

Business cycle developments and the role of monetary policy over the 1990s

This paper sets out the Reserve Bank's understanding of the key macroeconomic developments in the 1990s, with emphasis on the role that monetary policy played in shaping the nature of the business cycle over the latter half of the decade.

In the 1990s, low inflation was achieved and maintained. Moreover, GDP growth was higher than in the previous two decades, and the volatility of the real economy was lower. But the New Zealand economy is reasonably dependent on the primary sector, and is open to external shocks. The combination of the Asian crisis and a drought, in an environment of falling net migration and an already slowing economy, led to a short and shallow recession in the first half of 1998.

Our assessment is that, while monetary policy can, on average, smooth the cycle, it is not able to play any sort of precise buffering role. With the benefit of hindsight, we can identify occasions when monetary policy could have played a larger role in buffering the effects of shocks, had we fully anticipated them. For example, monetary policy tightened a little too late during the acceleration of the economy in 1992/93, and did not ease fast enough in response to the joint impact of the Asian crisis and the first drought in 1997/98. However, annual inflation rates never came close to breaching the lower edge of the inflation target bands, and indeed only fell into the bottom half of the target band in late 1998 after the unexpected impact of the Asian crisis and the droughts. The fact that inflation outcomes were generally consistent with the target ranges suggests that monetary policy settings through the period were broadly appropriate to the circumstances.

Looking forward, the last business cycle may be quite typical of what we can expect for the next decade, in the sense that the New Zealand economy will remain relatively undiversified and will continue to be buffeted by shocks. As a result, we should not expect New Zealand to achieve the same level of stability in the real economy as larger OECD countries.

Introduction

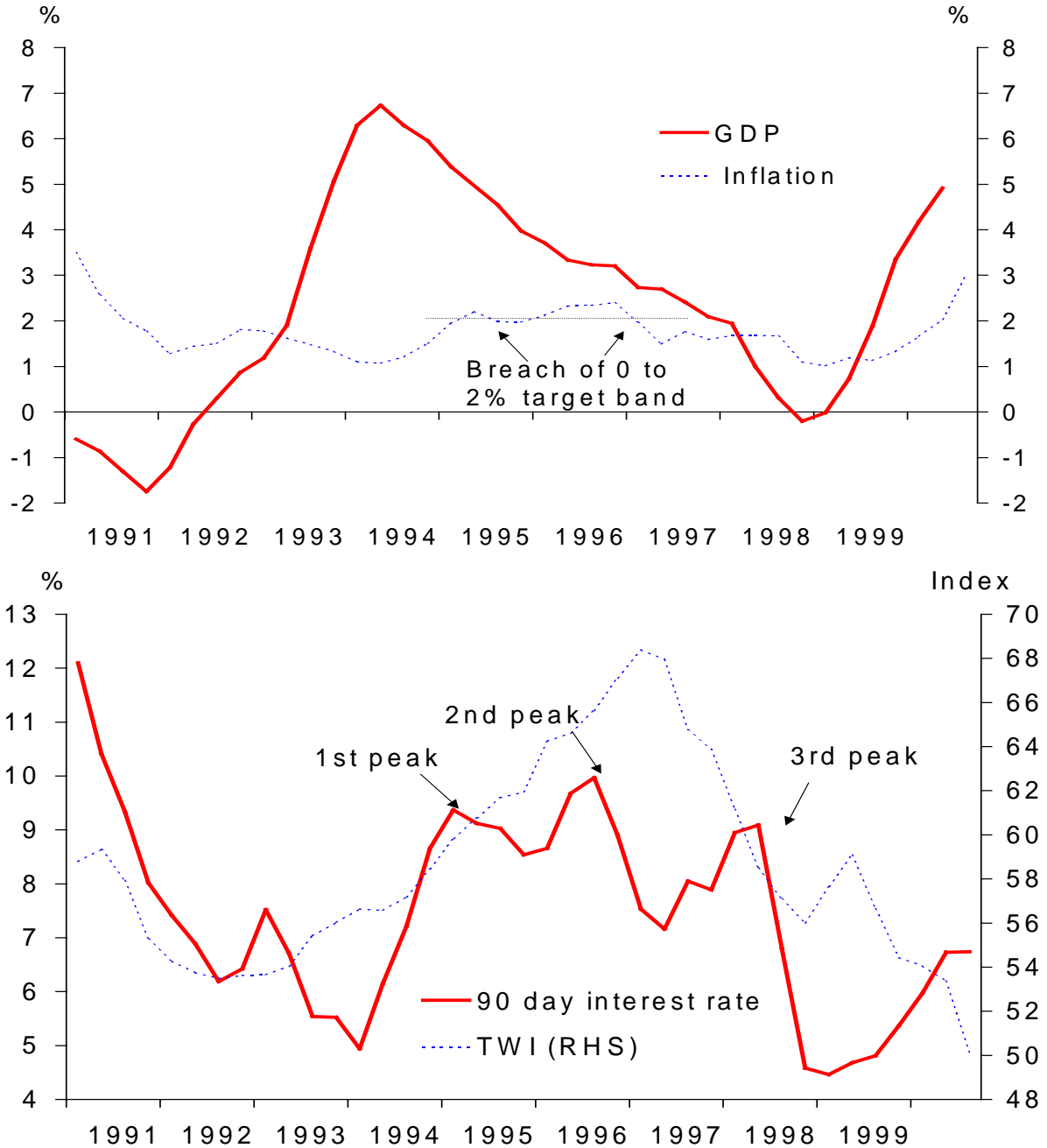
1. As a review of business cycle developments and the role of monetary policy over the 1990s, this paper follows on from a similar review of these matters published in the *Reserve Bank Bulletin* in December 1998 and March 1999. The period covered by that review ended at early 1998, that is, at just about the time the growth cycle of the 1990s was to end with a short recession. Given the timing of the previous review, it was not possible to provide much by way of perspective on the recession period or the factors that caused it.
2. This paper commences by laying out the key facts for the 1990s as a whole, so as to enable the developments that occurred in the latter part of the decade to be understood in context.

3. We then take another look at the conclusions we drew from our previous review, and consider how those conclusions now stand in the light of subsequent events. In that earlier review, we assessed that tight monetary policy was needed in the mid-1990s to counter inflation pressures arising from a particularly strong expansion in 1993-94. We attributed the strength of that expansion primarily to a number of positive “shocks” to demand, such as a strong increase in primary commodity prices in 1994, and a surge in immigration in the mid-1990s. From where we stand now, those earlier conclusions still seem valid.
4. From that point, we review monetary policy in the later years of the decade. To do this, we need to understand the main “exogenous” factors that were also present. In this section of the paper we address:
 - the sharp turnaround in migration, from large net inflows in the mid-1990s, to large net outflows by 1998, and the related swings in the housing market;
 - the Asian crisis; and
 - the droughts in the summers of 1997/8 and 1998/9.
5. Following that, we assess how those developments were taken into account by policy. In particular, we consider how the use of a monetary conditions index (MCI) helped or hindered the shaping of monetary policy in the face of shocks.
6. To provide a broader perspective on how these events, and in particular the Asian crisis, impacted on the New Zealand economy, we also briefly review how two other economies evolved over the same period, those being Australia and the Canadian province of British Columbia.
7. The final section of the paper makes some concluding remarks.

Facts about the last business cycle

8. Before we begin to draw conclusions about the role of monetary policy, we first review the broad macroeconomic characteristics of the 1990s. Figure 1 shows how inflation, GDP growth, 90-day interest rates and the trade-weighted exchange rate evolved after 1990.

Figure 1
Real GDP growth, CPI target measure of inflation, 90 day interest rates and the nominal TWI



Source: Statistics New Zealand, Reserve Bank of New Zealand.

Notes on figure 1:

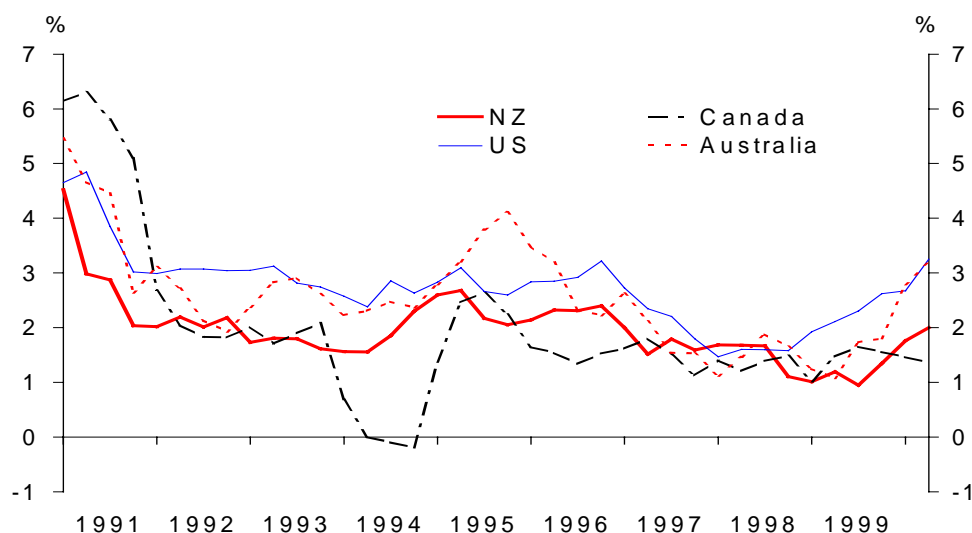
- (1) GDP growth is an annual average per cent change.
- (2) Inflation is measured as an annual per cent change.

(3) The inflation series is a spliced series of the CPI measures targeted by the Bank at different periods of time. These are the underlying inflation rate, the CPI ex credit services and the current CPI measure.

Inflation

9. The 1990s was the first complete decade of inflation targeting in New Zealand. Not coincidentally, it was also the first decade for a long time in which inflation remained low and stable. Since achieving the 0 to 2 per cent inflation target in 1991, monetary policy can be credited with having successfully anchored the inflation rate over the remainder of the decade.
10. From 1991 on, most standard measures of the inflation rate remained below 3 per cent, and typically between 1 per cent and 2.5 per cent. As indicated in figure 1, there were two breaches of the top of the (then 0 to 2 per cent) inflation target band: in the June quarter of 1995 and throughout 1996. However, underlying inflation never came close to breaching the lower edge of the target, and indeed never fell into the bottom half of the then 0 to 2 per cent target band. Subsequent to a number of adverse shocks in 1998, CPIX inflation fell to a trough of about 1 per cent by late 1998.
11. To put New Zealand's inflation record in an international context, figure 2 plots New Zealand's inflation rate (consumer prices ex interest charges) together with comparable measures of inflation in Australia, Canada, and the United States. New Zealand and Canada have tended to have the lowest inflation rates in the 1990s.¹ Overall, though, the similarities of the inflation rates are more notable than the differences.

Figure 2
Inflation rates for dollar bloc countries
(annual percentage change)

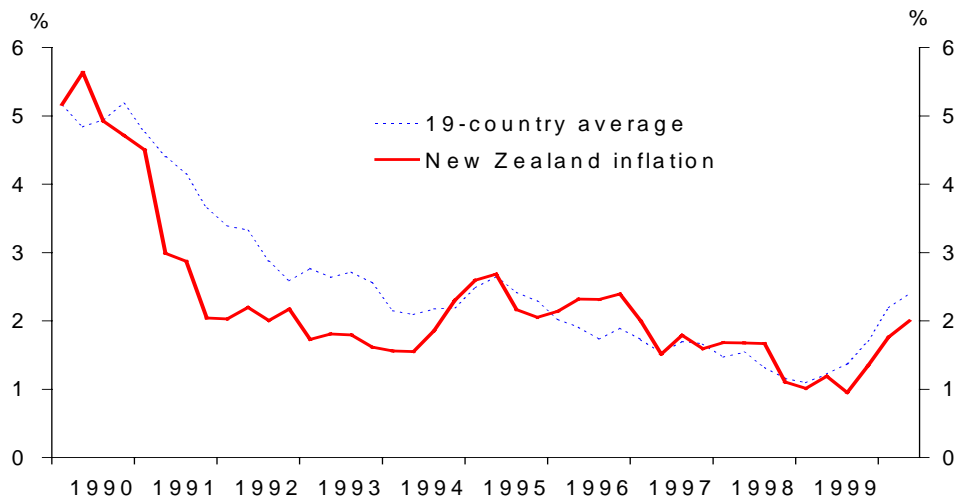


Source: Statistics New Zealand and Datastream.

Note: The inflation series depicted are CPI ex credit for New Zealand, CPI ex mortgage interest and credit charges for Australia, and CPI ex food and energy for both the United States and Canada.

12. Figure 3 compares New Zealand's average rate of CPIX inflation since 1991 with the OECD average. It is clear that New Zealand's average inflation rate has been very similar to the OECD average since 1995.

Figure 3
CPIX inflation in New Zealand and 19-country OECD average
(annual percentage change)



Source: Statistics New Zealand and *International Financial Statistics*.

Note: The 19 countries included in the OECD average are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom and the United States.

Gross Domestic Product

13. In part because of New Zealand's excellent inflation performance, many people have focused more closely on outturns for real economic variables and financial variables. Over this period, the swings in New Zealand's GDP growth have been more pronounced than those in some of our key trading partners – for example, Australia and the United States.
14. Figure 1 illustrates the cycle in GDP growth over the 1990s. There was a significant recession in the early part of the decade, followed by a strong boom in the mid-1990s. After that, there was a gradual slowing in growth, culminating in a small contraction in GDP in the first two quarters of 1998. GDP then accelerated quite quickly out of the 1998 trough before returning to more moderate growth rates.
15. Average GDP growth rates in the 1990s were higher than those in previous decades; real GDP growth averaged 2.5 per cent during the 1990s, compared with 1.8 per cent and 1.7 per cent in the 1970s and 1980s respectively. New Zealand's average GDP growth in the 1990s was also quite respectable compared with that in other industrialised countries. Table 1 shows that, of 18 industrialised economies, New Zealand's average GDP growth in the 1990s was 6th highest, although our strong average growth relative to the growth in many European economies was in part due to a faster growth in the workforce in New Zealand.

