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# Recent Unemployment Experience in New Zealand

Jeff Borland

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New Zealand Treasury Working Paper 14/01

February 2014



New Zealand Government

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WORKING PAPER  
14/01**

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Recent Unemployment Experience in New Zealand

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**NZ TREASURY**

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## Abstract

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This paper discusses the recent history of the rate of unemployment in New Zealand. The rate of unemployment in New Zealand increased by about 3.5 percentage points between late 2007 and late 2009, and then has remained relatively steady to early 2013. Compared to the most recent previous downturn in the late 1990s, this episode in the late 2000s has involved a larger increase in the rate of unemployment and much smaller subsequent reduction. This paper argues that changes to the rate of New Zealand unemployment can be explained entirely by economic growth outcomes, and do not seem to reflect any structural change in the labour market. This suggests that there are not any impediments to the rate of unemployment falling back to levels that existed in the mid-2000s. Of course, should the rate of unemployment remain at its current level for a prolonged period, hysteresis effects associated, for example with a growing incidence of long-term unemployment, may have some influence.

### **JEL CLASSIFICATION**

J63 - Turnover; Vacancies; Layoffs

J64 - Unemployment: Models, Duration, Incidence, and Job Search

### **KEYWORDS**

Unemployment, matching, Okun's relationship

# Executive Summary

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## **Recent movements in the rate of unemployment**

The rate of unemployment in New Zealand increased by about 3.5 percentage points between late 2007 and late 2009, and then has remained relatively steady to early 2013. Compared to the most recent previous downturn in the late 1990s, this episode in the late 2000s has involved a larger increase in the rate of unemployment and much smaller subsequent reduction.

## **The effect of changes to employment and labour force participation on the rate of unemployment**

Differences in the change in the rate of unemployment between the downturns in the late 1990s and late 2000s can be attributed to differences in changes in the employment/population rate and the labour force participation rate. The larger increase in the rate of unemployment in the late 2000s than late 1990s is explained by a larger decrease in the male full-time employment/population rate, and by a decrease in the female part-time employment/population rate rather than an increase which had occurred in the previous downturn. The smaller decrease in the rate of unemployment in the current episode compared to the comparable period of recovery in the late 1990s and early 2000s is explained by much weaker growth in the male and female full-time employment/population rates, with this effect however being offset to quite a large degree by slower growth in the rate of labour force participation in the current episode.

## **A flows perspective on changes in the rate of unemployment**

Changes in the rate of unemployment reflect changes to the rate of inflow to and outflow from unemployment. Increases in the rate of unemployment in the most recent downturn of the late 2000s were initially driven exclusively by an increase in inflows to unemployment. Subsequently both higher inflows to unemployment and lower outflows from unemployment caused the rate of unemployment to rise. The smaller increase in the rate of unemployment in the late 1990s was due to a much smaller increase in inflows to unemployment and smaller decrease in outflows from unemployment.

## **Economic growth and the rate of unemployment**

Rates of growth in GDP in New Zealand were lower in the period of downturn in the late 2000s than late 1990s, and also lower in the subsequent period of recovery in the late 2000s than in a comparable period after the downturn of the late 1990s. Using Okun's relation it is estimated that slower growth in GDP can explain the entire difference in the change in the rate of unemployment between these periods.

## **Structural change and the rate of unemployment**

There is little evidence that recent changes in the rate of unemployment in New Zealand reflect a decline in matching efficiency in the labour market. Analysis of the Beveridge curve, the matching function, and the evolution of long-term unemployment reveal no structural change in the period from the late 2000s onwards that would be consistent with such a decline in matching efficiency.

## **The future of unemployment**

That changes to the rate of unemployment in the current phase in New Zealand can be explained entirely by economic growth outcomes, and do not seem to reflect any structural change in the labour market, suggests that there are not any impediments to the rate of unemployment falling back to levels that existed in the mid-2000s. (Of course, should the rate of unemployment remain at its current level for a prolonged period, hysteresis effects associated, for example with a growing incidence of long-term unemployment, may have some influence.)

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# Recent Unemployment Experience in New Zealand

## 1 Introduction

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### 1.1 Introduction

This report reviews the recent history of the rate of unemployment in New Zealand. A particular emphasis of the review is to provide a comparative perspective with previous downturns in New Zealand.

Section 1 presents a brief introduction to institutional features of the New Zealand labour market. Section 2 provides an overview of the main features of the evolution of the rate of unemployment since the GFC. Sections 3 and 4 evaluate the two main possible influences that can explain that evolution – changes in the rate of growth in GDP, and structural factors.

### 1.2 The regulatory environment in the New Zealand labour market

Terms and conditions of employment in New Zealand are determined at a decentralised level, primarily via individual employment contracts between workers and employers, and to some extent through collective agreements negotiated at the enterprise level. In New Zealand the Employment Relations Act (2000) regulates the process of labour market bargaining. The Act requires the parties to a dispute to deal with each other in good faith, and promotes mediation as a method for early resolution of workplace disputes (New Zealand Government, 2012, p.17). Scope for workers to use collective bargaining is promoted in the Act through protection of the integrity of union membership. However, in New Zealand, as in many other industrialised economies, union density has fallen in the past several decades. In 2011 union density was 20.1 per cent; which placed New Zealand 13th out of 23 OECD countries for which data were available (OECD, 2013).

Outcomes from labour market bargaining in New Zealand are directly regulated through a fairly extensive set of minimum standards. In 2011 the ratio of minimum wage to median wage was 0.6; which placed New Zealand 4th out of 23 OECD countries for which data were available (OECD, 2013). Other minimum standards are specified in the Equal Pay Act, the Holidays Act and the Parental Leave and Employment Protection Act.

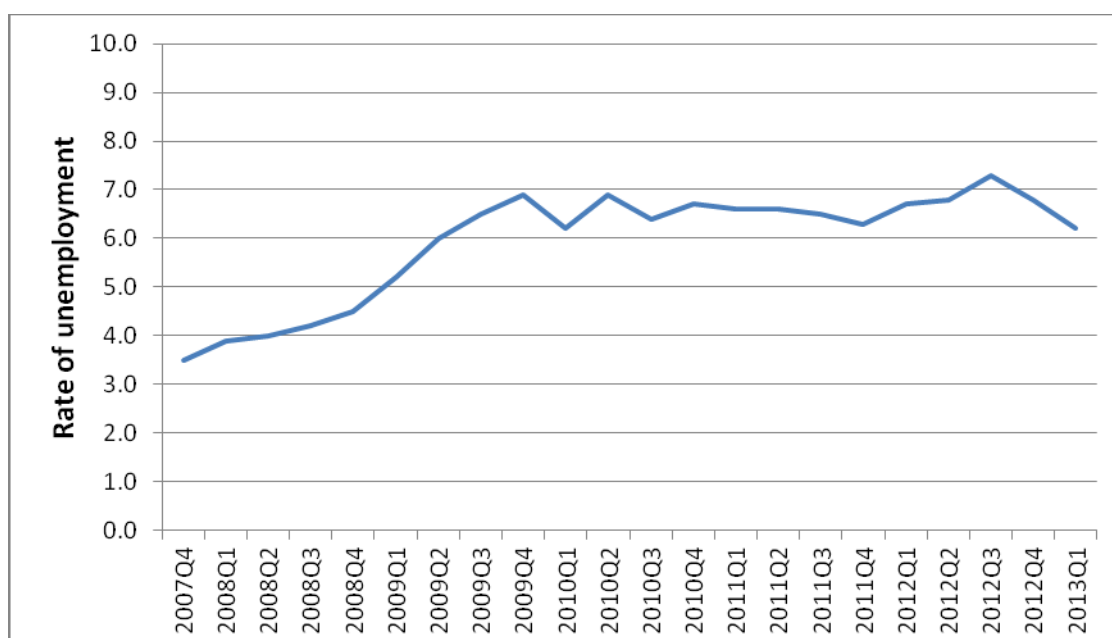
New Zealand has a relatively high degree of flexibility in its labour market arrangements. Much less restriction is imposed on the capacity of employers to dismiss workers than elsewhere. In 2011 New Zealand rated 33<sup>rd</sup> out of 33 OECD countries in its level of regulation of individual and collective dismissals for workers on regular contracts (OECD, 2013). It also has relatively low rates of labour taxes. For a single worker without children earning 100% of average wages the percentage of labour costs attributed to labour taxes is 16.4 per cent; which places New Zealand 32<sup>nd</sup> out of 33 OECD countries (OECD, 2013).

## 2 The evolution of unemployment

### 2.1 Recent outcomes in the rate of unemployment

The rate of unemployment in New Zealand rose sharply from late 2007 to late 2009, followed by a period of relative constancy to early 2013. Prior to the 4th quarter of 2007 the rate of unemployment had experienced almost a decade of decline, and reached the level of 3.5 percent. Over the next two years to the 4th quarter of 2009 the rate of unemployment increased by 3.4 percentage points to 6.9 per cent. Since that time there have been some ups and downs, with little overall trend. In the 1st quarter of 2013 the rate of unemployment was 6.2 per cent. These recent movements in the rate of unemployment in New Zealand from late 2007 are shown in Figure 1.

