

Output volatility in New Zealand

We use two measures of volatility to examine New Zealand's output performance relative to its recent past and other OECD countries. We find that:

- output volatility in New Zealand has declined over the past three decades due, in part, to a more benign world environment;
- the New Zealand economy has steadied following the turbulence of the 1970s and the economic reforms and restructuring during the 1980s and early 1990s to reveal a more familiar business cycle pattern in output;
- in line with international experience, contractions appear to be becoming less severe; and
- although output volatility has been declining, New Zealand's relative performance has probably not changed.

Introduction

1. The December 1999 Policy Targets Agreement states that in pursuing price stability the Reserve Bank must now explicitly "*seek to avoid unnecessary instability in output*". How to understand this clause is discussed in the background paper "[*Inflation targeting in principle and in practice*](#)". In this paper, we provide a brief history of New Zealand's output volatility. We describe, without attempting to evaluate, New Zealand's performance over the last 30 years and relative to other OECD countries.
2. Our focus is on year-on-year changes in real output and movements in output over the cycle rather than on quarterly changes. This is because monetary policy affects the real economy with long lags, and hence cannot affect output from quarter to quarter, though it can influence movements in output over the cycle.
3. To anticipate the conclusion, our analysis suggests that, if anything, output volatility has declined in New Zealand over the last decade. Much more tentatively, contractions appear to be becoming less severe and expansions longer. The last expansion (92:3-97:4) was the most enduring and steady over the last two decades (figure 1) and was only cut short by a mild contraction in the first half of 1998. However, in comparison with other countries, output fluctuations in New Zealand are larger with no obvious improvement in our relative position in recent years.

A comparison of 18 OECD countries

4. Despite the possible emergence of a more regular growth cycle (with expansions becoming longer and contractions becoming less severe), New Zealand's output growth has remained quite volatile. Over the last two decades, the New Zealand economy was one of the most volatile among the OECD countries in terms of year-on-year real output growth (see figure 2). Although output growth variability in New Zealand has declined since the end of the recession in the early 1990s, New Zealand's relative performance among OECD countries has not much improved.

5. The relative performance of New Zealand is not too surprising given the size of our economy and its degree of openness. For example, Australia's gross domestic product (GDP) is almost seven times bigger than New Zealand's. About 20 percent of Australia's output is exported compared to 30 per cent of New Zealand's. Output volatility tends to be greater in small economies compared to large countries because small countries are typically less well diversified and therefore more affected by external shocks. In addition, supply shocks are likely to be more important in New Zealand because of New Zealand's relatively large agricultural sector.

A comparison of the 70s, 80s, and 90s

6. To compare movements in output over the cycle requires a longer span of data than is available for the 18 OECD countries considered so far. As a result, we restrict our sample to eight representative countries that have a sufficient span of data (30 years), that are up to date and of sufficient quality.¹ These countries are New Zealand, Australia, the United States, the United Kingdom, Canada, Finland, Switzerland and Taiwan.
7. Output growth fluctuations have declined, to varying degrees, in all eight countries over the last three decades (see figure 3 and columns 2 and 3 in table 1). One reason for this is that more medium-term-focussed monetary and fiscal policies appear to have led to more economic stability around the world generally. Although this is also true for New Zealand, our story over the last three decades, as shown in figure 3, is also one of a departure from and return to the business cycle. During the period of economic reforms in the 1980s and early 1990s, the economy underwent substantial structural change, which is reflected in the erratic growth performance of New Zealand over this time. By the 1990s the economy had adjusted to the restructurings, and fiscal adjustment and disinflation had been concluded. Consequently there was a return to greater macroeconomic stability and a return to the earlier business cycle pattern observed in the 1970s.
8. Examining the length of expansions and contractions provides another perspective on output stability. Periods of expansions and contractions for each country can be dated using a simple rule for choosing peaks and troughs in the level of real output (see figure 4).² Figure 4 shows the messiness of the 1980s and early 1990s in the sideways tracking of New Zealand's output with lots of little expansions and contractions.
9. Finally, a summary of the magnitude of swings in output and the length of contractions and expansions is provided in figure 5. The *depth* of a contraction (expansion) is measured as the average percent change in output during the contraction (expansion), while the *length* of a contraction (expansion) is measured in quarters.
10. Again, output in New Zealand was very irregular during the 1980s with a more familiar business cycle pattern returning in the 1990s. Figure 5 also suggests that expansions are becoming longer and contractions shorter in most countries, except for Switzerland, where output growth during much of the 1990s was virtually zero.