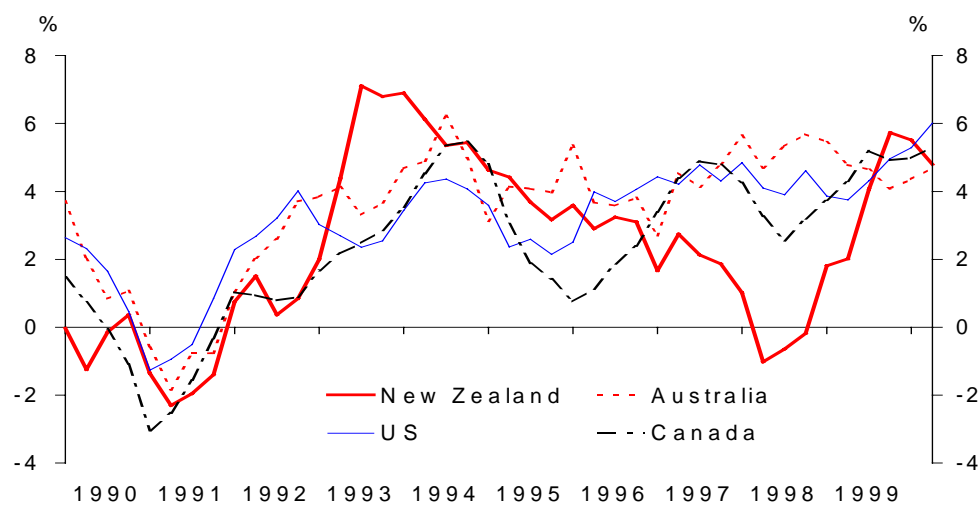
Table 1
Real GDP growth over the 1990s

Country	Average Growth Rate
Ireland	6.8
Australia	3.5
Norway	3.3
USA	3.2
Netherlands	2.9
New Zealand	2.5
Spain	2.5
Canada	2.4
Denmark	2.2
Belgium	2.1
Germany	2.0
United Kingdom	2.0
France	1.7
Finland	1.7
Italy	1.4
Sweden	1.3
Japan	1.3
Switzerland	0.9

Source: Datastream, Statistics New Zealand

16. Using two measures of volatility, the variability of output growth in New Zealand was also lower during the 1990s compared to the 1970s and 1980s [see "[Output Volatility in New Zealand](#)"]. Output volatility seems to have declined in New Zealand at the same time that inflation became more stable.
17. In comparison with other countries, output fluctuations in New Zealand have been relatively large and there has been no obvious improvement in our *relative* position in recent years. However, lower GDP volatility in large economies does not necessarily imply a more favourable impact on individuals in those countries. The "law of large numbers" means that the average of the growth of the six Australian states will almost certainly be less volatile than the individual state growth rates. In other words, even within a very large and well-diversified country like Australia or the United States, there exist communities or states with similarities to New Zealand that face volatility similar to that of New Zealand. New Zealand is unlikely ever to achieve the same level of stability in the real economy as larger more diversified economies, regardless of monetary policy or macroeconomic policy more generally.
18. The comparative stability of GDP growth in other dollar bloc countries compared with that in New Zealand is illustrated in figure 4. Of these countries, New Zealand had the highest growth rate in 1993 and 1994, but the lowest from late 1996 until early 1999. In mid-1997, Australia, Canada, and the US were all growing at rates in excess of 4 per cent, compared with around 2 per cent for New Zealand.²

Figure 4
Growth rates of GDP for dollar bloc countries
(annual percentage change)

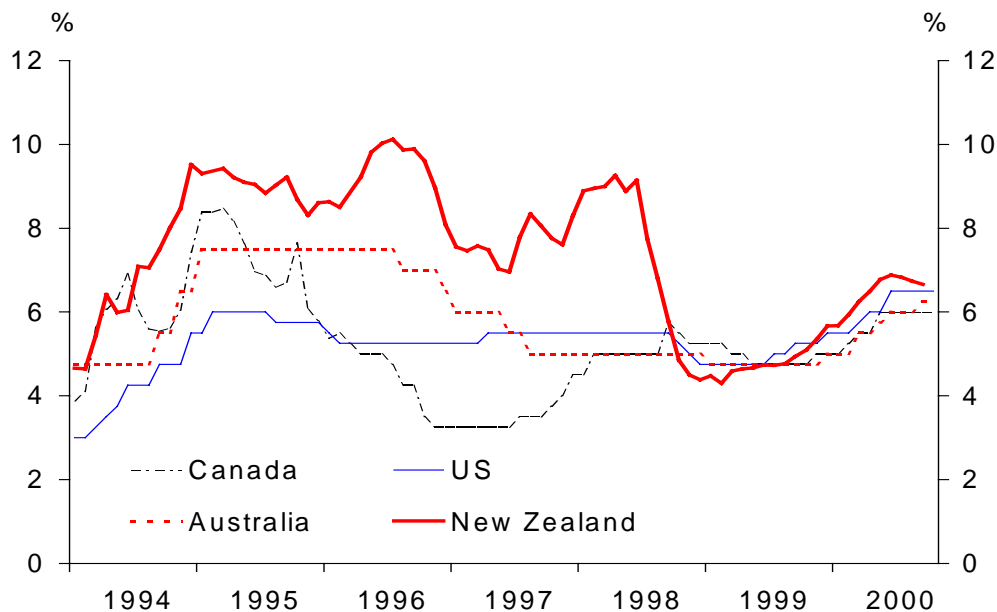


Source: Statistics New Zealand and Datastream.

Interest rates

19. The path of interest rates through the 1990s featured three humps: 1994/95, 1996 and 1997/98 (see figure 1). Over the late-1994 to early-1997 period, 90-day rates in New Zealand averaged about 9 per cent. This was in response to the strong inflationary pressures that had built up as a result of stimulatory monetary conditions during 1992/93, an upturn in the world economy, strong commodity prices, a sharp upturn in net migration, and strong investment growth following a period of structural reform and capital scrapping.
20. Following the 1996 peak, interest rates fell markedly to around 7 per cent in early 1997, before rising again sharply between mid-1997 and mid-1998 to a level of nearly 10 per cent. This increase in interest rates coincided with what is sometimes called 'the MCI regime', to be discussed in more detail later. Following the third peak, interest rates fell from about 9 per cent to 4 per cent in the latter half of 1998. Since then they have risen gradually to just over 6.5 per cent.
21. Figure 5 provides a cross-country comparison of short-term interest rates over this period. However, it should be noted that different inflation rates, different risk premia, and other factors mean that a simple comparison of nominal interest rates does not always provide a good indication of the relative tightness of monetary policy in different countries.

Figure 5
Short-term (official) interest rates of dollar bloc countries



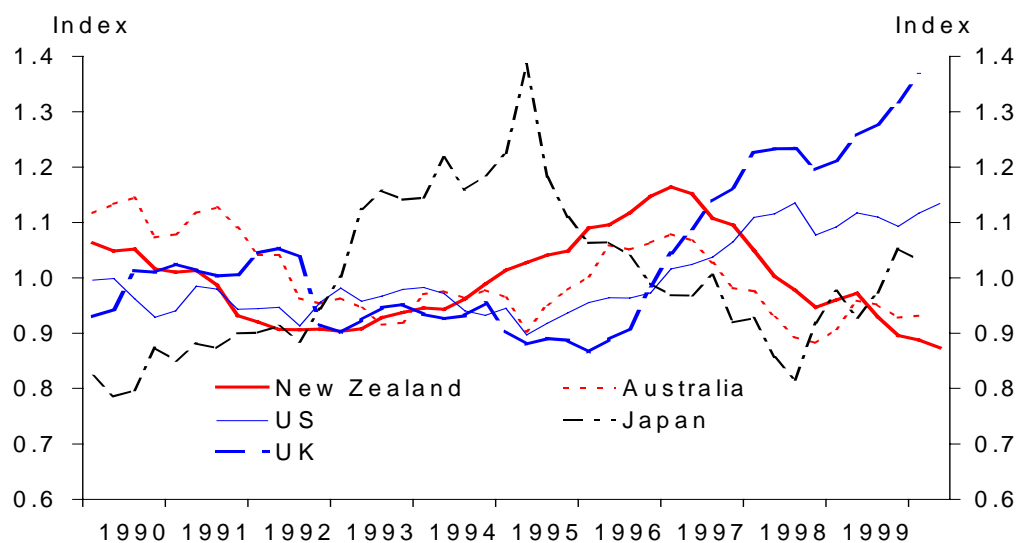
Source: Reserve Bank of New Zealand, Reserve Bank of Australia and Datastream.

Note: The short-term rates charted are: the US federal funds target rate; the Bank of Canada bank rate; the Australian cash rate; and the New Zealand 90-day bank bill rate. Australia's 3-month bank bill rate tracks the RBA's official cash rate closely during this period.

The exchange rate

22. The significant cycle in the trade-weighted exchange rate (TWI) is also depicted in the bottom panel of figure 1. After an appreciation of around 30 per cent between the first quarter of 1993 and the first quarter of 1997, the TWI subsequently depreciated by around 30 per cent.³ With respect to the US dollar, the New Zealand dollar fell from a post-float high of nearly 72 cents in November 1996, to an all-time low of less than 40 cents in October 2000.
23. It is worth making the point that New Zealand has not been alone in experiencing large exchange rate fluctuations. Figure 6 plots New Zealand's real effective exchange rate alongside similar measures of the exchange rate for some other countries. Although the amplitude of the cycle in the Australian exchange rate has been lower than that for the New Zealand exchange rate, the swings in the yen, and in some other major currencies, have been larger than those of the New Zealand TWI.

Figure 6
Real effective exchange rates for various countries



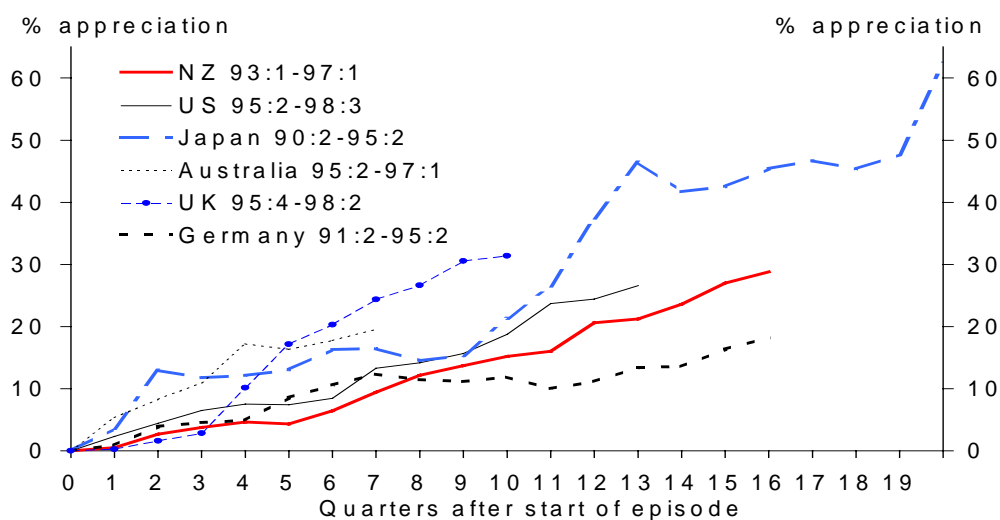
Source: *International Financial Statistics* and Reserve Bank of New Zealand.

Notes:

- (1) The exchange rates shown are the real effective exchange rates as calculated by the International Monetary Fund, except for New Zealand where a CPI-based real trade-weighted exchange rate has been used.
- (2) All the exchange rates have been re-based so that the respective indices average 1.0 over the period shown.

24. This point is also made clear in Figure 7, which compares “episodes” of currency appreciation in various OECD countries in the 1990s. Each episode has been lined up at a common starting point. Thus, for example, New Zealand’s episode of appreciation is taken as starting in the first quarter of 1993. An episode for Japan is taken as starting in the second quarter of 1990 and proceeding until the second quarter of 1995, and so forth.

Figure 7
Trough to peak comparison of various real exchange rates



Source: *International Financial Statistics*, Reserve Bank of New Zealand.

Note: The exchange rates shown are the real effective exchange rates as calculated by the International Monetary Fund, except for New Zealand where a CPI-based real trade-weighted exchange rate has been used.

The role of monetary policy in the 1990s business cycle

25. Thus far, this paper has described economic and monetary policy developments over the 1990s in the broadest of terms. Next we examine the record a little more deeply, to uncover the most likely influences on these events.
26. The Reserve Bank's previous assessment of the first part of the 1990s business cycle experience – up to the end of 1997⁴ – was that:
 - The scale of the very strong upswing was the result of several factors. First, there were strongly beneficial external influences, including growing demand in most of our trading partners, a low exchange rate, and a rebound in relevant commodity prices. Second, as economic reforms appeared to be delivering long-awaited beneficial results, there was a strong bounce-back in investment spending, following a period in which a significant portion of the capital stock had become obsolete. Third, private consumption was boosted by strong consumer confidence and by a run-up in household debt to a level more comparable with that in other countries. Finally, a sharp migration inflow was gathering pace and putting pressure on the housing market.
 - Monetary policy was a little late to start tightening (1994 instead of 1993), with interest rates and the exchange rate allowed to remain stimulatory as the upswing gathered pace. As a consequence, policy had to become tighter and remain tight for longer in order to control the inflation pressures that emerged, pressures that led to breaches of the 0 to 2 per cent inflation target range then in place.
 - Although monetary policy could, ideally, have started to tighten earlier, on the whole monetary policy was a stabilising influence. In other words, without monetary policy tightening sharply from 1994 through 1996, the pressure on resources would have been greater, as would the consequent inflation pressures and subsequent policy response.
27. The dominant point in our earlier analysis was that monetary policy by no means acts alone in influencing New Zealand's business cycle. And, given the time delay between monetary policy actions and their impact, as well as the uncertainties we face in identifying the current state of the economy, monetary policy is not able to play a precise buffering role in response to shocks even though monetary policy aimed at price stability acts to smooth the path of the economy on average. The remainder of this paper tests this conclusion by extending the analysis through to the end of 1999.
28. One of the dominant features of the last business cycle was the impact on the New Zealand economy of three unexpected negative shocks over 1997-98. Migration turned sharply from a strong inflow to an outflow; Asian trading partners suffered from a serious financial crisis that impacted demand for New Zealand products; and the first of two successive droughts impacted on the primary sector. These events culminated in a short and shallow recession in the first half of 1998.
29. If we had had the impossible gift of perfect foresight about these shocks, we might have run policy a little easier during 1996. However, that conclusion must be tentative. In the absence of the shocks, inflation probably would have remained towards the upper end of the 0 to 2 per cent target band in place at the time, and even near the top of the subsequent 0 to 3 per cent target. This suggests that monetary policy settings were not

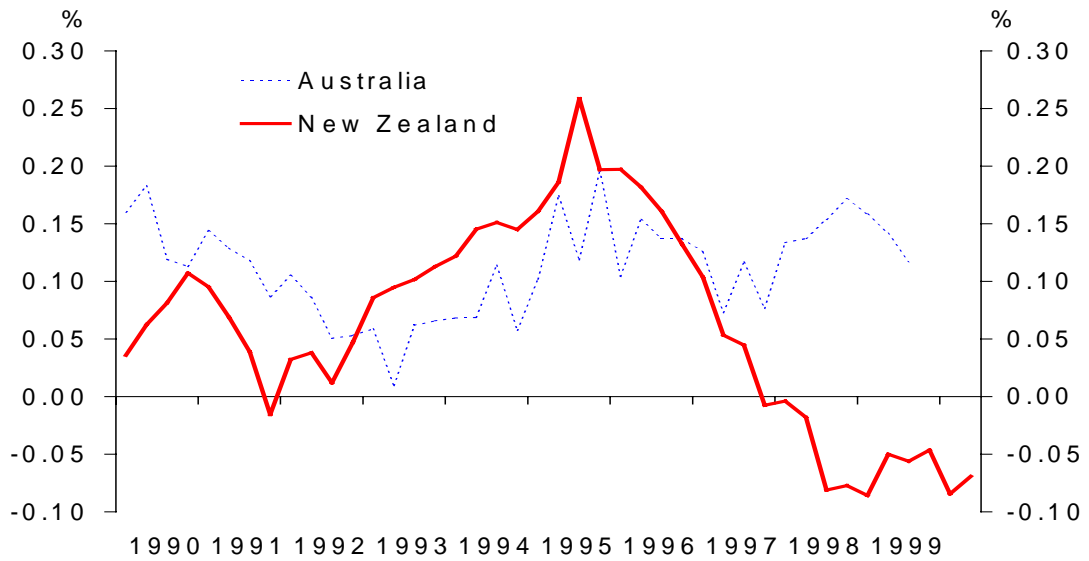
inappropriate in 1996. To put the point another way, inflation outcomes were not excessively low even with the surprise negative shocks.

30. With these general comments providing the wider context, we now turn in detail to the negative shocks that the New Zealand economy suffered throughout the 1996 to 1998 period, and their role in shaping the economic cycle and contributing to the brief recession of early 1998. In some ways, this was the reverse of the way that the economy was impacted by a succession of positive shocks in the earlier years of the decade. We also ask whether monetary conditions should have been eased more rapidly in late 1997 and early 1998.

