



DP2004/05

**What can the Taylor rule tell us
about a currency union between
New Zealand and Australia?**

**Nils Björksten, Arthur Grimes,
Özer Karagedikli & Christopher Plantier**

June 2004

JEL classification: E51, E52

Discussion Paper Series

DP2004/05

What can the Taylor rule tell us about a currency union between New Zealand and Australia?

Abstract^{1 2}

The merits of a trans-Tasman currency union have been debated in both New Zealand and Australia. It has been suggested that the New Zealand economy may not behave too differently from at least some of the Australian states, i.e. they have similar characteristics and they face similar shocks. We test this, under the presumption that the differences in Taylor rule implied interest rate paths for different regions over a business cycle can give us some indication about the nature of the differences in “aggregate” shocks that hit different economies. We compare the implied Taylor rule interest rates for the Australian states to the implied Taylor rule rates for New Zealand. We also compare them to the realised 90 day rates. We find that the Taylor rule implied interest rate paths in Australian regions and in New Zealand are not very different.

¹ Nils Björksten, Özer Karagedikli and Christopher Plantier are with the Reserve Bank of New Zealand. Arthur Grimes is with Motu Economic and Public Policy Research and the University of Waikato; his input is funded through a grant from the Marsden Fund administered by the Royal Society of New Zealand. The views expressed here are the views of the authors and do not necessarily reflect those of the Reserve Bank of New Zealand. We wish to thank Gordon de Brouwer for his comments at the Conference for Economists 2003 in Canberra.

² Corresponding author. Reserve Bank of New Zealand, 2 The Terrace, PO Box 2498, Wellington, New Zealand. Email: KaragedikliO@rbnz.govt.nz
© Reserve Bank of New Zealand

1 Introduction

With the introduction of the Euro, writings on optimum currency areas have become a cottage industry. The issue of a trans-Tasman common currency or currency union has been discussed in New Zealand (Grimes et al 2000, Coleman 2002) and also in Australia in an East Asian context (de Brouwer, 2001). At the political level, both the Australian Treasurer and the New Zealand Prime Minister have floated the possibility of a joint currency (Costello, 2003; Brockett, 2000).

In a classical cost-benefit framework, the main argument on the benefit side of a currency union is the reduction in transactions costs (widely defined to include costs of gathering and managing information) that arise from use of a single currency. This argument led Lloyd and Holmes (1991) to favour the Closer Economic Relations (CER) free trade agreement between Australia and New Zealand being extended to encompass all aspects of a single market, including a single currency. The main argument on the cost side of a currency union is the loss of independent monetary policy for at least one member country. This loss of monetary independence raises the possibility that the single monetary policy may not be suitable for each individual country (or region) in the currency union (Bayoumi and Eichengreen, 1993).³

Within Australasia, it has been argued that the New Zealand economy may behave little differently to some Australian states. The latter group already operates (apparently successfully) under a common currency. Hence, if the hypothesis is correct that New Zealand is not an economically atypical Australasian state, a currency union between Australia and New Zealand may not lead to inappropriate monetary conditions for New Zealand under a single monetary authority (Coleman 2002, Grimes forthcoming). Transitional issues aside, that would then leave the transactions benefits of a currency union intact without a material offsetting cost due to loss of monetary independence.

It is not, however, straightforward to measure the appropriateness for different regions of common monetary policy settings, and hence it is not

³ Mundell (1961, 1997) and Alesina and Barro (2000) provide frameworks for balancing these benefits and costs; Grubel (1999) and Murray (1999) provide perspectives on the merits of currency union for the case of Canada and the United States.

straightforward to measure the costs that would arise from loss of monetary independence with the adoption of a currency union. Researchers have attempted this task by comparing patterns of shocks and looking at correlations of different shocks across regions/countries. Another way of answering this question is to look at a benchmark monetary policy, which makes possible comparisons between the implied policy stances for each region and the actual policy settings.

In this paper, we address the question at hand by means of a simple Taylor rule (Taylor 1993) using an approach similar to the Euro area analysis of Björkstén and Syrjänen (1999). Björkstén and Syrjänen argue that one way of testing the appropriateness of a single monetary policy across multiple regions is to look at a benchmark for monetary policy, such as the Taylor rule (henceforth TR), which maps regional differences into interest rate space. By doing so, we assume that a simple TR mimics the monetary policy settings on both sides of the Tasman.⁴ We also explore the implications for our analysis of an extended TR encompassing the impact of the exchange rate on interest rate settings (Taylor 1999).

The remainder of the paper is structured as follows. Section 2 describes the data we use. Section 3 introduces the model we use to translate different Taylor rule implied interest rate settings into inferences with regard to asymmetric shocks across countries. This section also provides a discussion of our methodology and its relevant caveats. Section 4 discusses the implied Taylor rule paths under different assumptions for Australian states and for New Zealand. Section 5 discusses what the Taylor rules might be able to tell us about a currency union between Australia and New Zealand, and concludes.

2 Data description

The Taylor rule is a simple policy rule, in which the short term interest rates react to inflation deviations from its target and output deviations from potential. The Taylor rule normally requires data on the output gap, inflation and the neutral real interest rate.