Conclusion

11. Because there is no single measure of volatility, several different measures of output variability were investigated. From this analysis the following tentative conclusions emerged.
- Output volatility in New Zealand has declined over the past three decades due, in part, to a more benign world environment.
 - The New Zealand economy has steadied following the turbulence of the 1970s and the economic reforms and restructuring during the 1980s and early 1990s to reveal a more familiar business cycle pattern in output.
 - In line with international experience, contractions appear to be becoming less severe.
 - Although output volatility has been declining, New Zealand's relative performance has probably not changed.

Endnotes

¹ Quarterly *production* GDP numbers from Statistics New Zealand are only available from 1977Q2 onwards. The data prior to this point is estimated from Statistics New Zealand annual data. See also the explanatory note to figure 3.

² A 'contraction' is defined as at least two consecutive quarterly declines in output and an 'expansion' as at least two consecutive quarterly increases following a contraction. A 'cycle' is, therefore, a minimum of four quarters.

Figure 1: New Zealand's last three major expansions

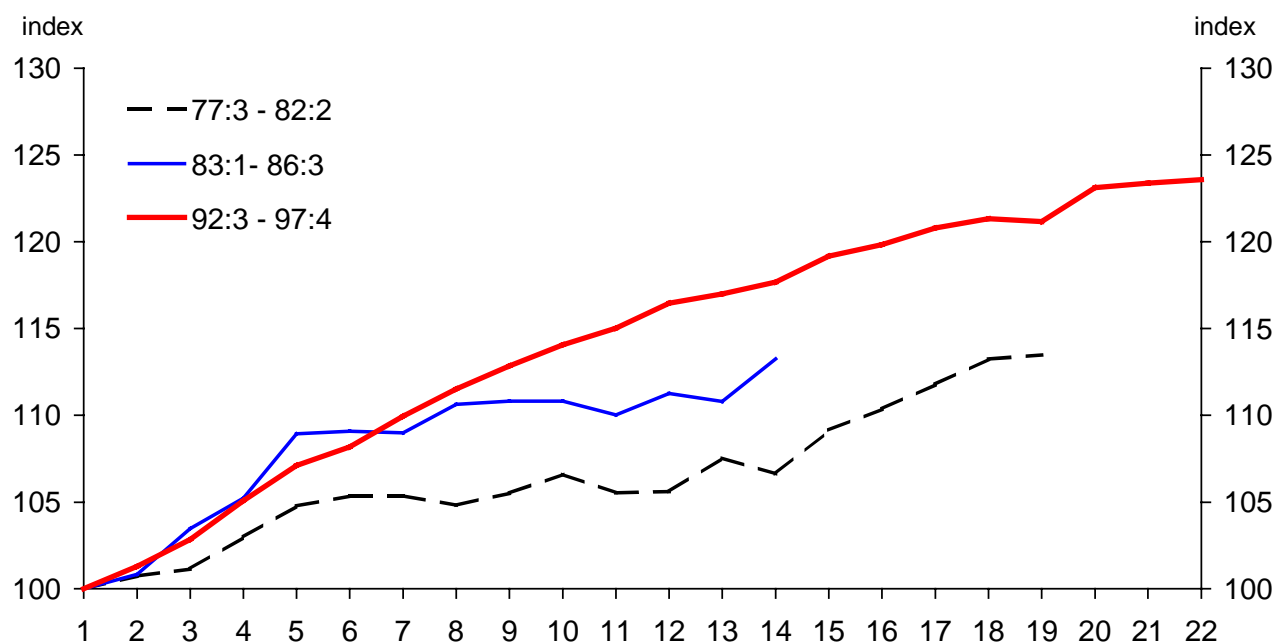
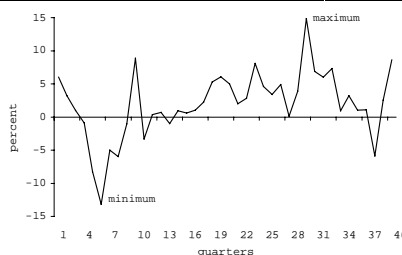


