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OCCUPATIONAL NET REPLACEMENT DEMAND IN NEW ZEALAND FROM 1991 TO 2006

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Abstract

Net replacement demand is defined as the number of job openings that arise from individuals leaving an occupation, net of jobs taken by individuals re-entering an occupation. This gives us a measure of the demand for labour required to replace the current workforce and may be used for resource allocation planning for education and training. This may also be used as an additional diagnostic measure for occupations experiencing recruitment and retention difficulties.
The average net replacement rate estimated across all occupations in New Zealand was in the order of 1.4% for 3- digit and 1.7% for 5-digit occupations during 2001-06. The 5-digit rates varied considerably between 0.1 (e.g. microbiologists) and 10 (e.g. checkout operators). Average net replacement demand rates for occupations in New Zealand when compared with those derived in the U.S (2.4%), Australia (2.0%) and the Netherlands (3.8%) suggest somewhat lower domestic rates. Variations in estimates between countries could be explained by differences in the level of occupational mobility as well as the age and gender structure of the workforce. Social and economic policies and differences in each country's retirement schemes and social assistance policies also give rise to differing net replacement demand rates.

Introduction to Net Replacement Demand

While there are various models that focus on the study and estimation of replacement demand, most definitions of replacement demand are centred on the idea that replacement demand measures the number of job openings that arise for individuals to replace workers leaving an occupation. This could be due to retirement, emigration, moving jobs or temporarily leaving the workforce.

Net replacement demand is often overlooked as an important source of information and can play a significant role in identifying possible job openings for job seekers. Net replacement demand rates may even have equal or greater impacts than job growth, as it can give a more accurate picture of the true number of job openings in an occupation (Shah & Burke, p. 648, 2001).

Net replacement demand has various uses. It can be valuable in providing information to agencies developing policies around resource allocation for training and education. Additionally, net replacement demand can provide insightful information about recruitment and retention difficulties for particular occupations. For example, occupations that experience outflows in all age cohorts, such as food processing machine operators, may indicate certain problems or issues in their particular industries.

Furthermore, forecasting net replacement demand information together with wage and job growth information can prove very valuable for people deciding on future career paths. This information may further help align supply and demand of workers and also increases the transparency of labour market information. An excellent example of this transparency is a document by Patton (2006). In this document, Patton produced an occupational forecast report for occupations in Alaska outlining net replacement demand (job openings) together with job prospects. The author outlines likely training and education needed to do the occupation, whether the occupation is declining or not and the average earnings expected. This is a step closer to achieving labour market information transparency and availability for all parties.

Overseas studies

A number of countries study and publish net replacement demand statistics and replacement demand forecasts. These include Australia where the Federal Government publishes total replacement demand for 81 occupational groups (Shah, 1998); the Netherlands through the ROA (Researchcentrum voor Onderwwijs en Arbeidsmarkt - Research Centre for Education and the Labour Market); the U.S through the Bureau of Labor Statistics (BLS) and Canada through the Canadian Occupational Projection System (COPS).

Definition of replacement demand in this study

There are various definitions of replacement demand covered by each of the models mentioned above and these are discussed further in the following section. This paper defines net replacement demand as the number of job

openings that arise from individuals leaving an occupation net of jobs taken by individuals re-entering an occupation (Shah and Burke, p. 649, 2001). Net replacement demand is the most relevant for advice on education and training needs (Shah and Burke, p. 649, 2001) and therefore is the focus of this paper.

Objective of this paper

This study closely follows the methodology used in the paper by Shah and Burke (2001) and estimates historical net replacements rates for 96 occupations at the 3-digit NZSCO level in New Zealand between 1991 and 2006 and 5-digit occupations for 2001-2006.

This study does not intend to provide a full comprehensive analysis of each occupation, but gives a reader a taste for what can be done with this type of information. New Zealand estimates are compared with those from Australia, the US and the Netherlands. Forecasts of net replacement demand rates for these occupations are not addressed in this paper and will be the subject of a forthcoming paper.

Concepts of Replacement Demand

This section defines the concepts of total replacement demand, replacement demand for those outside employment and net replacement demand, as covered in Shah and Burke's study in 2001.

Diagram 1 provides a visual representation of the typical labour mobility in the labour market. It demonstrates the gross inflows and outflows in a particular occupation. Inflows into an occupation can be attributed to individuals leaving education and moving into the labour-force (new entrants), or maybe due to changing jobs (re-entrants) or immigration and so forth.

Death, retirement, emigration, changing jobs and the transition out of the workforce or moving out of employment are the primary reasons for outflows from an occupation. Shah and Burke (p. 650, 2001) separates inflows into new entrants and re-entrants, defining new entrants as individuals entering an occupation for the first time and re-entrants as being individuals re-entering an occupation after leaving it temporarily or due to termination. Diagram 1 shows the inflows and outflows of people into an occupation as well as people who remain in an occupation (A).

Total Replacement Demand

Total replacement demand can be defined as the overall number of job openings resulting from individuals leaving an occupation for any reason, including changing occupations (Shah and Burke, p. 650, 2001). If an occupation is expanding, this is equal to the sum of outflows B, C and D (as shown in Diagram 1). If an occupation is declining, total replacement demand is equal to B, C, and D minus the decline in occupation. The US Bureau of Labor Statistics produces estimates of total replacement demand for approximately 500 U.S occupations (BLS, 1998).

Replacement Demand for those outside employment

This concept is primarily covered in the Canadian Occupational Projections System (COPS) model and defines the replacement demand for those outside employment "this results from netting out inflows from other occupations (inflows E and F), from total replacement demand". The COPS model excludes full-time students from all calculations. This is because Bothby *et al* (1995), claim that students who are about to enter the labour market are a source of labour supply but are often already in the labour market and therefore should not be counted when estimating replacement demand (Shah and Burke, p. 651, 2001).

Net Replacement Demand

Net replacement demand attempts to measure job openings for new entrants to an occupation. In Diagram 1, net replacement demand is defined as the sum of outflows B, C and D minus the re-entrants F, H and J into an occupation. Net replacement demand figures are estimated in the Shah and Burke (2001) paper, for approximately 81 occupational groups as well as in the ROA model where 80 occupational classes are covered.