Migration and housing

31. Migration trends were an important influence on the domestic economy in the 1990s. As figure 8 shows, net migration as a percentage of the New Zealand population picked up strongly in the early to mid-1990s, with most new migrants settling in the upper part of the North Island. Both push and pull factors undoubtedly played a role in driving the inflow, with the push coming from political changes in South Africa and Hong Kong, and the pull factor being the strong New Zealand economy and supportive immigration policy. Following its peak in 1995, net migration fell sharply over the following three years. The fall-off probably related to the weakening in the domestic economy, to a tightening in immigration policy in 1996 and to heightened political debate about the desirability of substantial immigration. The fall in net migration culminated in a net long-term outflow of people by the end of 1997.
32. The overall impact of these swings in migration was unfortunate for the economy as a whole. On the upswing, immigration fueled speculative behaviour in the housing sector and reinforced the need for tight monetary policy; on the downswing, negative net migration contributed to a sharp fall in residential investment, which impacted most severely in the first two quarters of 1998, contributing to the recession.
33. Australia's experience stands in sharp contrast. Not only was net migration positive for Australia throughout the entire decade of the 1990s, but that inflow remained relatively stable, in contrast with New Zealand's significant fluctuations. Indeed, the trend in the Australian inflow continued to rise even during the worst part of the Asian crisis (early to mid-1998). It is likely that this stable and positive inflow of migrants to Australia underpinned Australian domestic demand throughout this period.

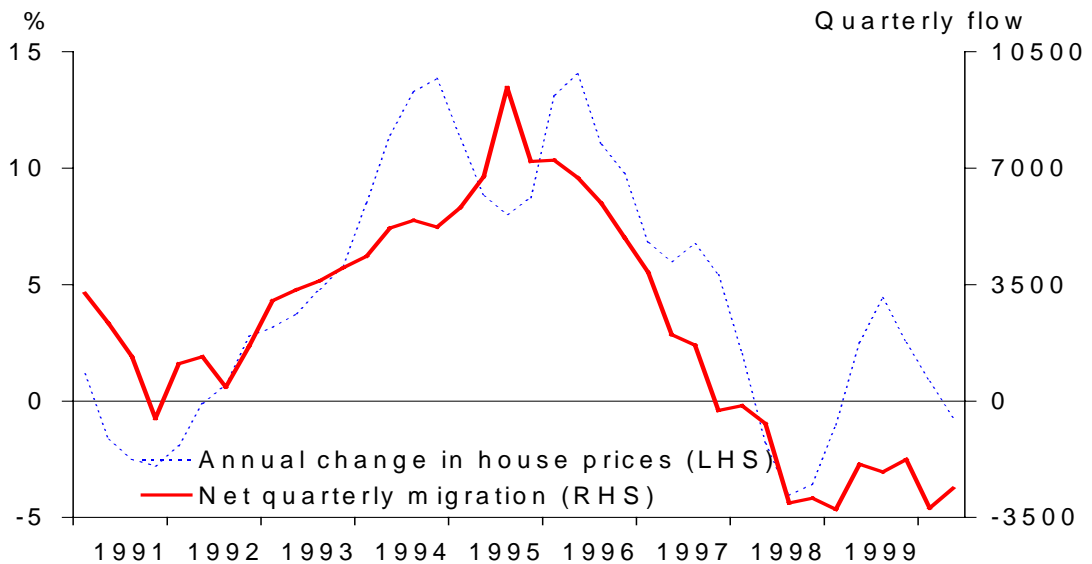
Figure 8
Net long-term migration in New Zealand and Australia
(quarterly flow as a percentage of population)



Source: Statistics New Zealand and Datastream.

34. The immediate economic impact of the fall in migration was largely felt in the housing market. Figure 9 shows the close correlation between net migration and annual changes in house prices.

Figure 9
Net migration and annual changes in house prices



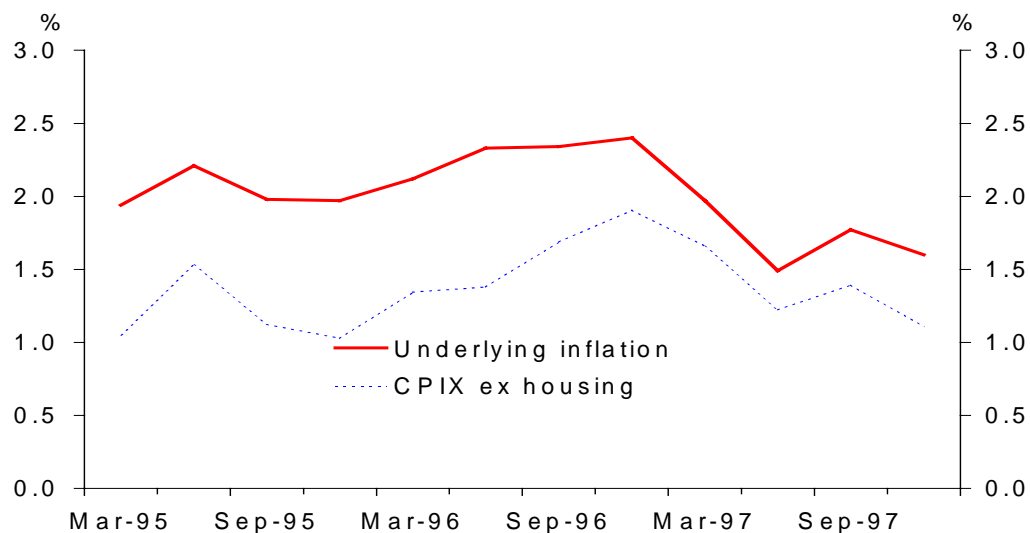
Source: Statistics New Zealand and Valuation New Zealand.

35. One question this prompts is whether migration alone explains the rapid increase in house prices in the mid-1990s. If so, then the house price changes of the 1990s were a necessary shift of relative prices in direct response to a higher population, and a monetary policy response might not have been required. Another possibility is that

there was also something of a ‘bubble’ stemming from a pervasive sense of optimism about the profitability of housing as an investment.

36. What we observe is consistent with both explanations. It is likely that immigrants prompted an initial surge in demand for houses, not immediately met by supply, and thus started the ball rolling with higher rates of house price increase. This in turn sparked a certain level of speculative behaviour, which contributed significantly to strong demand and to inflationary pressures elsewhere.
37. Certainly, at the same time that increases in house prices were peaking, the Reserve Bank was responding strongly to inflation that was projected to threaten the top of the 0 to 2 per cent inflation band. On the basis of this, it has been suggested that the Reserve Bank may have been preoccupied with house prices. For example, figure 10 shows that once housing is removed from the CPIX, average inflation in other goods and services never rose above 2 per cent (see CPIX excluding housing in figure 10).⁵ Of course, this argument is somewhat circular, since with looser monetary policy, inflation outcomes would undoubtedly have been higher still.
38. Even accepting that the housing sector was an important contributor to inflation over this period, the inflationary pressure of the mid-nineties was considerably more broad-based than just the housing market. We see this in measures of weighted median inflation, shown in figure 11. By definition, half of the average New Zealander’s consumption is spent on goods and services whose price is rising faster than the weighted median rate of inflation. Since weighted median inflation was above 2 per cent from December 1995 until September 1996, we can conclude that *more than 50* per cent of the CPIX regimen was experiencing inflation of above 2 per cent over this period.

Figure 10
Annual inflation: Underlying inflation and CPIX ex housing

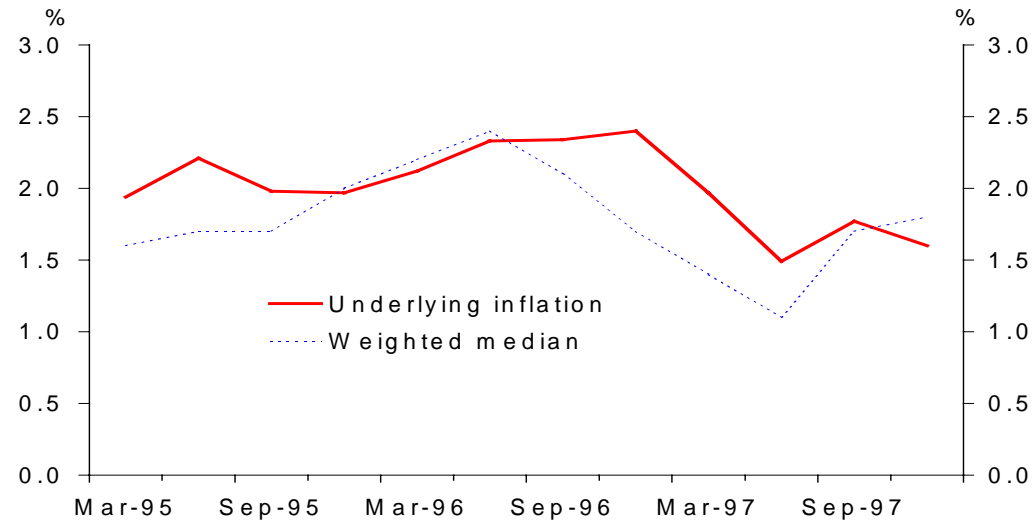


Source: Statistics New Zealand and Reserve Bank of New Zealand.

39. Through this period, New Zealand’s real interest rates were high by international standards, at least when deflated by CPIX inflation. However, strong credit demand from households suggests that New Zealanders did not share this perception. Figure 12 shows that the average mortgage interest rate deflated by house price changes was

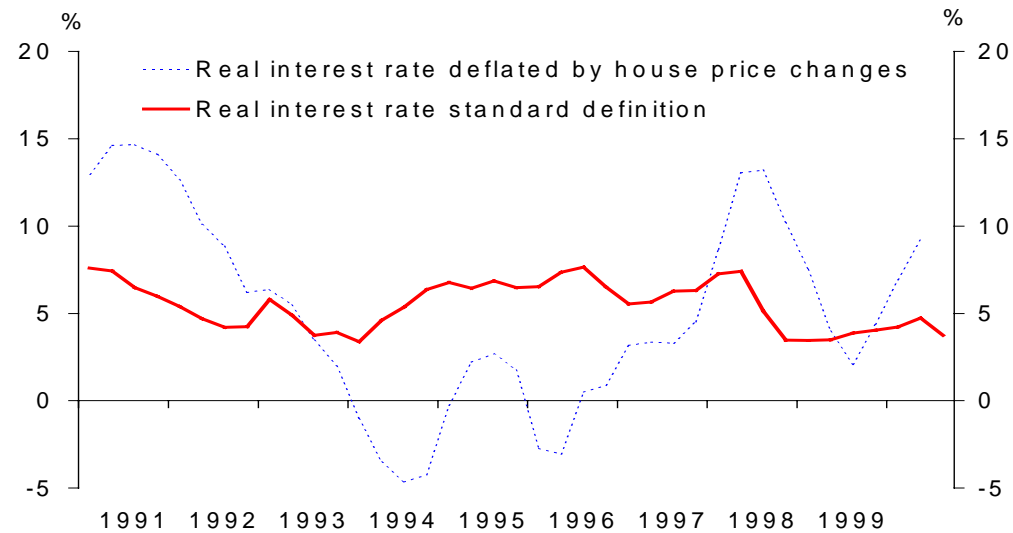
much lower than standard definitions of real interest rates. If borrowers expected house price increases to continue at a rate close to or exceeding their mortgage interest rate, it is likely that they did not perceive New Zealand's interest rates as being particularly high.

Figure 11
Annual inflation: Underlying inflation and weighted median



Source: Statistics New Zealand and Reserve Bank of New Zealand.

Figure 12
Two measures of ex-post real interest rates



Source: Statistics New Zealand, Reserve Bank of New Zealand, Valuation New Zealand.

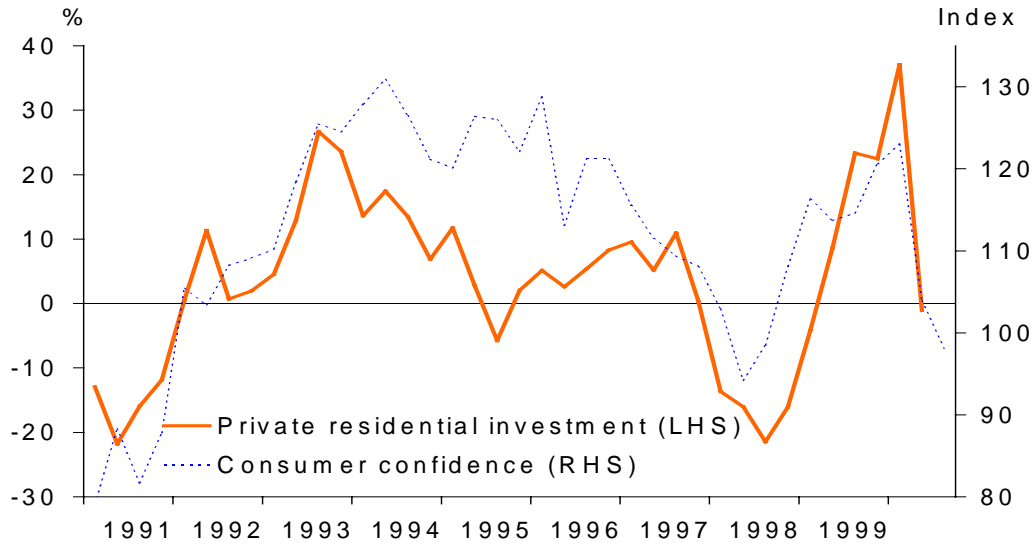
Notes:

- (1) The real interest deflated by house price changes is defined as the first mortgage interest rate minus the annual change in house prices.
- (2) The standard definition of the real interest rate is defined as the 90-day bank bill rate minus CPIX inflation.

40. To the extent that migration impacted on prices in the housing market, we can also expect it to have influenced residential investment (and, to a lesser extent, private

consumption), although other factors also play an important explanatory role here. For example, figure 13 shows a positive correlation between residential investment and consumer confidence.

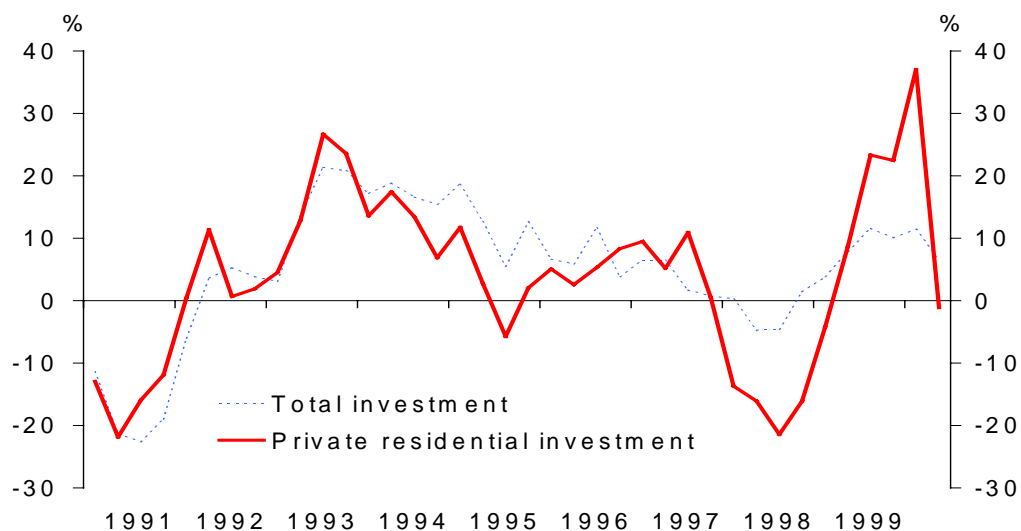
Figure 13
Consumer confidence and annual growth in private residential investment



Source: Statistics New Zealand and Westpac-McDermott-Miller Consumer Confidence survey.