**Figure 1: Rate of unemployment, New Zealand, 2007/qtr4 to 2013/qtr1 (seasonally adjusted)**

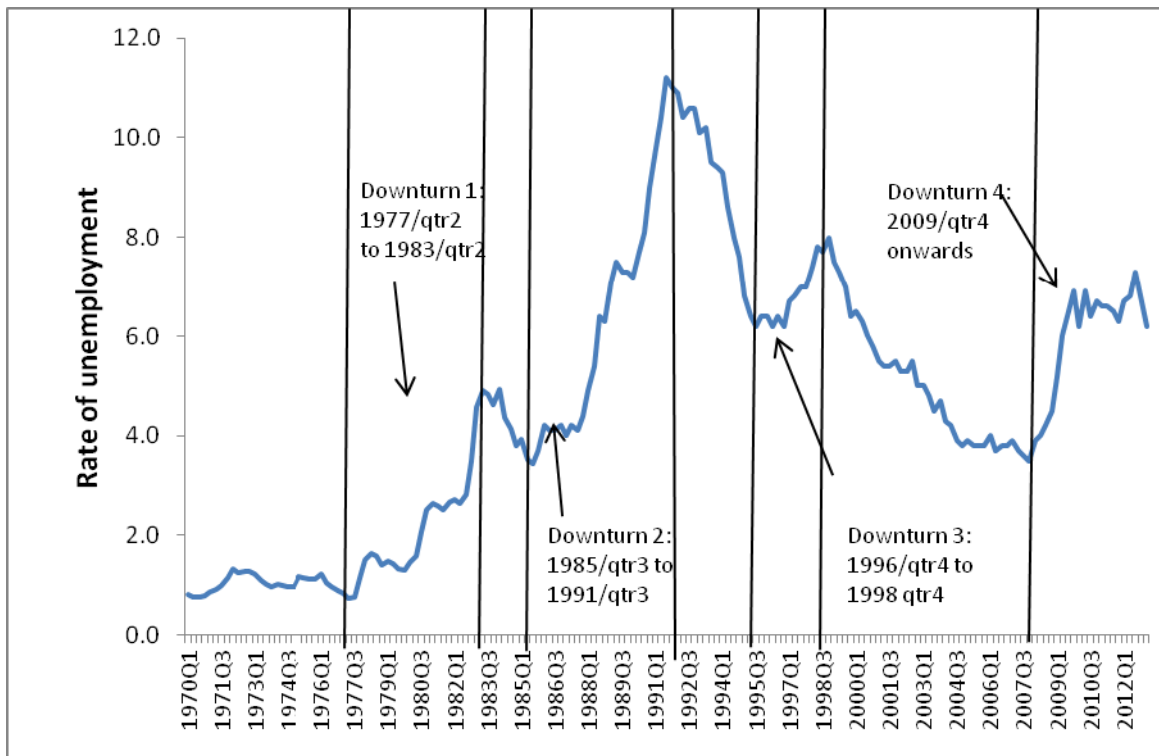


Source: RBNZ (<http://www.rbnz.govt.nz/keygraphs/graphdata.xls>).

The rise in the rate of unemployment since 2007 is one of four episodes of major increases since 1970. Figure 2 shows the rate of unemployment in New Zealand from 1970 to 2013, with the four episodes identified. The phases of major increases are identified using a rule that defines a downturn as a period with three consecutive quarterly increases in the rate of unemployment with a cumulative effect of at least one-half a percentage point.

- In the first episode, from 1977 to 1984, the rate of unemployment increased from about 1 per cent to 5 per cent, mainly due to adverse effects on economic activity from oil price shocks and a terms of trade decline for New Zealand (Carroll, 2012, p.11).
- In the second episode, from 1985 to 1991, the rate of unemployment rose from about 3.5 per cent to 11 per cent, due to contractionary fiscal and monetary policy and the adjustment process associated with the major economic reforms of that time (Carroll and Chapple, 2001, p.2).
- In the third episode, from 1996 to 1998, the New Zealand economy experienced a mild downturn due to the East Asian crisis, causing the rate of unemployment to rise from about 6 per cent to 8 per cent (Chetwin, 2012, p.15).
- In the fourth episode, from 2007 to 2009, the rate of unemployment increased from about 3.5 per cent to 7 per cent. This was as a result of the impact of the GFC on economic activity and a high New Zealand exchange rate (Chetwin, 2012, pp.22-23).

**Figure 2: Rate of unemployment, New Zealand, 1970/qtr1 to 2013/qtr1**

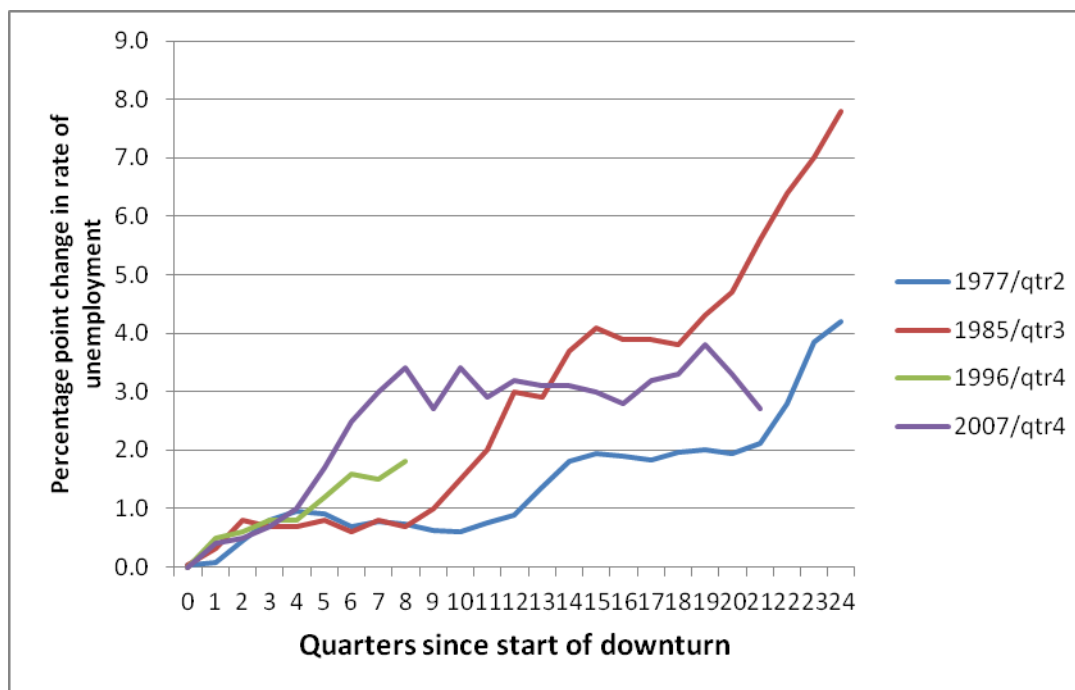


Source: RBNZ (<http://www.rbnz.govt.nz/keygraphs/graphdata.xls>).

A direct comparison of the four episodes of downturns is presented in Figure 3. This figure shows the change in the rate of unemployment in each of the four downturns, commencing from the specified starting date. For the first four quarters in each downturn the rate of unemployment followed a similar path. But after that point there has been considerable diversity. The most recent episode since late 2007 appears distinctive in two regards. First, for the next four quarters (5<sup>th</sup> to 8<sup>th</sup> quarters after commencement of the

downturn) the rise in the rate of unemployment was much larger than in previous episodes. Second, since that time (from the 8th quarter onwards) the rate of unemployment has remained relatively stable, whereas in the 1970s and 1980s the rate of unemployment continued to increase, and in the 1990s the rate of unemployment began to decrease.

**Figure 3: Rate of unemployment, New Zealand, Comparison between downturns**



Source: RBNZ (<http://www.rbnz.govt.nz/keygraphs/graphdata.xls>).

## 2.2 A disaggregated perspective

Who has been affected by changes to the rate of unemployment in New Zealand? This question is addressed in Table 1. It presents the rate of unemployment for labour force participants in different age groups, with different levels of education attainment, and living in different regions, relative to the average rate of unemployment. Each column shows the relative rate of unemployment averaged within a specified time period. The first two columns compare the periods in the late 1990s and late 2000s when the rate of unemployment increased. The second two columns compare the subsequent periods once the increase in the rate of unemployment had ceased – from late 2009 to early 2013 and a period of the same length from late 1998 to early 2002.

There are clear patterns of relativities in the rate of unemployment between the groups. Across all phases of the business cycle the rate of unemployment is higher for labour force participants who are younger and have lower levels of education attainment, and there are also large regional differences. These differences are largely persistent between downturns and recoveries, and between the 1990s and 2000s. The magnitude and ranking of each sub-group's relative rate of unemployment within age, education and region remain largely unchanged across the time periods. The only exception is for young persons. For that group the relative rate of unemployment is much higher in the present phase of downturn and recovery in the late 2000s than in the previous episode.

**Table 1: Ratio of rate of unemployment to average rate of unemployment by disaggregated population groups, New Zealand, Recent downturns and recoveries**

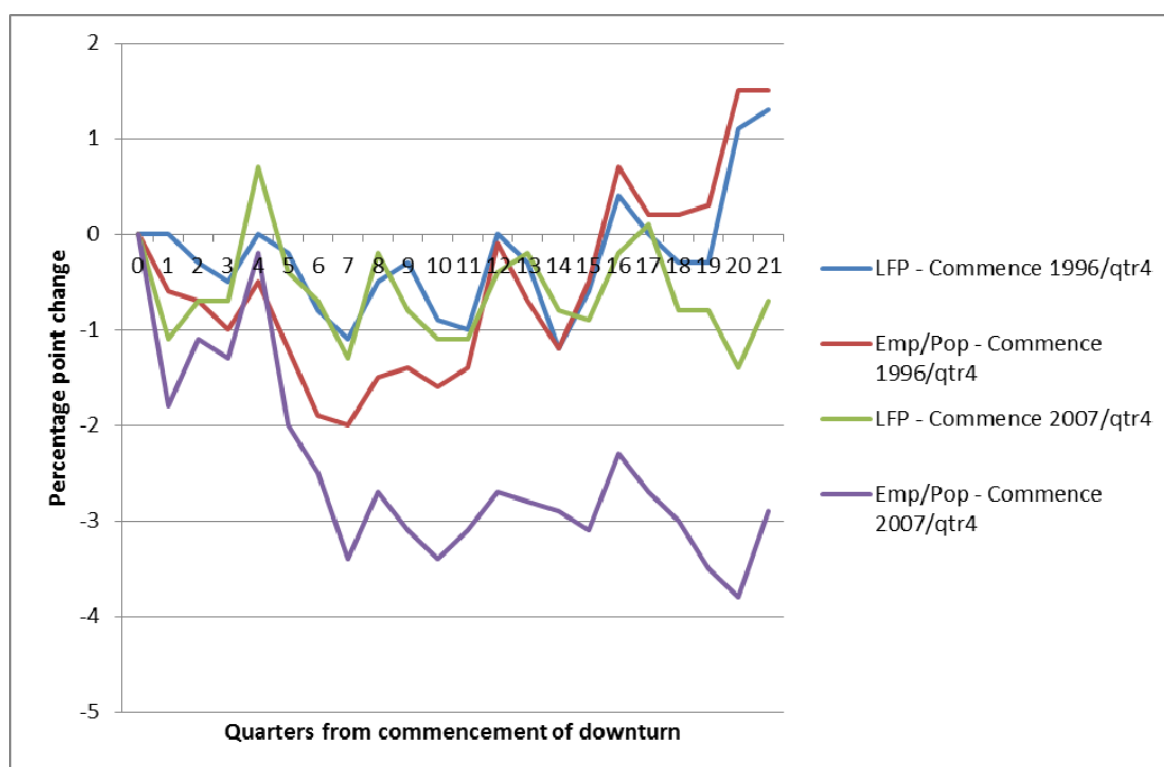
	Downturn		Recovery	
	1996/4	2007/4	1998/4	2009/4
	- 1998/4	- 2009/4	- 2002/1	- 2013/1
<b>Age</b>				
15-24	1.93	2.63	2.08	2.51
25-34	0.98	0.91	0.92	0.94
35-44	0.76	0.64	0.77	0.68
45-54	0.63	0.55	0.61	0.60
55-64	0.58	0.48	0.70	0.52
<b>Education attainment</b>				
No qualification	1.74	1.66	1.67	1.53
School qualification	0.96	1.19	1.00	1.26
Post-school but no school qualification	1.12	1.02	1.19	1.15
Post-school and school qualification	0.61	0.68	0.64	0.66
<b>Regional Council</b>				
Northland	1.43	1.38	1.38	1.16
Auckland	0.97	1.11	0.78	0.97
Waikato	1.08	1.06	0.97	0.83
Bay of Plenty	1.40	1.11	1.23	0.99
Gisborne/Hawke's Bay	1.28	1.40	0.97	0.99
Taranaki	1.04	0.72	0.92	0.64
Manawatu-Wanganui	0.93	1.00	0.85	0.94
Wellington	0.83	0.94	0.73	0.81
Tasman/Nelson/Marlborough/West Coast	0.81	0.70	0.67	0.60
Canterbury	0.97	0.81	0.86	0.69
Otago	0.82	0.83	0.85	0.62
Southland	0.84	0.60	0.70	0.56

Source: Statistics NZ, Household Labour Force Survey.