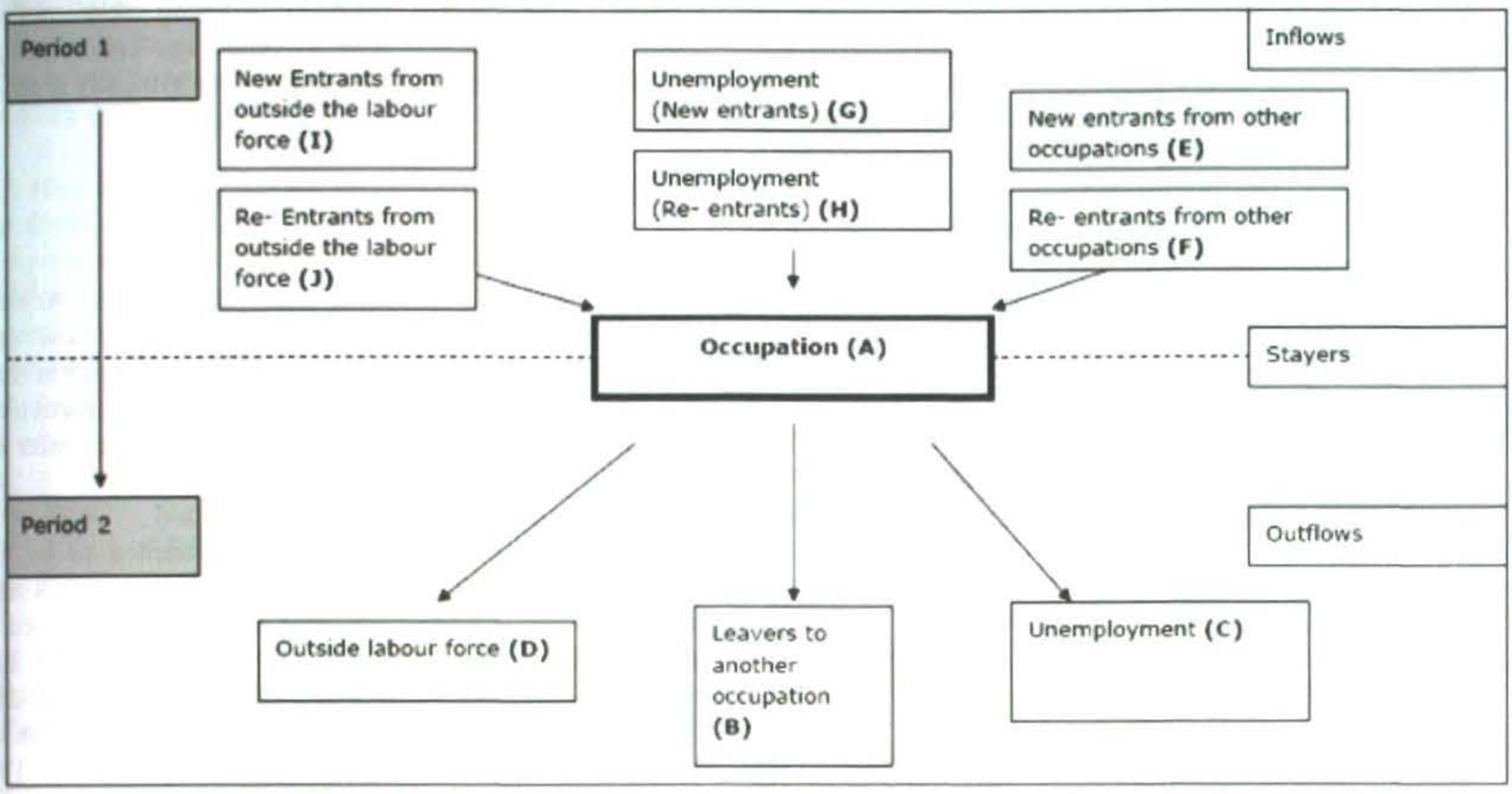
It is important to recognise that if there is a high mobility within an occupation, then this will result in a lower net replacement demand rate. Net replacement demand attempts to capture the measure of turnover coupled with those changing occupation and/or moving in and out of the labour force in order to determine the demand for skills and/or training to maintain the current workforce.

Caveats of the net replacement demand measure

It must be noted that net replacement demand is not only a measure of outflows due to workers changing jobs, exiting the labour force and migration but also in some sense an implicit measure of retirement (Access Economics, p. 48, 2005). Furthermore, it does not tell us anything about inflows into an occupation. In other words, it would be useful to identify the source and size of inflows into an occupation to get a better understanding of the current supply and demand of skills.

Additionally, Access Economics (p. 47, 2005) explains that this methodology does not enables us to know the skill level of re-entrants and therefore, this net replacement demand measure is most likely overestimating the demand for training for these individuals. Furthermore, we do not know anything about whether the people in the first year are the same people that stay on in the occupation in the second period and therefore we do not know the level or demand for training that these people need.

Diagram 1: Flows of individuals in and out of an occupation



Source: This diagram is an adaptation of the Table 1 in Shah and Burke (2001) and Figure 1 in Willems and de Grip (1993)

Methodology of Net Replacement Demand: Application to New Zealand

This study focuses on estimating historical net replacement demand rates in New Zealand for the period 1991 through to 2006 for 3-digit occupations and 5-digit net replacement demand rates.

Data Used

Data used in this study was extracted from the 1991, 1996, 2001 and 2006 New Zealand Censuses of Population and Dwellings[1]. The New Zealand Population and Dwellings Census is conducted every 5 years and collects information on several demographic and socio-economic features. This differs to the Australian Bureau of Statistics' labour mobility data; a supplement to the Labour Force Survey dataset used in the study by Shah and Burke (2001). Data from the New Zealand Population and Dwellings Census (Census) was considered more accurate, complete and, by the nature of being a Census, offers greater levels of disaggregation and confidence than other sources of similar data in New Zealand, such as the quarterly Household Labour Force Survey (HLFS) where sample sizes for certain occupations by age-cohorts could be limiting.

In order to measure the outflows between Census years for an occupation, occupational employment at the 3-digit level New Zealand Standard Classification Occupation (NZSCO) was used. The study population consisted of the working-age population (15 year and over) divided into 5 year age cohorts.

The disadvantage of using Census data

Ideally, data from the Census would provide details of the sources of outflows in order to calculate net replacement demand rates. However, due to the nature of the data, it is not possible to distinguish between new entrants and re-entrants to an occupation. Additionally, it is also not possible to determine the type of mobility for occupations individuals have experienced during separate years in between Census years and therefore the sources of outflows due to an employee changing jobs, death, retirement or emigration cannot be differentiated.

Nevertheless, it is possible to estimate net replacement demand rates by using the cohort-component method described in the following section. 3-Digit rates are calculated because it directly avoids the comparability problem using 5-digit rates due to a change in occupational coding system in 1996. For this reason, 5-digit net replacement demand rates are only calculated for the 2001- 2006 period.

Unlike, the Shah and Burke (2001) paper, the gender variable is not included for reasons of simplicity.

Cohort-component method

The cohort-component method outlined by Eck (1991) and Willems and de Grip (1993) can be utilised to approximate net replacement rates. This is because it allows estimation of flow rates in and out of an occupation by taking into account net changes in cohort sizes over a given period (Shah and Burke, p. 651, 2001).