41. Overall, the combination of falling net migration, falling consumer confidence and continued high levels of interest rates combined to produce a sudden drop in private residential investment in 1997/98. While most aspects of the 1998 recession were far milder than the 1991/92 recession (including aggregate investment), the falls in private residential investment were roughly similar in each downturn (see figure 14).

Figure 14
Growth in private residential investment and in total investment (including stocks)
(annual percentage change)

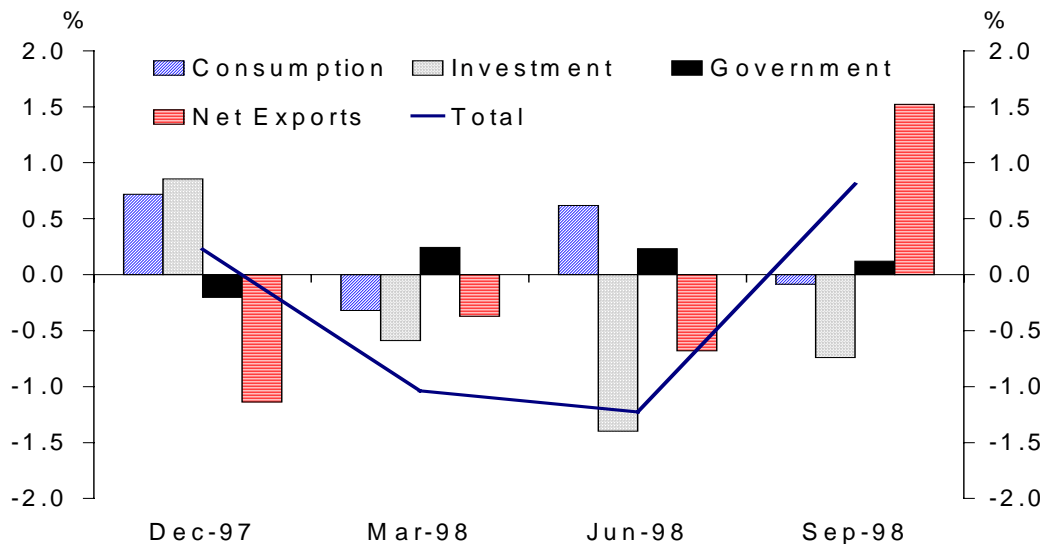


Source: Statistics New Zealand and Reserve Bank of New Zealand.

42. Figure 15 provides a breakdown of total GDP growth into its expenditure components and shows that investment provided a significant negative contribution to GDP growth

in both the recession quarters (March and June 1998), and for one more quarter thereafter.

Figure 15
Contributions to quarterly growth in expenditure GDP, by component
(percentage points)



Source: Statistics New Zealand.

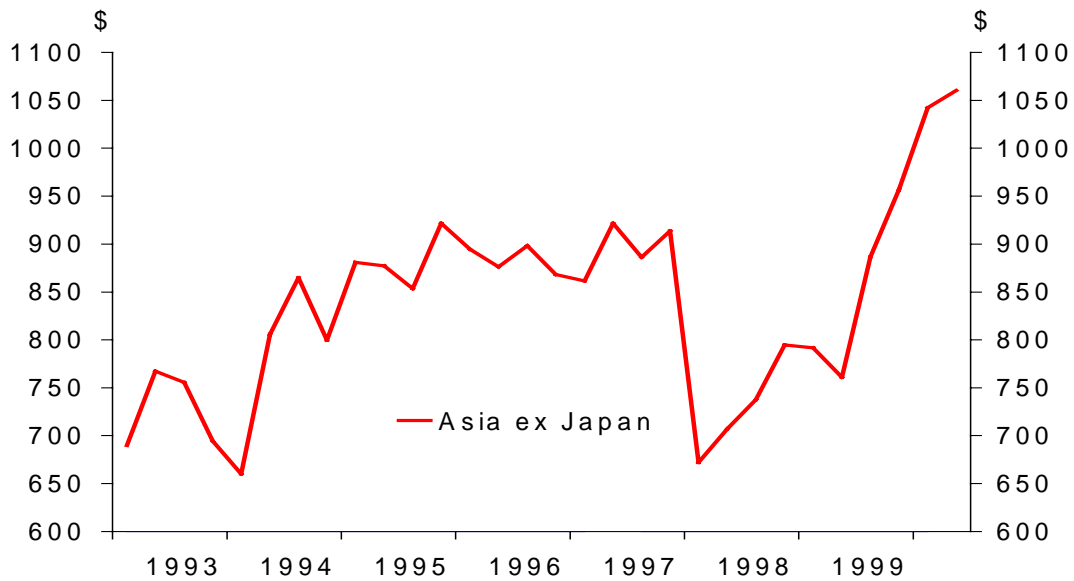
Note: Stockbuilding is counted in Investment.

43. Overall, we would conclude that net migration played an important role in swinging the economy around and in contributing to the domestic economy weakness in early 1998.

The role of the Asian crisis

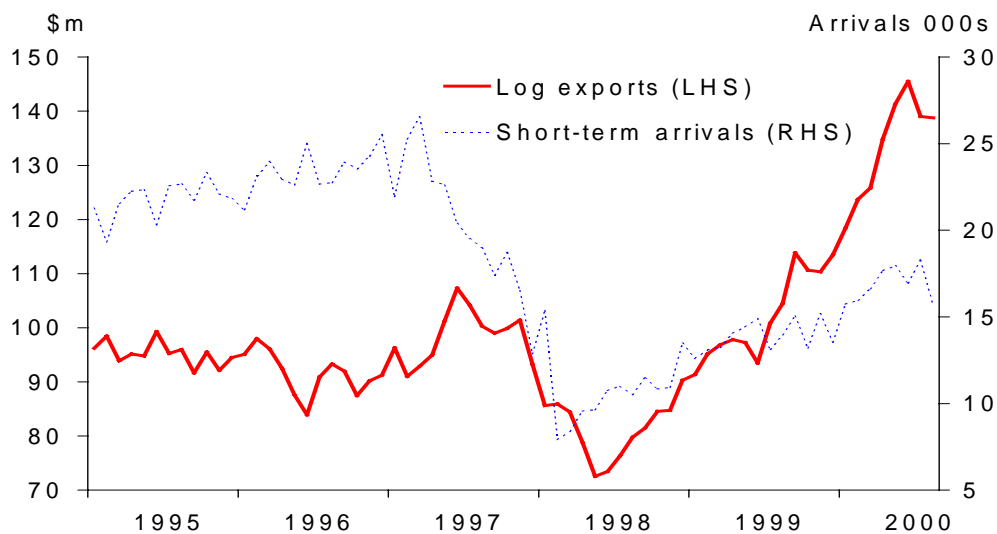
44. A shock of considerable relevance to the period, and one that had a significant adverse effect on the New Zealand economy in the late 1990s, was the Asian crisis. The Asian financial crisis led to a sharp fall in the growth rates of many Asian nations and led to much lower demand for some New Zealand exports. Overall, it is likely that the Asian crisis contributed significantly to the 1998 recession.
45. Around one third of New Zealand's exports are destined for Asia, amounting to roughly 10 per cent of GDP, so the potential for the Asian crisis to damage the New Zealand economy was large. Figure 16 shows that, in the March quarter of 1998, the seasonally adjusted value of *merchandise* exports to our main non-Japan Asian trading partners⁶ fell by 26 per cent – equivalent to a 1.0 per cent fall in New Zealand's GDP.⁷
46. The impact on New Zealand exports was particularly pronounced in some sectors. Figure 17 plots the monthly (seasonally adjusted and smoothed) value of log exports from New Zealand. In 1997, log exports accounted for 5 per cent of total merchandise exports. Much of the fall in early 1998 is due to a period when log exports to South Korea virtually ceased. This chart also shows the even more dramatic fall in short-term visitor arrivals from our non-Japan Asian trading partners.

Figure 16
Quarterly value of merchandise exports to non-Japan Asian trading partners



Source: Statistics New Zealand.

Figure 17
Monthly value of log exports from New Zealand and short-term arrivals from non-Japan Asian trading partners



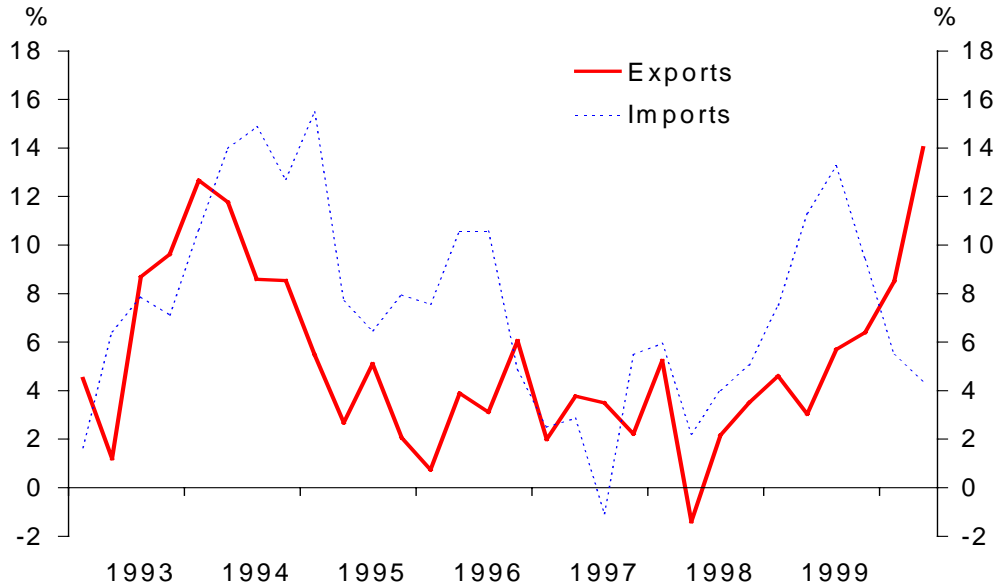
Source: Statistics New Zealand

Note: Log exports are smoothed using a three month moving average.

47. As noted, figure 15 shows contributions to the recession, broken down by the components of expenditure GDP. Net exports, including services, contributed -0.4 percentage points to the total -1.0 per cent change in expenditure GDP in the March quarter of 1998. In the June quarter, net exports contributed -0.7 percentage points to the total -1.2 per cent change in expenditure-based GDP.
48. While exports fell in 1998, so too did imports (figure 18). This could have been due partly to the falling exchange rate, and also to the more generally subdued domestic sector. However, given that the import penetration ratio did not fall, the fall in imports

was more a reflection of a weak economy than of resources shifting from the importing sector to the import-competing sector.

Figure 18
Growth rates of real exports and imports
(annual per cent change)

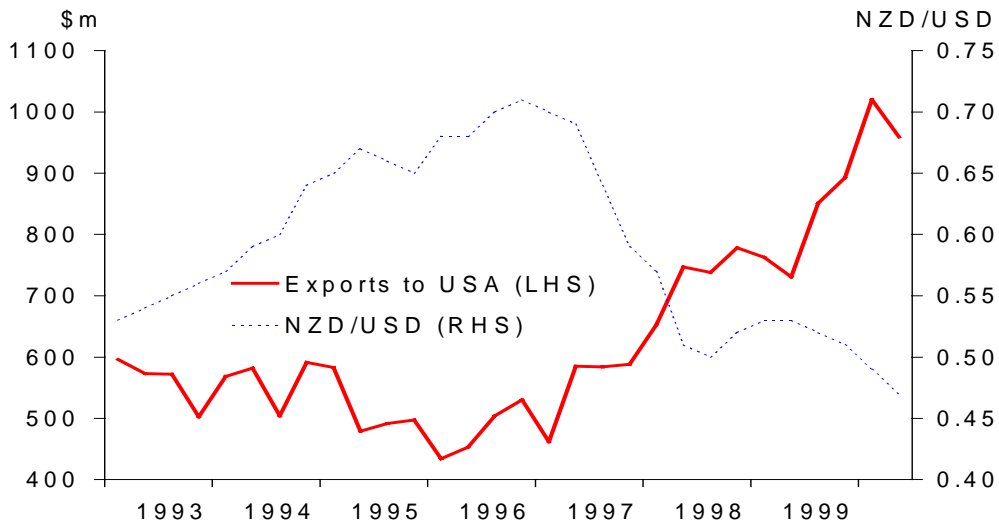


Source: Statistics New Zealand.

Note: Import data has been adjusted to remove the impact of the frigate purchases.

49. While the Asian crisis was a major contributor to the recession, conditions in the external sector were not as bad as export figures to the Asian crisis countries alone would suggest. Increasing export revenues to the USA provided some offset to the sharp fall in exports to Asian countries, driven in part by the depreciation of the New Zealand dollar against the US dollar (see figure 19).

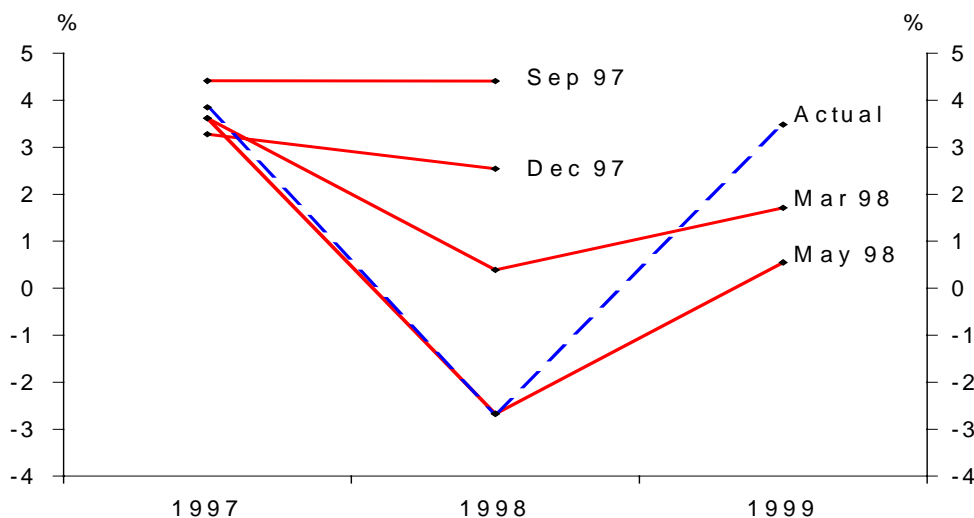
Figure 19
New Zealand dollar / US dollar bilateral exchange rate and monthly merchandise exports to the US



Source: Statistics New Zealand and Reserve Bank of New Zealand.

50. The Asian crisis had its most severe impact on the New Zealand economy in the March quarter of 1998. An important question, therefore, is whether the Bank should have, or could have, recognised the severity of the crisis earlier than it did.
51. The crisis began in mid-1997 with the Thai devaluation in July, and gradually spread, reaching Korea by later that year. The Bank does not produce independent forecasts of trading partner growth. Rather, we base our projections for the world economy on *Consensus Forecasts*.⁸ The September 1997 *Economic Projections* shows that the Bank knew by then that there were downside risks to Asian growth. But our Consensus-based forecasts still suggested average growth in our Asian trading partners of 4.4 per cent in 1998.
52. However, with the benefit of hindsight, it is now clear that that forecast, and those in December 1997 and March 1998, did not fully anticipate the magnitude of the fall in world growth. Figure 20 illustrates this by plotting the Bank's *Consensus*-based projections of economic growth in Asia during the Asian financial crisis. Clearly, in 1997, *Consensus*, and hence the Reserve Bank, greatly overestimated Asian growth for 1998.