With regard to inflation data, the only state-level Australian CPI series are those for the capital cities of the states. We adjust these series for the

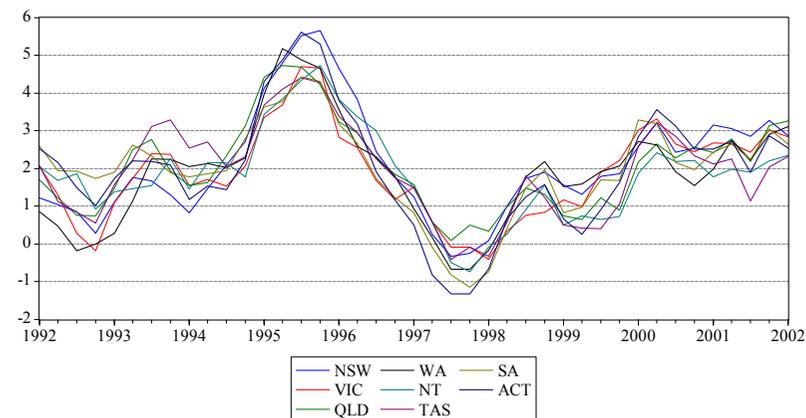
⁴ See de Brouwer and O'Regan (1997) and Huang et al (2001).

introduction of a goods and services tax in Australia. We concentrate on the five largest states (New South Wales, NSW; Victoria, VIC; Queensland, QLD; Western Australia, WA; and South Australia, SA). To be consistent with the measure for the Australian states, we use the CPI excluding GST series for New Zealand (NZ).

Figure 1 shows that inflation rates are quite similar across Australian regions. Although the difference across states can at times be as high as 2 per cent, the overall patterns are very similar, making the monetary authority's job easier. We need to keep in mind that the inflation rates for the capital cities of the Australian states or the territories may be more volatile than inflation in a state/territory as a whole.

The mean inflation rates across states are very similar to each other, with NSW having the highest mean inflation of 2.12 per cent and Northern Territory having the lowest mean inflation of 1.82 per cent over the sample period. This is a very narrow range and suggests that the inflation rates across Australian states are closely integrated.

Figure 1:
Inflation in Australian states⁷



⁷ The inflation for Australian states are derived from the CPI indices for the capital cities of each state or territory of Australia. We assume the price level or inflation in capital city to be same as whole state.

Figure 2:
Inflation in New Zealand, Australia and in selected individual Australian states

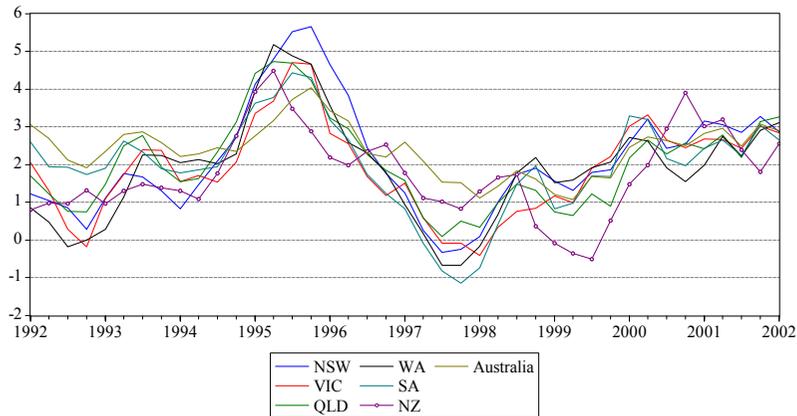


Figure 2 shows inflation rates across Australian states and New Zealand. For the most part, inflation rates moved very closely together in New Zealand and Australian states, with New Zealand generally somewhere in the middle of the pack. It should be noted that in comparison with New Zealand, Australia had a somewhat higher inflation target during this time period.

Now let us analyse the figure 2 in more depth by means of table 1 below. Table 1 shows the mean, minimum, maximum and standard deviation of the inflation series for selected states of Australia, New Zealand, and Australia as a whole.

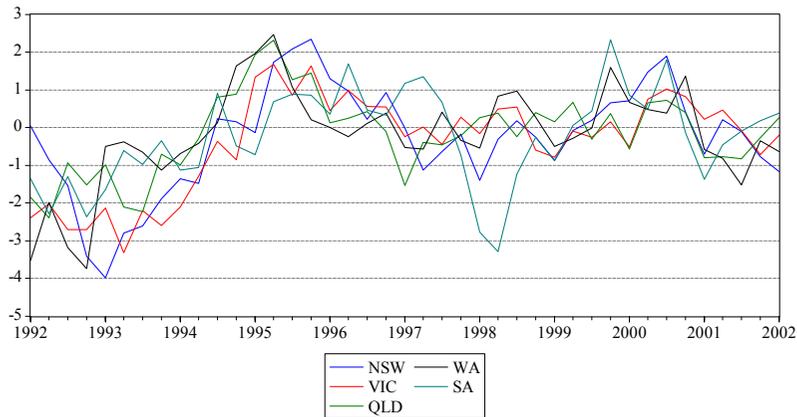
Table 1:
Descriptive statistics of inflation rates⁸

	NSW	VIC	QLD	WA	SA	NZ	AU
Mean	2.12	1.88	2.04	1.88	1.97	1.82	2.43
Median	1.78	1.89	1.92	2.01	1.93	1.74	2.49
Minimum	-0.33	-0.41	0.08	-0.67	-1.14	-0.50	1.06
Maximum	5.65	4.72	4.72	5.17	4.42	4.48	4.03
Standard deviation	1.45	1.23	1.19	1.39	1.25	1.12	0.68

With regard to output gap data, we do not have quarterly output data at the state level. Instead, we used employment figures for Australian states. Figure 3 shows the Hodrick-Prescott (1997) filtered employment gaps in selected Australian regions. Although the peripheral regions add some volatility to the overall relationship, it is clear that employment gaps are closely related.

⁸ The Australian state level CPI data includes interest costs, so they average less than the aggregate Australian country level CPI, which excludes interest costs. We use CPI data for New Zealand that excludes interest costs, so the correlation does not arise because of any common trend in this component. If we use CPI data for New Zealand including interest costs, this tends to increase the correlation in inflation cycles.