The authors outline how this method has been used for a variety of different purposes including estimating survival

ratios (ABS, 1992) and progression rates through courses in higher education (Shah and Burke, 1999).

The cohort-component method uses data at two different points in time, to establish the inflows and the outflows for an occupation by age-cohorts. Annual data is typically used, however due to the lack of availability of this type of data for New Zealand, five yearly Census data was used. As a result, a particular occupation of cohort age *a* in a particular Census is compared to the same cohort in the next Census five years later.

Definition of net outflows

Shah and Burke (p. 652, 2001) describe the net flow from an occupation as being the change in size of cohort over a certain period and given by:

$$F_{at} = E_{a+1t+1} - E_{at}$$

Where F_{at} is the net flow from age cohort *a* at time *t*

The authors go on to outline that if the size of the cohort decreased ($F_{at} < 0$), then there has been an outflow ($-F_{at}$), otherwise the net outflow is equal to zero. This is true if the employment in an occupation is expanding, however if employment is decreasing then the net outflow is equal to sum of outflows minus the size of the contraction.

This method approximates net replacement demand as it estimates "the number of leavers from an occupation less (mostly) re-entrants" (p. 652). Using this model, outflows are generally seen in older age cohorts (e.g. through retirement) and new entrants are typically seen in the younger ones (e.g. from education).

Example of net replacement demand calculations

Table 1 presents a similar hypothetical example to that given in Shah and Burke (2001), showing how net replacement demand is calculated for an occupation that is increasing in size. Employment numbers in a particular age cohort are compared in 2001 and five years later in 2006.

For simplicity the retirement age is assumed to be 40 years and therefore there are 100% outflows in this age cohort. As can be seen from table 1, most outflows occur in the older age cohorts, in this case, the 25-39 age cohorts. Therefore, all workers in the older age groups need to be replaced. Conversely, increases in inflows in the younger age cohorts are due to new entrants. The sum of outflows (200) from this occupation approximates the number of number of job openings available for new entrants or shows the net replacement demand in this occupation.

Table 1: Hypothetical example of net replacement demand for an occupation where employment is increasing [a]

Age cohort 2001	Employment 2001 (Period t-5)	Age cohort 2006	Employment 2006 (Period t)	Employment Change 2001-2006	Net Flow 2001-2006
		15-19 years	90	90	0[b]
15-19 years	100	20-24 years	180	80	0[b]
20-24 years	200	25-29 years	250	50	0[b]
25-29 years	240	30-34 years	200	-40	40[c]
30-34 years	180	35-39 years	120	-60	60[c]
35-39 years	100	40 years and over	0	-100	100[c]
Total	820		840	20	200[d]

a. If an occupation is decreasing then the change in employment (loss) is subtracted from the total net outflows.

b. The net outflow is equal to zero, as no employees need to be replaced.

c. Net outflow here is positive as employees have been lost from this cohort and need to be replaced.

d. Net Replacement demand rate = $\frac{200}{820} \div 5 = 4.9\%$

Source: Shah and Burke (2001) and Centre for the Economics of Education and Training

Assumption about retirement age in the model

In this study the retirement age is assumed to be 70 and over. An extra cohort was added into the data that included the 70+ category and all employment in this category was assumed to equal zero and therefore 100% of outflows are from this cohort. This is necessary as New Zealand does not have a compulsory retirement age; however most people retire by the age of 70. While some people remain in employment over the age of 70, they make up a small proportion of the overall workforce. The assumption that people over the age of 70 are not in work is used by Shah and Burke (2001) as well as in the ROA model.

Historical Net Replacement Demand Estimates for New Zealand

This section briefly discusses the results for a subset of 3-digit occupations in this study. It is not intended to provide a full analysis for all occupations. The objective is to give the reader an idea of how this data could be used to investigate what is going on in an occupation with respect to outflows.

There are a variety of observable factors that affect net replacement demand rates within a certain occupation. These factors include the age distribution within an occupation, income, skill level of an occupation and whether an occupation is experiencing recruitment and retention difficulties.

The results showed that occupations that had a younger age distribution, tended to be associated with higher net replacement demand rates. This was particularly true for cashiers, tellers and related clerks at the 3-digit occupational group level, where a large proportion of individuals fell into the 15-19 age group and the average age in 2006 was 33 years, well below 41 years for all occupations (figure 1). The average net replacement demand rate for this group of 4.8 % percent was considerably higher than the average rate for all occupations of 1.4 % between 2001 and 2006. There are several reasons driving this higher than average result. First, this is a low-skilled occupation and therefore exhibits low average tenure and secondly, people do not return to these types of jobs after a certain age (C. Shah, personal communication, April 10, 2008).

However, a younger average age does not always yield a high net replacement demand rate, as seen with the case for computing professionals (figure 2). The results showed that this occupation had the lowest net replacement demand rate, between 2001 and 2006, of 0.2%, while the average age for this occupation was relatively young (37 years). And so, it seems that other factors were driving the very low result. According to the 2006 Census the average annual income was $59,000, well above the average income for all occupations of $38,900 and may help explain larger inflows compared to outflows within this occupation (Shah & Burke, p. 657, 2001). The low net replacement demand result is somehow puzzling given that this occupation is usually associated with a high turnover. However, examining more closely, high mobility *within* this occupation would also result in low net replacement demand rates. Additionally, this lower net replacement demand rate could be due to the occupation being relatively new when compared with other professional occupations (C. Shah, personal communication, April 10, 2008).

3-Digit occupations with net replacement demand rates around the average for all occupations of 1.4 percent, such as health associate professionals (1.5%) shown in figure 3, exhibited net outflows in older age groups and therefore showed a retirement pattern typically seen in the average occupation.

Occupations experiencing recruitment and retention difficulties may explain a higher than average net replacement demand rates. An occupation is said to experience recruitment and retention difficulties when there is a sufficient supply of individuals with the required skills in the potential labour market but insufficient numbers are willing to take up employment at current levels of remuneration and conditions of employment. Retention problems are often a major contributor to this condition. The results showed that semi-skilled or elementary occupations such as food and related products processing machine operators experienced high outflows in nearly all age groups. Further research is needed to confirm this view, however high outflows particularly across all age groups could be a symptom of this type of problem.