## 2.3 Sources of changes in the rate of unemployment: A labour force decomposition analysis

Changes in the rate of unemployment can be decomposed between the effects of changes to the employment/population rate and changes in the labour force participation rate. Figure 4 compares how these rates changed in the downturns and phases of recovery in the late 1990s and late 2000s. Changes in the labour force participation rate are quite similar between the two episodes for about 16 quarters, but after that time diverge considerably, with much stronger growth in the late 1990s than late 2000s. Changes in the employment/population rates between the episodes are strikingly different. From about four quarters after the commencement of downturn, the two series diverge considerably. At the end of the time period, 21 quarters after the commencement of downturn, the employment/population rate was 3 percentage points lower in the episode of the late 2000s whereas it was 1 percentage point higher in the late 1990s. These patterns in the employment/population rate, and to some extent in the labour force participation rate, are consistent with the rate of unemployment rising more and remaining higher in the late 2000s than the late 1990s.

**Figure 4: Changes in LFP and Employment/Population rates, comparison between downturns**



Source: Statistics NZ, Household Labour Force Survey.

To investigate this formally, Table 2 shows a decomposition of the sources of changes in the rate of unemployment in New Zealand for the episodes of downturn and recovery from the late 1990s and late 2000s. It shows the effects on the rate of unemployment of changes in the male and female full-time and part-time employment/population rates and the male and female labour force participation rates. In each row, the ‘Change in the rate of UE’ shows the change in the aggregate rate of unemployment in New Zealand for the specified time period. Other items in the same row show the contribution of changes to the employment/population rate or labour force participation rate to the change in the aggregate rate of unemployment. For example, in the top row, the entry for ‘Males – FTE/POP’ shows that the independent contribution of the increase in male full-time employment between 1996/qtr4 and 1998/qtr4 would have been to increase the rate of unemployment by 1.9 percentage points.

**Table 2: Sources of changes in the rate of unemployment – New Zealand – Persons – 1996/4 to 2013/1**

	Change in Rate of UE	Effect of:					
		Males – FTE/POP	Males – PTE/POP	Males – LF/POP	Females – FTE/POP	Females – PTE/POP	Females – LF/POP
1996/4-1998/4	+1.6	+1.9	0	-1.0	+1.3	-0.8	+0.3
1998/4-2007/4	-4.4	-3.4	-1.1	+1.8	-5.3	0	+3.4
2007/4-2009/4	+3.5	+2.7	-0.1	-0.6	+1.2	+0.4	+0.1
2009/4-2013/1	-0.3	-0.5	+0.9	-1.1	-0.6	+0.7	+0.3

Source: Statistics NZ, Household Labour Force Survey.

Note: The decomposition is derived from:

$$RUE_t \approx -\ln[\alpha_{mt}((FTE/POP)_{mt} \cdot (POP/LFP)_{mt}) + \alpha_{mt}((PTE/POP)_{mt} \cdot (POP/LFP)_{mt}) + (1 - \alpha_{mt})((FTE/POP)_{ft} \cdot (POP/LFP)_{ft}) + (1 - \alpha_{mt})((PTE/POP)_{ft} \cdot (POP/LFP)_{ft})]$$

where  $\alpha_{mt}$  = proportion of males in labour force at time t,  $(FTE/POP)_{mt}$  and  $(PTE/POP)_{mt}$  are the full-time and part-time employment/population rates for males, and  $(POP/LFP)_{mt}$  is the inverse of the labour force participation rate for males. The decomposition of the change in the rate of unemployment between periods t and t+1 is undertaken by sequentially varying components of the expression for the rate of unemployment (from period t to period t+1 values) in order as shown in the Table.

A fairly consistent story on the sources of changes to the rate of unemployment emerges from Table 2. Both the male and female full-time employment/population rates vary procyclically, and that variation has been a major driver of changes in the rate of unemployment. Changes in labour force participation by males and females have also had a large impact on the rate of unemployment; but in the opposite direction via counter-cyclical variation. Changes in the part-time employment/population rate for males and females have had less impact on the rate of unemployment.

Increases in the rate of unemployment during downturns have therefore been primarily associated with declines in the full-time employment/population rates for both males and females. Declines in the male labour force participation rate during downturns have moderated the increase in the rate of unemployment that would otherwise have occurred. Decreases in the rate of unemployment have been caused mainly by growth in the full-time employment/population rates for males and females. Increases in labour force participation rates during recoveries, especially for females, have offset that decrease.

The same decomposition of the sources of changes in the rate of unemployment can also be applied to understand two key questions with regard to the period from the late 2000s:

- Why in the most current episode of downturn in the late 2000s was the rise in the rate of unemployment larger than in the late 1990s? (The rate of unemployment increased by 3.5 percentage points in the late 2000s compared to 1.6 percentage points in the late 1990s.)
- Why has no decrease in the rate of unemployment happened in the current episode whereas this did occur in the late 1990s and early 2000s? (The rate of unemployment has fallen by only 0.3 percentage points in the current episode compared to 2.0 percentage points in a comparable period after the late 1990s downturn.)



To enable these questions to be answered, Table 3 compares decompositions of the downturn and recovery phases from the late 2000s and late 1990s. Panel A compares the downturn phases. Panel B compares the recovery in the late 2000s with a period of equivalent length from the recovery of the late 1990s. As a result, the decompositions of the recovery phase in the late 1990s differ between Table 2 and Table 3 as different time periods are being used.

To illustrate how to read Table 3, consider the 'Downturns' section in Panel A. The rate of unemployment is shown to have increased by 1.9 percentage points more in the downturn of the late 2000s than late 1990s. Looking at the entry in the 'Males – FTE/POP' column then shows that a larger decrease in the male full-time employment/population rate in the late 2000s than late 1990s accounts for 0.8 percentage points of the 1.9 percentage points difference in that change in the rate of unemployment.

These decompositions provide clear messages on the causes of differences in changes in the rate of unemployment across the episodes of late 1990s and late 2000s:

- The larger increase in the rate of unemployment in the late 2000s than late 1990s is shown to be explained in about equal parts by a larger decrease in the male full-time employment/population rate, and by a decrease in the female part-time employment/population rate in the 2000s rather than an increase which had occurred in the 1990s. These differences in changes in the male full-time employment/population rate and female part-time employment/population rate account for respectively 0.8 and 1.2 percentage points of the larger increase in the rate of unemployment. It seems likely that the much larger decline in these employment/population rate in the late 2000s than late 1990s is related to the relatively worse unemployment outcome for the younger population in the more recent period. Young workers are likely to have been disproportionately affected by the lack of job creation.
- The smaller decrease in the rate of unemployment in the current episode compared to the comparable period of recovery in the late 1990s is explained by much weaker employment growth, with this effect being offset to a large degree by slower growth in labour force participation in the current episode. Slower growth in the male employment/population rate (full-time and part-time) has caused a smaller downward adjustment in the rate of unemployment by 3.3 percentage points, and slower growth in the female full-time employment/population rate has caused a smaller adjustment by 2.1 percentage points. These effects were offset by slower growth in the labour force participation rate in the late 2000s than late 1990s which caused the rate of unemployment to be lower by 3.6 percentage points. The offsetting effect of changes to labour force participation is likely to reflect a discouraged worker effect. Some potential labour force participants will have been deterred from seeking work due to the perception that they will be unlikely to find a job.



**Table 3: Sources of changes in the rate of unemployment – New Zealand – Persons – 1996/4 to 2013/1: Comparing downturns and recoveries**

	Change in Rate of UE	Effect of:					
		Males – FTE/POP	Males – PTE/POP	Males – LF/POP	Females – FTE/POP	Females – PTE/POP	Females – LF/POP
<b>A. Downturn</b>							
1996/4-1998/4	+1.6	+1.9	0	-1.0	+1.3	-0.8	+0.3
2007/4-2009/4	+3.5	+2.7	-0.1	-0.6	+1.2	+0.4	+0.1
<i>Difference</i>	+1.9	+0.8	-0.1	+0.4	-0.1	+1.2	-0.2
<b>B. Recovery</b>							
1998/4-2002/1	-2.0	-2.2	-0.7	+1.5	-2.7	+0.6	+1.3
2009/4-2013/1	-0.3	-0.5	+0.9	-1.1	-0.6	+0.7	+0.3
<i>Difference</i>	+1.7	+1.7	+1.6	-2.6	+2.1	+0.1	-1.0

Source: Statistics NZ, Household Labour Force Survey.

Note: The decompositions of the recovery phase in the late 1990s differ from Table 2 as different time periods are being used.