Figure 3:
HP Filtered Employment Gap Figures in Australian States



One shortcoming of the employment series for the Australian states is that they exhibit seasonality. We adjusted for seasonality by using the conventional X11 technique. In a Taylor rule context this is nevertheless not a major issue, as the weight on the output gap in a Taylor rule is relatively small in comparison with the weight attached to inflation.

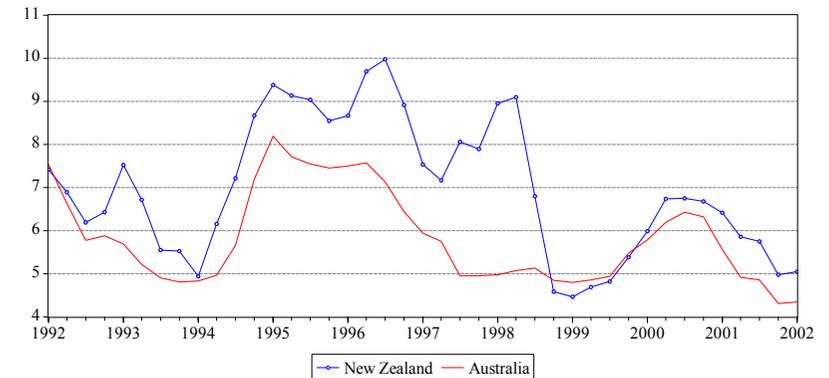
To be consistent we also used the employment series as a proxy for output in New Zealand. We filtered these data with a Hodrick-Prescott (HP) filter to get our employment gap series, which we argue reasonably proxies output gaps. We confirmed this by HP filtering both the employment and the output series for New Zealand and Australia as a whole. In each case, we found that the output gap and employment gap series looked very similar.

Figure 4 shows the realised 90-day rates in Australia and New Zealand. With the exception of the late 1997 to early 1998 period⁹, the respective 90-day rates in both economies co-move very closely. However, there remains a positive gap between New Zealand and Australian rates, which we assumed to come from the constant in the Taylor rule, the neutral real

⁹ This can be attributed to the Monetary Conditions Index used by the Reserve Bank of New Zealand at the time.

interest rate.¹⁰ For this reason, we assumed that the neutral real rate in New Zealand is 4.5 over the sample and 3.5 for Australia.

Figure 4:
Movements of 90 day rates in New Zealand and Australia



3 Our model and a discussion of our methodology

We develop a simple model according to which the differences between TR-implied interest rates can be used to proxy the differences in aggregate shocks between economies. One can think of the movements in the TR-implied rates as a summary measure of the shocks that the different states have been hit by.

The TR is a reaction function in which the interest rate reacts to shocks to inflation (from both the supply and demand sides) and to the output gap (from the demand side). The degree of co-movement of TR-implied rates in two different economies indicates how similar are the aggregated shocks relevant to monetary policy that hit the different economies. For monetary policy purposes, this aggregated measure is more useful than analysis of each individual shock since interest rate setting utilises only one policy instrument which must be set according to some weighted average of relevant shocks. It is possible that individual shocks might differ across regions at a point in time but the implied monetary policy settings are

¹⁰ See Plantier (2003) and Björkstén and Karagedikli (2003) for estimates of the neutral real rates in New Zealand and Australia.

similar if the shocks are offsetting. Conversely, the desired interest rate responses to a particular deviation of inflation from target may differ across regions if their output gaps at the time are materially different. Examination of individual shocks across regions would not account for considerations such as these.

Our model is described by the following equations.¹¹

$$y_t^j = y_t^{*,j} - \alpha^j r_t^j + \varepsilon_t^{d,j} \quad (1)$$

$$\pi_t^j = \pi_{t+1}^{e,j} + \beta^j (y_t^j - y_t^{*,j}) + \varepsilon_t^{s,j} \quad (2)$$

$$i_t^j = r^{*,j} + \pi_{t+1}^{e,j} + \psi_0^j (\pi_t^j - \pi^{*,j}) + \psi_1^j (y_t^j - y_t^{*,j}) + \varepsilon_t^{m,j} \quad (3)$$

$$r_t^j = i_t^j - \pi_{t+1}^{e,j} \quad (4)$$

$$\pi_{t+1}^{e,j} = \pi^{*,j} \quad (5)$$

where y is real output, y^* is potential output, π is the inflation rate, π^e is expected inflation, i is the short term nominal interest rate, r^* is the neutral real interest rate, π^* is the inflation target, r is the real interest rate, ε^d , ε^s , ε^m are demand, supply and monetary shock terms respectively, t is the time subscript, j is the superscript indicating regions and α , β , ψ_0 , ψ_1 are positive coefficients.

Equation 1 is the output equation. Real output deviates from its supply-determined trend, depending on the real interest rate and random demand shocks. Equation 2 is the inflation equation, where inflation is a function of inflation expectations, the output gap and a shock term representing supply side shocks. We also assume, in equation (5), that under a credible inflation targeting regime, inflation expectations are equal to target inflation. Equation (5) can be supplemented with a term in which

¹¹ Constant terms are suppressed. For a similar model and analysis of its micro-underpinnings, see Clarida, Gali and Gertler (1999).

expectations are determined (positively) also by the gap between current and target inflation, so embodying an expectation of partial adjustment of inflation towards target. This adjustment process is consistent with flexible inflation targeting regimes (Svensson 2000). Addition of this term yields the same reduced form expression for the short term interest rate as shown in (9) below,¹² and so is consistent with the remaining analysis in the paper. We omit this additional term from the formal model for the sake of clarity.