Table 2: Summary of Results

NZSCO	Occupation	Employment 2006	Average income	Average Age	Annual Average net replacement demand rate
421	Cashiers, Tellers and Related Clerks	32,600	$24,500	33	4.80%
42112	Checkout Operators	12,921	$10,300	26	10.10%
42111	Cashiers	3,882	$16,300	33	1.30%
42151	Bill and Debt Collectors	11,236	$36,100	38	1.00%
322	Health Associate Professionals	11,208	$36,700	41	1.50%
32241	Veterinary Assistant	1,263	$26,400	34	4.00%
32252	Retail Dispensary Assistant	87	$38,500	38	0.10%
223	Nursing and Midwifery Professionals	35,148	$41,000	45	0.90%
22311	Plunket Nurse	495	$34,400	46	3.10%
22314	Principal Nurse	1,455	$52,800	48	0.30%
213	Computing Professionals	27,858	$59,200	37	0.20%
21311	Systems Engineer	7,656	$67,00	38	0.90%
21312	Computer Applications Engineer	14,193	$58,300	36	0.10%

Figure 1: Age Profile and net outflows of Cashiers, Tellers and Related Clerks

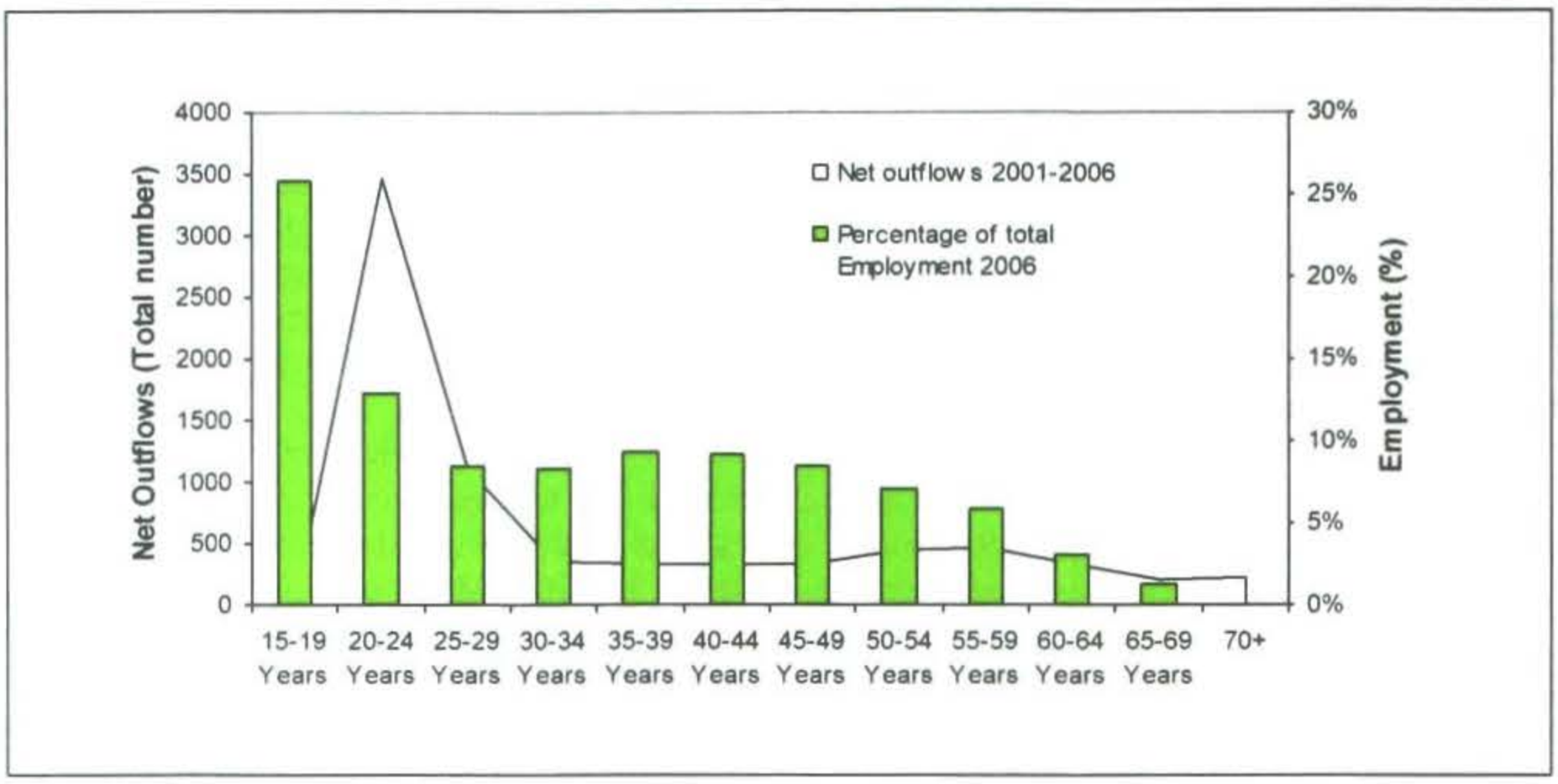


