percentages nationally of people that lived and work in the same territorial authority (42.5 percent of the employed population that specified their workplace address).

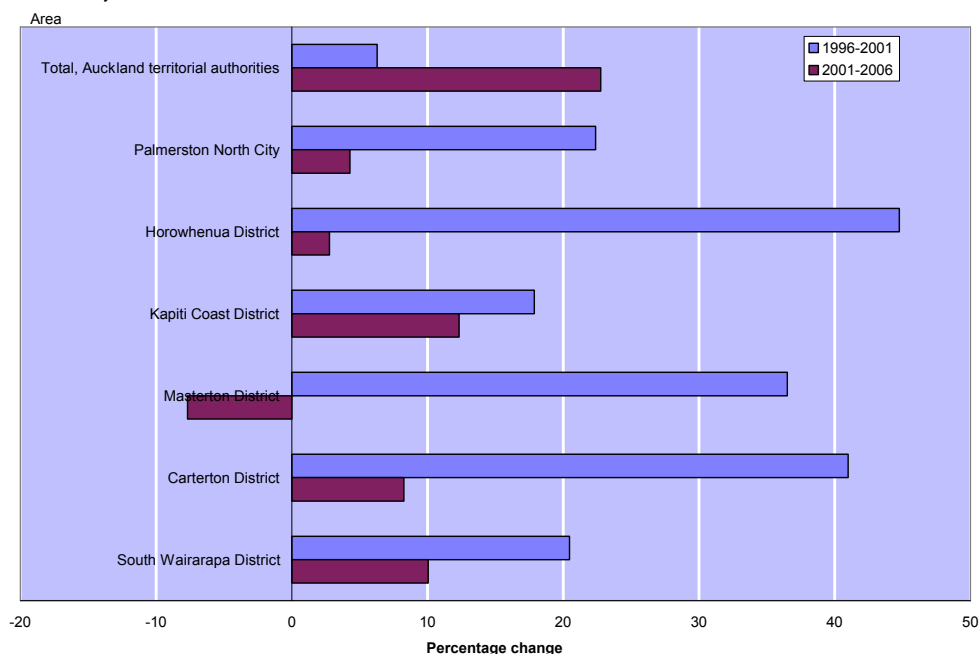
Table 3
Percentage of employed population working in Wellington metropolis

Usual Residence	Workplace address				
	Porirua City	Upper Hutt City	Lower Hutt City	Wellington City	Wellington metropolis
Horowhenua District	0.4	0.1	0.4	2.1	3.1
Kapiti Coast District	5.2	1.0	4.5	22.3	33.0
Porirua City	42.5	1.6	7.9	44.8	96.8
Upper Hutt City	2.5	45.3	25.1	24.7	97.5
Lower Hutt City	1.7	3.6	59.7	32.8	97.9
Wellington City	2.9	0.7	5.9	88.2	97.7
Masterton District	0.1	0.4	1.0	2.4	3.9
Carterton District	c	1.4	2.6	6.6	10.7
South Wairarapa District	0.5	2.5	4.1	11.9	19.0
Total, North Island	1.0	0.8	3.0	8.9	13.8

Source: Census of Population and Dwellings, 2006.

As the following graph shows, most of this growth occurred between 1996 and 2001 with a much smaller increase (in fact numbers coming from Masterton have declined) between 2001 and 2006. The only area to show significant growth is from people in Auckland who said that they had a workplace address in one of the Wellington cities).

Figure 9
Percentage change in people listing one of four cities in Wellington region as a workplace address, 1996-2006



Source: Census of Population and Dwellings, 1996 and 2006.

Again Wellington is a significant influence for surrounding urban communities, with over a third of the employed population in Featherston and Kapiti working in the Wellington metropolis. The majority of these commuters worked in Wellington city.

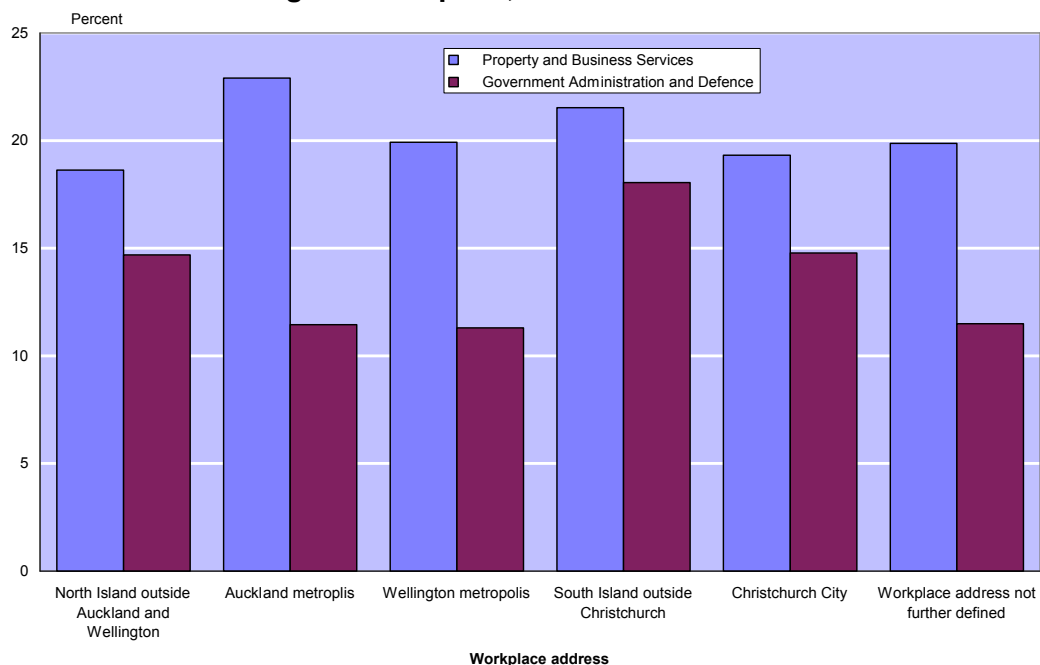
Table 4
Numbers and percentage of employed population in other urban centres that gave a workplace address in the Wellington metropolis, 2006

Usual residence	Percent of employed population	Numbers
Kapiti	36.5	4,944
Levin	3.3	213
Masterton	4.1	303
Waiouru	3.7	30
Foxton Community	1.3	18
Shannon	2.3	9
Otaki	12.2	210
Carterton	12.8	201
Greytown	17.1	141
Featherston	36.1	300
Martinborough	13.7	75

Source: *Census of Population and Dwellings, 2006.*

The Wellington metropolis (particularly Wellington city) employed substantial numbers of people in surrounding local authorities. There is also the presence of a small labour market that operates between Auckland, Christchurch and Dunedin. These workers were largely engaged in the property and business services and government administration and defence industries. The Wellington metropolis is in a unique position in New Zealand because of the location of government in Wellington city.