The third equation is the Taylor Rule, which represents the monetary policy reaction function. Monetary policy reacts to the output gap and to inflation deviations from target, where inflation is affected both by the output gap and by shocks.

Substituting (4) and (5) into (1), and re-arranging, gives:

$$y_t^j - y_t^{*,j} = -\alpha^j (i_t^j - \pi^{*,j}) + \varepsilon_t^{d,j} \quad (6)$$

We can do a similar substitution for (2):

$$\pi_t^j - \pi^{*,j} = \beta^j (y_t^j - y_t^{*,j}) + \varepsilon_t^{s,j} \quad (7)$$

Now substitute (6) and (7) into (3) and re-write the policy rule as:

$$i_t^j = r^{*,j} + \pi^{*,j} + \psi_0^j \left[\beta^j (-\alpha^j (i_t^j - \pi^{*,j}) + \varepsilon_t^{d,j}) + \varepsilon_t^{s,j} \right] + \psi_1^j \left[-\alpha^j (i_t^j - \pi^{*,j}) + \varepsilon_t^{d,j} \right] + \varepsilon_t^{m,j} \quad (8)$$

Solving (8) for the nominal interest rate gives:

$$i_t^j = \Pi_0^j r^{*,j} + \Pi_1^j \pi^{*,j} + \Pi_2^j \varepsilon_t^{s,j} + \Pi_3^j \varepsilon_t^{d,j} + \Pi_4^j \varepsilon_t^{m,j} \quad (9)$$

Equation (9) holds for any region j or k ; the Π_i^j coefficients are combinations of the parameters in equations (1) - (3). In a currency union,

¹² The composition of the reduced form parameters, which is not central to this paper, differs slightly.

$\psi_0^j = \psi_0^k$, $\psi_1^j = \psi_1^k$, $\pi^{*,j} = \pi^{*,k}$, $\varepsilon_t^{m,j} = \varepsilon_t^{m,k}$ and provided there is a free capital mobility between states, then $r^{*,j} = r^{*,k}$. Furthermore, it is reasonable to assume that $\alpha^j \approx \alpha^k$ and $\beta^j \approx \beta^k$, implying that $\Pi_i^j = \Pi_i^k$ ($i=1, \dots, 4$).

Hence the difference in (9) between regions j and k will be :

$$i_t^j - i_t^k = \Pi_2(\varepsilon_t^{s,j} - \varepsilon_t^{s,k}) + \Pi_3(\varepsilon_t^{d,j} - \varepsilon_t^{d,k}) \quad (10)$$

Equation (10) indicates that differences in TR-implied interest rates between states arise from differences in shocks to demand and supply. If these differences are small (or offsetting), then the TR-implied interest rate paths will be similar.

In this simple setup the central bank adjusts the short term interest rate in response to inflation deviations from target and the deviations of output from potential. We calculate the TR path for each Australian state and for New Zealand with the original weights suggested by Taylor in his 1993 paper. These weights are only a benchmark, however, and one potential criticism of this approach is that the weights used in the TR may not be appropriate. The weight on inflation should be greater than one so that a rise (fall) in the nominal interest rate increases (decreases) the real interest rate in order to have an effect on the real economy; we use Taylor's recommended weight of 1.5. Our weight on the output gap is Taylor's recommended value of 0.5. Unless one changes these coefficients significantly, the interest rate implied by the TR does not change materially. Although it has been suggested that higher weights are needed for a more efficient rule, the original Taylor weights are found to mimic the monetary policy settings well in many economies. Although it is not a fully efficient rule, the TR is robust to different models. This robustness characteristic is desirable if model uncertainty is an issue. For New Zealand, Huang et al (2001) and Drew and Plantier (2000) showed that Taylor's original weights are relevant to the country's average experience in recent years.

Problems associated with the unobserved nature of potential output and the neutral real interest rate are another set of concerns. The unobserved nature

of these variables is an issue for most models in macroeconomics. Over the longer term, if a central bank systematically underestimated or overestimated these variables, inflation would overshoot or undershoot (Drew and Plantier 2000). Given that the TR has been estimated to be a reasonable proxy for central bank behaviour in recent years and that we have not observed systematic overshooting of inflation in this period, we consider that the TR provides an adequate basis to model desired monetary policy behaviour for the purposes of this study.

4 Findings

Figure 5 shows the quarter by quarter Taylor rule recommendations for different Australian states. One very clear conclusion one can get from this figure is that the Taylor rule movements across different states are very similar.

Figure 5:
Taylor Rule implied rates for Australian states

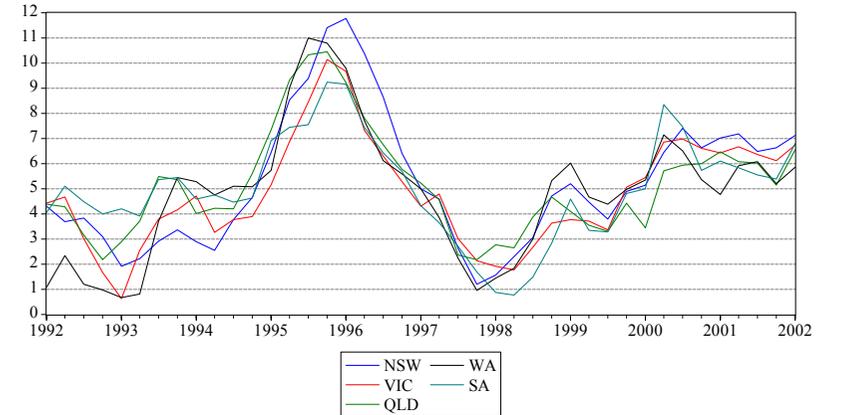
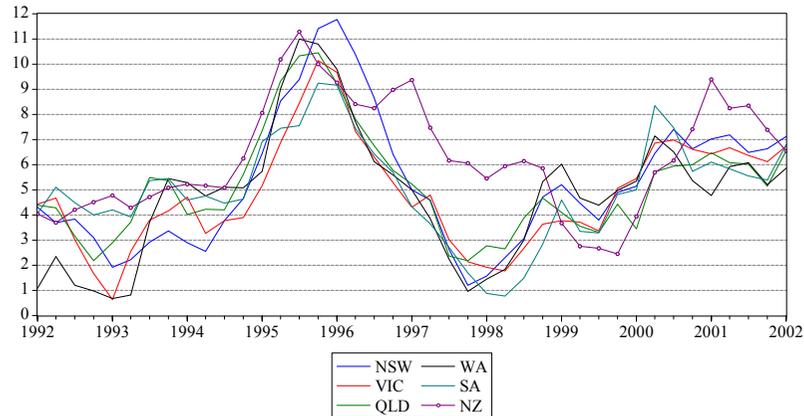