## 2.4 Sources of changes in the rate of unemployment: A flows perspective

Changes to the rate of unemployment between two points in time will depend on inflows to and outflows from unemployment during that time. Formally it is possible to show this relation as (see Elsby et al., 2009):

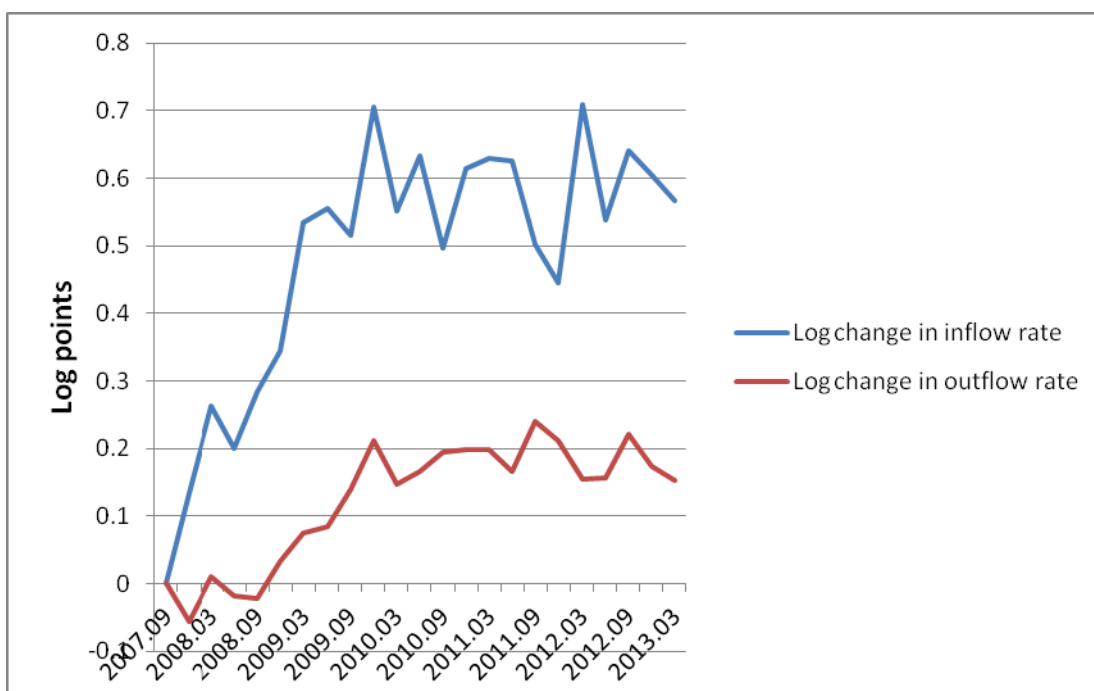
$$\Delta u_t = \beta_{t-1} [\Delta \log s_t - \Delta \log f_t]$$

where  $\beta_{t-1} = u_{t-1}(1-u_{t-1})$ ,  $\Delta u_t$  is the change in the rate of unemployment, and  $s_t$  and  $f_t$  are respectively the inflow rate to unemployment and the outflow rate from unemployment.

Elsby et al. (2010, p.18) note that an implication of this formula is that: ‘...to compare changes in unemployment, all one needs to do is compare the logarithmic variation in each of the flow hazards.’ This is done in Figure 5 which shows the cumulative log change in each of the flows. The rate of inflow to unemployment is defined as the sum of flows to unemployment from employment and out of the labour force divided by those stocks. The rate of outflow from unemployment is defined as the sum of flows to employment and out of the labour force divided by the stock of unemployed.

Quite strong conclusions can be drawn from Figure 5. Increases in the rate of unemployment in the first four quarters of the most recent downturn that commenced in late 2007 were driven exclusively by an increase in inflows to unemployment. In the second four quarters increases in the rate of unemployment were due both to higher inflows to unemployment and lower outflows from unemployment. Since that time from late 2009 both the cumulative inflow and cumulative outflow rates have remained relatively constant. This implies that inflows to and outflows from unemployment have been approximately equivalent, which explains the relative constancy of the rate of unemployment through to early 2013.

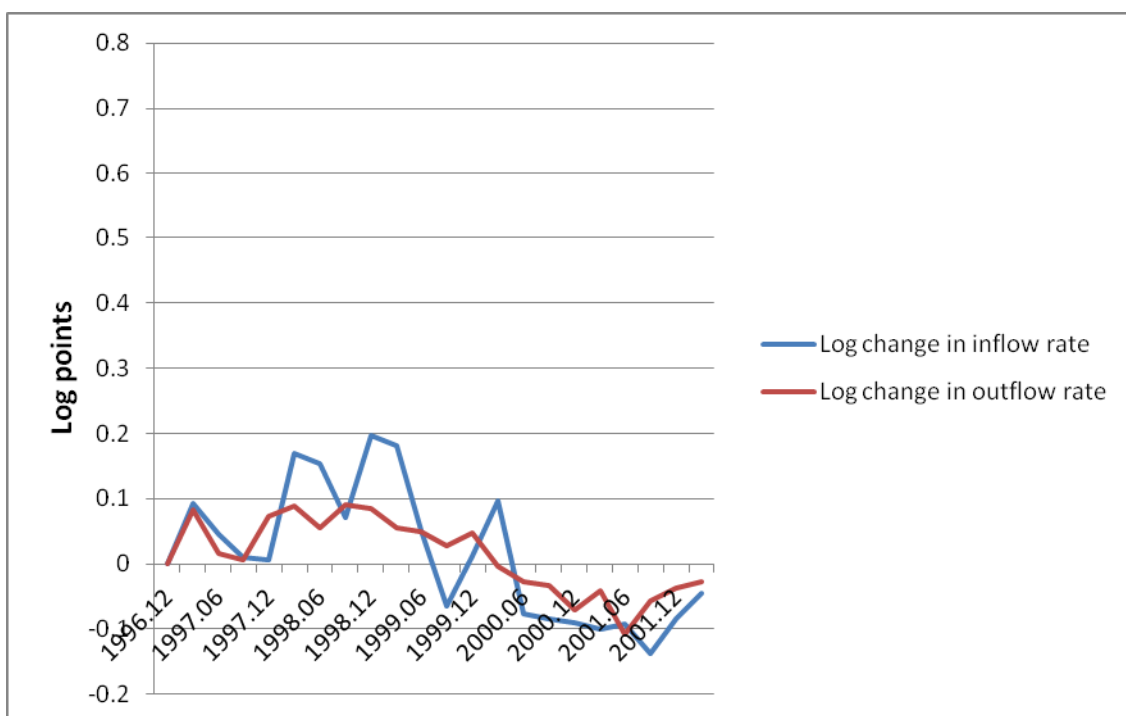
**Figure 5: Cumulative change in unemployment inflow and outflow rates, New Zealand, Post-2007/qtr1**



Source: Statistics NZ, Household Labour Force Survey.

A similar exercise for the late 1990s downturn and recovery is presented in Figure 6. There was a much smaller increase in inflows to unemployment and decrease in outflows from unemployment in this period of downturn than in the late 2000s; and both contributed relatively equally to the increase in the rate of unemployment. These smaller changes in inflows and outflows explain the smaller increase in the rate of unemployment in the late 1990s than late 2000s. Then, after eight quarters in the late 1990s downturn, the cumulative rate of inflow to unemployment decreased and cumulative rate of outflow increased. Hence outflows from unemployment were above inflows to unemployment, so that the rate of unemployment thereafter declined.

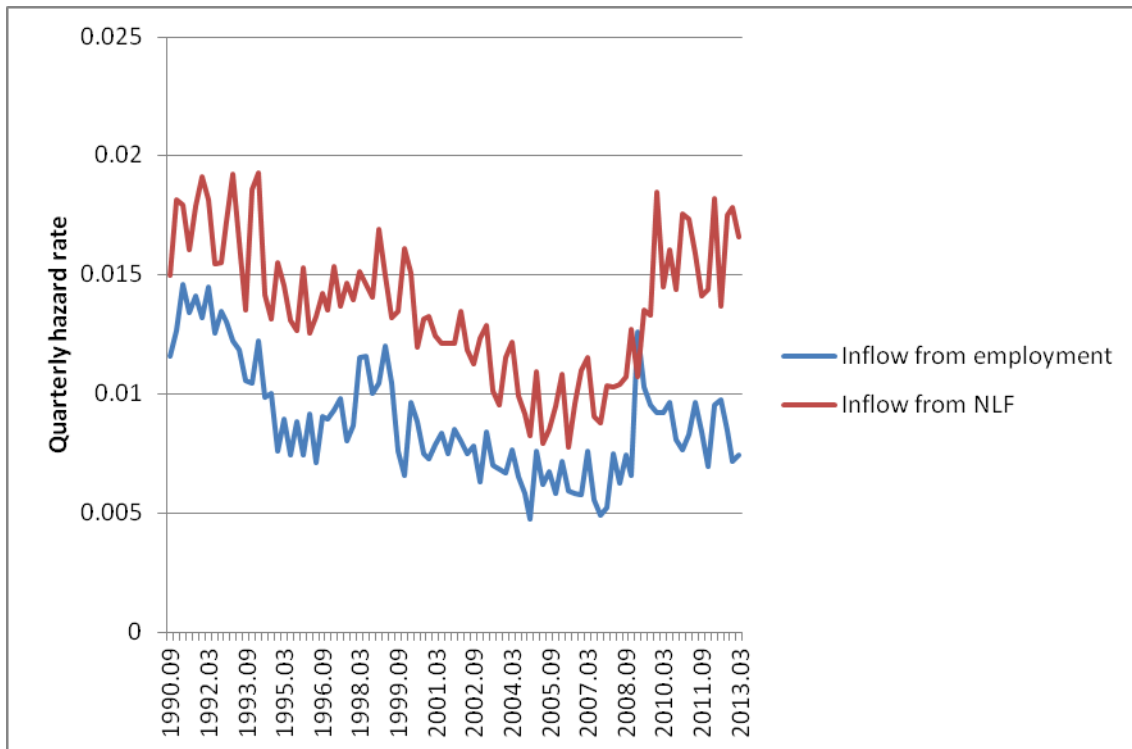
**Figure 6: Cumulative change in unemployment inflow and outflow rates, New Zealand, Post-1996/qtr1**



Source: Statistics NZ, Household Labour Force Survey.