Figure 10
Selected industry by usual residence for employed population that specified an address in the Wellington metropolis, 2006

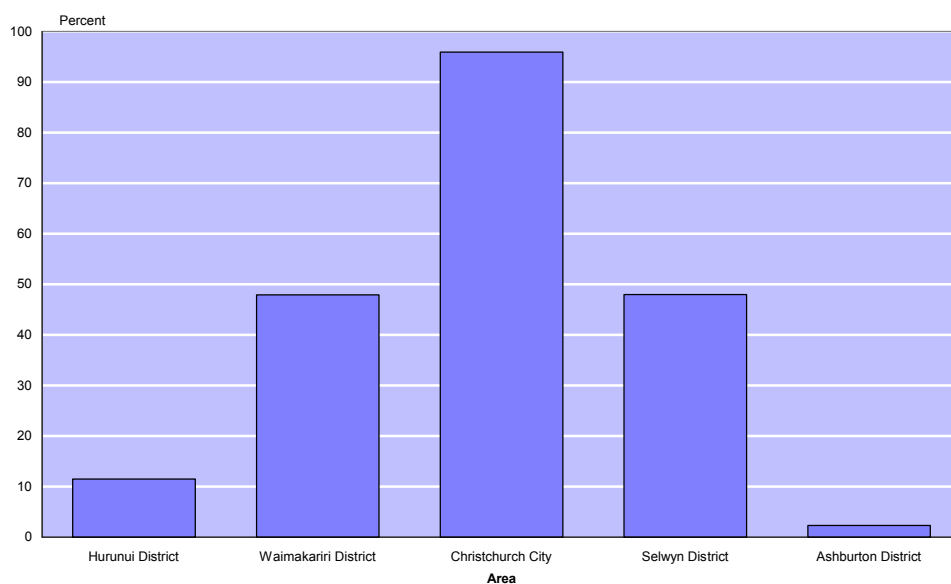


Source: *Census of Population and Dwellings, 2006.*

Commuting Patterns to Christchurch city

Both Auckland and Wellington cities exert a considerable employment pull with Auckland cities having the furthest reach. Christchurch is the largest city in the South Island, and with a population of 348,435 people it is more than twice as large as the next largest city, Dunedin. Yet commuting patterns to Christchurch appear different to patterns in Auckland or Wellington. Christchurch exerts a very strong labour market influence on surrounding areas. High proportions of the employed population in contiguous districts listed Christchurch as a workplace address but fewer people from more distant territorial authorities listed Christchurch as a workplace. In six districts outside Christchurch city more than 100 people gave the city as a workplace address (Auckland city was the only distant territorial where over a hundred people gave a workplace address in Christchurch city).²⁵ In total, 927 people in the North Island said that they worked in Christchurch city with the majority (53.7 percent) coming from the Auckland and Wellington metropolises.

Figure 11
Percentage of people who listed Christchurch city as a workplace address, 2006



Source: *Census of Population and Dwellings, 2006.*

²⁵ As mentioned previously, it is difficult to know what patterns might be for these distant commuters.

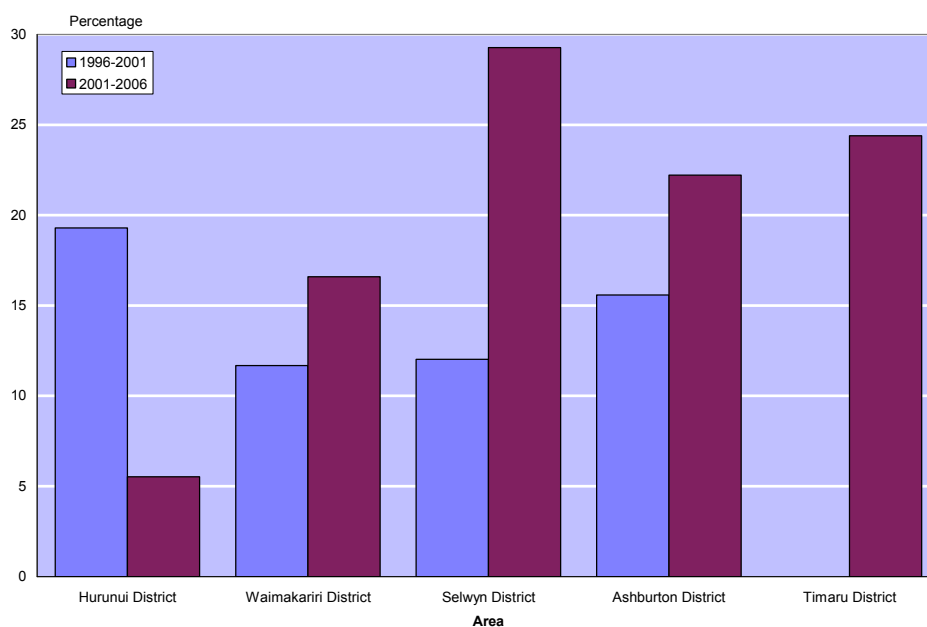
Table 5
Numbers of employed population specifying Christchurch as a workplace address²⁶, 2006

Usual residence	Number specifying a Christchurch workplace address
Auckland City	129
Waimakariri District	8,931
Christchurch City	146,910
Selwyn District	7,767
Ashburton District	297
Timaru District	123

Source: *Census of Population and Dwellings, 2006*.

In 2006, Christchurch city had strong employment links with Waimakariri and Selwyn districts. Numbers of people living in Waimakariri district but working in Christchurch city increased sharply between 1996 and 2006: from 6,579 to 8,931 people. The proportion of the employed population in this district working in Christchurch, however, remained fairly constant at around 47 percent.²⁷ In contrast, Selwyn district saw a marked increase in both the number and proportion of people who worked in Christchurch. In 1996, 4,833 people listed Christchurch as a workplace address compared with 7,767 people in 2006, a rise from 41.8 percent of the employed population of the district to 48.0 percent.

Figure 12
Percentage change in numbers of people specifying a Christchurch workplace address, by selected territorial authority, 1996-2006



Source: *Census of Population and Dwellings, 1996 and 2006*.

²⁶ These figures are for territorial authorities with more than a hundred people. Small numbers of people in other South Island districts also gave Christchurch as a workplace address (87 people in Dunedin city, 42 in Invercargill, 69 in Queenstown-Lakes district, 42 in Waitaki district, 66 in Marlborough, 54 in Nelson city and 42 in Tasman district).