Figure 6:
Taylor Rule implied rates for Australian states and New Zealand



In figure 6 we add the Taylor rule implied path for New Zealand. It appears that with the exception of the late 1990s they look very similar. Since the Taylor rule attached a much higher weight on inflation deviations from the target, the similarity in Figure 6 may have been driven by similarities in inflation across the states.

In figure 7 we add the Australian 90 day rate if it would fit the needs of the individual Australian states and New Zealand. It is clear that the Australian 90-day rate is not as volatile as what the Taylor rule implies for different states of Australia. This is probably driven by the very volatile nature of the capital city based inflation series for Australian states.

Figure 7:
Taylor rule implied rates for Australian states and New Zealand and Australian 90 day rate

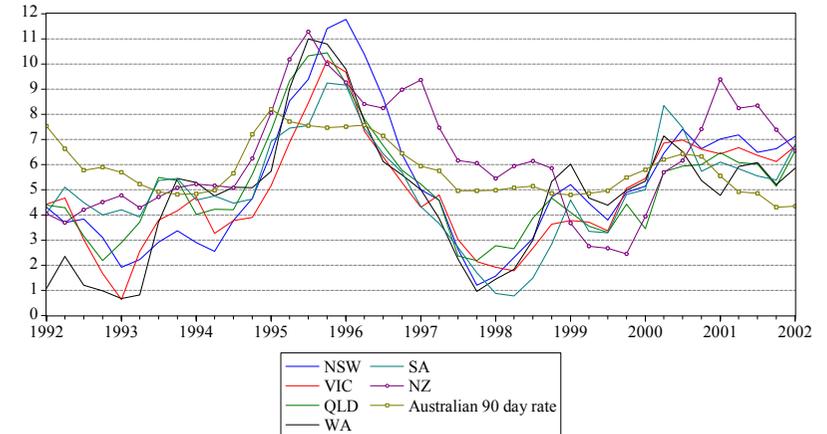
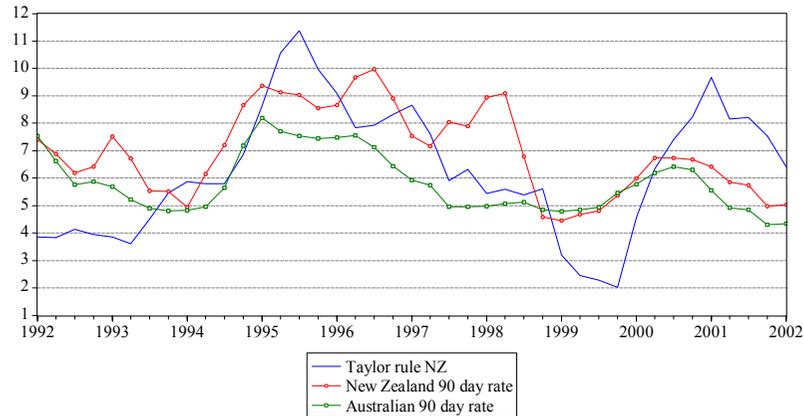


Table 2:

	NSW	VIC	QLD	WA	SA	NZ	AU short rate
Mean	5.29	4.88	5.23	4.98	5.09	6.28	5.82
Median	5.02	4.51	4.93	5.23	5.12	6.06	5.65
Standard Deviation	2.68	2.19	2.09	2.48	2.12	2.22	1.07

Table 2 above shows the descriptive statistics of the series in figure 7. Some interesting patterns emerge. The average short term interest rate in Australia as a whole is higher than what the average of the Taylor rule recommendations for each state would recommend. On the other hand, the standard deviation of the short rates is much lower than what the state level Taylor rules suggest. In terms of averages, the New Zealand Taylor rule suggests higher settings than in any of the Australian states, although the difference between New Zealand and Australian short rates are about 50 basis points. The New Zealand Taylor rule does not differ from those of the Australian states in terms of the variance of the Taylor rule recommendations.

Figure 8:
Taylor rule implied rates New Zealand and New Zealand 90 day rate and Australian 90 day rate



Our analysis so far suffers from two types of inconsistencies, namely we have implicitly assumed that Australia and New Zealand have different inflation targets and different neutral real interest rates. We attempt to address these by means of figures 9a, b and c. Under a currency union, one would expect (or hope) that New Zealand would have the same neutral real interest rate as Australia. Figure 9a shows the Taylor rule implied rates for selected Australian states and New Zealand under a 3.5 per cent neutral real rate assumption. However we are still allowing the inflation targets to be different in this figure.