Table 1: Some summary statistics

	Standard deviation in the year on year growth rate in output			(Maximum minus minimum year on year growth rate)/2 ^a			Number of contractions (1970-1999)	Percentage of time spent in contraction		
	1970s	1980s	1990s	1970s	1980s	1990s		1970s	1980s	1990s
New Zealand	3.9	2.6	2.6	8.6	6.0	4.7	7	15	37.5	15
Australia	2.1	2.6	1.9	4.0	6.3	4.0	4	10	10	10
United States	2.8	2.7	1.5	5.2	5.8	3.0	4	20	15	8
UNITED KINGDOM	2.7	2.5	1.8	6.9	5.5	3.7	6	25	20	20
Canada	1.8	2.8	2.2	3.7	5.2	4.3	3	0	20	10
Finland^b	3.2	3.6	4.2	5.4	7.7	6.9	4	13	28	38
Switzerland	3.6	2.0	1.4	6.7	4.3	2.9	7	23	10	23
Taiwan	4.9	3.1	1.2	10.9	5.6	2.6	1	10	0	0

a. This is another indicator of volatility. It is computed by taking the highest growth rate achieved in the period specified and subtracting the lowest growth rate achieved and dividing by two.



b. Data used for Finland start in 1975 and the number of contractions and proportion of time spent in contraction for the 1970s may be understated.