Figure 2: Age Profile and net outflows of Computing Professionals

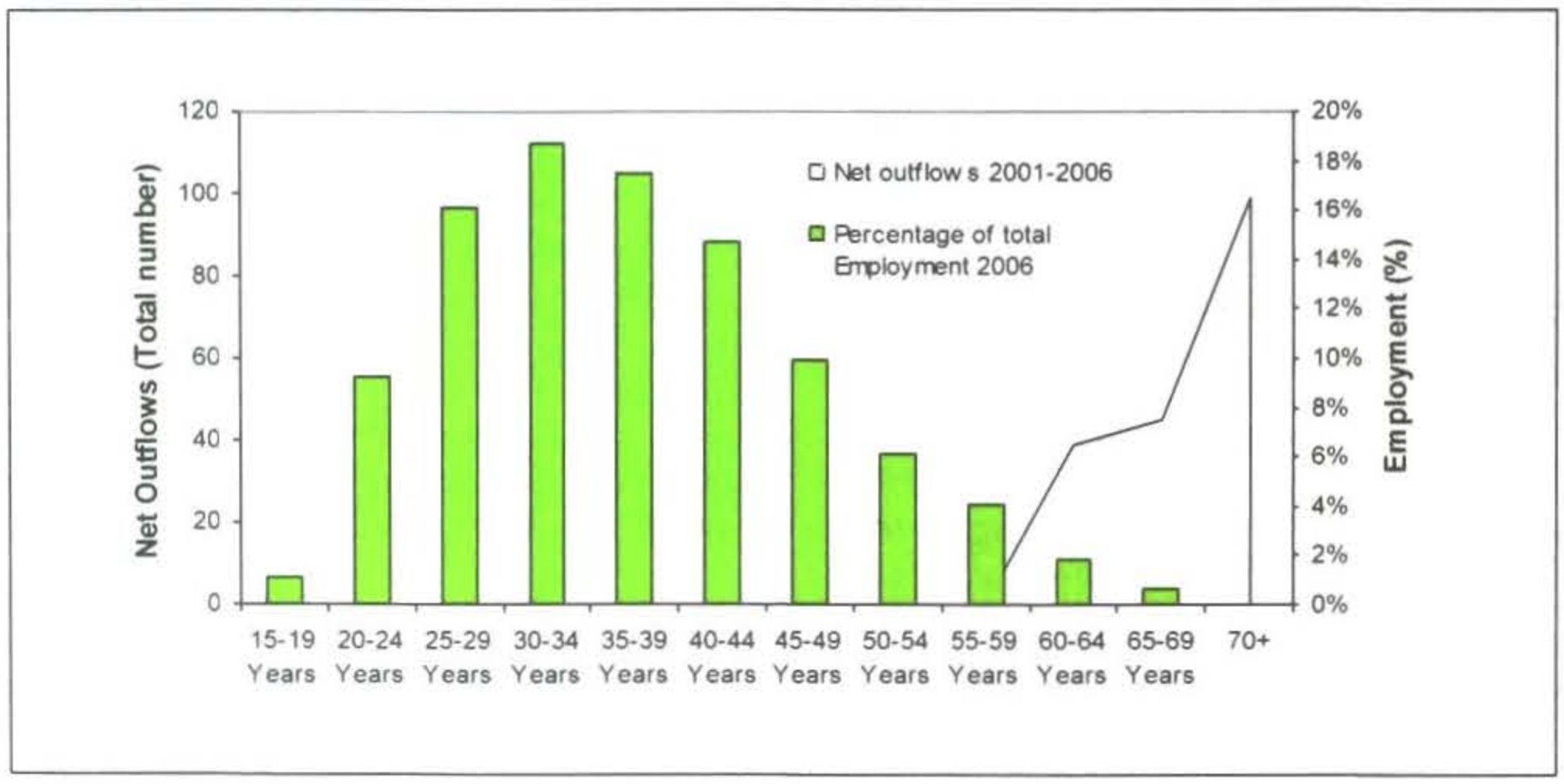
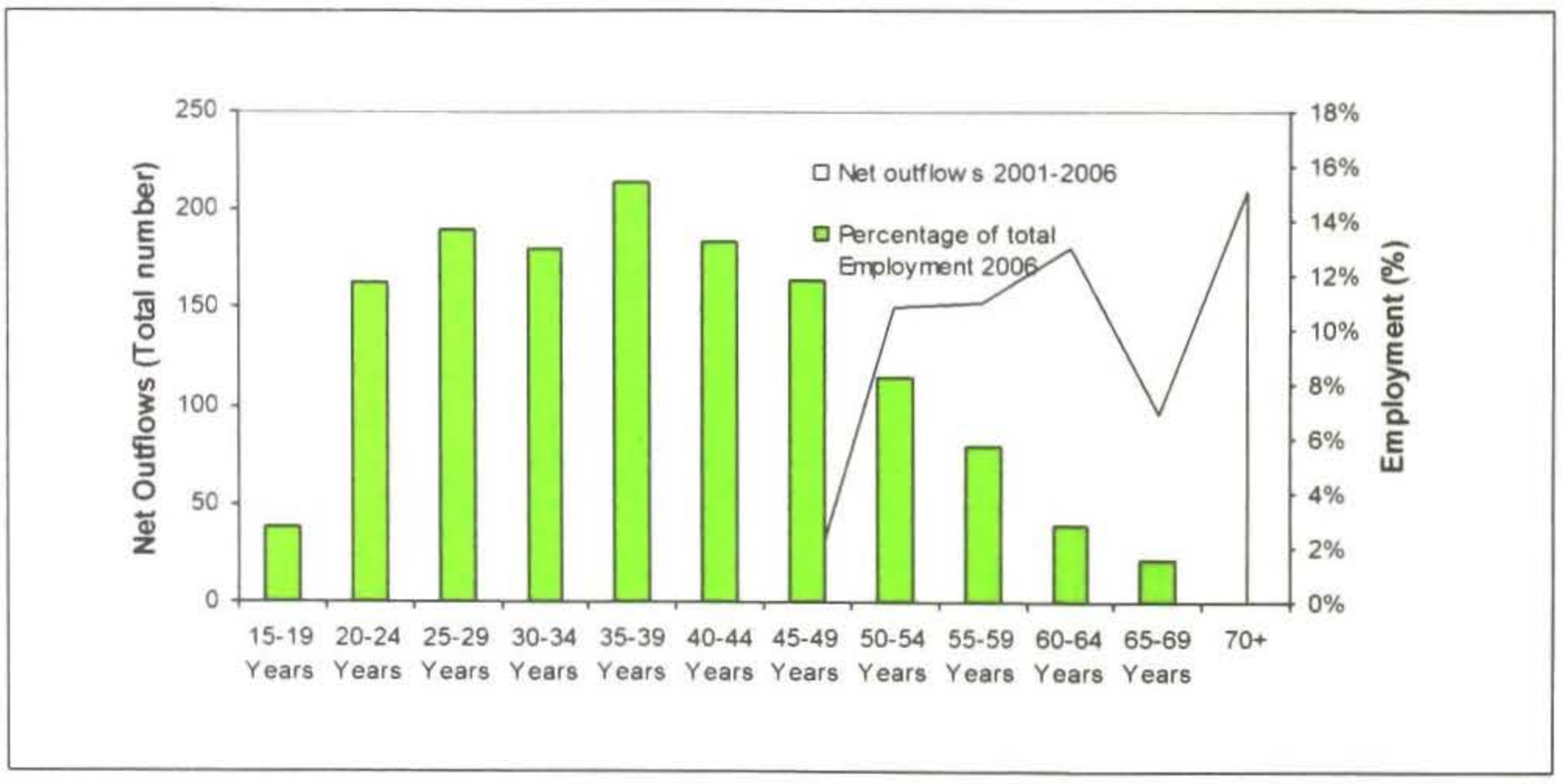


Figure 3: Age Profile and net outflows of Health Associate Professionals



International comparison of net replacement estimates

This sections gives an overview of the net replacement demand rates for the U.S, Australia, The Netherlands and New Zealand and explores possible reasons for differing rates between countries.

The average net replacement rates for the U.S, Australia, The Netherlands and New Zealand are 2.4%, 2%, 3.8% and 1.4%[2] respectively. U.S net replacement rates were taken from the BLS (2006) and related to the period 2004-2014. Rates for Australia (1999-2003) and the Netherlands were obtained from the Shah and Burke (2001) paper. Due to the unavailability of comparable estimates and data, rates cannot be compared for corresponding periods.