²⁷ Proportions increased slightly from 45.7 percent of the employed population in Waimakariri district listing a Christchurch workplace address. For the purposes of time series Banks Peninsula has been included with Christchurch city since it amalgamated with the city just before the 2006 census. In 2001 almost half of the employed population of Banks Peninsula that specified their workplace address (1,680 people) gave a Christchurch workplace address.

Christchurch city exerted a strong pull on surrounding areas, attracting 9,576 from rural areas (including inland and oceanic) and substantial populations from small towns.

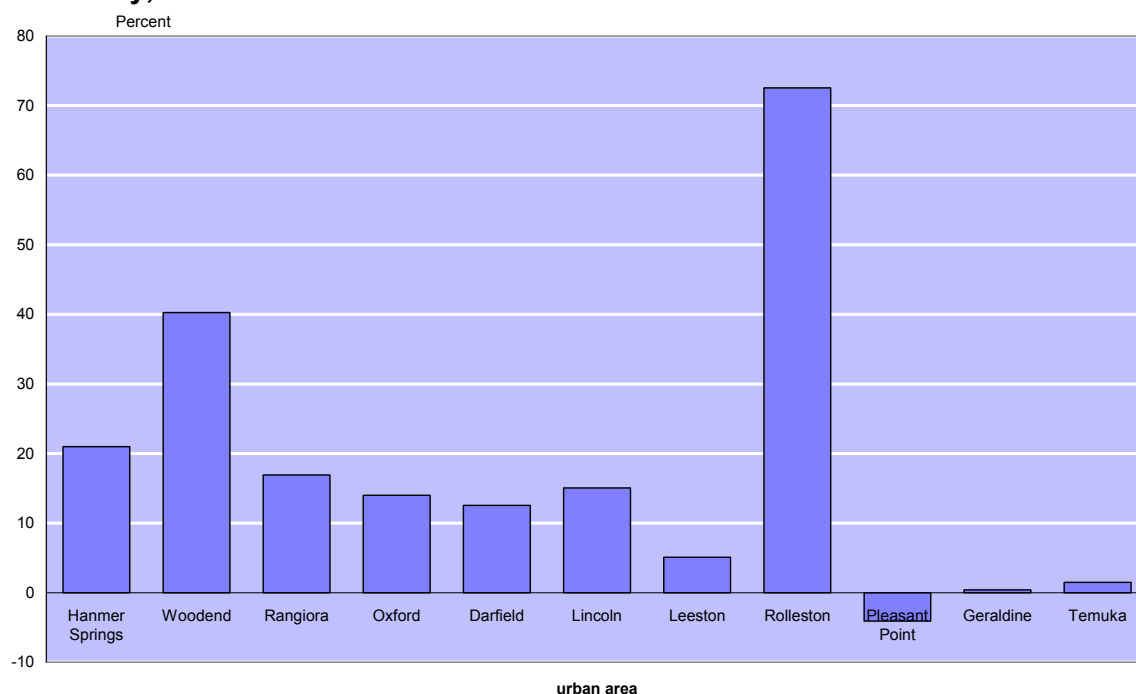
Table 6
Numbers and Percentage of employed population that worked in Christchurch city by urban area, 2006

Usual residence	Percent of employed population	Numbers
Woodend	63.0	720
Rangiora	39.2	1,848
Oxford	30.5	180
Darfield	33.8	210
Lincoln	52.8	561
Leeston	36.2	204
Rolleston	72.0	1,293

Source: *Census of Population and Dwellings, 2006*.

Urban areas that had substantial proportions of their populations working in Christchurch city had the highest growth rates between 2001 and 2006. This information parallels the findings of “New Zealand: An Urban/rural profile”, which showed satellite urban areas as having much higher growth rates.²⁸ The highest growth rates in New Zealand were experienced by Rolleston, which had been promoted and developed as a satellite town in the 1990s.²⁹ A similar parallel growth is likely to occur to the north of Christchurch where approval has been given to and work started on Pegasus town.³⁰

Figure 13
Percentage change in usually resident population in selected smaller urban areas in Canterbury, 1996-2006



Source: *Census of Population and Dwellings, 1996 and 2006*.

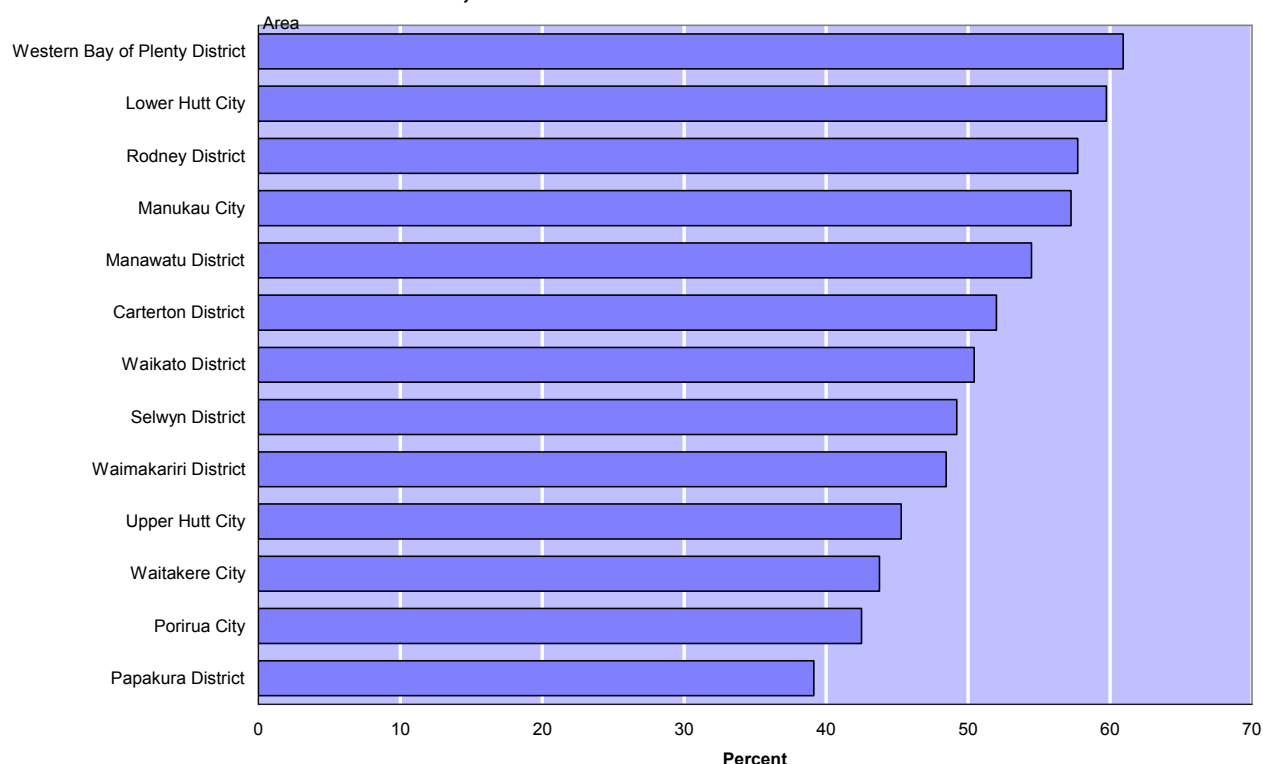
²⁸Statistics New Zealand, “New Zealand: An Urban/Rural Profile”, <http://www.stats.govt.nz/urban-rural-profiles/default.htm>