Figure 20
Forecasts of Asian trading partner growth used by the Reserve Bank

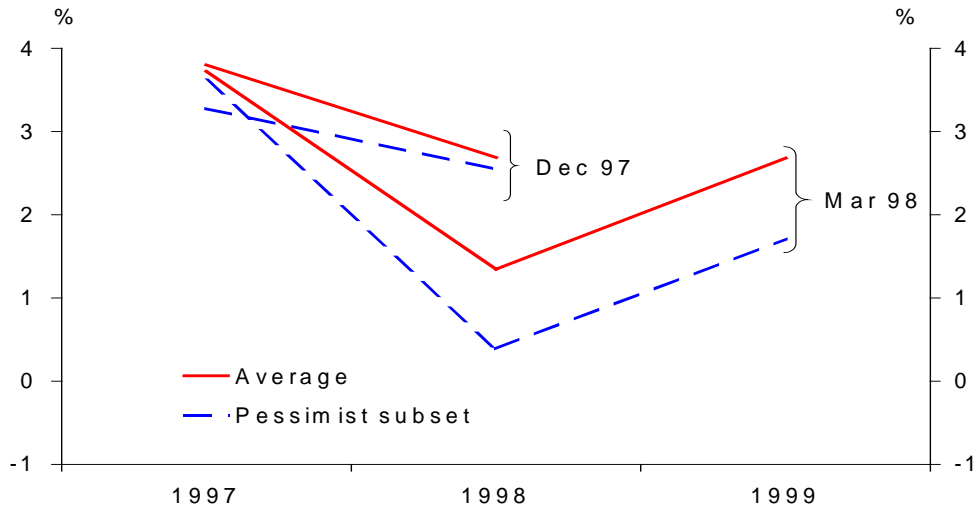


Source: Consensus Forecasts.

Note: Partner countries as defined here are Japan, China, Hong Kong, Indonesia, Malaysia, South Korea, Taiwan, and Thailand. Growth rates are trade-weighted by New Zealand export weights.

53. As the depth of the crisis became apparent, the Bank's view was that GDP growth in Asia would be somewhat lower than *Consensus* was projecting. Rather than follow our usual practice of using the average of the *Consensus* forecasts for a country as the best estimate of growth, in the December 1997 and March 1998 forecast rounds the Bank adopted a 'pessimist' subset of the *Consensus* forecasts. Adopting a pessimist subset allowed the Bank to express its view that *Consensus* was overly optimistic, while remaining within the bounds of what was seen as reasonable at the time. Figure 21 shows the difference between the *Consensus* average and pessimist forecasts in December 1997 and March 1998.

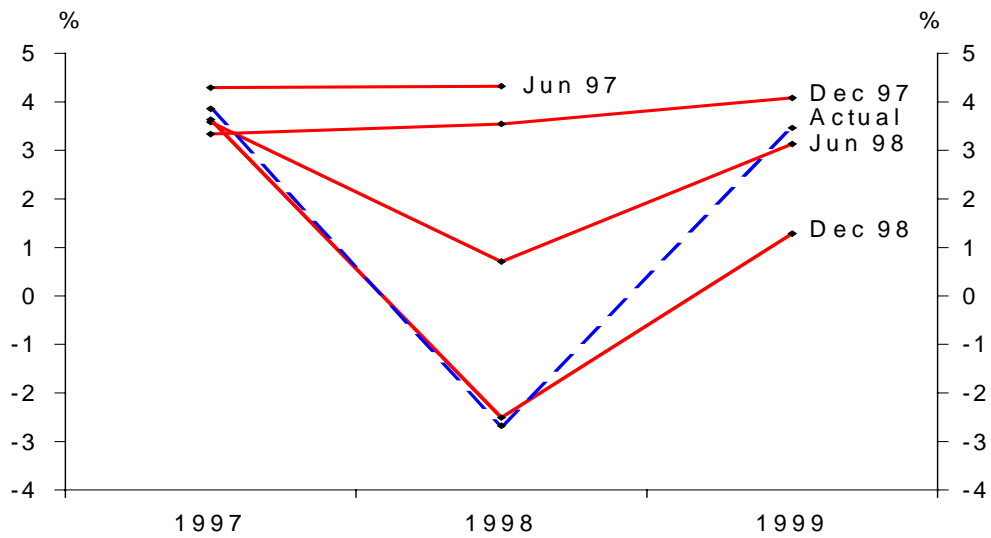
Figure 21
Forecasts of Asian trading partner growth
 (average compared to pessimist Consensus)



Source: Consensus Forecasts.

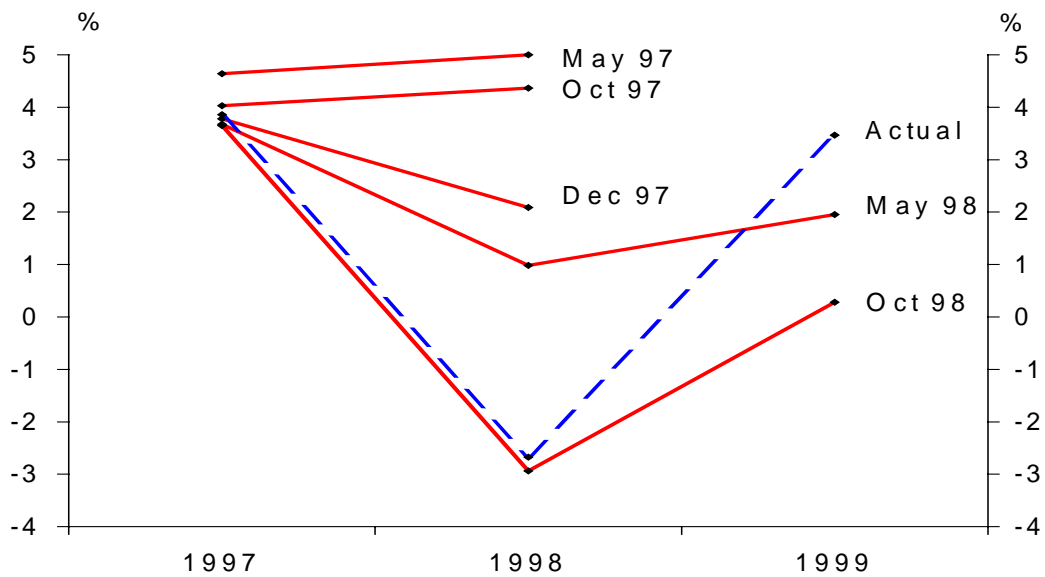
54. Publicly available forecasts from other international agencies such as the OECD (figure 22) and the IMF (figure 23) indicate that they too were slow to revise down their projections of growth in the Asian region.

Figure 22
OECD forecasts of growth in New Zealand's Asian trading partners



Source: OECD Economic Outlook.

Figure 23
IMF forecasts of growth in New Zealand's Asian trading partners



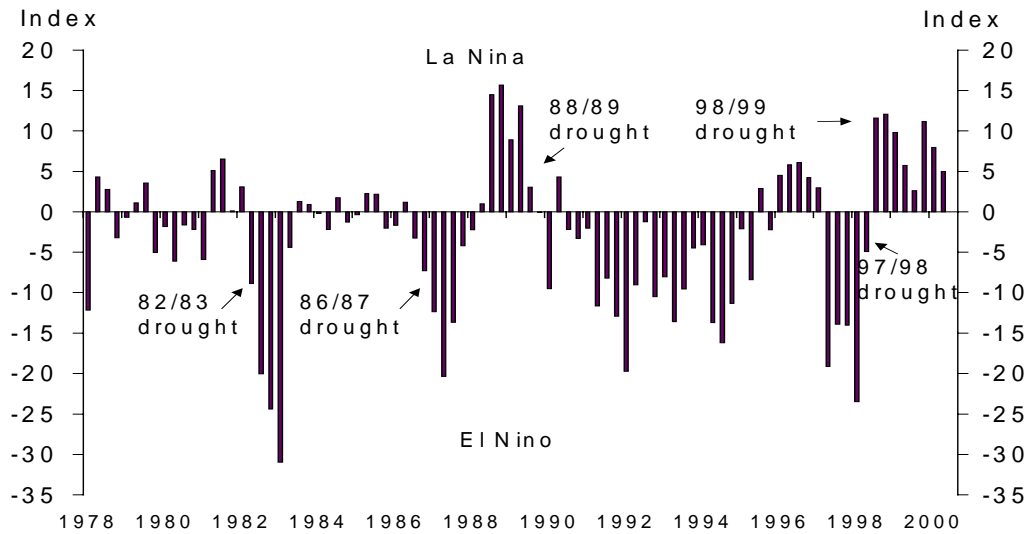
Source: IMF *World Economic Outlook*.

55. The incorporation of explicit downward revisions to our trading partner growth assumption in December 1997 shows that we recognised the crisis reasonably promptly. We were helped in this by being closely involved in discussions with Asian counterparts on the funding needs of the Asian crisis countries. That recognition probably led to some acceleration of the easing of monetary policy that was already underway.

The droughts

56. In this period, the New Zealand economy also faced the two droughts of 1997/98 and 1998/99. Monetary policy is not well suited to buffer this type of shock. It is often difficult to identify an emerging drought from the vagaries of weather variations, which do not fit well with the time delays between monetary policy actions and their impact on the real economy. Also, a drought is a supply shock, which could imply a different monetary policy response from that suggested by the fall in agricultural incomes.
57. Figure 24 uses the Southern Oscillation Index to measure the extent to which New Zealand faced extreme weather patterns.⁹ A negative value represents an El Nino weather event, which in late 1997 brought drought conditions to the eastern regions of New Zealand, with Marlborough, Canterbury and the Hawke's Bay hardest hit. A positive value represents a La Nina event, which in late 1998 prolonged the drought in North and Central Otago for a second season and brought drier than normal conditions to western districts and Southland. Figure 24 also illustrates that drought episodes over the last twenty years or so generally correspond to periods when a strong measure is recorded on the index.

Figure 24
The Southern Oscillation Index and drought episodes since 1978



Source: Australian Department of Natural Resources. Drought episodes identified from Ministry of Agriculture and Forestry documents.

58. The impact of a drought on primary production depends on a number of factors, including the availability of feed remaining from the previous winter, the level of aquifers, the base health of livestock, and the behavioural responses of farmers to drought conditions. The complex interplay of these factors makes it difficult to quantify the precise role of the weather on subsequent production data.
59. Nevertheless, it is clear that prolonged poor growing conditions significantly reduced both meat and dairy production over 1998 and 1999. Figures 25 and 26 show the falls in meat and dairy volumes, and in growth rates over the period, with lags continuing to affect output through 1999. Note, however, that the droughts did not impact on the meat and dairy industries concurrently, given the different regions in which these activities are based, and the different timing of the two droughts in the various regions. For example, the first drought predominantly affected beef and sheep numbers, whereas the second drought hit dairy districts hardest. As a result, the drought-induced impact on dairy production came later than that on livestock.

Figure 25
Levels of livestock slaughter and milkfat production

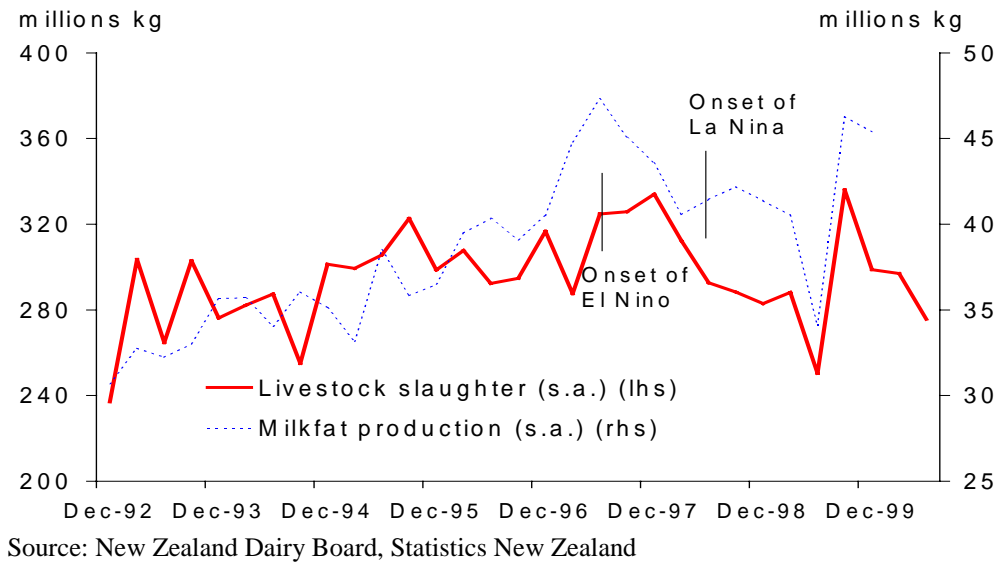
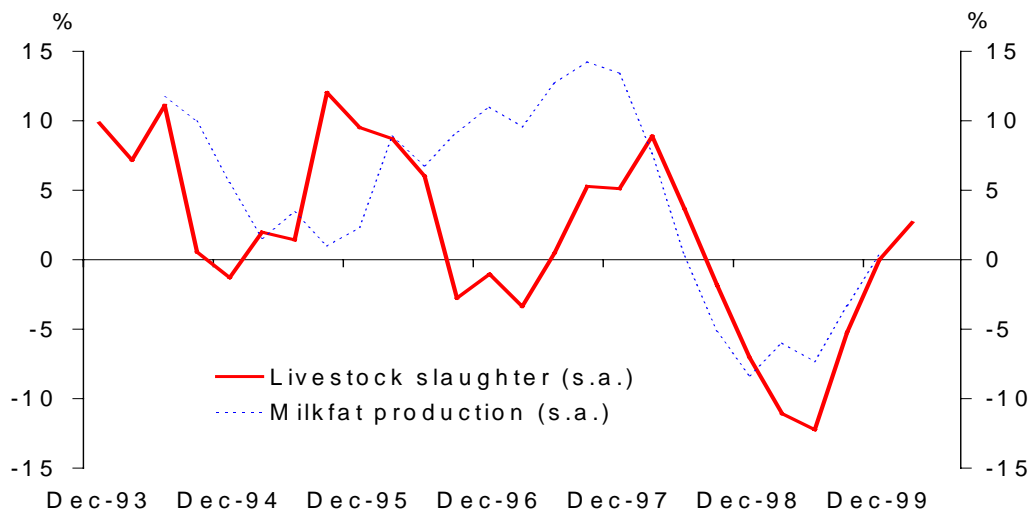


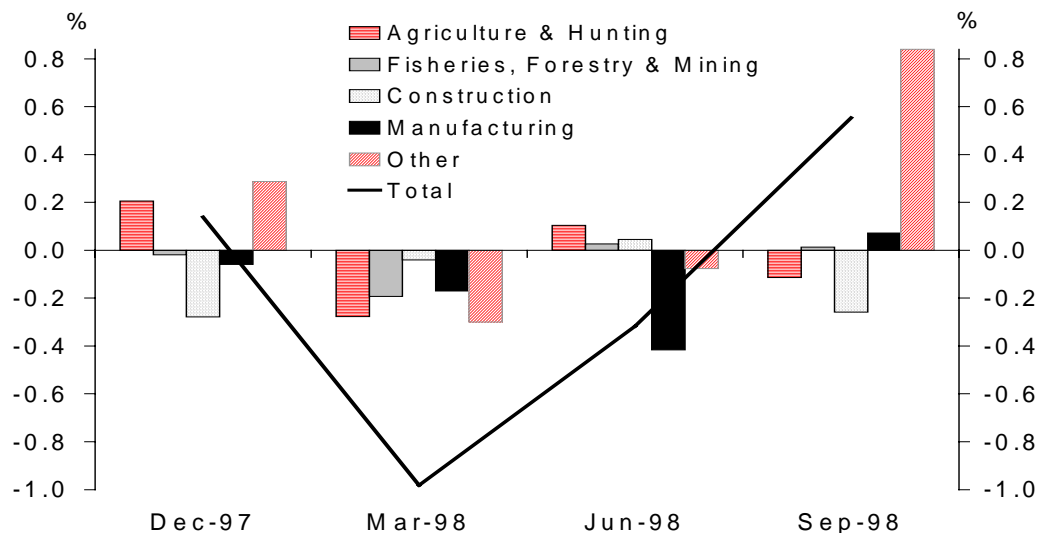
Figure 26
Growth of livestock slaughter and milkfat production
(annual average percentage change)



60. A very rough estimate of the impact of the drought can be calculated by considering the impact on production in key drought-susceptible sectors of the economy. The agricultural and hunting industry directly contributes approximately 6 per cent of real GDP and includes the production of livestock, wool, dairy, horticulture, and crops, as well as the provision of agricultural contracting services and hunting. The primary food manufacturing industry contributes approximately 3 per cent of GDP and covers the processing of meat and dairy products for export and local markets. In the March quarter of 1998, the agricultural and hunting industry and the primary food manufacturing industry contracted by 4.3 per cent and 5.8 per cent respectively.