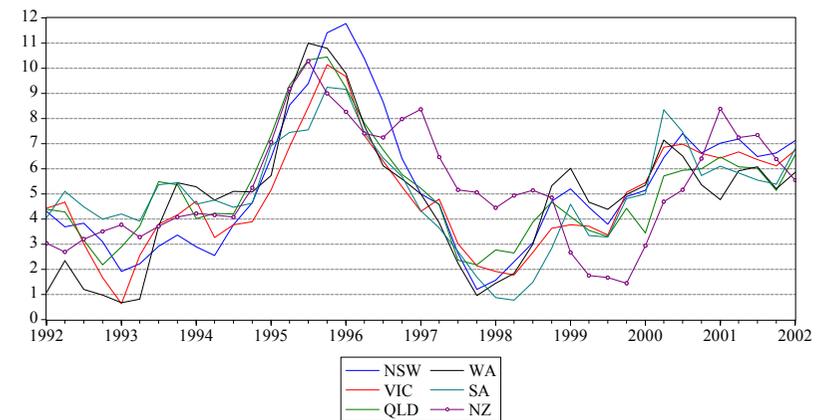
Figure 9b assumes the same inflation target of 2.5 per cent in both New Zealand and Australia but allows the neutral real interest rates to differ. Drew et al (2001) did not control for the fact that Australia has a higher inflation target and compared New Zealand's inflation performance against New Zealand's own inflation target.¹³

¹³ Drew et al (2001) used the Reserve Bank of New Zealand's FPS model and plugged the Australian interest rates to see the effects of those rates on New Zealand's inflation and output variability. They did not allow for the possibility that the neutral real rates in New Zealand could converge to the rates in Australia had New Zealand adopted the Australian currency. This is especially relevant if one believes that New Zealand's higher neutral real interest rates derive from a 'currency premium'.

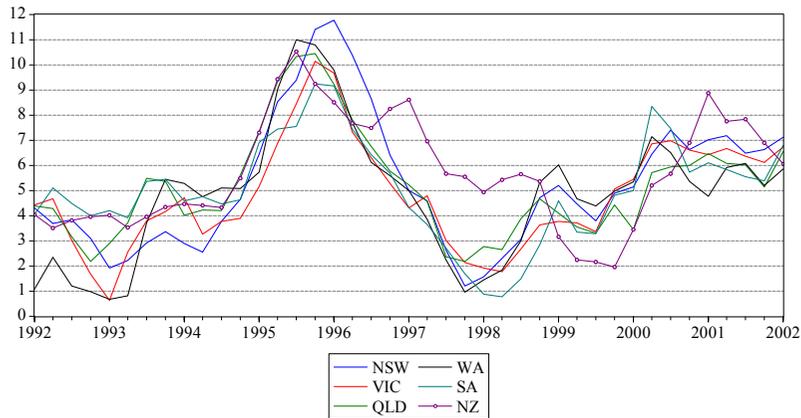
Finally figure 9c assumes the same inflation target and the neutral real interest rate for New Zealand and Australian states. With this we want to see what the Taylor rule recommendations would have looked like if we control for both the common inflation target and a common neutral real interest rate.

Figures 9 a, b and c:
Taylor Rule implied rates for selected Australian states and New Zealand with different assumptions about the r^* and π^*

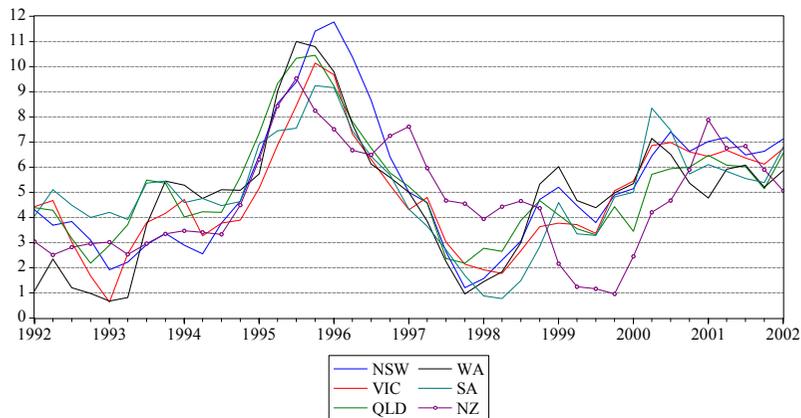
9a Different neutral real rate and inflation target neutral real rate in New Zealand



9b Same inflation target but different neutral real rate in New Zealand



9c Same neutral real rate and inflation target



Figures 9a, 9b and 9c suggest some lag between the Taylor rule recommendations in Australia and New Zealand. This could arise from a number of channels. Conway (1998) for example argues that the US economy transmits to the Australian economy first, then to the New Zealand economy with more of a lag. Another reason could be the importance of the Australian economy for New Zealand. Any shock that

hits the Australian economy may be affecting the New Zealand economy with some lags.

Another feature of the figures above is that the inflation cycles between New Zealand and Australia is highly correlated. Some preliminary analysis show that the New Zealand inflation lags Australian inflation with a few quarters. Hence, if one lags the relationship above, the correlation becomes more pronounced. This correlation between inflation cycles deserves further attention.

Our analysis so far has not addressed such aspects as variation over time of the neutral real interest rate in the Taylor rule, real time issues or the exchange rate channel. We also used the same weights for every state and country. While the issue of a time varying neutral real interest rate is important, we argue that for our purposes a reasonable historical average is sufficient. To the extent that New Zealand and Australia have experienced a more or less parallel decline in their equilibrium neutral real interest rates, using time varying neutral real interest rates in the Taylor rules might if anything have made the picture even more similar.

The real time estimation of output gap is not an issue here, as our objective is to compare the ex-post/realised history. As our analysis is descriptive rather than prescriptive, it is reasonable to make use of ex-post values of the output/employment gaps.