²⁹ Rolleston was founded in 1866 but was fairly small until the 1990s. http://en.wikipedia.org/wiki/Rolleston%2C_New_Zealand

³⁰Pegasus Town is a new town being constructed 25 km north of Christchurch and aims to eventually house around 5,000 residents, New Zealand <http://www.pegasustown.com/>

The largest cities in New Zealand have a strong labour market influence over surrounding areas. Data show that these cities employ people not just from their own area but from surrounding areas, with the largest cities of Auckland having the greatest influence. Employment growth evident in that region according to LEED statistics is paralleled by the increase in people living outside but working in Auckland. Even within the four Auckland and four Wellington cities there is considerable variance. In Porirua, Upper Hutt, Waitakere and Manukau cities, approximately 50 percent or less of their employed populations (that specified a workplace address) lived and worked in the same territorial authorities.

Figure 14
Percent of the employed population that lived and worked in the same territorial authority, for 13 lowest territorial authorities, 2006



Source: Census of Population and Dwellings, 2006.

Commuting between areas has grown considerably in New Zealand and the growth and extent of labour markets have an influence on the prosperity of surrounding areas. While commuting may have a positive economic impact, there may be some negative implications.

Travel to work and mode of transport

As a number of researchers have shown, long distance commuting has implications outside the lives of the individuals concerned. There are considerable environmental and social impacts such as traffic planning and congestion issues, which raise long term questions about the sustainability of our lifestyles. Peak time traffic is a concept shared among developed nations, and even though travel to work may be only a part of total traffic (estimates in the United States is that it accounts for about a quarter of total traffic), much of this traffic occurs at similar times of the day.³¹ In the United States for example, estimates from the 2000 Census calculated that about 76 percent of workers drove by automobile to work. Mark Horner, in his study of the spatial implications of urban commuting, noted that: “Commuting significantly affects the performance of urban transportation systems and ultimately has an impact on society at large . . . Vehicles are least efficient at slow speeds, which is why the service reduction resulting from congestion is all the more detrimental to the environment.”³² New Zealand has fairly high motor vehicle usage, and motor vehicles were the most common means of transport to work. Two thirds of the employed population (that specified their mode of transport) in 2006 said that they travelled to work in an automobile.³³

What mode of transport did long distance commuters use in New Zealand and did it differ significantly from the total employed population? While generally long distance commuters were more likely to use cars there were some significant differences between the Wellington metropolis and Auckland. Those people who lived in the North Island but commuted to the cities of Auckland were most likely to have arrived there by motor vehicle (82.0 percent drove or were a passenger in a private or company car, truck, van or company bus, compared with 70.3 percent who lived and worked in the city). A further 4.0 percent took public transport, compared with 6.6 percent of those who lived and worked in the city. Wellington emerges as very different, largely because of the variety and flexibility of the public transport modes in the city. Commuters from outside one of the four Wellington cities were much more likely to use public transport than people who lived and worked in one of these four cities (25.7 percent compared with 16.2 percent). Wellington has consistently been the region with the highest use of public transport for commuting, according to the population census.

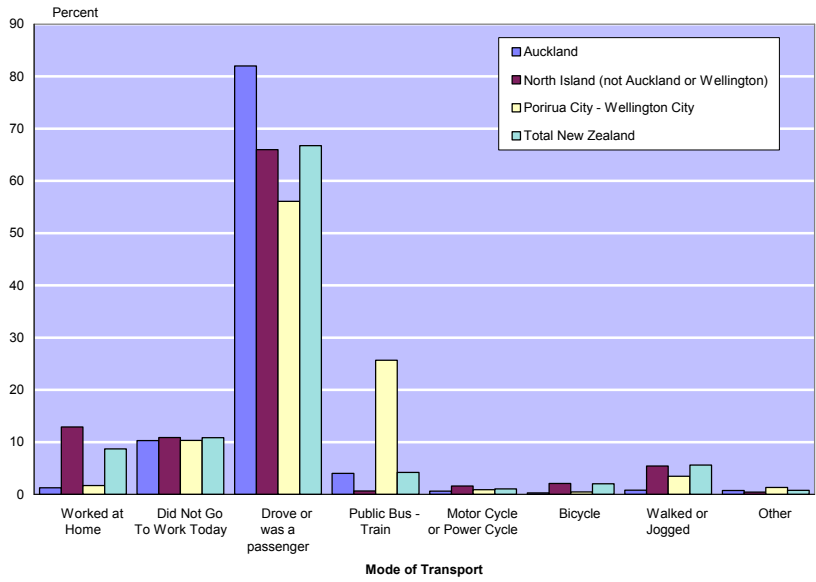
In contrast, people commuting to Christchurch appeared to follow similar patterns to Auckland, patterns that may be reinforced by issues of geography as well as public transport provision. Most South Islanders who lived outside Christchurch but worked in that city drove (83.7 percent drove or were a passenger in a private or company car, truck, van or company bus) and very few took public transport (0.9 percent). In contrast, 4.4 percent of people who worked and lived in Christchurch took public transport, 5.7 percent went by bicycle and 4.9 percent walked or jogged.

³¹ Mark W. Horner, “Spatial Dimensions of Urban Commuting: A Review of Major Issues and Their Implications for Future Geographic Research, *The Professional Geographer*, Vol 56, Number 2, May 2004. 160.

³² Mark W. Horner, 161.