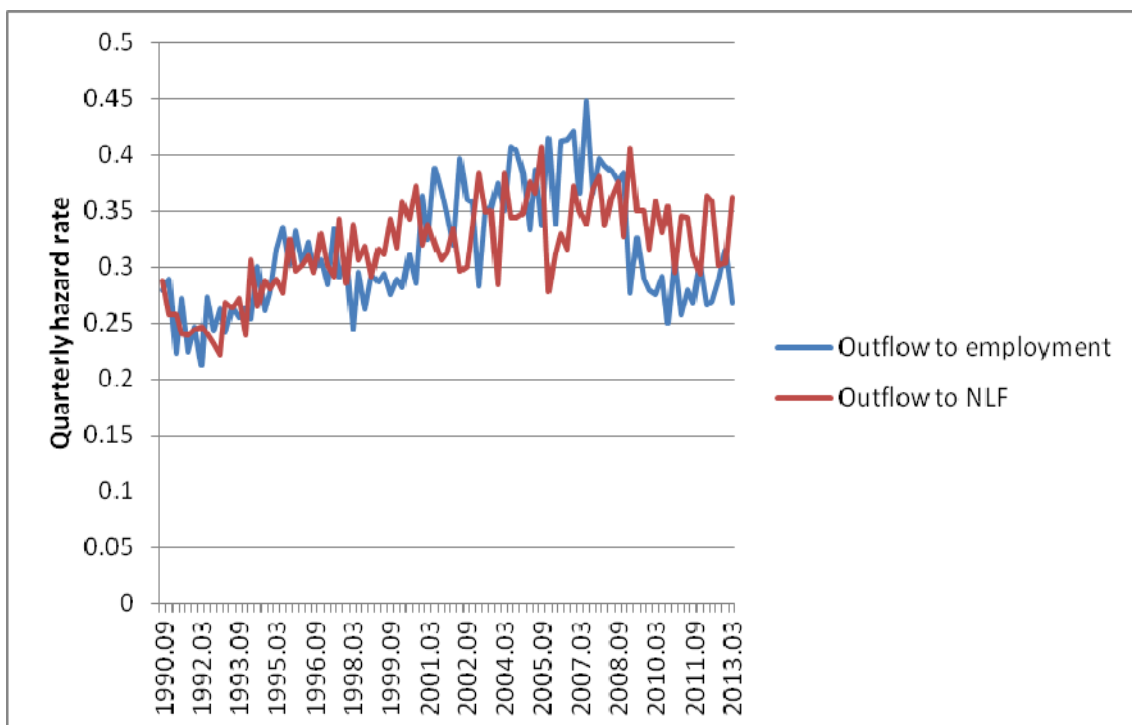
Figure 7 and Figure 8 provide further information on inflows to and outflows from unemployment in New Zealand since the early 1990s – disaggregating between flows to and from employment and not in the labour force. Increases in the inflow to unemployment during the downturn of the late 2000s can be seen to have derived both from flows from employment and to and from out of the labour force. After that time, inflows to unemployment from employment decreased, however, this has been entirely offset by a continued increase in the inflow to unemployment from out of the labour force. The increase in inflows to unemployment from out of the labour force may be another manifestation of slow employment growth. Some potential labour force participants have responded by being discouraged from commencing to look for work; and in this case others have been forced to shift into unemployment rather than into work. The decrease in outflows from unemployment during the downturn of the 2000s can be seen to have been mainly due to a decrease in outflows to employment; whereas outflows to out of the labour force have remained relatively constant during this episode.

**Figure 7: Unemployment inflow rates, New Zealand, 1990/qtr3 to 2013/qtr1**



Source: Statistics NZ, Household Labour Force Survey.

**Figure 8: Unemployment outflow rates, New Zealand, 1990/qtr3 to 2013/qtr1**



Source: Statistics NZ, Household Labour Force Survey.

## 2.5 A framework for analysis of the causes of differences in the rate of unemployment

Major points of comparison between the late 1990s and late 2000s have been shown to be:

- A larger increase in the rate of unemployment during the downturn phase in the late 2000s than late 1990s; and
- A much smaller subsequent reversal in the rate of unemployment in the late 2000s than late 1990s.

This difference in outcomes has two main potential explanations:

- Differences in economic activity (the rate of growth in GDP); or
- Differences in the impact of economic activity on the rate of unemployment.

Each of these potential explanations is investigated in the following sections.

## 3 The influence of GDP

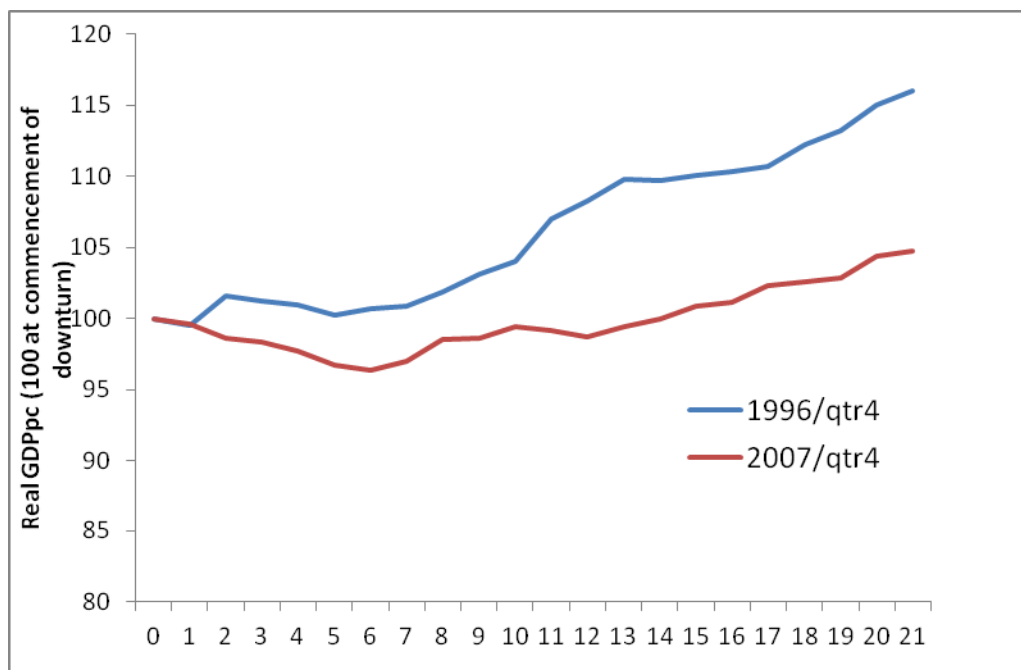
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### 3.1 A comparison of the rate of growth in GDP

There are large differences in the rate of growth in GDP in New Zealand between the downturns and recoveries in the late 1990s and late 2000s. Figure 9 shows the cumulative percentage change in GDP from the commencement of the downturns in both the late 1990s and late 2000s. During the first eight quarters, in which the rate of unemployment was rising, GDP grew by about 2 per cent in the 1990s and declined by about 1.5 per cent in the 2000s. Over the next thirteen quarters GDP grew by 14 percentage points in the 1990s, and only 6 percentage points in the 2000s.

Table 4 translates these numbers into average annual rates of growth. During the periods of downturn the average annual rate of growth in GDP was 0.8 per cent in the late 1990s and -0.8 per cent in the late 2000s. In the subsequent 3 ¼ years the annual growth rate in GDP was 4.0 percent in the late 1990s and only 1.8 per cent in the late 2000s. This difference in rates of growth in GDP has also been noted previously by Fabling and Mare (2012, p.6). Explanations proposed for the slow growth in the late 2000s onwards include the high New Zealand exchange rate and slow credit and spending growth (Chetwin, 2012, pp.22-23).

**Figure 9: Cumulative change in real GDP, New Zealand, Recent downturns**



Source: Statistics NZ, Economic Indicators.

**Table 4: Average annual rate of growth in GDP, New Zealand, Recent downturns and recoveries**

Period	Growth rate
<b>A. Downturn</b>	
1996/4-1998/4	0.8
2007/4-2009/4	-0.8
<b>B. Recovery</b>	
1998/4-2002/1	4.0
2009/4-2013/1	1.8

Source: Statistics NZ, Economic Indicators.

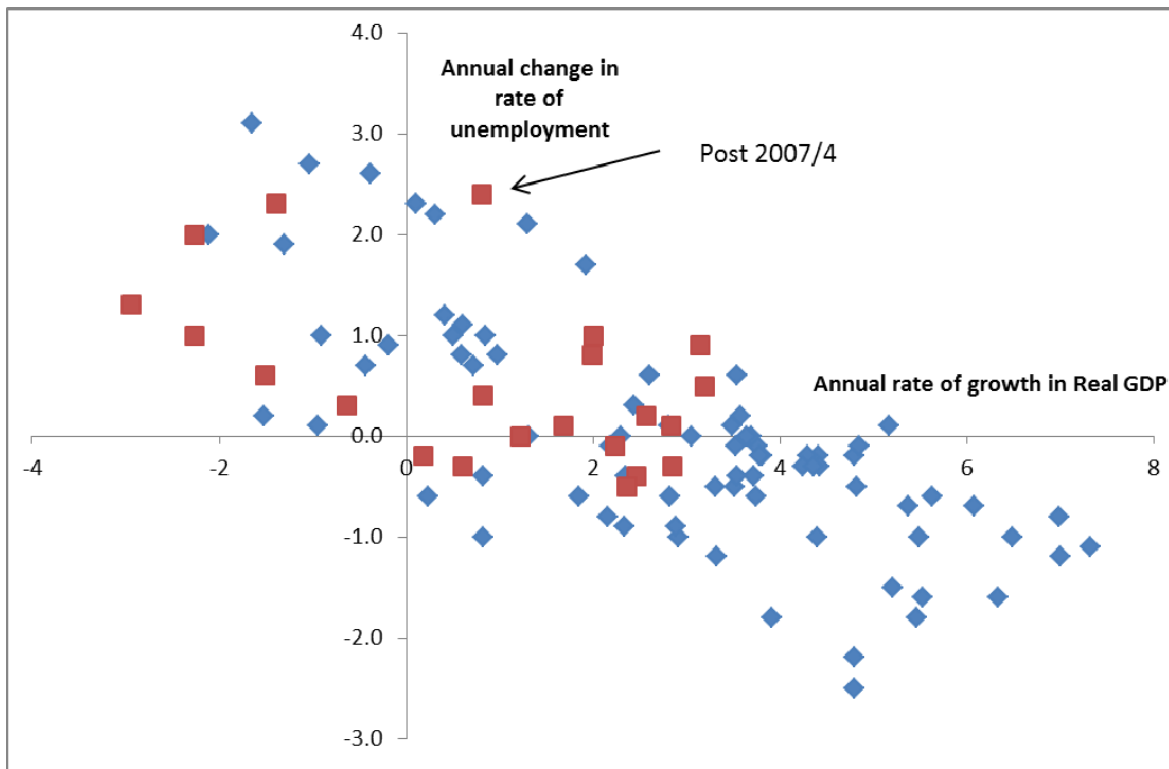
## 3.2 Okun's relation

The extent of differences in the growth rate in GDP between the downturns of the late 1990s and late 2000s suggest this is an important explanation for the different size of changes in the rate of unemployment in those episodes. One way to estimate exactly how much of the difference in the change in the rate of unemployment can be attributed to differences in rates of growth in GDP is to use Okun's relation. This is the idea, proposed by Arthur Okun in the early 1960s, that there is a relatively stable relation between changes to the rate of unemployment and the rate of growth in GDP (Okun, 1962).