The exchange rate issue merits some attention, however. Analysis so far has not taken into account any open economy considerations, which are of course important for both New Zealand and Australia. Taylor (1999) discusses the following form of a simple reaction function in an open economy context.¹⁴

$$i_t = f\pi_t + gy_t + h_0e_t + h_1e_{t-1} \quad (11)$$

where i_t is the short term nominal interest rate, π_t is the inflation rate, y_t is the output gap and e_t is the appreciation of the exchange rate. If $h_0 = h_1 = 0$, then the rule collapses to the simple Taylor rule with no reaction to the exchange rate misalignments. We use the Taylor (1999)

¹⁴ Ignoring the equilibrium real interest rate, real exchange rate and inflation target is zero.

coefficients of $h_0 = -0.25$ and $h_1 = 0.15$ to see if adding these to the reaction function would make a difference. These coefficients suggest that a 10 per cent deviation of the exchange rate from its equilibrium value would lead to 1 percentage point change in policy rates. This is made up of two components: a 2.5 percentage point rise in the very short run, which is offset in the following period by 1.5 percentage points. In addition, we use the West (2003) coefficient of $h_0 = -0.05$ ¹⁵ as an alternative exchange rate reaction coefficient. We compare these results in table 3.

Figure 10:
Taylor rule implied rates with different exchange rate reactions

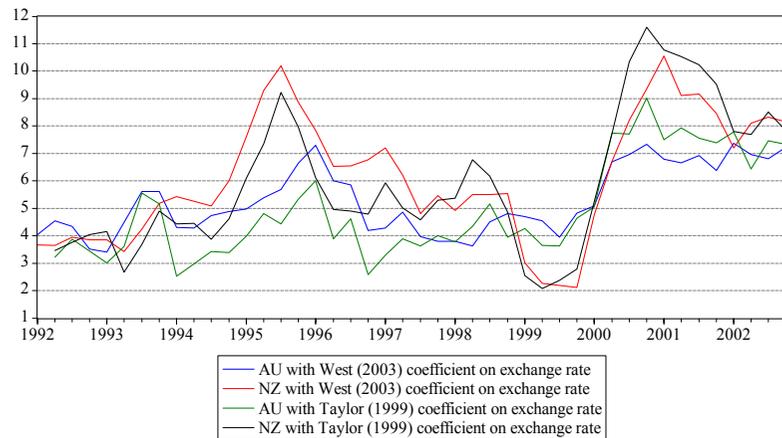


Figure 11 suggests that adding reactions to the exchange rate misalignments does not alter the basic conclusions we made earlier in this paper: The Taylor rule recommendations for the interest rate decisions are still very similar for New Zealand and Australian rates. This is clear from the fact that the movements of the Australian dollar and the New Zealand dollar against other currencies are highly correlated. For example, the raw correlation coefficient between the US-Australian dollar and US –New Zealand dollar exchange rate over the 1990s is 0.872 for the 1990-2002 period while the correlation between the nominal trade weighted indexes between the two countries is 0.663

¹⁵ $h_1 = 0$ in West (2003).

Table 3:
Descriptive statistics of open economy Taylor rule paths

	AU with West	AU with Taylor	AU Historical	NZ with West	NZ with Taylor	NZ Historical
Mean	5.31	4.95	5.78	6.19	5.97	6.92
Median	4.87	4.33	5.55	5.99	5.23	6.73
Minimum	3.39	2.51	4.3	2.10	2.07	4.46
Maximum	7.36	9.00	8.19	10.54	11.60	9.97
Standard Deviation	1.23	1.77	1.06	2.24	2.52	1.56

This is consistent with the findings of Huang et al (2001) for New Zealand, who found that monetary policy rules with no response to the exchange rate describe well the behaviour of interest rates.

5 Conclusions

The question of whether “one monetary policy size fits all” is a major concern in establishing a currency union. Coleman (2002) suggests that New Zealand is very similar to a state of Australia, and hence might be able to manage quite well under a common monetary authority arrangement. In other words, New Zealand would not be worse off in a currency union with Australia. We attempted to answer this question by looking at what a simple Taylor rule implied for rates in New Zealand and the states of Australia. We implicitly assume that the Taylor rule is the central bank’s reaction function and reacts to shocks to output and inflation. The movements in the Taylor rule implied interest rates derive from the nature of the aggregate shocks that affect the economy.

We found that inflation in both economies is highly correlated, yet we are uncertain whether this represents common shocks or the strength of some shock transmission between the two economies. The Taylor rule evidence suggests that the cost to New Zealand associated with abandoning its independent currency and monetary policy may not be substantially greater than the costs associated with the individual Australian states not having independent monetary policies. This nevertheless abstracts from the fact that automatic fiscal stabilisers exist between Australian states, and that

they may do a fair amount of the work in smoothing asymmetric shocks, which currently New Zealand relies on monetary policy to respond to.

It seems that our results are driven primarily by the similarity in the inflation rates between Australian states and New Zealand. It is also the case that the employment gap cycles are not too dissimilar across Australian states and New Zealand. This may suggest that that shocks to the Australian economy transmit to New Zealand with some lags. Our very preliminary simple VAR analysis supported this. Future studies might consider the issue of inflation and employment gap correlations under the different exchange rate regimes that have existed historically for the two countries. Extending the research in this manner enables consideration of a greater time span, and hence a greater range of shocks hitting each country and state.

Our work does not address any of the issues associated with managing a transition from one exchange rate regime to another. Neither does it address benefits from a currency union that may derive from closer economic integration.