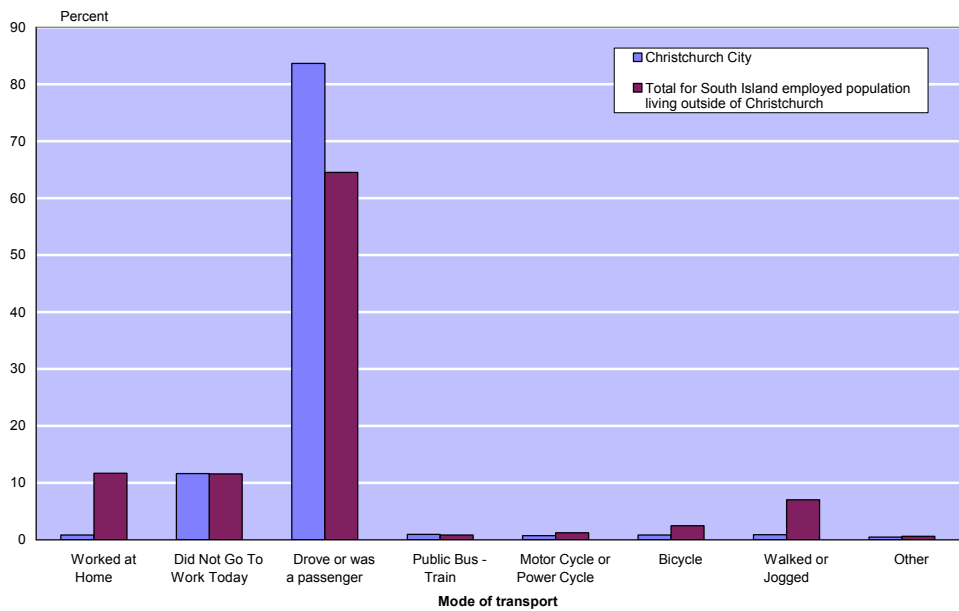
³³ This includes driving a private car, truck or van (50.6 percent), or company car, truck or van (11.3 percent) or as passenger in car, truck, van or company bus (4.8 percent).

Figure 15
Mains means of travel to work for employed population in the North Island that lived outside the Auckland and Wellington metropolises, by workplace address, 2006



Source: Census of Population and Dwellings, 2006.

Figure 16
Mains means of travel to work for employed population in the South Island that lived outside Christchurch city, by workplace address, 2006



Source: Census of Population and Dwellings, 2006.

The high rate of car use by commuters is of concern, particularly in Auckland since vehicle traffic seems to have a greater impact on pollution there. The regional council calculates that approximately 80 percent of the

region’s air quality problems are caused by vehicle emissions.³⁴ Other researchers have also calculated that air pollution (vehicle PM10) because of vehicles causes 253 extra deaths per year in the Auckland region.³⁵

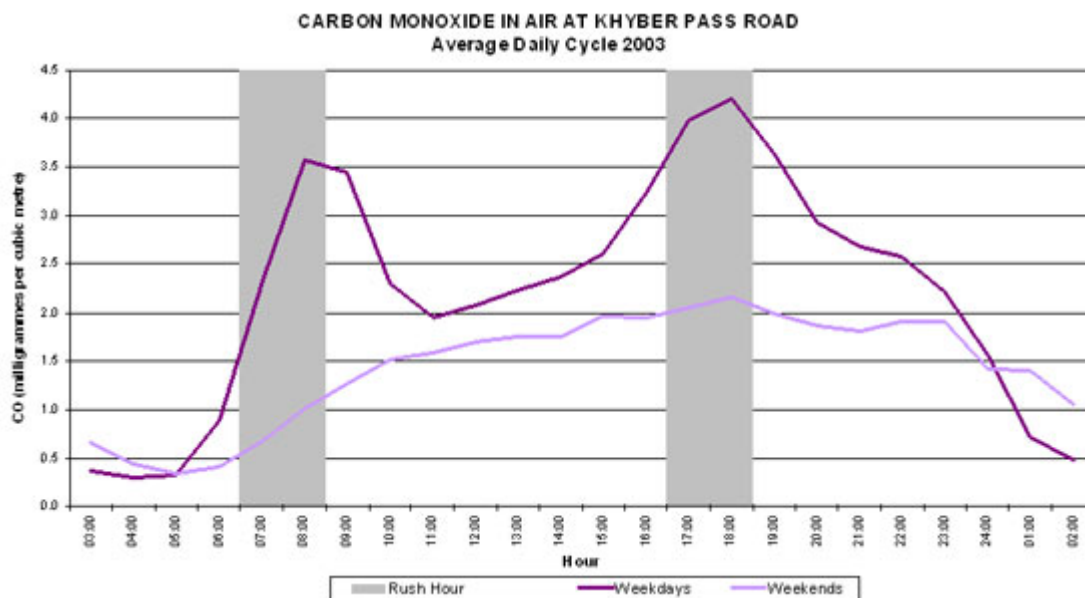
Table 7
Air pollution in Auckland region 1991-2001¹

	Number of days where at least one exceedance occurred										
	91	92	93	94	95	96	97	98	99	2000	2001
PM _{2.5}						10	7	6	3	3	6
PM ₁₀				3	2	0	3	2	4	4	7
NO ₂ ¹	0	0	0	2	0	0	0	23	27	23	28
CO ²	21	8	9	11	3	5	47	32	31	3	2
Total³	21	8	9	16	5	13	57	53	57	33	48

(Source Auckland Regional Council)

The following graph, taken from the Auckland Regional Council website in 2003, shows the effects of peak traffic flows on the levels of air pollution in the city.³⁶

Figure 17
Carbon Monoxide in Air at Kyber Pass Road



Source: ARC website.

³⁴ Air quality fact sheet <http://www2.auckland.ac.nz/bikes/rpos/pdf/air.pdf>

³⁵ T Kjellstrom, S Hill, “New Zealand Evidence for the Health Impacts of transport”, Public Health Advisory Committee, Dec 2001, p.28.

³⁶ <http://www.arc.govt.nz/arc/index.cfm?401B097A-7BF4-42B0-A098-F317012422D1CAB35E63-88E4-4358-889C-043A012DF815> [as at June 2006].