61. Thus, a back-of-the-envelope estimate of the impact of the drought-induced fall in supply would suggest a contribution from the agricultural sector to production GDP for the March quarter of 1998 of around -0.4 percentage points out of the total 1 per cent fall in production GDP. In the June quarter of 1998, the contribution from these sectors was close to zero. At least one important caveat on this estimate is necessary, as it does not take into account any second round effects on the wider economy that result from the income loss attributable to the decline in production, or even the direct impact on the transport sector.
62. A more thorough disaggregation of the production GDP statistics helps us identify the impact of other supply side shocks, such as the closure of the automobile assembly plants in mid-1998, which resulted from a government decision to accelerate tariff reductions for automobiles. Figure 27 shows a breakdown of the contribution to total production GDP of each key component over the recession period.

Figure 27
Contributions to quarterly growth in production GDP, by component
(percentage points)



Source: Statistics New Zealand.

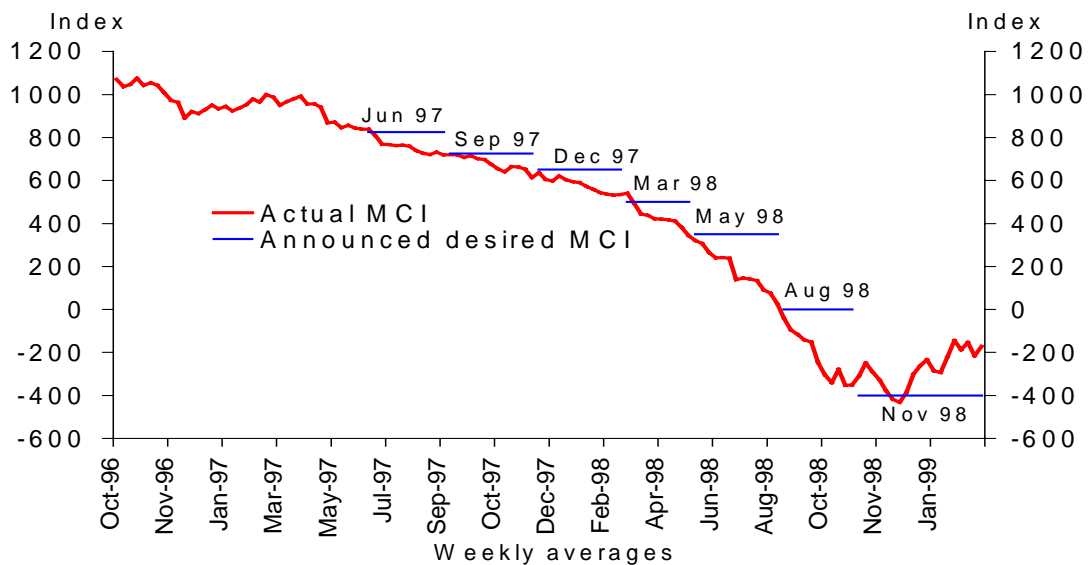
Note: 'Other' includes Government Services, the Seasonal Balancing Item, Retail and Wholesale Trade, and a number of smaller categories.

63. As discussed above, figure 27 shows that agricultural output slowed sharply in the March quarter of 1998 (indeed it remained subdued until the June quarter of 1999). The sudden fall in logging exports (stemming from the Asian crisis) seems to have contributed to a drop in forestry output in the March quarter of 1998 that was of comparable importance to the fall in agricultural output (see the fishing, forestry & mining category in figure 27). The fall in manufacturing output in the March quarter of 1998 can be traced mainly to primary food manufacturing and wood processing. In the June quarter of 1998, the most striking contribution to the fall in GDP was manufacturing. This appears to be the result of continued declines in the primary food manufacturing and wood processing, as well as the impact of the final car manufacturing plant closures.¹⁰ The small positive contribution of the construction sector in the June quarter might at first appear strange given the large decline in private residential investment observed earlier (figure 14). However, strong gains in non-residential construction offset the strong decline in residential construction.

The management of monetary policy from 1997 to 1999

64. The previous three sections of this paper have discussed the way in which the New Zealand economy was hit by three coincident influences, those being large swings in net migration, the Asian crisis and the droughts. Together with the tight monetary policy settings then in place, these had a significant impact on the economy – impacting on both the domestic and external sectors. In the absence of any one of these shocks, the 1998 recession might have been avoided, but growth would still have slowed significantly.
65. Even though these shocks were unavoidable, the question remains whether monetary policy responded appropriately, and in doing so buffered the shocks, or whether it was unhelpful. To begin this discussion, it is helpful to review the 1997/98 hump in interest rates (see figure 1). During this period, the MCI was used to signal “desired monetary conditions”.¹¹ Each quarter, with the release of a *Monetary Policy Statement*, the Bank would update the desired level of monetary conditions. In order to maintain that policy stance, a depreciation in the exchange rate which occurred between quarterly resets needed to be offset by rising interest rates. This led to interest rates rising, between quarterly resets, as the exchange rate began to trend sharply downwards.
66. As the exchange rate fell through much of 1997 and into 1998, we initially resisted the extent of the easing in monetary conditions by indicating at successive quarterly resets desired levels of monetary conditions that were consistent with interest rates rising. It was only as the extent of the fall in economic activity (and consequential decline in inflation pressures) became more obvious through the first half of 1998 that we began to encourage a more rapid easing in “desired” monetary conditions. Figure 28 shows the profile of the MCI from late 1996 to early 1999 together with indications of the ‘desired MCI’ at successive quarterly policy resets. It is clear that the easings that occurred each quarter between mid-1997 and the end of that year were quite small, but they became larger after December 1997.

Figure 28
The Monetary Conditions Index and successive quarterly policy resets



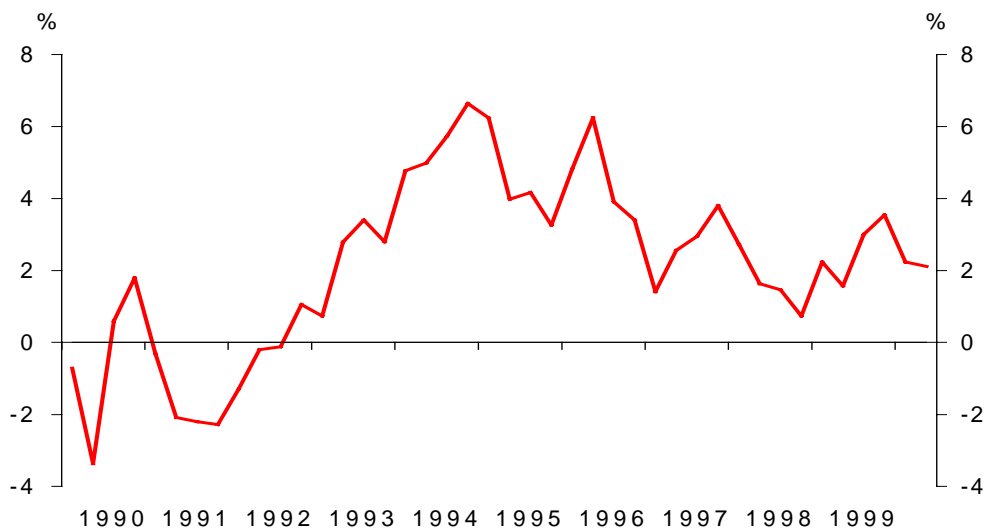
Source: Reserve Bank of New Zealand, *Monetary Policy Statements and Economic Projections*.

67. In the second half of 1997 and early 1998, we thought we were facing a world that was rather stronger than subsequently turned out to be the case. We had not anticipated the full magnitude of the Asian crisis or recognised the severity of the first drought.
68. Our policy stance was also influenced by our understanding of what was driving the fall in the exchange rate. If we had recognised the depreciation as well-founded by changing fundamentals, and therefore not requiring an offsetting interest rate move, we would have targeted a lower desired level of the MCI and allowed actual conditions to ease more quickly.
69. During the period in which the Bank used an MCI to inform the market of its policy stance, interest rates were set by market participants, who understood that if monetary conditions moved too far from the indicated desired MCI the Reserve Bank would intervene to more directly influence interest rates. It is likely that had the Reserve Bank more *directly* set interest rates during this period, as we do now with the OCR, the burden of proof for raising interest rates would have been higher. In other words, it is likely that interest rates would have peaked at a lower level had we been operating an OCR regime at that time.
70. In addition, at least in late 1997, we also lacked a full appreciation of the required cyclical amplitude of monetary conditions in the context of large exchange rate shocks. This meant that the effective magnitude of easing at each quarterly policy reset, in terms of its impact on the real economy, was perhaps rather less than we expected and intended it to be at the time.
71. Another feature of this MCI framework, at least initially, was that it resulted in more volatile short-term interest rates. During the second half of 1997, in the period immediately following the release of a new set of desired conditions, the Bank expected the actual MCI to stay within about 50 MCI points of desired conditions. Use of these tight indicative bands did not adequately allow for the short-term “noise” in the exchange rate and greatly increased the day-to-day and week-to-week responsiveness of interest rates to short term exchange rate movements. Subsequently, in 1998, the Bank

began to move away from enunciating tight intra-quarter bands around the stated desired level of the MCI, and allowed greater intra-quarter flexibility in monetary conditions. Nevertheless, interest rates remained somewhat more volatile than they had been previously, encouraging the shift to a more conventional cash rate scheme in early 1999.

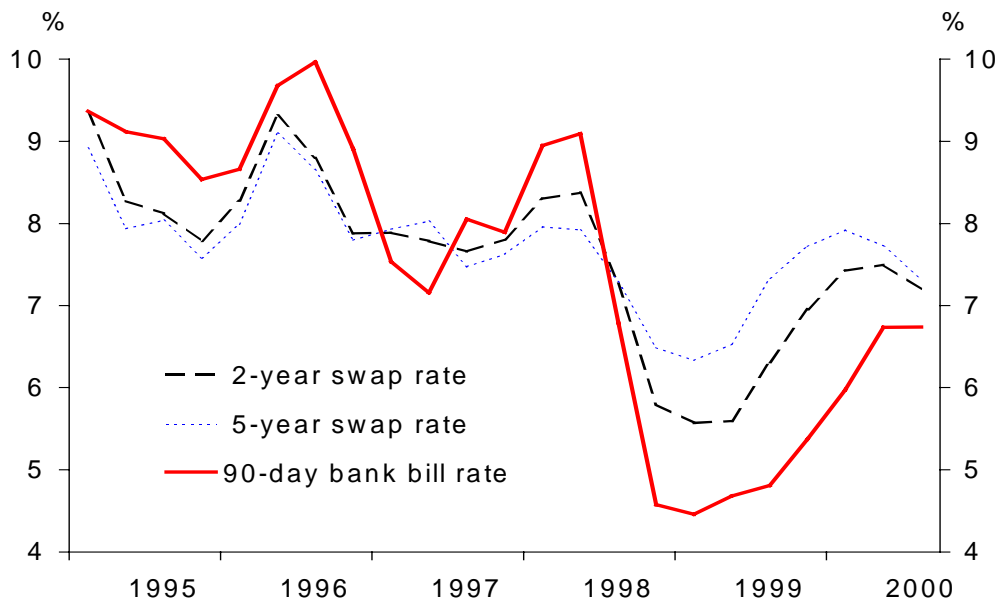
72. The volatility of interest rates and the interest rate rises of early 1998 happened at the same time as the falls in consumer confidence and residential investment, and the slowdown in private consumption. (See figure 13 for a chart of consumer confidence and residential investment, and figure 29 for consumption growth.) For the 1997/98 hump in interest rates to have contributed to the weakness in the domestic economy in the first half of 1998, it would have had to have affected the real economy almost immediately. We would normally rule out such rapid transmission as being implausibly fast. However, transmission times are not always and everywhere the same. Given the environment of considerable uncertainty resulting from the Asian crisis, it is possible that the interest rate rises could have contributed to observed falls in consumer confidence. In turn, lower confidence may have fed through to lower consumption and investment quite quickly. Indeed, figure 15 shows that both consumption and investment were weak in the March quarter of 1998, with the weakness of investment persisting for a number of quarters.
73. Of course, short-term interest rates are just one measure of the tightness of credit conditions. In New Zealand, 2-year and 5-year swap rates are arguably a more appropriate measure of the cost of financing capital investments. Figure 30 shows that 2-year and 5-year rates rose by less than 90-day rates. However, to the extent that people locked in these longer-term interest rates, they may have had a longer lasting effect.

Figure 29
Private consumption growth
(annual percentage change)



Source: Statistics New Zealand.

Figure 30
Short-term interest rates and 2-year and 5-year swap rates



Source: Reserve Bank of New Zealand.

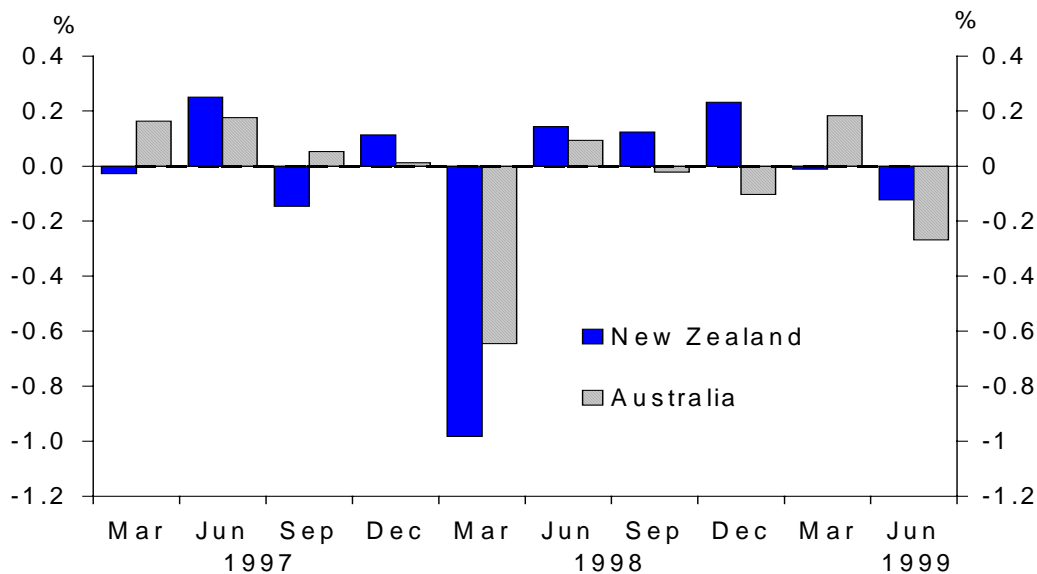
74. Overall, it is difficult to separate the likely impact on the economy of monetary conditions from that of the shocks that hit the economy concurrently. The negative impact of the sharp downturn in migration, the Asian crisis and the drought were always going to produce a reduction in growth and, given the slow-down projected as far back as 1996, potentially a recession. However, it does seem likely that the use of the MCI implementation framework, in the way that was chosen, shaped the evolution of monetary policy during that period in a manner that was on balance unhelpful, and added unnecessary interest rate volatility.