U.S net replacement demand rates across all occupations range from 1.0% to 6.2%. In Australia, rates ranged from around 0.5% to over 6% for the 1999-2003 period, while in The Netherlands the minimum was 2% (Shah and Burke, 2001, p. 658). Rates in New Zealand varied from 0.2% to just over 5% between 2001 and 2006.

Example of possible reasons for differences in estimates internationally

Differences in international net replacement demand rates could be due to a variety of reasons. For example, differences in the age and gender structure of the workforce of the respective countries along with their social and economic policies and differences in assumptions made in each country's model (Shah and Burke, 2001, p. 658). More specifically, differences in net replacement demand might be explained by the same financial drivers that influence workers to move in and out of the labour force. For example, Nickell and Nunziata (2002) state that changes in the unemployment benefit system directly influences the readiness of the unemployed to fill vacancies (p.4). Additionally, incentives created by different retirement schemes and changes to social assistance over recent years in the U.S, Australia and New Zealand may also have an influence on net replacement rates.

Retirement schemes and their influence on net replacement rates

Differences in retirement schemes are an interesting feature to examine more closely that could explain changes in net replacement rates across different countries (Shah and Burke, 2001).

The Netherlands have one of the lowest participation rates in the OECD in the 55-64 age cohort (Euwals *et al*, 2006). Higher net replacement rates in the Netherlands could be explained by the generous retirement schemes, in the past. However, Euwals *et al* (2006), argue that retirement behaviour has changed in the Netherlands, since the policy reform towards less generous and actuarially fair capital funded schemes took place. Their study claims that this policy reform has transitionally induced workers to post pone early retirement.

This change in behaviour may have some effect when estimating future net replacement estimates for this type of situation. Therefore, it is imperative that policy changes and their affect on the labour market are recognised when attempting to forecast.

New Zealand Superannuation

On the other hand, New Zealand has one of the highest participation rates of older workers in the OECD. This trend, Hurnard (p.1, 2005) argues, has been primarily due to the change in age of eligibility for the New Zealand Superannuation (NZS) from 60 to 65.

The author goes on to state that the New Zealand incentives that have encouraged older workers to stay in the labour force, are due to the unique features in the public pension design. These include:

- having no legal impediment for continuing to be employed beyond the New Superannuation eligibility age;
- not having a compulsory retirement age;
- the New Zealand Superannuation is not work or income tested (meaning that a worker eligible for NZS can continue to work with no financial penalty while receiving NZS); and
- the absence of an early eligibility option for the NZS will mean that people will be more likely to stay in the labour force until they are eligible for the NZS (p. 19, 2005).

These incentives, unique to New Zealand, could all explain why New Zealand has overall lower net replacement rates when compared to the U.S, the Netherlands and Australia, because older workers in New Zealand do not have strong incentives to retire early.

Assumption about retirement age

Assumptions about the retirement age play an important part in determining net replacement rates. Shah and Burke (p. 658, 2001) explain that the lower retirement age (65 years) assumption in the ROA model may also explain why net replacement rates are higher in the Netherlands. Conversely, having a higher retirement age assumption in the New Zealand methodology might also help account for low net replacement rates. Then again, a higher assumed retirement age (70 years) in the New Zealand case may align with the fact that New Zealand has higher than average participation rates in the 55-64 age cohort.

Conclusion

The main aim of this paper was to estimate historical net replacement demand rates for 96 3-digit NZSCO occupations in New Zealand over the three 5 year Census periods 1991-2006 (shown in Appendix A) and for 560 5-digit NZSCO occupations between 2001 and 2006[3].

The results show that between 2001 and 2006 an estimated 26,400 annual job openings at the 3-digit occupational level and 28,200 at the 5-digit occupational level were due to net replacement demand. Furthermore, net replacement demand rates in New Zealand for 3-digit NZSCO occupations ranged from 0.2% to just over 5% and zero to 10.1% for 5-digit occupations.

When combined with wage information and growth of additional or new jobs created, net replacement demand rates may prove extremely valuable for job seekers as it provides a more accurate picture of the full extent and distribution of jobs openings. Additionally, net replacement rates may be used for assessing the cost-effectiveness of policies on training (Shah and Burke, p.659, 2001).

Furthermore, net replacement demand rates may provide an indication of which occupations have and could experience retention and recruitment difficulties which could be further explored by employers and policy makers.

Variations in rates could also be explained by the differing nature and skill levels of occupational groups. For example, higher rates seemed to occur in lower skilled occupations, such as cashiers, tellers and related clerks. While this was primarily due the lower skill level, this could also be due to the transitory nature of these occupations experiencing larger net outflows in younger age groups. High net replacement demand rates for low skill occupations can also be due to low average tenure and because people do not tend to return to such jobs after a certain age.

On the other hand, very low net replacement rates of around 0.2% were seen in highly skilled professional groups such as computing professionals, at the 3-digit level. Despite having high turnover within individual 5-digit computing related occupations, it was assessed that this high mobility may not result in higher net replacement rates for the overall occupational group. These lower rates could also be due to the numerous computer related occupations being relatively new when compared with other professional occupations coupled with a higher than average annual income.

Net replacement demand information informs and provides some insights to the the reader about an aspect of the dynamics of an occupation. In a sense, it is one piece of the puzzle in trying to understand the demand and supply skills for a particular occupation.

Further work needs to be done in not only understanding the inflows into the occupation but where these inflows are coming from. For example, examining the supply of immigrants and graduates into an occupation is needed to understand the current supply of and demand for skills. Therefore, it is imperative that net replacement demand is combined with other data sources such as inflows into an occupation and outflows from an occupation as well as wage rates in order to gain a more complete understanding about an occupation.

As mentioned in Shah and Burke (2001), further research is also needed to investigate the reasons for variations in net replacement demand rates across occupational groups. In the New Zealand case, areas of interest would lie in uncovering the reasons why particular occupational groups are experiencing recruitment and retention difficulties. This would be valuable, as New Zealand is still experiencing a certain level of skill shortage in some occupations. However, the types of shortages and why they may be occurring are yet to be fully understood.

Notes

1. Data from Statistics New Zealand is randomly rounded to base 3 in order to protect confidentiality.

2. This rate refers to the 3- digit occupation net replacement rate.

3. Net replacement demand rates for 5 digit occupations can be accessed by contacting Maria Guerra Maria.Guerra@dol.govt.nz.