Figure 2: Year on year GDP growth volatility ranking for 18 OECD countries

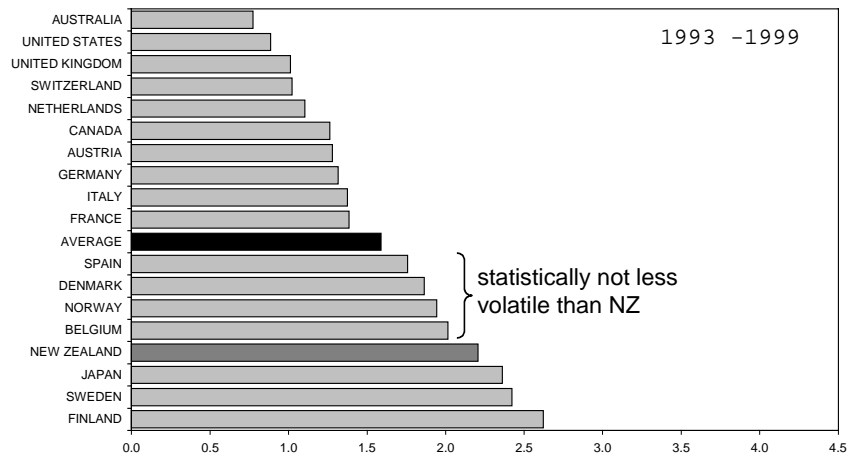
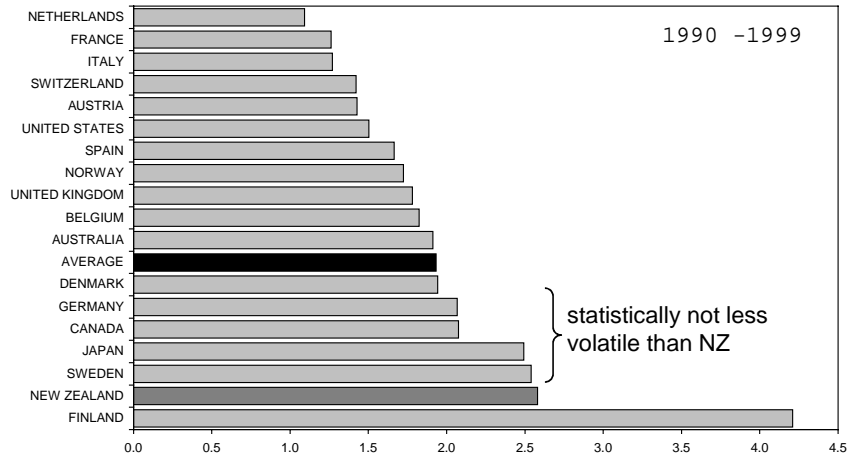
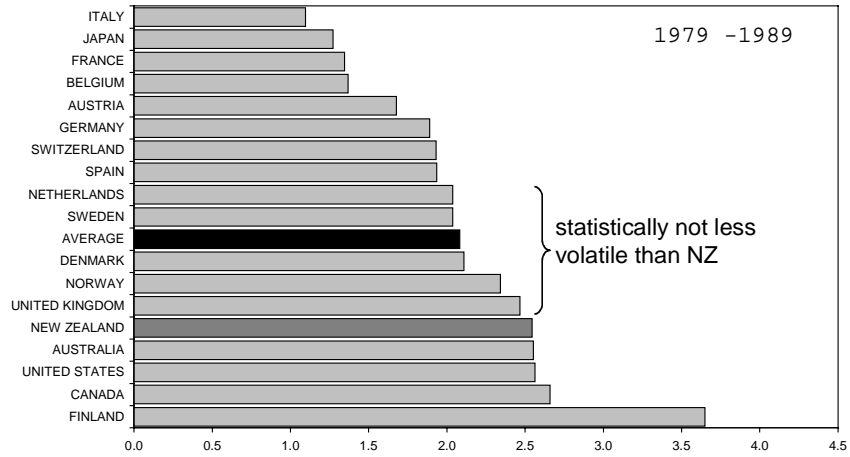
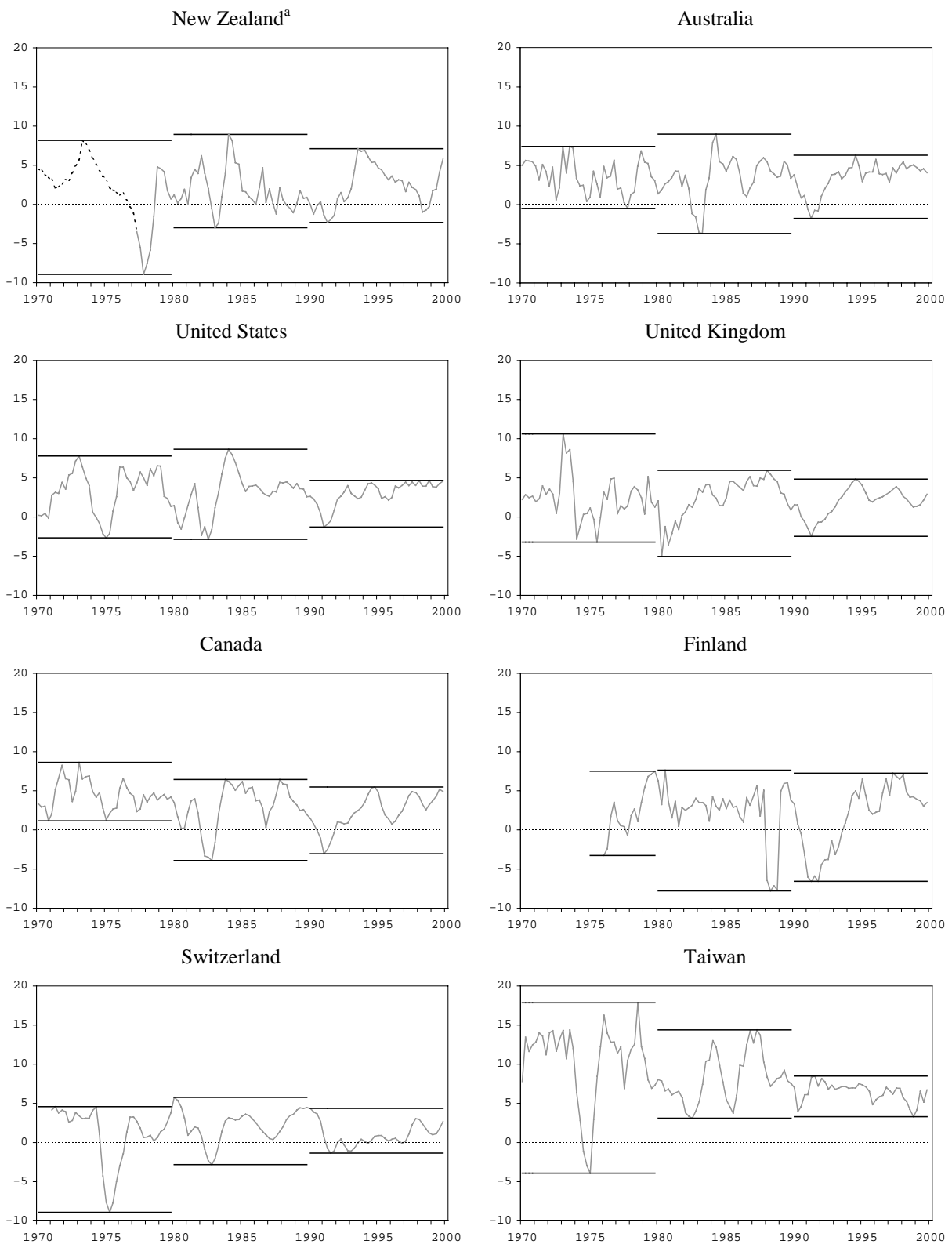


Figure 3: Year on year percent changes in real GDP



^aThe official production GDP data used for New Zealand begins in 1977Q2. Prior to that the series is estimated from annual Statistics NZ data (the dashed line). Therefore the volatility prior to 1977 may be understated.