How does New Zealand's growth performance stack up with international comparisons?

75. As a small and relatively outward-looking economy, it is not surprising that we readily compare our economic performance with those of other countries, and especially our nearest neighbour. Over the decade as a whole, and particularly the second half, the Australian economy considerably out-performed the New Zealand economy, with higher average growth and a much more stable growth pattern. That out-performance continued during the Asian crisis, with the Australian economy barely slowing from its 4 per cent trend growth rate, while New Zealand experienced a recession. Yet Australia's exposure to Asia was at least as large as New Zealand's.¹² So why did we perform so differently to our closest neighbour during 1998? Our conclusions are that:
- The impact of the Asian crisis on New Zealand was only slightly larger than that on Australia. As such, it was only one of several simultaneous factors that contributed to New Zealand's recession.
 - The Australian economy was very robust leading into the Asian crisis. Indeed, shortly before the Asian crisis hit, markets were expecting that the easing cycle had ended and that the next monetary policy change in Australia would be a rate rise.

- The most unusual feature of our disparate growth rates may be Australia's strength rather than New Zealand's weakness. Also, differences in productive bases of economies may be more important than geographical and cultural proximity. Thus, later in this paper we investigate the economic performance of British Columbia and find that British Columbia's experience during the late 1990s was more similar to New Zealand's.
76. Figure 31 shows that the impact of the Asian crisis on Australia's merchandise exports was only slightly smaller than that suffered by New Zealand. Falling exports to our main non-Japan Asian trading partners contributed just under -1 percentage points to New Zealand's GDP in March 1998, and -0.65 percentage points to Australia's. In subsequent quarters, New Zealand's merchandise exports contributed more strongly than Australia's.

Figure 31
Contributions to GDP growth from merchandise exports to non-Japan Asian trading partners
(percentage points)

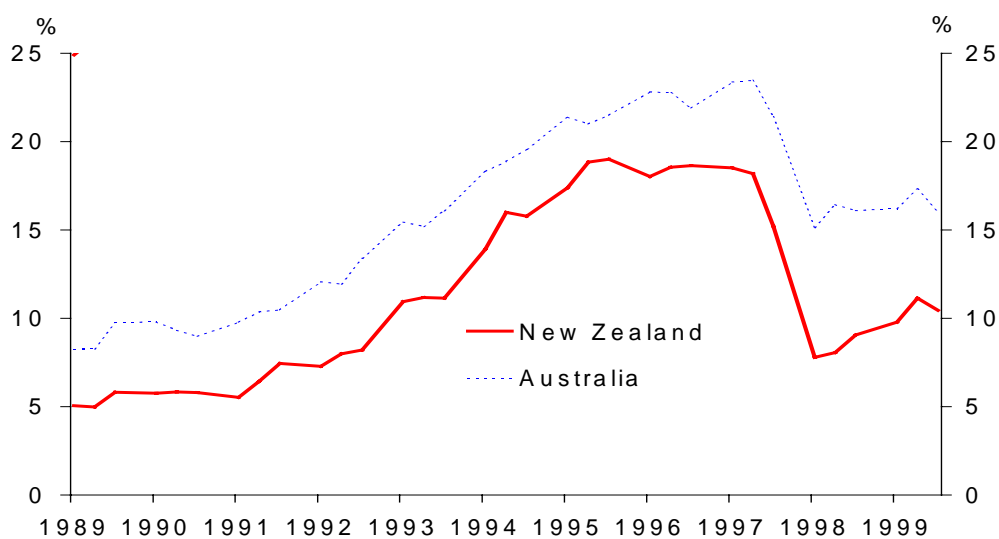


Source: Statistics New Zealand and Datastream

Note: Major non-Japan Asian trading partners include: Hong Kong, Indonesia, South Korea, Malaysia, the Philippines, Taiwan and Thailand

77. Figure 32 shows that Australia also suffered a slightly smaller fall-off in tourism from Asia than did New Zealand. However, Australia has slightly higher exposure to Asia as a source of tourists.

Figure 32
Short term visitor arrivals from non-Japan Asian trading partners as a percentage of total short-term arrivals: New Zealand and Australia

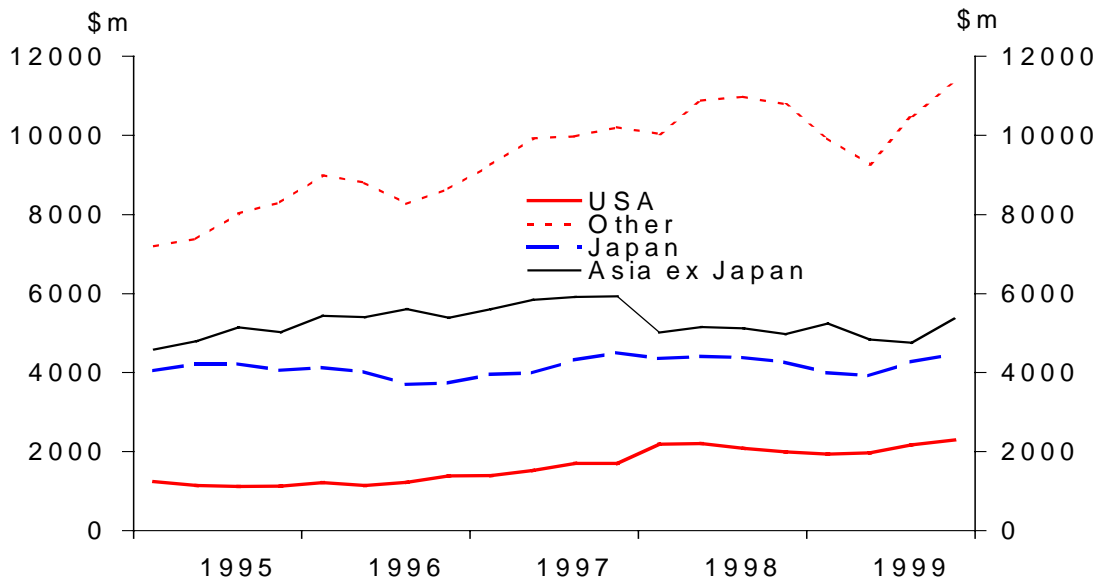


Source: Statistics New Zealand and Australian Bureau of Statistics.

78. Earlier, we suggested that rising exports to the USA and other countries may have alleviated the effects of the Asian crisis on New Zealand's export sector. Figure 33 shows that the same thing happened in Australia. Australian exports to the USA and

other countries increased significantly in 1998. For both New Zealand and Australia, the “other” category was driven largely by increased exports to Europe. Also, a number of large mining investments that were begun in the mid-nineties came on line around the time of the Asian crisis, boosting Australian exports. Without the Asian crisis, Australian exports would have risen rather further.

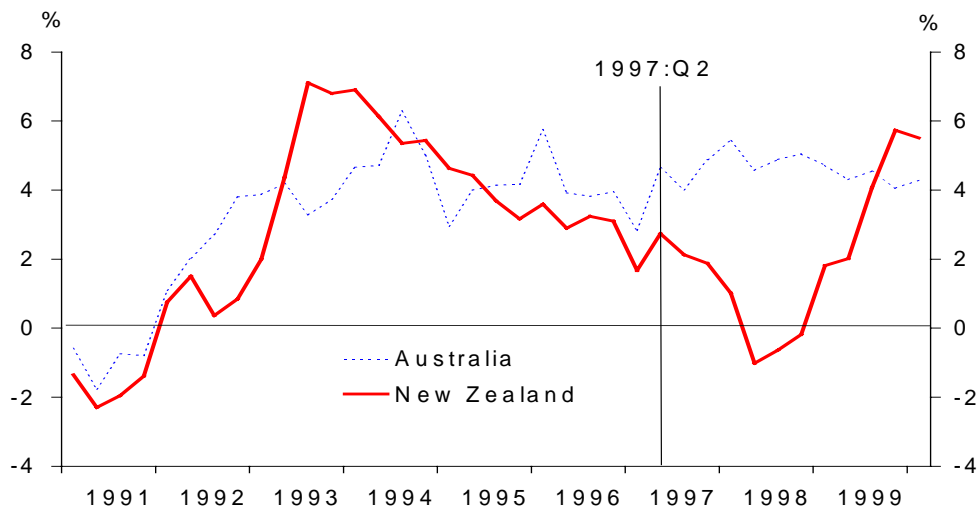
Figure 33
Quarterly dollar value of Australian exports to various regions



Source: Datastream.

79. A more important explanation for Australia’s higher growth rate was the fact that, in 1997, Australia was at a very different stage of the business cycle than New Zealand. Figure 34 shows that New Zealand’s GDP growth rate peaked at over 7 per cent in 1994 and then began to decelerate. Meanwhile, the Australian rate of growth was lower than New Zealand’s in 1993/94, but much higher right through 1996 and 1997.

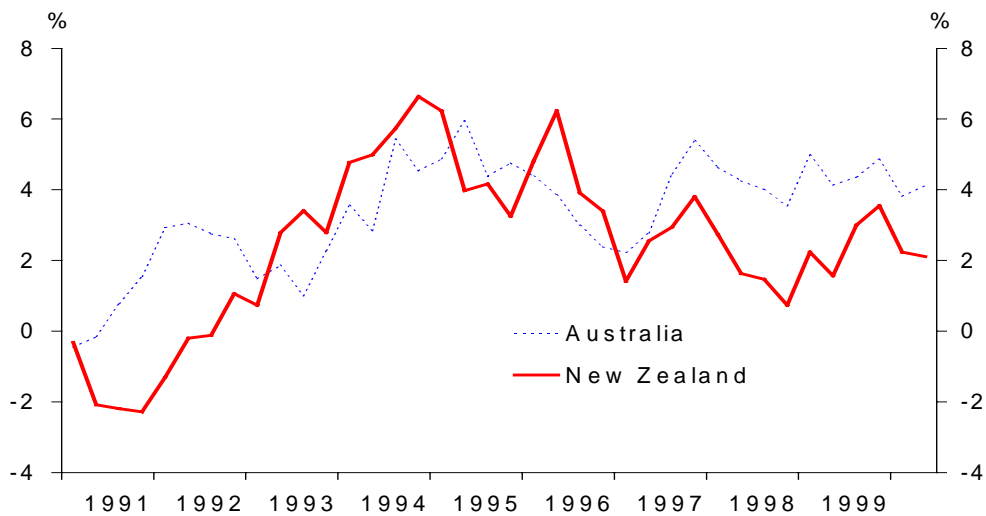
Figure 34
Growth of GDP in Australia and New Zealand
(annual percentage change)



Source: Statistics New Zealand and Datastream.

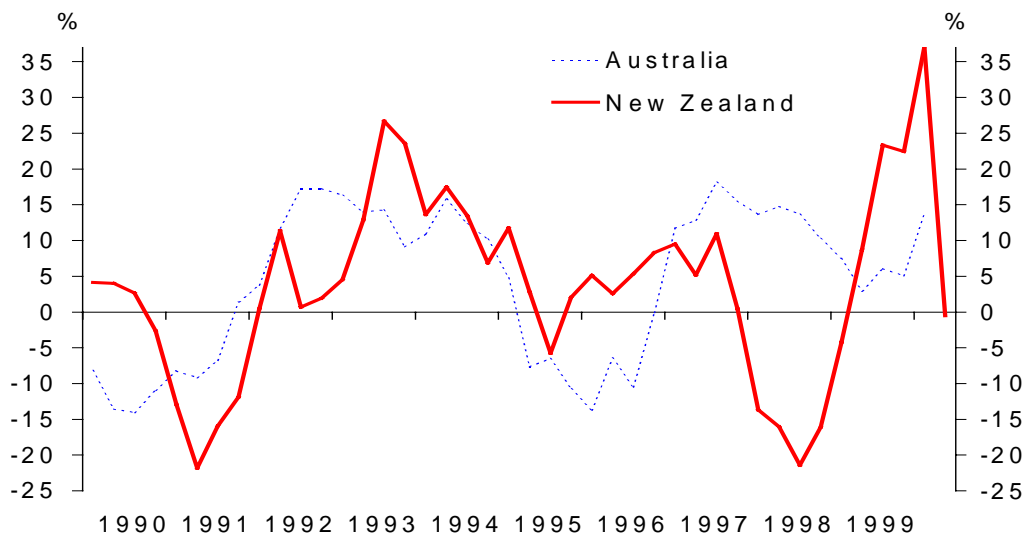
80. A comparison between some other aspects of the Australian and New Zealand economies quite clearly shows the disparity in domestic performance in the late 1990s. For example, figure 35 shows that Australian consumption growth held up during 1998, while in New Zealand consumption growth slowed. Similarly, figure 36 shows that Australia did not experience a “hole” in private residential investment like that in New Zealand. Finally, confidence fell in Australia during the Asian crisis, but by less than the precipitous fall in confidence experienced by New Zealand (figures 37 and 38).

Figure 35
Consumption growth in Australia and New Zealand
(annual percentage change)



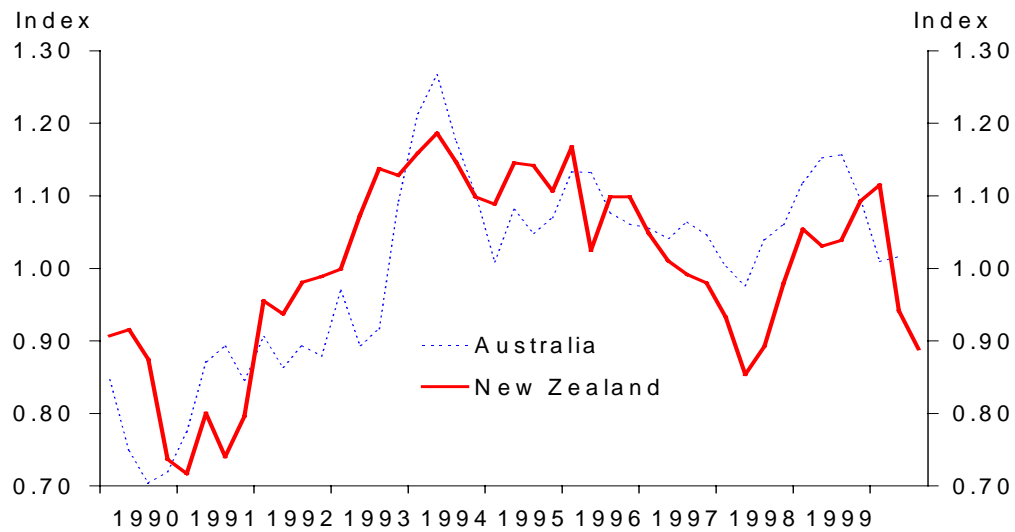
Source: Statistics New Zealand and Datastream.

Figure 36
Private residential investment growth in Australia and New Zealand
(annual percentage change)



Source: Statistics New Zealand and Datastream.