References

- Alesina, A and R Barro (2000), "Currency Unions", NBER Working Paper 7927, *National Bureau of Economic Research*.
- Bayoumi, T and B Eichengreen (1993), "Shocking Aspects of European Monetary Unification", in: Torres, F and F Giavazzi (eds) *Adjustment and Growth in the European Monetary Union*, Cambridge: Cambridge University Press.
- Beechey, M, N Bharudua, A Cailarini, D Gruen and C Thompson (2000), "A Small Model of the Australian Economy", *Reserve Bank of Discussion Paper*, 2000-05.
- Björkstén, N and Ö Karagedikli (2003), "Neutral real rates revisited", *Reserve Bank of New Zealand Bulletin* 66 3, 18-27.
- Björkstén, N and M Syrjänen (1999), "Divergence in the Euro Area: A Cause for Concern?" *Bank of Finland Discussion Paper* 11/99.
- Brockett, M (2000), "PM Floats Idea of Joint Central Bank", *The Dominion*, 14 September.
- Coleman, A (1999), "Economic Integration and Monetary Union", New Zealand Treasury Working Paper 99/6.
- Coleman, A (2002), "Three Perspectives on an Australasian Monetary Union" in Gruen, D and J Simon (eds) *Future Directions in Monetary Policy in East Asia*, Reserve Bank of Australia.
- Coleman, A, and T Daghlish (1998), "Regional Price Convergence in Australia and New Zealand 1984-1996", *Treasury Working Papers Series*, 98/03.
- Costello, P (2003), "20th Anniversary of the Closer Economic Relations Agreement Between Australia and New Zealand", Speech to Auckland Chamber of Commerce, 20 February (<http://www.treasurer.gov.au/tsr/content/speeches/2003>).

- Conway, P (1998), "Macroeconomic Variability in New Zealand: An SVAR Study", *New Zealand Economic Papers*, 32(4).
- Crosby, M and G Otto (2000), "An Australia-New Zealand Currency Union?" paper prepared for the Financial Markets and Policies in East Asia Conference, Australian National University.
- de Brouwer, G and J O'Regan, (1997), "Evaluating Simple Monetary-policy Rules for Australia" in Lowe, P (ed) *Monetary Policy and Inflation Targeting*, Reserve Bank of Australia.
- de Brouwer, G (2001), "Common Currency Arrangements for East Asia: Does a Formal Common Basket Peg Make Sense?" in de Brouwer, G (ed) *Financial Markets and Policies in East Asia*, London: Routledge.
- Drew, A, V Hall, J McDermott, and R StClair (2001), "Would Adopting the Australian Dollar Provide Superior Monetary Policy for New Zealand?" *Reserve Bank of New Zealand Discussion Paper*, DP 2001/03.
- Grimes, A (forthcoming), "Is New Zealand an Economic State of Australasia", Wellington: Motu.
- Drew, A and L C Plantier (2000), "Interest rate smoothing in dollar bloc countries", *Reserve Bank of New Zealand Discussion Paper*, DP 2000/06.
- Grimes A, F Holmes and R Bowden (2000), "*An ANZAC Dollar? Currency Union and Business Development*", Institute of Policy Studies, Wellington.
- Grubel, H (1999), "The Case for the Amero: The Economics and Politics of a North American Monetary Union", Vancouver: *Fraser Institute Critical Issues Bulletin*.
- Hernandez, J D and A P Layton, (2003), "The Regional Appropriateness of Monetary Policy: An Application of Taylor's Rule To Australian States and Territories", *Queensland University of Technology Discussion Paper Series*.

- Hochreiter E, A Korinek, P L Siklos (2002), "The Potential Consequences of Alternative Exchange Rate Regimes: A Study of Three Candidate Regions", paper presented at the Monetary Union: Theory, EMU Experience, and Prospects for Latin America, Vienna.
- Hodrick, R J and E Prescott (1997), "Post-War US Business cycles: an empirical investigation", *Journal of Money, Credit and Banking* 29(1).
- Huang, A, D Margaritis, and D Mayes (2001), "Monetary policy rules in practice: evidence from New Zealand", *Bank of Finland Discussion Paper* 18/2001.
- Lloyd, P and F Holmes (1991), "The Future of CER: A Single Market for Australia and New Zealand", Wellington: *Institute of Policy Studies*.
- McCaw, S and J McDermott (2000), "How New Zealand Adjusts to Macroeconomic Shocks: Implications for Joining a Currency Union", *Reserve Bank of New Zealand Bulletin* 63 1, 35-51.
- Mundell, R (1961), "The Theory of Optimum Currency Areas", *American Economic Review*, 51, 509-517.
- Mundell, R (1997), "Updating the Agenda for Monetary Union" in Blejer, M I (ed) *Optimum Currency Areas: New Analytical and Policy Developments*, Washington DC: International Monetary Fund.
- Murray, J (1999), "Why Canada Needs a Flexible Exchange Rate", Ottawa: *Bank of Canada Working Paper* 99-12.
- Plantier, L C (2003), "New Zealand's economic reforms after 1984 and the neutral real rate of interest", paper presented at the Analysing the economy for monetary policy purposes: key issues, Reserve Bank of New Zealand.
- Taylor, J B (1993), "Discretion versus Policy Rules in Practice", Carnegie-Rochester Conference Series on Public Policy, Vol. 39(1), pp.195-214.

Taylor, J B (1999), “The Robustness and Efficiency of Monetary Policy Rules as Guidelines for Interest Rate Setting by the European Central Bank”, *Journal of Monetary Economics*, June, **43**(3), pp. 655-679.

West, K (2003), “Monetary Policy and the Volatility of Real Exchange Rates in New Zealand”, *Reserve Bank of New Zealand Discussion Paper*, DP 2003/09.