In contrast Wellington's windiness means that air quality there is fairly good and in Christchurch city particulate matter from home heating is considered a more serious pollution problem.³⁷

Characteristics of long distance commuters

Who were these long distance commuters and did differences in human capital emerge compared with the general employed population? Again the analysis used here is at the broad level of territorial authority, but even at this level interesting patterns emerge. The definition of human capital used here is from the Organisation for Economic Co-operation and Development (OECD) which defines human capital as the "knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being".³⁸ Economic well-being is vital for the individual and society, as individual earnings contribute to the economic well-being of society.³⁹ Three proxies for human capital are used here, knowledge (proxy here is highest qualification⁴⁰), income (census income response is used) and occupation. Internationally, the various characteristics for defining human capital do not have a common unit of measurement so the common practice is to employ proxies for human capital, such as years of schooling. Such proxies are not perfect but do give a broad indication of difference, thus informing researchers on aspects of human capital theory.⁴¹ British research has shown that the highly skilled are more geographically mobile and this seems to apply to long distance commuters as well.⁴²

The characteristics of long distance commuters appear fairly stable between this and the previous study that focused on Auckland. In the 2001 Census, long distance commuters included higher than average proportions of legislators, managers and professionals; professionals; and technicians and associate professionals. In 2006, similar patterns emerge with long distance commuters being more likely to be professionals and less likely to be labourers. Of the longest distance commuters, the small group of people that worked between the main urban areas of Auckland, Wellington and Christchurch, almost a third were professionals. These figures support the logical assumption that people in more highly skilled occupations have more scope for flexibility about where they live and work as well as limited opportunities to use their qualifications in smaller urban and rural areas. Patterns were fairly consistent between areas although some interesting variations appear between Auckland, Wellington and Christchurch. Higher proportions of clerical and administrative workers also commuted from outside Auckland, Wellington and Christchurch.⁴³

³⁷ T Kjellstrom, S Hill, p.28.

³⁸ Adolf Strombergen, Dennis Rose and Ganesh Nana, "Review of the Statistical Measurement of Human Capital", Statistics New Zealand, 2002, p.12.

³⁹ Adolf Strombergen, Dennis Rose and Ganesh Nana, p. 12.

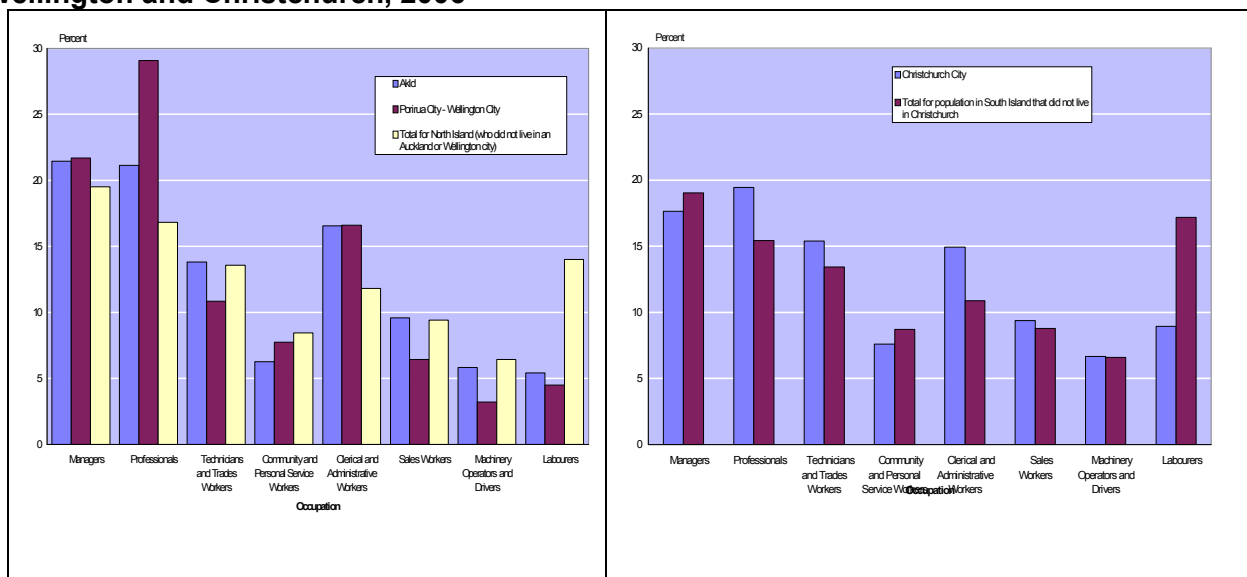
⁴⁰ The knowledge measure chosen for this paper comes from the New Zealand census, which is the most comprehensive information source available at smaller geographical levels. The variable from the census that provides the most effective proxy for knowledge is highest qualification. This variable is derived from two questions: What is your highest secondary school qualification? Apart from secondary school qualifications, do you have another qualification? The qualification had to be complete and take more than 3 months of full-time study.

⁴¹ Adolf Strombergen, Dennis Rose and Ganesh Nana, p.10.

⁴² S Dixon, Migration within Britain for job reasons, *Labour Market Trends*, April 2003, ONS, p 191.

⁴³ Evidence from New Zealand - An Urban/Rural profile suggests that there were higher proportions of these workers in satellite urban areas with the most highly skilled populations tending to live in rural areas close to cities.

Figure 18
Occupation for employed population with lived outside the cities of Auckland, Wellington and Christchurch, 2006



Source: Census of Population and Dwellings, 2006.

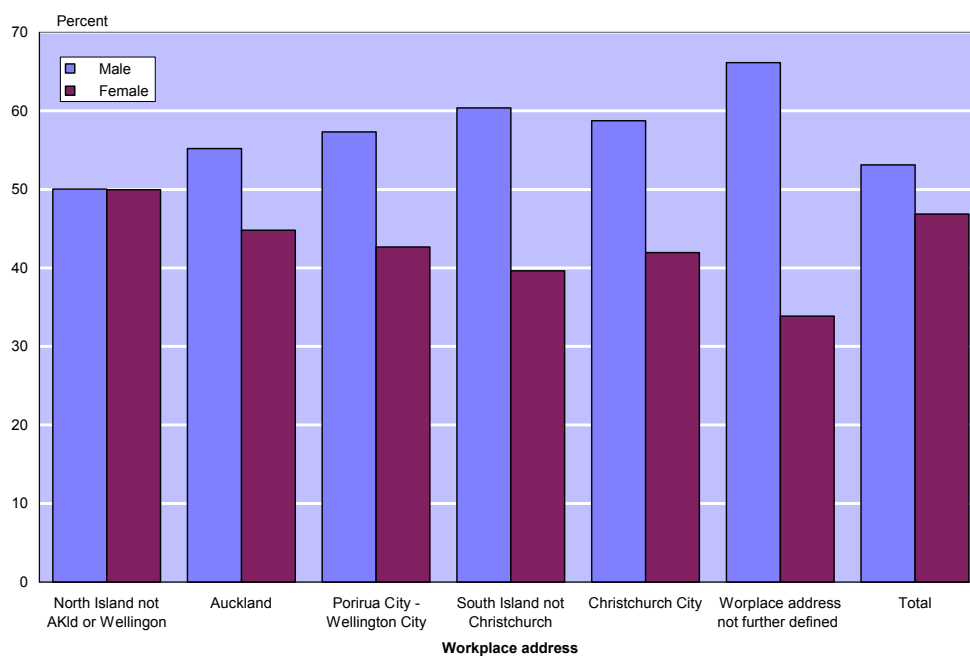
Note: Auckland here includes the cities of North Shore, Waitakere, Auckland and Manukau and Wellington includes Porirua, Lower and Upper Hutt, as well as Wellington city.