### 3.2.1 Okun's relation in New Zealand

Figure 10 graphs Okun's relation in New Zealand – showing the 4-quarter change in the rate of unemployment and the annual rate of growth in GDP using quarterly data from 1987/2 to 2013/1. The GDP series is the seasonally adjusted chained volume product measure. An inverse relation between the series is apparent. Estimates from a basic linear regression model of Okun's relation, reported in column (1) of Table 5, confirm a significant negative relation exists between the rate of growth in GDP and change in the rate of unemployment. A 1 per cent increase in the rate of growth of GDP is associated with a 0.33 percentage point reduction in the rate of unemployment. Using the results from the regression model it is also possible to calculate the rate of growth in GDP required for the rate of unemployment to remain constant. This is done by dividing the constant term by the coefficient on the rate of growth in GDP. Doing this exercise establishes that the rate of unemployment in New Zealand is stabilised at a rate of growth in GDP of 2.7 per cent.

**Figure 10: Okun's relation, New Zealand, Annual rates of change in GDP and in the rate of unemployment, 1988/2-1987/2 to 2013/1-2012/1**



Source: Statistics NZ, Household Labour Force Survey; Economic Indicators.

**Table 5: Okun's relation, New Zealand, Annual rates of change in GDP and in the rate of unemployment, 1988/2-1997/2 to 2013/1-2012/1**

	(1)	(2)	(3)
Constant	0.905** (0.110)	0.992** (0.139)	0.902** (0.119)
Annual rate of growth in real GDP	-0.337* (0.033)	-0.363** (0.038)	-0.342** (0.033)
Dummy for post-2007/4		-0.234 (0.229)	
Dummy for post-2007/4* Annual rate of growth in real GDP		0.134 (0.094)	
Dummy for post-2009/4			-0.433 (0.487)
Dummy for post-2007/4* Annual rate of growth in real GDP			0.280 (0.223)
Adjusted R-squared	0.511	0.511	0.510
Number of observations	100	100	100

Source: Statistics NZ, Household Labour Force Survey; Economic Indicators.

Note: \*\* = significant at 1% level; \* = significant at 5% level.

*Applying Okun's relation to estimate the effect of differences in the rate of growth in GDP on changes in the rate of unemployment*

It is now possible to calculate how much of the difference in the change in the rate of unemployment between the episodes of the late 2000s and late 1990s can be explained by the difference in the rate of growth of GDP. This is done by applying the estimated effect of GDP on the rate of unemployment from Okun's relation (Table 5, column (1)), together with the data on differences in rates of growth in GDP between the late 1990s and late 2000s (Table 4), in the following formula:

**Difference in change in rate of unemployment due to difference in rate of growth in GDP =**

[Effect of 1 percentage point increase in GDP on rate of unemployment]\*

[(Years of downturn)\*(Difference in rate of GDP between downturns in late 2000s and late 1990s) + (Years of recovery)\*(Difference in rate of GDP between recoveries in late 2000s and late 1990s)]

Applying this formula yields:

**Difference in change in rate of unemployment =**

$$0.337*[(1.6)*(2)+(2.2)*(3.25)] = 3.5 \text{ percentage points}$$

The actual difference in the change in the rate of unemployment between the episodes in the late 1990s and late 2000s has been 3.6 per cent. Hence, Okun's relation suggests that almost the entire difference in the change in the rate of unemployment between the 1990s and 2000s can be explained by differences in the rate of growth in GDP.

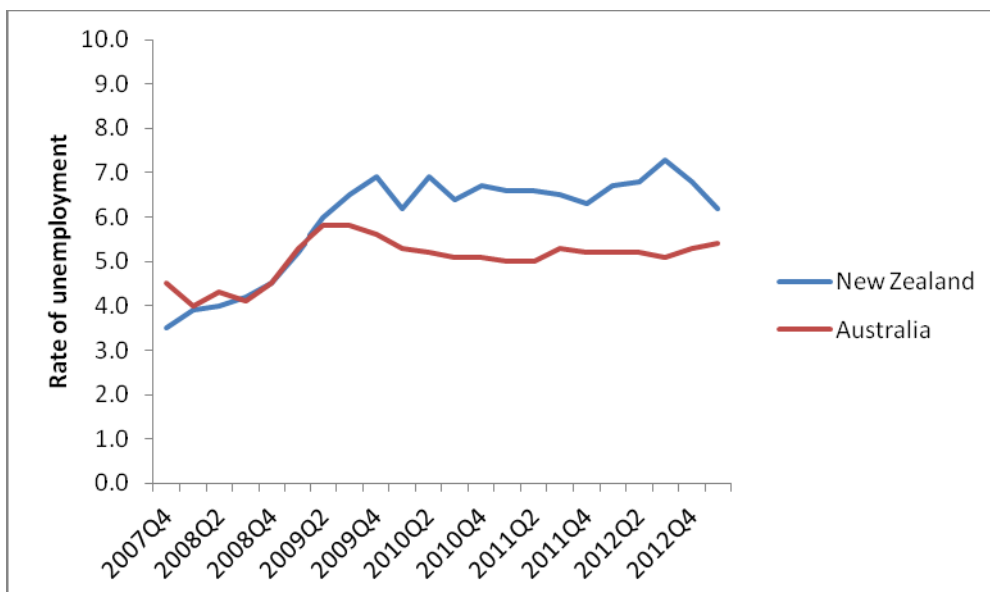


Figure 10 also identifies separately the periods prior to and after 2007/qtr4, in order to examine whether there might have been some change in the relation between changes to the rate of unemployment and rate of growth in GDP after the late 2000s. No such change is evident, as the observations for the period from 2007/qtr4 onwards are mixed in with the earlier observations. Furthermore, extending the regression model of Okun's relation by including a dummy variable for the periods after 2007/qtr4 or after 2009/qtr4, and an interaction of that dummy with the rate of growth in GDP, shows no support for change in the relation between the change in the rate of unemployment and growth in GDP. These results are shown in columns (1) and (2) of Table 5.

### 3.3 Comparison with Australia

Relatively slow economic growth has not been unique to New Zealand during the 2000s in the aftermath of the GFC. Australia, for example, has had a similar experience. That being the case, another perspective on the effect of the rate of growth in GDP on the rate of unemployment can be obtained by comparing the experiences of Australia and New Zealand. This is shown in Figure 11. It is apparent that the rate of unemployment has followed a similar path in both countries. In the aftermath of the GFC both countries had increases in the rate of unemployment; and following that period the rate of unemployment has been stable in both countries.

**Figure 11: Rates of unemployment, Australia and New Zealand, 2007/qtr4 to 2013/qtr1 (seasonally adjusted)**



Source: RBNZ; Australian Bureau of Statistics, Labour Force Survey.

## 4 The influence of structural factors

### 4.1 Labour force composition

Over some periods the composition of the labour force is known to have been an important influence on the rate of unemployment in New Zealand (see for example Carroll and Chapple, 2001, Table 2). Here the influence of changes to the age composition of the labour force is considered. Table 6 presents the actual rate of unemployment at the start and end of the phases of downturn and recovery in the late 1990s and late 2000s. It also shows the unemployment rate that would have existed at the end of each phase had the age composition of the labour force been the same as at the start of that phase. For example, the rates of unemployment in 1996/qtr4 and 1998/qtr4 were 6.3 percent and 7.9 percent respectively; and the rate in 1998/qtr4 if the age composition had been the same as in 1996/qtr4 would have been 8.0 percent. This shows that changes to the age composition had little effect on the rate of unemployment over that period of downturn. The same conclusion applies to each of the other episodes. Changes to the age composition of the labour force appear to have little role in explaining changes in the rate of unemployment.

**Table 6: Rate of unemployment, New Zealand, Actual and predicted for constant age composition of population**

Downturns		Recoveries	
1996/4	6.3	1998/4	7.9
1998/4	7.9	2002/1	5.8
1998/4 with age composition from 1996/4	8.0	2002/1 with age composition from 1998/4	5.8
2007/4	3.4	2009/4	7.1
2009/4	7.1	2013/1	6.8
2009/4 with age composition from 2007/4	7.2	2013/1 with age composition from 1998/4	6.9

Source: Statistics NZ, Household Labour Force Survey.

### 4.2 Matching efficiency

The rate of unemployment at any time will depend on the degree of efficiency in matching between unemployed workers and job vacancies. Hence, a further explanation for differences in unemployment outcomes between the 1990s and 2000s downturns could be a decline in matching efficiency between those episodes.

This hypothesis has been explored in previous work on the New Zealand labour market. Craigie et al. (2012) find several pieces of evidence which it is argued suggest that a decline in matching efficiency has occurred since 2010. The effect of the Canterbury earthquake (see also Parker and Steenkamp, 2012) and a net migration outflow of prime age workers are proposed as possible explanations for the decline in matching efficiency.

### 4.3 Beveridge curve

One way to explore matching efficiency is using the Beveridge curve. The Beveridge curve represents a negative relation between the vacancy rate and the rate of unemployment. It has been described as a:

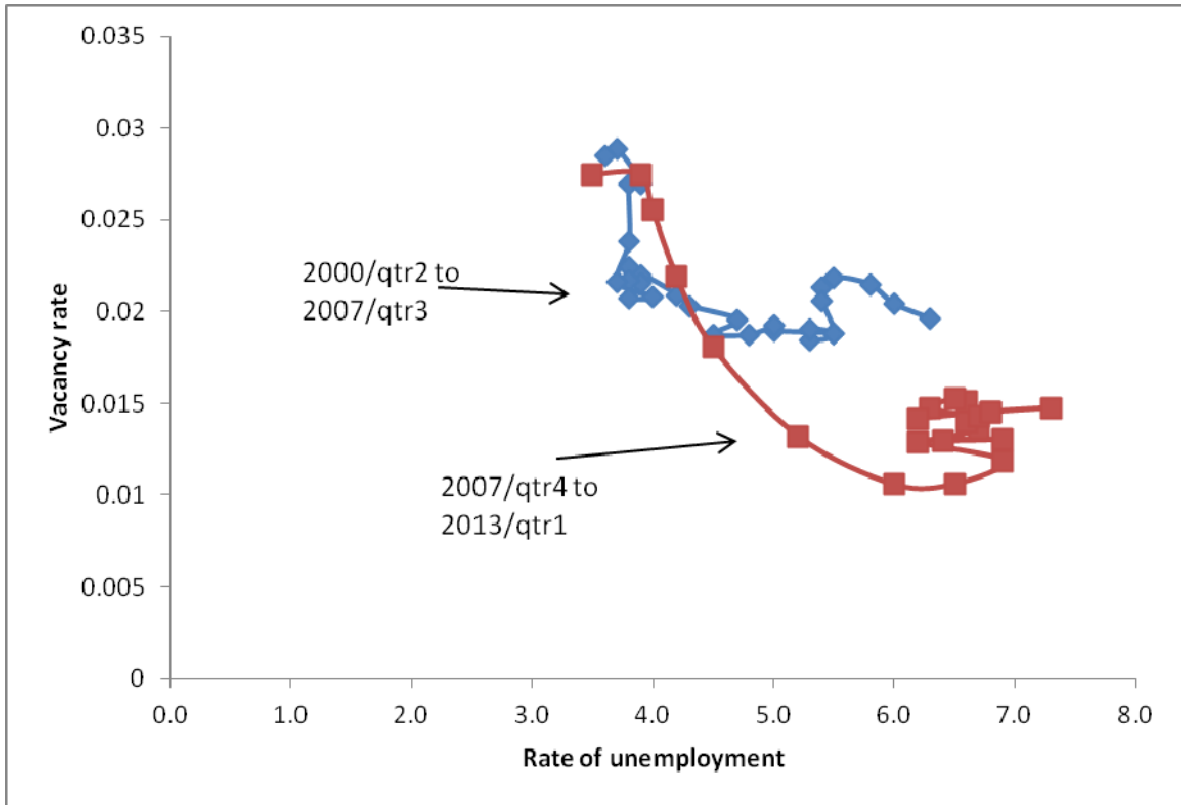
*'...production possibility frontier for the job matching capabilities of the labor market, where the rate at which job seekers are matched to job openings depends primarily on the ratio of the vacancy rate to the unemployment rate'* (Daly et al., 2012, p.7).

Movements along the Beveridge curve occur due to business cyclical fluctuations; for example, a downturn will cause a decline in labour demand, with a consequent decrease in the vacancy rate and increase in the rate of unemployment. Changes in matching efficiency are reflected in shifts in the Beveridge curve; for example, a decline in matching efficiency implies workers have more difficulty finding jobs at any given level of vacancies so that there will be an outward shift of the Beveridge curve.

Figure 12 shows the Beveridge curve for New Zealand for the period from 2000/qtr2 onwards. The vacancy rate is calculated as the number of job vacancies divided by the sum of job vacancies and employment. The measure of job vacancies is equal to the sum of newspaper and internet advertisements. (The starting date for representing the Beveridge curve is the first quarter for which data on both types of job advertisements are available.)

To establish that a decline in matching efficiency has occurred during or after the downturn of the late 2000s it would be necessary to find evidence of an outward shift in the Beveridge curve. Periods before and after 2007/qtr4 are therefore identified separately in Figure 12. A first look at the Beveridge curve might be thought to indicate that there has been an outward shift of the curve and decline in matching efficiency. The recent observations post-2007/qtr4 seem to be associated with a higher rate of unemployment while the vacancy rate has remained constant. However, it is difficult to make inferences from a relatively short time-series, and where it is known that changes in the rate of unemployment can derive from either a change in matching efficiency (shift of the Beveridge curve) or aggregate labour demand (shift along the Beveridge curve) (see Daly et al., 2012, pp.5-6, and Razzak, 2013).

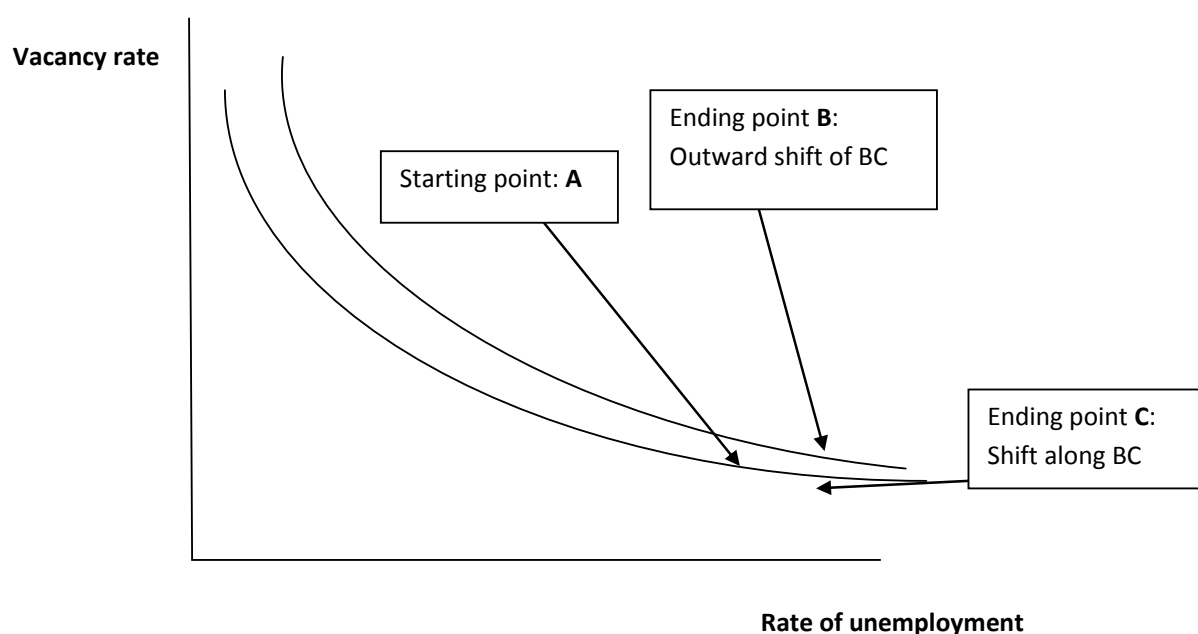
**Figure 12: Beveridge curve, New Zealand, 2000/qtr2 to 2013/qtr1**



Source: Rate of unemployment: RBNZ; Job vacancies: NZ Treasury; Employment: NZ Statistics, Household Labour Force Survey.

The potential difficulty of identifying cyclical variation in the rate of unemployment from an increase in the rate of unemployment due to a decline in matching efficiency is illustrated in Figure 13. The rate of unemployment begins at point A. Subsequently there is an increase in the rate of unemployment and a relatively small decrease in the vacancy rate. The illustration makes the point that where this occurs around a section of the Beveridge curve that is relatively flat, it may be difficult empirically to disentangle the effects on the rate of unemployment of changes to matching efficiency (point B) and cyclical influences (point C).

**Figure 13: Identifying the source of a change in the rate of unemployment from the Beveridge curve**



## 4.4 Matching function

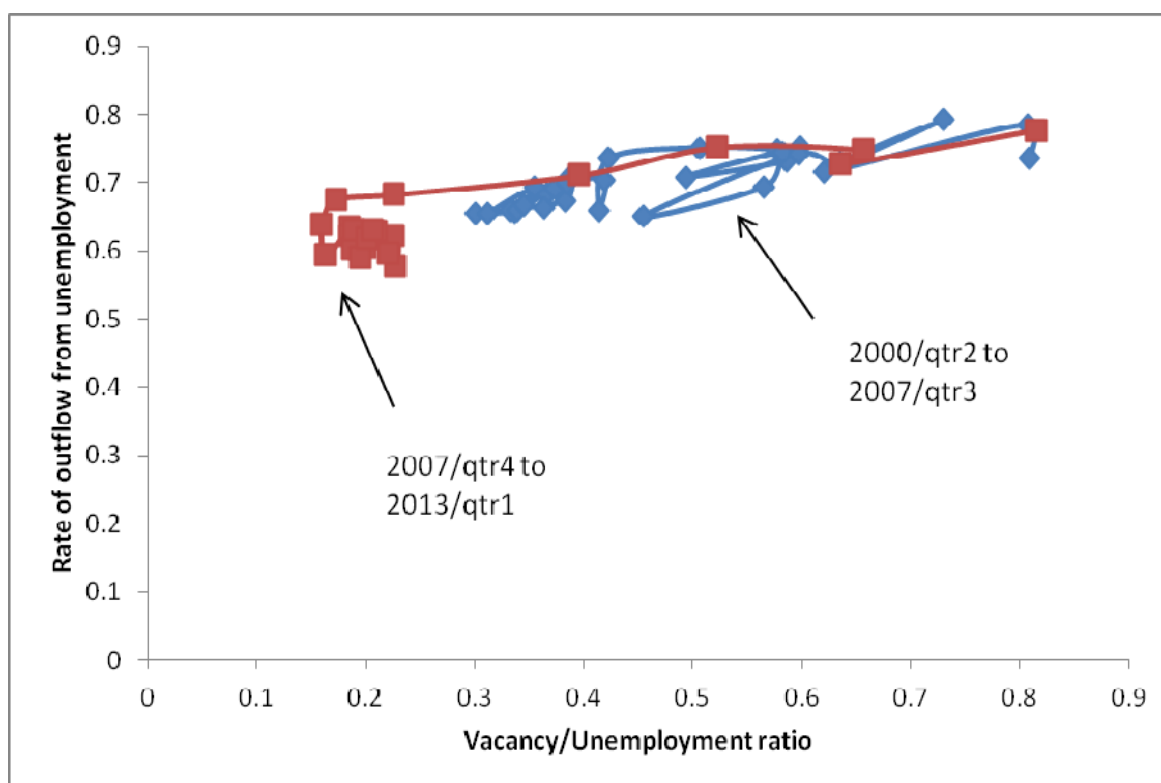
An alternative perspective on matching efficiency can be obtained by examining the matching function – the relation between the outflow rate from unemployment and labour market tightness measured by the ratio of vacancies to unemployment. The concept of the matching function summarizes a trading process which brings workers and employers together:

‘...into productive matches. The key idea is that this complicated exchange process is summarized by a well-behaved function that gives the number of jobs formed at any moment in time in terms of the number of workers looking for jobs, the number of firms looking for workers, and a small number of other variables.’ (Petrongolo and Pissarides, 2001, p.391; see also Shimer, 2005).

Movements along the matching function occur due to business cycle fluctuations; for example, a downturn will cause a decrease in labour demand, with a consequent decrease in the rate of outflow from unemployment and in the vacancy/unemployment ratio. Changes in matching efficiency will be reflected in shifts in the matching function; for example, a decrease in matching efficiency will be associated with a lower rate of outflow from unemployment at a given vacancy/unemployment ratio.