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3 Digit NZSCO Occupation	Total Annual Net Replacement 1991-1996	Total Annual Net Replacement 1996-2001	Total Annual Net Replacement 2001-2006	Total Employment 1991	Total Employment 1996	Total Employment 2001	Total Employment 2006	2006 Mean Income
912 Messengers and Doorkeepers	5.90%	7.20%	5.20%	6,807	12,660	12,045	11,493	24,700
421 Cashiers, Tellers and Related Clerks	3.70%	4.60%	4.80%	31,863	33,303	31,776	32,601	24,500
523 Fashion and Other Models	3.10%	3.00%	4.60%	78	120	183	120	20,900
111 Legislators	2.20%	3.90%	4.10%	327	558	702	822	66,700
732 Glass Cutters and Related Workers	2.00%	1.40%	3.90%	243	168	186	174	33,100
512 Housekeeping and Restaurant Services Workers	2.50%	4.30%	3.80%	44,274	58,209	63,348	72,540	16,000
744 Leather Goods Makers	1.20%	0.00%	3.60%	966	855	252	255	27,400
211 Physicists, Chemists and Related Professionals	1.20%	1.00%	3.50%	1,554	1,986	1,524	1,530	57,000
521 Salespersons and Demonstrators	2.10%	4.30%	3.20%	76,020	93,585	95,874	102,327	22,500
741 Food and Related Products Processing Trades Workers	2.70%	2.20%	2.70%	9,312	8,292	7,977	8,175	28,500
721 Metal Moulders, Sheet-Metal and Related Workers	1.90%	1.60%	2.60%	15,645	13,686	13,473	13,779	38,300
731 Precision Instrument Makers and Related Workers	1.70%	1.90%	2.60%	2,325	2,283	2,322	2,292	32,800
834 Ships' Deck Crews and Related Workers	2.60%	1.40%	2.50%	1,197	1,230	1,305	1,122	36,400
422 Client Information Clerks	0.90%	2.70%	2.50%	21,804	28,596	30,081	32,754	25,800
612 Market Oriented Animal Producers	2.00%	1.50%	2.30%	93,636	99,930	83,163	80,415	36,900
823 Rubber and Plastics Products Machine Operators	2.70%	2.70%	2.30%	3,243	2,748	2,769	2,925	32,600
827 Food and Related Products Processing Machine Operators	3.20%	0.80%	2.20%	24,444	23,592	27,012	25,242	30,000
813 Glass and Ceramics Kiln and Related Plant Operators	2.10%	1.70%	2.00%	1,725	1,926	1,761	1,359	31,200
831 Railway Engine Drivers and Related Workers	0.20%	1.40%	1.90%	1,137	693	681	750	50,000
312 Computer Equipment Controllers	2.20%	2.30%	1.90%	9,816	8,823	9,168	7,911	50,400
724 Electrical and Electronic Instrument Mechanics and Fitters	1.40%	1.80%	1.90%	3,132	3,321	3,192	3,360	40,200
232 Secondary Teaching Professionals	1.90%	1.50%	1.90%	17,145	16,602	18,528	21,180	50,600
822 Chemical Products Machine Operators	3.10%	2.90%	1.90%	1,884	1,821	1,881	1,503	28,400
911 Building Caretakers and Cleaners	1.50%	2.70%	1.80%	29,145	36,360	37,029	38,943	17,700
245 Religious Professionals	1.70%	1.30%	1.70%	3,306	3,093	3,492	3,756	31,400
742 Cabinet Makers and Related Workers	0.80%	1.80%	1.70%	4,263	5,007	4,746	4,062	32,800
522 Street Vendors	3.00%	2.40%	1.60%	1,719	1,929	1,542	990	32,500
337 Non-Ordained Religious Associate Professionals	2.50%	2.20%	1.60%	606	699	687	840	22,300
829 Assemblers	1.90%	1.60%	1.50%	11,418	9,708	9,417	8,625	35,400
233 Primary and Early Childhood Teaching Professionals	2.00%	1.10%	1.50%	27,858	31,407	37,899	43,692	37,300
913 Refuse Collectors and Related Labourers	1.50%	0.20%	1.50%	717	858	1,128	1,224	27,800
322 Health Associate Professionals	0.80%	0.60%	1.50%	6,468	8,133	10,623	11,208	36,700
712 Building Finishers and Related Trades Workers	1.40%	1.60%	1.50%	20,721	23,016	23,346	26,223	35,200
824 Wood Products Machine Operators	0.30%	2.10%	1.50%	1,356	2,400	2,394	2,487	35,900
722 Blacksmiths, Toolmakers and Related Workers	1.80%	0.90%	1.40%	7,938	7,044	5,802	5,076	44,100
815 Chemical Processing Plant Operators	1.70%	1.10%	1.40%	2,064	1,806	1,533	1,563	46,200

3 Digit NZSCO Occupation	Total Annual Net Replacement 1991-1996	Total Annual Net Replacement 1996-2001	Total Annual Net Replacement 2001-2006	Total Employment 1991	Total Employment 1996	Total Employment 2001	Total Employment 2006	2006 Mean Income
414 Library, Mail and Related Clerks	1.40%	1.20%	1.40%	56,544	62,391	68,454	71,511	30,300
611 Market Farmers and Crop Growers	1.00%	2.30%	1.40%	34,329	42,423	42,984	39,681	26,800
121 General Managers	1.20%	1.40%	1.30%	39,234	50,508	43,077	50,955	66,700
811 Mining and Mineral Processing Plant Operators	1.60%	0.90%	1.30%	1,317	1,458	1,563	2,085	50,200
841 Building and Related Workers	1.50%	0.50%	1.30%	5,343	6,441	7,365	9,282	38,200
235 Other Teaching Professionals	0.90%	1.10%	1.30%	900	1,188	1,464	2,565	48,700
743 Tailors and Dressmakers	1.40%	1.30%	1.20%	6,231	6,585	5,550	5,961	33,800
243 Archivists, Librarians and Related Information Professionals	1.10%	0.90%	1.20%	3,348	3,912	4,911	5,340	35,600
234 Special Education Teaching Professionals	0.80%	1.00%	1.20%	1,860	3,186	4,248	4,494	33,700
613 Forestry and Related Workers	0.30%	3.30%	1.20%	4,959	7,011	6,963	4,899	34,600
713 Electricians	1.90%	1.60%	1.10%	12,099	11,784	12,081	14,217	43,600
412 Numerical Clerks	1.50%	1.80%	1.10%	34,122	28,068	26,229	28,629	32,600
222 Health Professionals (Except Nursing)	2.40%	0.90%	1.10%	12,252	12,621	15,024	18,045	85,000
514 Other Personal Services Workers	0.40%	2.90%	1.10%	14,055	21,189	19,515	22,341	21,900
821 Metal and Mineral Products Processing Machine Operators	0.60%	0.20%	1.10%	4,131	7,059	11,826	12,909	36,000
914 Packers and Freight Handlers	2.40%	2.30%	1.00%	24,993	21,939	21,204	24,129	25,800
614 Fishery Workers, Hunters and Trappers	2.30%	1.70%	1.00%	4,437	4,239	4,374	4,656	34,400
413 Material Recording and Transport Clerks	0.90%	1.70%	1.00%	13,485	19,662	20,661	22,791	34,700