Breakdowns by district show some interesting variation; however, in some of these areas the numbers are fairly small so should be treated as indicative only. Occupational breakdowns for long distant commuters to Auckland cities were fairly consistent between 2001 and 2006. The most common occupation for long distant commuters in both census years was legislators, administrators and managers, followed by professionals and technicians and associate professionals. Figures for clerks were highest in Papakura (16.7 percent of people listing a workplace address in an Auckland city), but slightly lower than the almost 20 percent in 2001. In 12 territorial authorities (Kaipara, Rodney, Franklin, Thames-Coromandel, Waikato, Hamilton city, Waipa, Western Bay of Plenty, Hastings, New Plymouth, Wellington city and Christchurch), approximately a fifth of all people who had a workplace address in an Auckland city was a legislator, manager or administrator.⁴⁴ People commuting to Wellington and Christchurch appear similar although a slightly higher percentage of people commuting to Wellington were professionals rather than legislators, managers or administrators.

Figures show a gender bias in long distance commuting. Men were more likely to be long distance commuters particularly when a long distance was involved such as from one of the four cities of Auckland to one of the four cities in the Wellington region (61.4 percent were male and 38.6 percent females).

⁴⁴ NZSCO99 has been used here for consistency of occupational groupings between years.

Figure 19
Sex and workplace for usual residents of the North Island outside the main cities (North Shore, Auckland, Waitakere and Manukau, and Porirua, Upper Hutt and Lower Hutt and Wellington), 2006



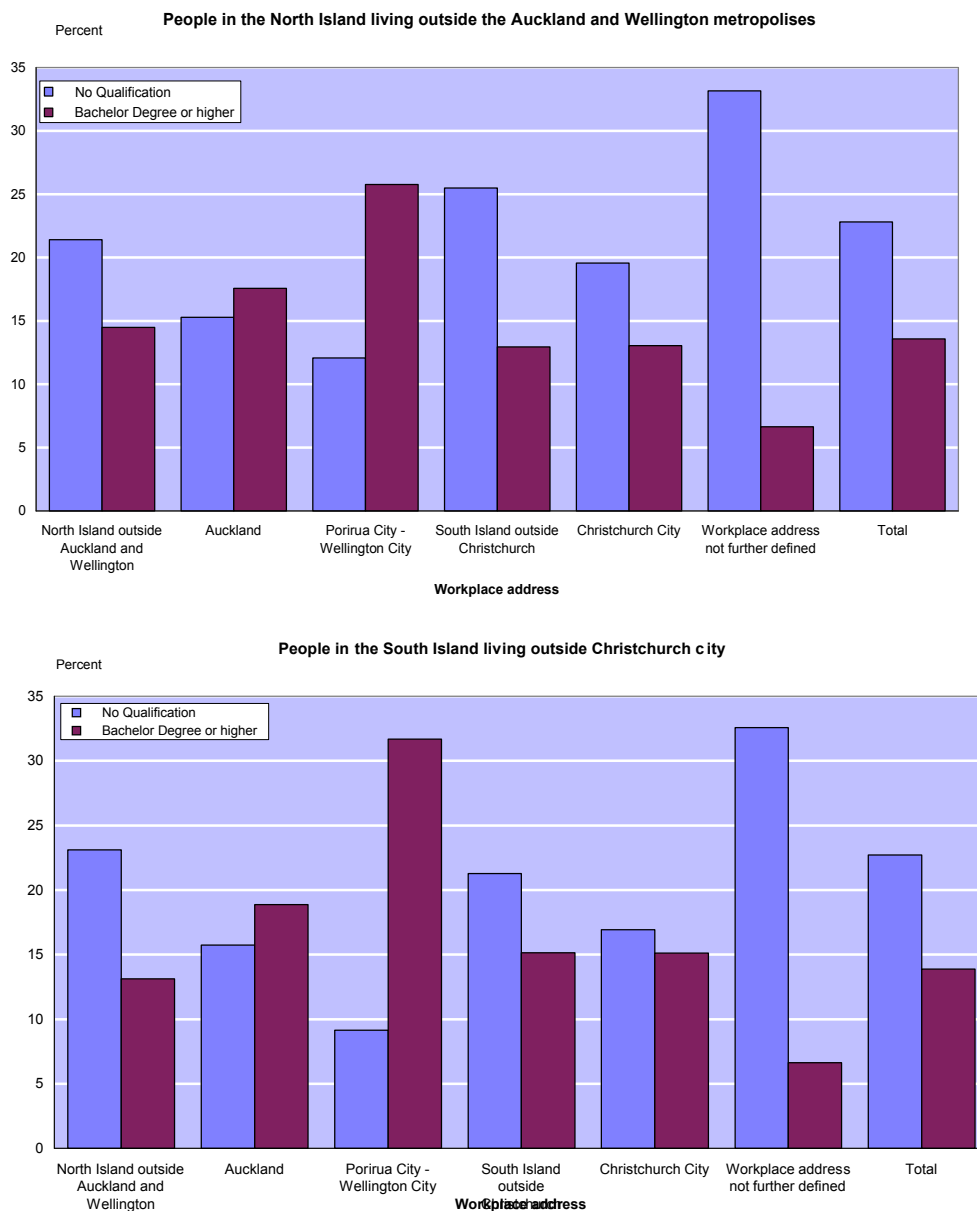
Source: *Census of Population and Dwellings, 2006*.

Where the employed population lived and worked in the same area the sex balances were even. This pattern has been noted in other studies: researchers such as James Newell suggested that reduced geographical mobility among females is largely due to their differing household responsibilities and occupational profile.⁴⁵

An analysis of education patterns also shows a variation based on workplace address. People who listed a workplace in the Wellington and Auckland metropolises had on average a higher level of qualifications. People commuting to the Wellington metropolis had the highest level of qualifications. Commuters to Christchurch city from other territorial authorities in the South Island were less likely to have no qualifications, but there was little noticeable difference with regard to tertiary qualifications. This reinforces the more evenly spread distribution of occupations.

⁴⁵ James Newell and Martin Perry (2003). This sex imbalance had also emerged in the 2001 Census.

Figure 20
Employed population outside the cities of Auckland, Wellington and Christchurch listing an workplace address in one of those cities⁽¹⁾ By Highest Qualification, 2006



Source: *Census of Population and Dwellings, 2006.*

(1) Notes this includes North Shore, Auckland, Manukau and Waitakere cities, plus Porirua, Upper and Lower Hutt and Wellington cities.