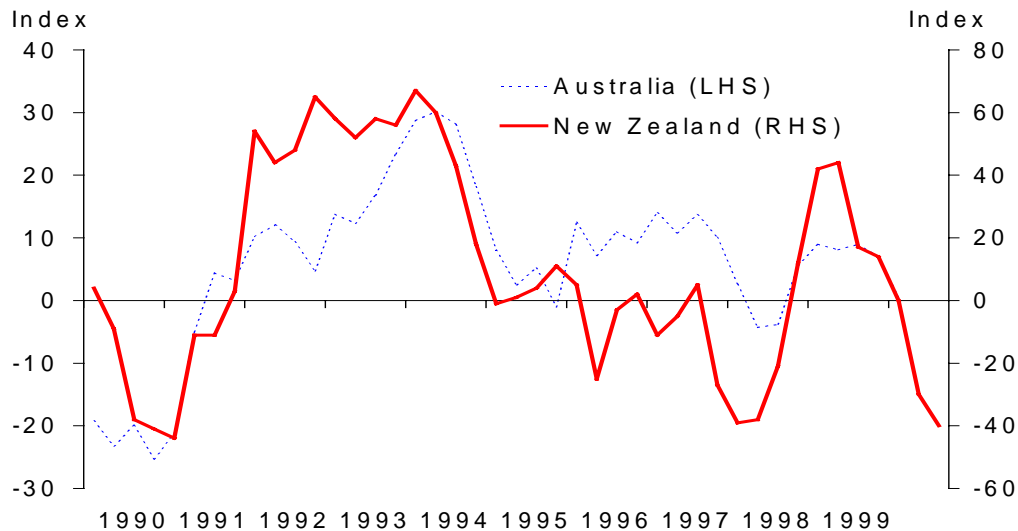
Figure 37
Consumer confidence in Australia and New Zealand



Source: Westpac-McDermott-Miller Consumer Confidence survey and Westpac-Melbourne Institute Consumer Sentiment survey.

Note: The indices have been re-based so that they average 1.0 over the period shown.

Figure 38
Business confidence in Australia and New Zealand

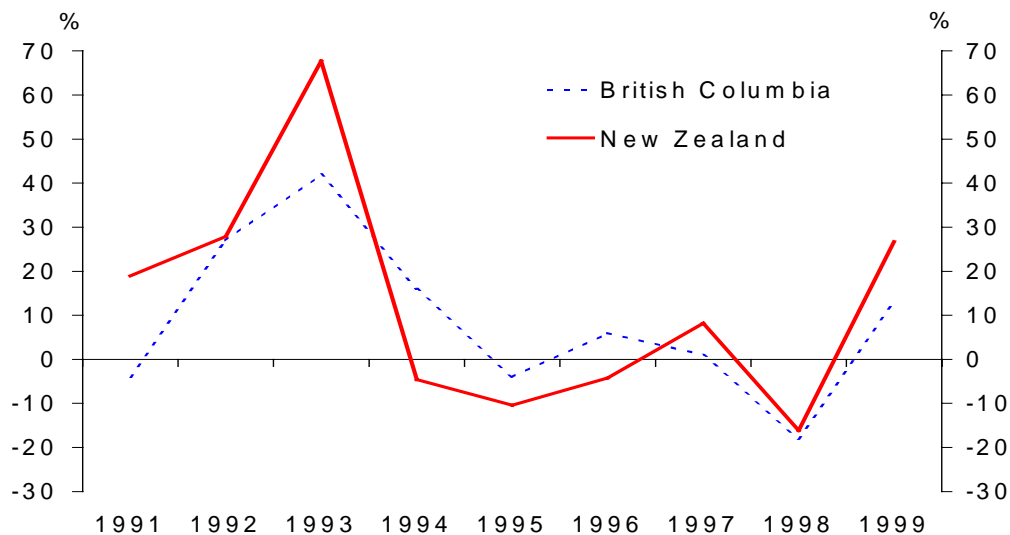


Source: New Zealand: Quarterly Survey of Business Opinion. Australia: National Australia Bank Business Confidence survey.

81. The difference in domestic economic fortunes in Australia and New Zealand can be explained by a combination of at least four different factors. First, as discussed earlier, New Zealand suffered a large drop-off in immigration in the late 1990s, whereas Australia maintained a net inflow throughout the 1990s, which actually accelerated in 1998 (figure 8). Australia's consistent increase in population over that period would have provided a stable underpinning to domestic demand that was absent in New Zealand. The net outflow of people from New Zealand was almost certainly partly responsible for the sharp fall in residential investment during 1998.

82. Second, monetary policy in Australia had been easing since mid-1996. This probably helped consumption and investment in Australia during the Asian crisis. In many ways, as mentioned above, the timing of the Asian crisis may have been less damaging for Australia than it was for New Zealand. Indeed, shortly before the Asian crisis hit, markets were expecting that the next monetary policy move in Australia would be a rate rise.
83. Third, Australia did not suffer from a drought in 1998. Even if it had done, agriculture is far less important to Australia than it is to New Zealand, and also less important than mining. Indeed, as mentioned above, there was a lot of mining investment in Australia in the mid-1990s and many of the new mines came on line in 1998, boosting employment, domestic economic activity, and exports, and providing a natural offset to the Asian crisis.
84. Finally, Australia is a larger and more diversified economy than New Zealand. This, together with the fact that Australia had a lot of 'momentum' in its domestic sector, mitigated the importance of the Asian crisis.
85. In conclusion, the differences between Australia's and New Zealand's economic performance in the late 1990s are at least as much a story about Australian strength as one about New Zealand weakness. Another economy, that of British Columbia, illustrates this point well. British Columbia, Canada's westernmost province, has roughly the same population as New Zealand. Like New Zealand, it is a resource-based economy. Also like New Zealand, roughly a third of British Columbian exports are destined for Asia (including Japan). British Columbia's fortunes evolved in a remarkably similar way to New Zealand's during the 1990s.
86. Similarities between British Columbia and New Zealand include those of exports, immigration and monetary policy. For example, prior to the Asian crisis, both economies were significant exporters of logs to South Korea. As a result, both economies experienced a marked, and closely correlated, fall in log exports in 1998 (figure 39). The immigration patterns of the two regions were also similar.

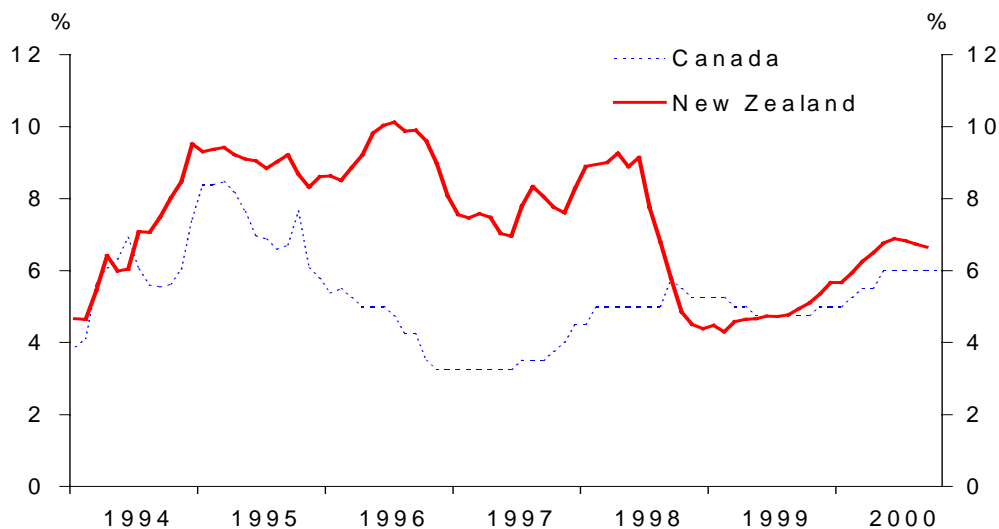
Figure 39
Value of log exports from British Columbia and New Zealand
(annual percentage change)



Source: Statistics New Zealand, British Columbia Statistics.

87. As for monetary policy, British Columbia's monetary policy reflects Canada's overall needs rather than British Columbia's alone. Figure 40 shows that British Columbia experienced an interest rate rise leading into the Asian crisis, as did New Zealand. The main difference in monetary policies between the two economies was the fact that British Columbia's exchange rate was not floating but fixed to that of the rest of Canada. This would have given British Columbia one less adjustment mechanism than New Zealand had in response to the Asian crisis.
88. Given that British Columbia and New Zealand experienced similar export, immigration, and monetary policy patterns in the late 1990s, it is not overly surprising that New Zealand's growth record was more similar to British Columbia's over the late 1990s than to Australia's (figure 41). Both New Zealand and British Columbia experienced recession in 1998. What is perhaps more surprising is that both economies performed very differently to their closest neighbours – Australia in New Zealand's case, and Eastern Canada in British Columbia's case. Eastern Canada exports far more to Europe and the United States than British Columbia. Eastern Canada also exports relatively fewer agricultural and forest products than British Columbia does, and was therefore far less affected by the Asian crisis. For this reason, when searching for a counterfactual economy against which to gauge New Zealand during the Asian crisis, British Columbia may be more appropriate than Australia, with the one proviso that British Columbia lacks the tool of exchange rate adjustment.

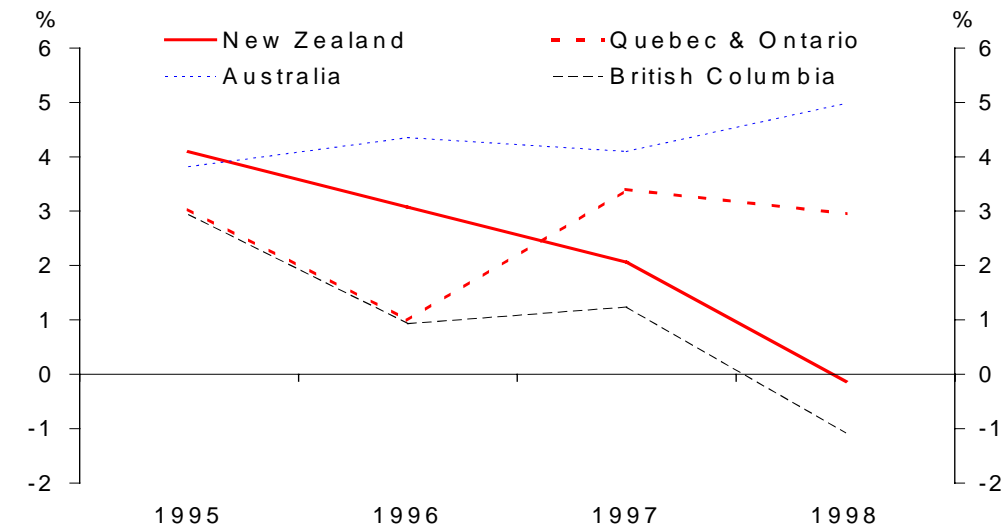
Figure 40
Canadian and New Zealand short term interest rates



Source: Reserve Bank of New Zealand and Datastream.

Note: The interest rates shown are the Bank of Canada bank rate and the New Zealand 90-day bank bill rate.

Figure 41
GDP Growth in Australia, New Zealand, and Canadian regions
(annual percentage change)



Source: Statistics Canada, Australian Bureau of Statistics, and Statistics New Zealand.

Concluding remarks

89. The 1990s was the first decade of inflation targeting and the first decade for a long time in which inflation in New Zealand remained low and stable. GDP growth was higher than in the previous two decades, and the volatility of the real economy was lower.
90. However, the New Zealand economy remains open to economic shocks. Such shocks are, by definition, unexpected, and as such play a large role in generating variability in inflation, output and financial variables. For example, the Asian crisis led to a sudden fall in demand for New Zealand exports and coincided with a net migration outflow and the impact of a drought. Together these led to a recession in the first half of 1998. Through most of the 1990s, inflation proved to be reasonably persistent and did not fall into the lower half of the inflation target band until the end of 1998, after the economy was impacted by the Asian crisis and the drought. The fact that inflation outcomes were not lower still suggests that monetary policy settings were broadly appropriate, at least prior to the onset of the Asian crisis.
91. The primary aim of monetary policy is to maintain price stability and this contributes to a stable environment for economic growth. Our judgement is that, on average, monetary policy is able to help smooth the cycle and thereby reduce the overall impact of shocks on the variability of inflation and output. Unfortunately, due to inherent data limitations and delays, other uncertainties, and the time delay between monetary policy actions and their impact on the real economy, it is impossible for monetary policy to play a precise buffering role. With the benefit of hindsight, we can identify occasions when earlier and larger monetary policy responses could have assisted in further softening the impact of particular shocks. For example, we were a little slow to recognise the pace of acceleration of the economy in 1992/93, and a little slow to recognise the joint impact of the Asian crisis and the first drought through late 1997 and early 1998.

92. To some extent then, the last business cycle may be quite typical of what we can expect going forward. Low and stable inflation remains an important base for generating economic prosperity, but, as the last business cycle illustrates, it is not a panacea for all ills. The New Zealand economy will continue to be hit by external shocks, and will remain less diversified than other larger economies. As a result, it is probably unrealistic to expect New Zealand to achieve the same level of stability in the real economy as most other OECD countries.

Endnotes

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- ¹ One must, however, be quite careful in making these kinds of cross-country comparisons of inflation. The rankings can depend importantly on the precise CPI measure one uses for the various countries.
- ² As noted, New Zealand's GDP growth rates are more volatile than those of the other dollar bloc countries, which makes a cross-country comparison difficult. However, if we smooth through the volatility in New Zealand's growth rates, we obtain about 2 per cent in mid-1997.
- ³ Note that percentage appreciations and depreciations are not directly comparable, because of the different levels from which the percentage changes are calculated.
- ⁴ Brook, Anne-Marie, Sean Collins, and Christie Smith (1998), "[The 1991-97 business cycle in Review](#)", *Reserve Bank of New Zealand Bulletin*, Vol 61, No 4, and Drew, Aaron and Adrian Orr (1999), "[The Reserve Bank's role in the recent business cycle: actions and evolution](#)", *Reserve Bank of New Zealand Bulletin*, Vol 62, No 1.
- ⁵ 'Housing' is defined (on the basis of the 1993 regimen) as including: purchase and construction costs of new dwellings, private dwelling rents, dwelling maintenance services, Housing New Zealand and local authority rents, real estate agent services, and professional services.
- ⁶ Countries included are: Hong Kong, Indonesia, South Korea, Malaysia, the Philippines, Taiwan and Thailand.
- ⁷ See figure 31.
- ⁸ Consensus Economics is a London-based service that produces forecasts of macroeconomic variables in over 70 countries by taking an arithmetic mean of the forecasts obtained from a survey of forecasters. (See www.consensuseconomics.com.) The Reserve Bank's Asian GDP forecast shown in figure 21 is a trade-weighted average of the central Consensus GDP forecasts for 8 Asian countries.
- ⁹ The Southern Oscillation is the result of cyclical warming and cooling of the surface of the southern ocean in the central and eastern Pacific. The warming and cooling cycles affect the sea level barometric pressure, and the Southern Oscillation Index is generated as the difference between the barometric pressure measured in Darwin, Australia, and that measured in Tahiti.
- ¹⁰ The June 1998 fall in "machinery and equipment" manufacturing, which includes car manufacturing, contributed -0.2 percentage points to the -0.4 per cent decline in total production GDP.
- ¹¹ The exact nature of the MCI implementation framework is discussed in more detail in the paper "[The evolution of monetary policy implementation](#)".
- ¹² New Zealand's merchandise exports to our main non-Japan Asian trading partners in December 1996 were 17 per cent of the total, whereas Australia had slightly higher merchandise export exposure at 24 per cent. However, as a slightly more open economy, New Zealand's merchandise exports as a percentage of total GDP are higher than in Australia (21 per cent for New Zealand as compared to 17 per cent for Australia). So overall, the two countries had a roughly similar exposure to non-Japan Asia (3.6 per cent of GDP in New Zealand, and 4.1 per cent of GDP in Australia).