The matching function for New Zealand from 2000/qtr2 onwards is shown in Figure 14. The outflow rate from unemployment includes both the outflow to employment and to not in the labour force. Periods before and after 2007/qtr4 are again identified separately. While it can be seen that observations for the more recent period are distinct from the earlier period, the relation between outflows from unemployment and the vacancy/unemployment ratio shows no apparent shift. To investigate more formally whether a shift has occurred, a linear regression model for the matching function was estimated. Results are reported in Table 7. No evidence is found of a change to the matching function either post-2007/qtr4 or post-2009/qtr4. Repeating this analysis using a measure of outflows from unemployment restricted to outflows to employment obtains the same finding that there is no evidence of a shift in the matching function from the late 2000s.

**Figure 14: Matching function, New Zealand, 2000/qtr2 to 2013/qtr1**



Source: Flows and Numbers unemployed: NZ Statistics, Household Labour Force Survey; Vacancies: NZ Treasury.

**Table 7: Matching function, New Zealand, 2000/qtr3-2000qtr2 to 2013/qtr1-1012/qtr4**

**Dependent variable: Rate of outflow from unemployment**

	(1)	(2)	(3)
Constant	0.575** (0.008)	0.594** (0.016)	0.610** (0.010)
Vacancy/Unemployment	0.264** (0.019)	0.230** (0.032)	0.204** (0.021)
Dummy for post-2007/4		-0.024 (0.019)	
Dummy for post-2007/4* Vacancy/Unemployment		0.043 (0.044)	
Dummy for post-2009/4			0.025 (0.069)
Dummy for post-2007/4* Vacancy/Unemployment			-0.324 (0.344)
Adjusted R-squared	0.788	0.787	0.845
Number of observations	52	52	52

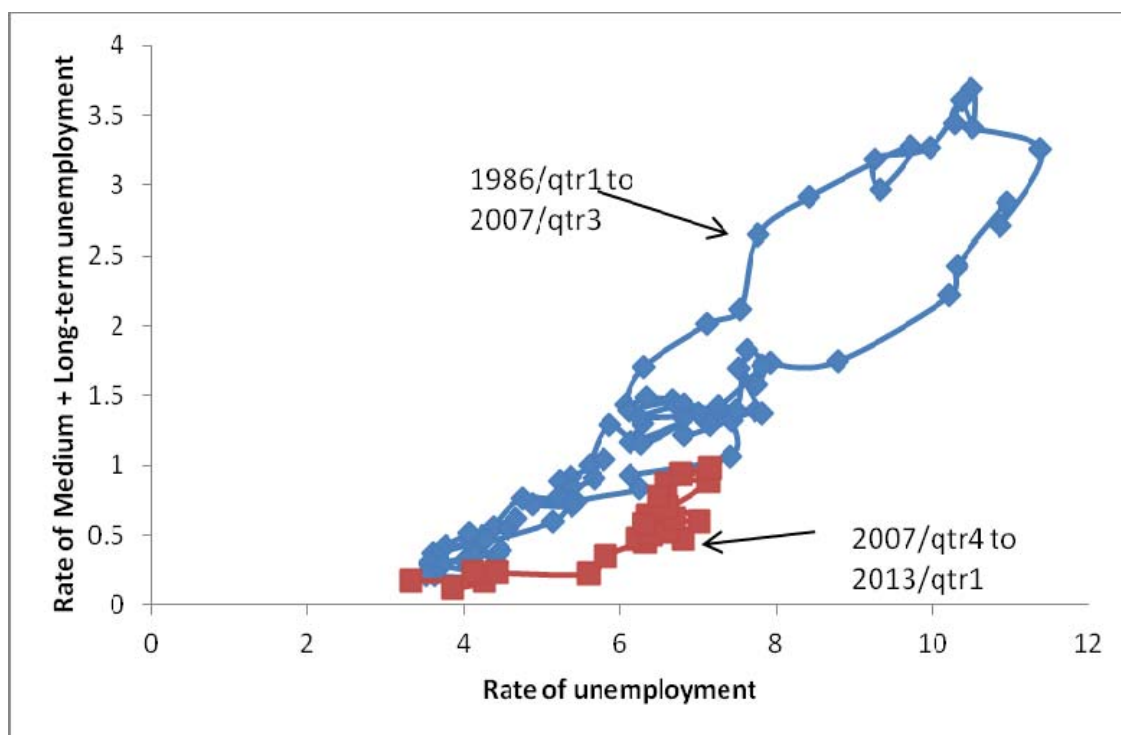
Source: Flows and Numbers unemployed: NZ Statistics, Household Labour Force Survey; Vacancies: NZ Treasury.

Note: \*\* = significant at 1% level; \* = significant at 5% level.

## 4.5 Long-term unemployment

As a final way of addressing the issue of matching efficiency, the evolution of long-term unemployment is considered. A rise in the proportion of long-term unemployed has been suggested as one reason why a decline in matching efficiency might occur (Blanchard and Diamond, 1994). Figure 15 graphs the rate of unemployment against the rate of medium (6-12 months) plus long-term (12 months and above) unemployment in New Zealand for the period from 1986/qtr1 onwards. The two series can be seen to follow the usual loop pattern, with changes to the rate of long-term unemployment lagging changes in the rate of unemployment. In the most recent downturn it appears that the rate of medium plus long-term unemployment initially remained relatively low by comparison with previous experience. This is explained by this most recent downturn being more severe, so that new inflows were higher than in previous episodes, causing the proportion of short-term unemployed to be relatively high and the proportion of longer-term unemployed to be relatively low. However, after enough time elapses for short-term unemployed to transition to the categories of medium and long-term unemployment, the path of the rate of medium and long-term unemployment moves back close to what had been the previous experience. In any case, there is no evidence that the proportion of long-term unemployed has been higher than in previous downturns. Hence, it does not seem that this would thus far have been a cause of a decline in matching efficiency.

**Figure 15: Rate of unemployment and rate of medium + long-term unemployment, New Zealand, 1986/qtr1 to 2013/qtr1**



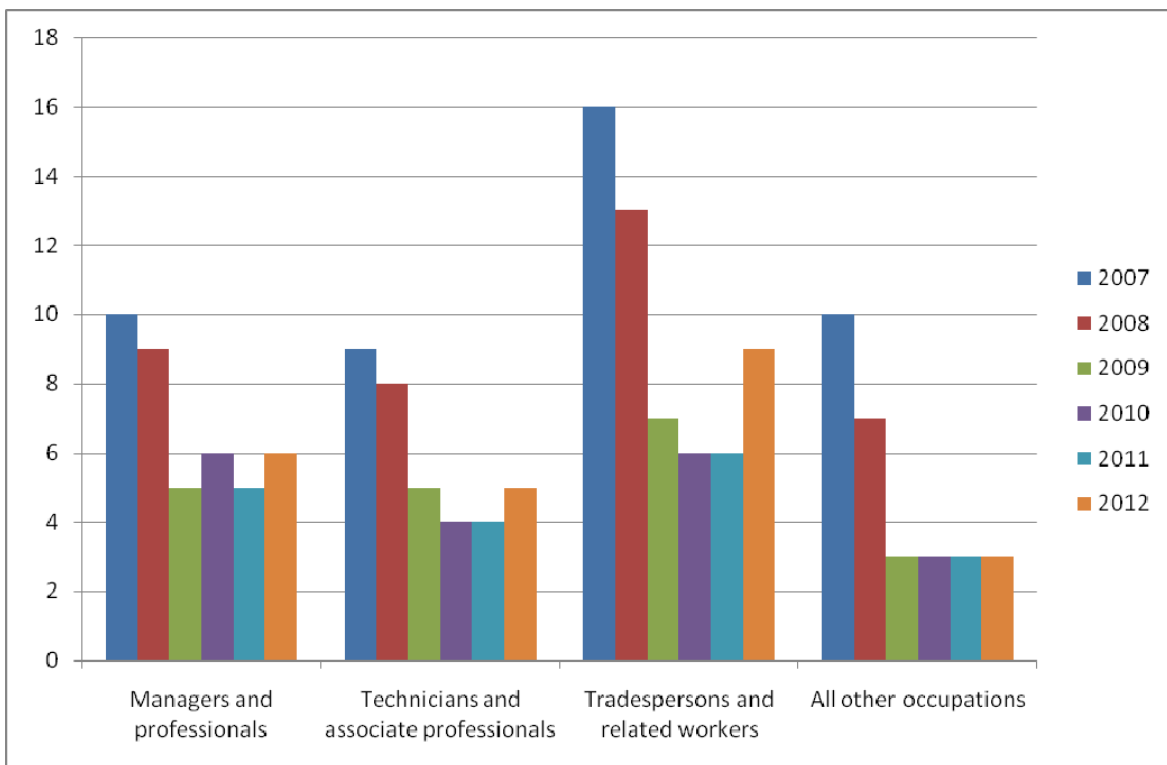
Source: NZ Statistics, Household Labour Force Survey.

## 4.6 Summary on matching

Alternative approaches for examining matching efficiency have been applied. They provide little evidence of a decline in matching efficiency in the period from 2007 onwards in New Zealand. Since this analysis has been for the aggregate New Zealand labour market, it is possible that there has been a decrease in matching efficiency within some particular regions (for example, Craigie et al., 2012). But this is not manifested at the economy-wide level.

The finding that matching efficiency has not deteriorated since 2007 is supported by other evidence on hiring. Figure 16 shows data from the Business Operations Survey on the proportion of firms indicating they had a severe difficulty in recruitment for major occupation groups from 2007 to 2012. If anything, it appears that hiring has become easier for firms over this period. For all occupation groups there was a decline in the proportion of firms having severe difficulty in hiring from 2007 to 2009, after which it has remained stable.

**Figure 16: Proportion of firms indicating they have a severe difficulty with recruitment, 2007 to 2012, Business Operations Survey**



Source: Provided to author by David Rea (New Zealand Treasury)



## 5 Summary

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The various approaches used to investigate structural influences on the rate of unemployment in New Zealand do not show much evidence of a decrease in matching efficiency in recent years.

This is consistent with the other finding from this study that most of the change in the rate of unemployment in New Zealand since the end of 2007 can be explained by changes in the rate of growth in GDP.

It differs, however, from the study by Craigie et al. (2012) which did conclude that there has been a decline in matching efficiency in the New Zealand labour market from the late 2000s, at the same time as qualitative evidence suggests that it became more difficult to hire labour.

A starting point for seeking to reconcile the findings from these studies would be to make a detailed comparison of the measures of labour market outcomes used – for example, this study measures job matches using outflows from unemployment whereas the Craigie et al. (2012) study used data on new hires.

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