Figure 4: Peaks (solid lines) and troughs (dashed lines) in the log level of real output

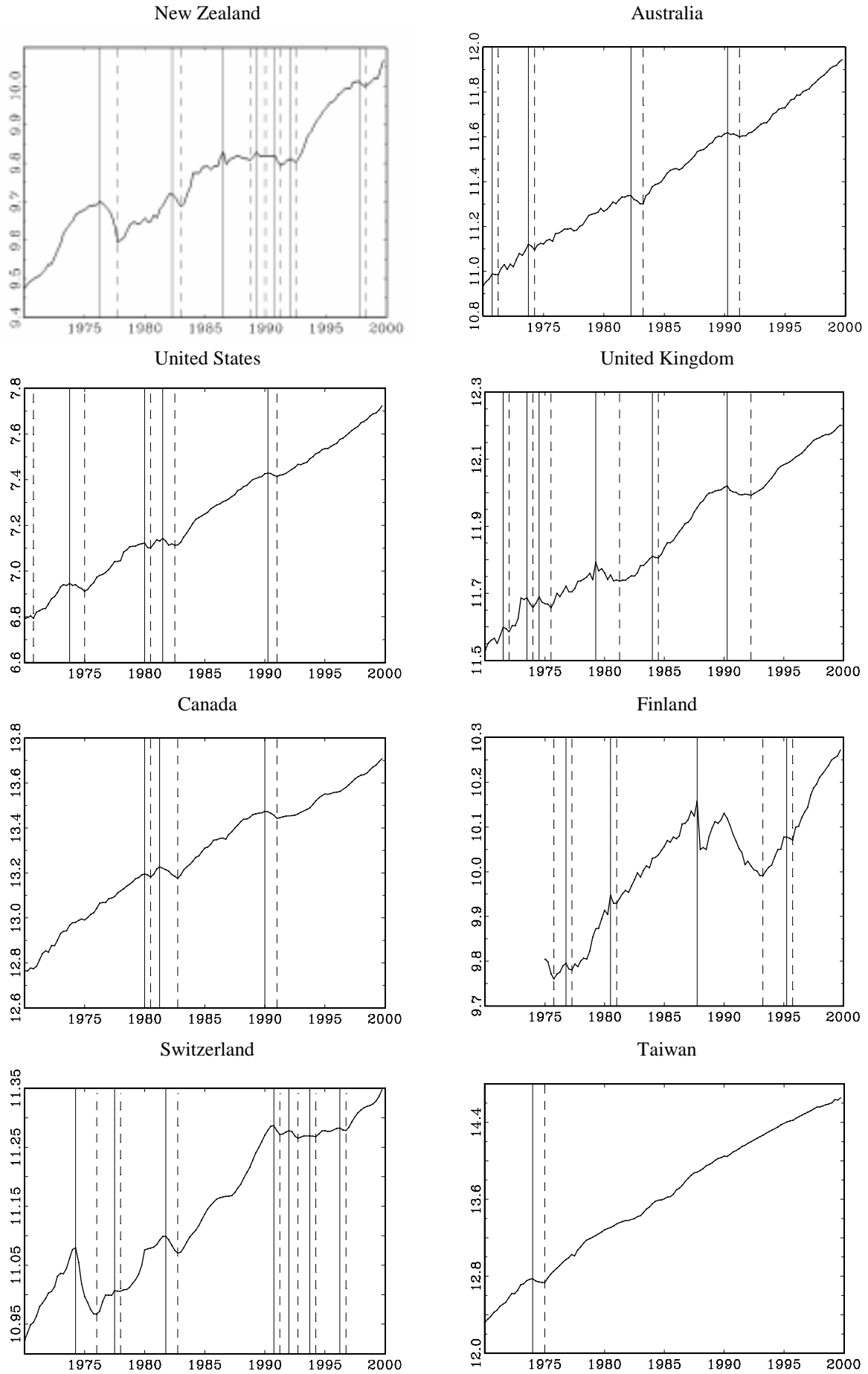
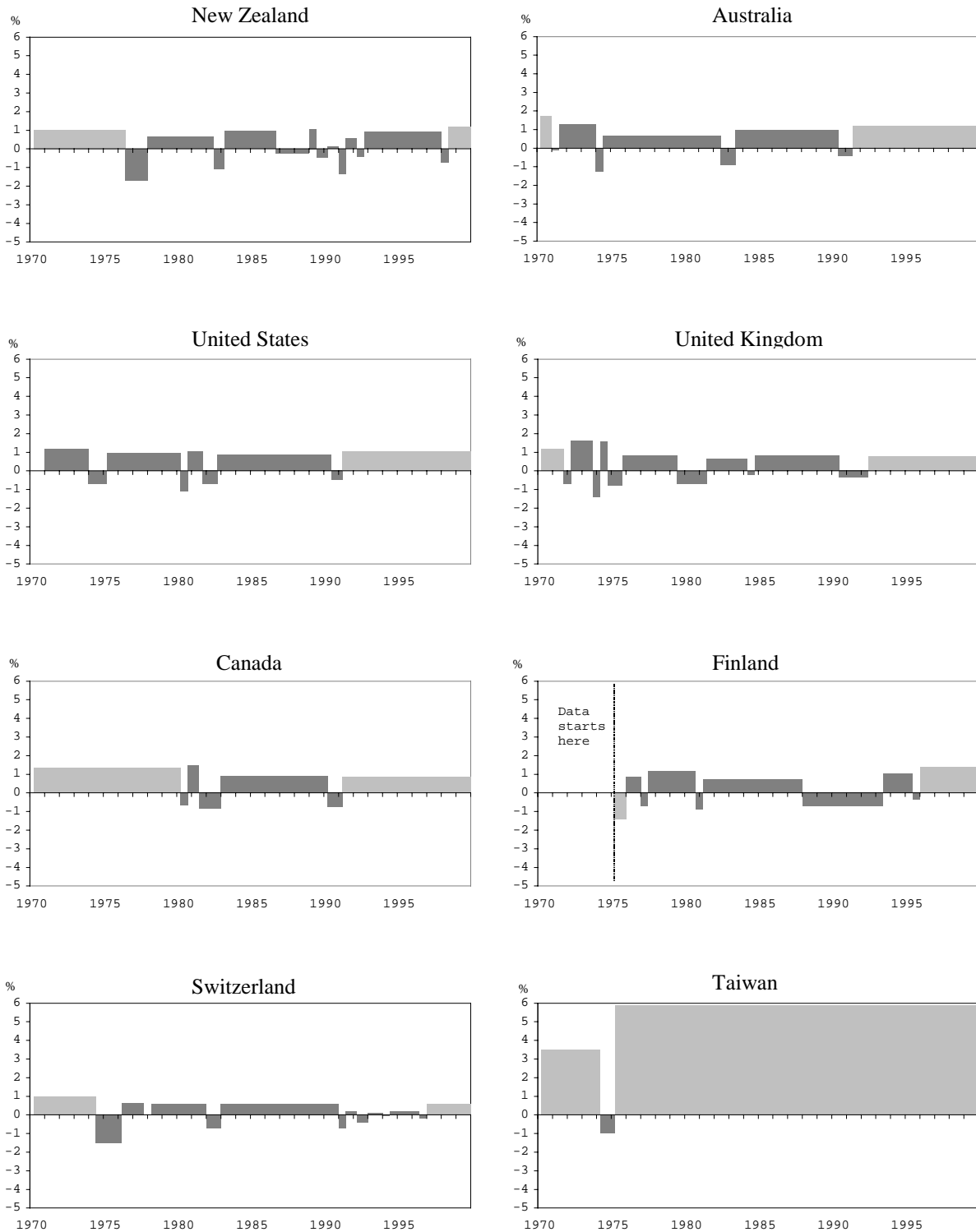


Figure 5: Depth and length of contractions and expansions



This figure provides some information on the depth and the length of contractions (peak to trough) and expansions (trough to peak) in each of the countries. The depth of an expansion (contraction) is measured as the average percent change in output during the expansion (contraction). The length of a contraction (expansion) is measured in quarters. Note that the growth rate for the last period was calculated as the average rate from the last contraction to the end of 1999. The numbers at the beginning of the sample were calculated accordingly.