3 Digit NZSCO Occupation	Total Annual Net Replacement 1991-1996	Total Annual Net Replacement 1996-2001	Total Annual Net Replacement 2001-2006	Total Employment 1991	Total Employment 1996	Total Employment 2001	Total Employment 2006	2006 Mean Income
231 Tertiary Teaching Professionals	2.80%	1.30%	1.00%	12,006	12,573	13,944	16,335	54,000
223 Nursing and Midwifery Professionals	2.30%	1.20%	0.90%	28,113	28,302	30,954	35,148	41,000
825 Paper Products Machine Operators	0.60%	1.50%	0.90%	2,001	978	855	546	32,700
334 Social Work Associate Professionals	0.10%	0.40%	0.90%	6,804	14,895	23,664	27,825	27,000
336 Writers, Artists, Entertainment and Sports Associate Professionals	0.80%	0.80%	0.90%	17,946	23,481	28,980	37,788	34,200
113 Senior Business Administrators	0.90%	0.40%	0.90%	459	816	9,840	14,493	81,300
723 Machinery Mechanics and Fitters	2.30%	1.90%	0.90%	23,331	23,238	22,812	26,091	38,200
513 Personal Care Workers	0.70%	0.30%	0.90%	17,889	26,238	36,249	39,396	19,500
311 Physical Science and Engineering Technicians	2.30%	1.90%	0.90%	25,656	21,378	19,104	20,631	46,200
112 Senior Government Administrators	2.10%	1.30%	0.90%	840	1,149	987	1,788	59,200
242 Legal Professionals	1.20%	0.80%	0.80%	6,570	7,452	9,300	11,430	82,000
241 Business Professionals	1.40%	0.50%	0.80%	24,780	27,912	42,489	53,820	61,100
122 Specialised Managers	1.90%	1.30%	0.80%	120,609	134,703	160,350	213,288	54,400
214 Architects, Engineers and Related Professionals	0.90%	1.80%	0.80%	16,956	22,173	21,552	27,402	59,600
411 Secretaries and Keyboard Operating Clerks	1.50%	1.10%	0.80%	42,993	44,445	39,270	29,769	34,200
733 Printing Trades Workers	1.70%	1.10%	0.80%	9,078	9,501	8,046	8,874	38,200
511 Travel Attendants and Guides	0.60%	1.40%	0.70%	3,009	4,167	4,731	5,673	33,500

3 Digit NZSCO Occupation	Total Annual Net Replacement 1991-1996	Total Annual Net Replacement 1996-2001	Total Annual Net Replacement 2001-2006	Total Employment 1991	Total Employment 1996	Total Employment 2001	Total Employment 2006	2006 Mean Income
315 Safety and Health Inspectors	1.20%	1.80%	0.70%	3,396	4,602	4,374	6,318	41,800
314 Ship and Aircraft Controllers and Technicians	1.20%	2.10%	0.70%	3,081	3,744	3,717	4,500	72,300
711 Building Frame and Related Trades Workers	2.20%	1.30%	0.70%	34,152	34,191	35,514	49,602	39,100
832 Motor Vehicle Drivers	1.40%	0.70%	0.70%	30,813	32,805	35,061	39,366	35,300
816 Power Generating and Related Plant Operators	0.30%	2.90%	0.70%	2,238	1,467	1,374	1,053	55,300
244 Social and Related Science Professionals	0.30%	0.40%	0.70%	4,347	7,284	9,210	11,883	52,200
114 Special-Interest Organisation Administrators	0.90%	2.60%	0.60%	822	1,242	1,416	1,917	40,000
333 Government Associate Professionals	1.70%	0.40%	0.60%	1,101	1,017	1,359	1,971	45,400
331 Finance and Sales Associate Professionals	0.90%	2.20%	0.60%	46,980	56,868	59,265	80,790	45,400
814 Wood-Processing and Papermaking Plant Operators	2.00%	2.30%	0.60%	3,111	3,570	3,522	4,230	37,100
323 Nursing Associate Professionals	0.20%	0.10%	0.60%	3,924	3,210	2,298	2,004	31,500
833 Agricultural, Earthmoving and Other Materials-Handling Equipment Operators	0.90%	0.80%	0.60%	9,432	12,057	13,446	16,527	37,600
221 Life Science Professionals	0.50%	1.10%	0.60%	2,589	4,725	5,274	6,819	52,600
812 Metal-Processing Plant Operators	0.70%	1.20%	0.50%	3,357	4,746	4,074	5,133	39,500
915 Labourers	2.80%	1.90%	0.50%	38,118	39,468	29,232	46,431	26,800
332 Administrative Associate Professionals	0.60%	1.00%	0.50%	13,713	20,031	15,300	22,323	42,000
335 Careers and Employment Advisers	2.30%	0.60%	0.40%	1,035	1,056	957	1,320	44,200
313 Optical and Electronic Equipment Controllers	1.10%	0.60%	0.40%	4,218	4,839	6,348	8,460	40,800

Source: Census of Population and Dwellings 1991, 1996, 2001, 2006, Statistics New Zealand.

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711 Building Frame and Related Trades Workers	2.20%	1.30%	0.70%	34,152	34,191	35,514	49,602	39,100
832 Motor Vehicle Drivers	1.40%	0.70%	0.70%	30,813	32,805	35,061	39,366	35,300
816 Power Generating and Related Plant Operators	0.30%	2.90%	0.70%	2,238	1,467	1,374	1,053	55,300
244 Social and Related Science Professionals	0.30%	0.40%	0.70%	4,347	7,284	9,210	11,883	52,200
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335 Careers and Employment Advisers	2.30%	0.60%	0.40%	1,035	1,056	957	1,320	44,200
313 Optical and Electronic Equipment Controllers	1.10%	0.60%	0.40%	4,218	4,839	6,348	8,460	40,800
212 Mathematicians, Statisticians and Related Professionals	4.50%	2.90%	0.40%	507	492	495	801	60,200
321 Life Science Technicians and Related Workers	2.00%	2.00%	0.30%	5,040	4,719	4,494	5,664	35,100
828 Leather and Related Products Processors	0.90%	1.50%	0.30%	1,038	1,338	1,101	666	32,000
515 Protective Services Workers	1.50%	1.80%	0.30%	13,659	20,646	21,072	25,845	46,700
213 Computing Professionals	0.10%	0.00%	0.20%	3,471	6,558	19,308	27,858	59,200
338 Environmental Protection Associate Professionals	0.00%	0.00%	0.20%	921	99	330	522	36,200
Average across all 3 digit occupations	**1.60%**	**1.60%**	**1.40%**					**$38,900**