The difference in human capital between people who commuted to the larger cities is evident in relation to occupation and education and is further reinforced by information about income. People who commuted outside their local territorial authority to go to the Auckland or Wellington metropolises or Christchurch city had higher incomes than people who were lived and worked outside these areas. The highest premium in relation to income seemed to be for people who lived outside but worked in the Wellington metropolis. The figures used here are annual personal income from all sources. They are not a perfect measure of human capital since researchers prefer the use of hourly or weekly earnings (full-time) to annual income but we do not have this information in the census.⁴⁶

⁴⁶ Adolf Strombergen, Dennis Rose and Ganesh Nana, 12.

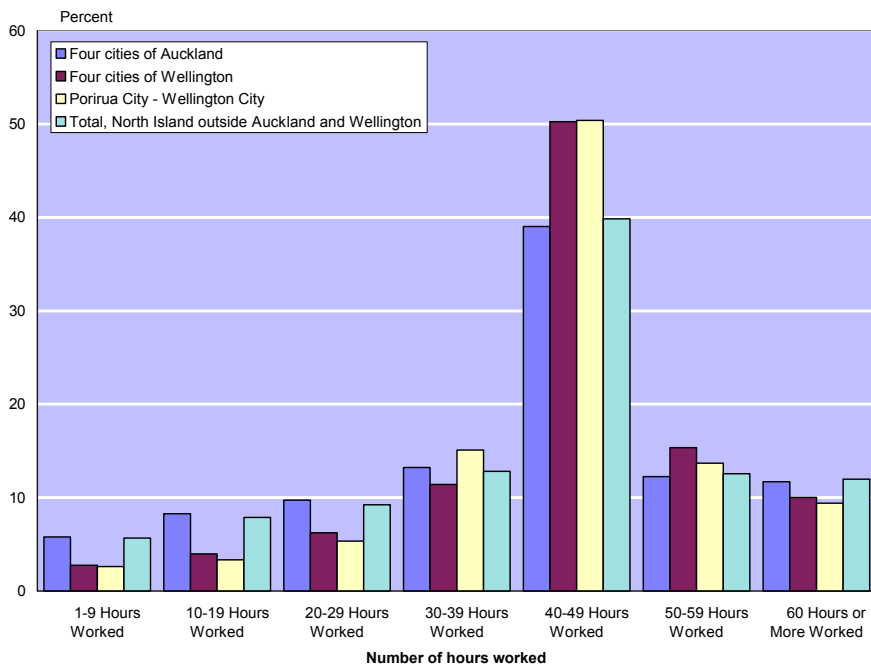
Table 8
Annual personal median income of employed population by selected workplace address and usual residence, 2006

Usual residence	Workplace address						Total
	North Island outside Auckland and Wellington	Four cities of Auckland	Four cities of Wellington	South Island outside Christchurch	Christchurch City	Workplace address not further defined	
North Island outside Auckland and Wellington	\$32,031	\$44,363	\$48,152	\$29,532	\$33,659	\$27,748	\$32,202
Four cities of Auckland	\$38,054	\$39,008	\$46,250	\$33,751	\$36,775	\$29,509	\$37,737
Four cities of Wellington	\$36,801	\$45,334	\$40,859	\$38,334	\$42,500	\$30,088	\$39,395
South Island outside Christchurch	\$27,744	\$36,330	\$43,611	\$30,466	\$39,476	\$28,372	\$30,696
Christchurch city	\$29,808	\$44,286	\$49,524	\$37,369	\$33,514	\$28,102	\$32,955
Total New Zealand	\$32,178	\$39,449	\$41,285	\$30,631	\$34,247	\$28,531	\$34,247

Source: Census of Population and Dwellings, 2006.

Long distance commuters seem to have generally worked longer hours than people who lived and worked in the same territorial authority. The effects of long commutes or of living away from home and returning on weekends may have other consequences, such as an impact on social capital: reduced time for family and for other activities outside the household.⁴⁷

Figure 21
Hours worked by workplace address for employed population in the North Island who lived outside the Auckland and Wellington metropolises, 2006



Source: Census of Population and Dwellings, 2006.

⁴⁷ A preliminary look at rates of volunteering showed lower rates for long term commuters but this is a complex subject and needs to be further explored.

Conclusion

This paper shows that there has been a growth in commuting to the Auckland and Wellington metropolises and to some extent Christchurch city between 1996 and 2006. The growth has been greatest and most extensive for people commuting to the Auckland metropolis. The evidence in this paper reinforces the conclusions of the earlier study based on the 2001 census; that there has been a real shift in where people live and work. Distance travelled has increased, with people from the North Island and South Island giving a workplace address in the Auckland metropolis. The Wellington metropolis also has a far-reaching influence. There is also the presence of a small labour market operating between Auckland, Wellington and Christchurch. The commuting population tends to be more highly educated, to have higher incomes and work in more skilled occupations. They are also more likely to be male. Current trends suggest that the desire for increased flexibility about work and home locations is likely to continue although the sharp growth in petrol prices since 2006 may moderate or alter this trend. This rise in commuting has been paralleled by large increases in population in districts and smaller towns closest to these cities. This paper has identified, however, that long distance commuting may have some detrimental environmental effects. The experience of the Wellington region with its higher use of public transport, however, does show that long distance commuting can occur in a more sustainable manner. Information on workplace address from the census provides some insight into the commuting patterns, which can be used to inform council planners and labour market specialists. Although a snapshot in time it does provide a reasonable consistent picture about commuters between census years.⁴⁸

Disclaimer: The opinions, findings, recommendations and conclusions expressed in this report are those of the author(s). They do not purport to represent those of Statistics New Zealand, who takes no responsibility for any omissions or errors in the information contained here.

⁴⁸ Non-response rates were reasonably high with between 12 and 21 percent of the employed population excluded from this analysis, either because they had no fixed abode, did not list a workplace address, or the address was not of sufficient quality to be coded accurately to a territorial authority. However, the workplace patterns over the last censuses have been very consistent, which can increase our confidence in the information from people that specified their workplace address. It is interesting to note that people who did not specify their workplace address at a level that it could be coded to a territorial authority level also had distinct characteristics. They were more likely to be male and to have not specified answers to a range of other questions such as mode of transport, occupation, industry etc. They were also more likely to have few qualifications. For people that did specify their industry, the highest percentage (21.6 percent) were construction workers who may in fact find it difficult to specify their workplace address.

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JEL Classification

O18 - Regional, Urban, and Rural Analyses

P25 - Urban, Rural, and Regional Economics; Housing; Transportation

Transport, Auckland, Wellington, Christchurch, education, income, employment