Three Perspectives on an Australasian Monetary Union

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1.   Introduction

Whether Australia and New Zealand should have a single currency is periodically debated in New Zealand. There was a resounding 'No' when the question was discussed in the early 1990s, but there was less agreement when the debate resurfaced two or three years ago.[2] Indeed, the idea now has considerable support within New Zealand amongst academics, businessmen, and the general public.[3] Even the Prime Minister, Helen Clark, has suggested that an Australasian monetary union might be sensible. While there have been different motives for the debate, underlying them all is the following question: what policy goals are New Zealand hoping to achieve by having an independent currency and monetary policy, and are there alternative means to achieving these goals?

Whether Australia and New Zealand should have a single currency is hardly debated at all in Australia. Australian financial and political leaders have not considered the issue to be important, as it is assumed that a monetary union involves New Zealand adopting the Australian dollar, with control of the dollar remaining in Australian hands. While the lack of debate in part reflects greater confidence in the optimality of Australian monetary arrangements, it is odd that New Zealand's debate has been so half-heartedly followed. A monetary union decreases trade costs and increases economic integration, so it is at least possible that non-trivial benefits would accrue to Australians and Australian companies were New Zealand to adopt the Australian dollar.

The literature examining the probable costs and benefits of New Zealand forming a monetary union with Australia/adopting the Australian dollar is large, and growing larger. The literature analysing monetary unions is vast. This paper is not a summary of either literature, although it does note that the recent academic literature is broadly

2. See Lloyd (1990) and Grimmond (1991). Hargreaves and McDermott (1999) and Grimes and Holmes (2000) are excellent examples of the literature discussing a possible Australia–New Zealand monetary union.

3. Grimes and Holmes (2000) report that of 400 firms responding to a survey about their attitudes toward a monetary union with Australia, 57 per cent were favourably disposed, 14 per cent opposed and the remainder neutral. The One News-Colmar Brunton Poll of the general public, 18 September 2000, reported that 50 per cent were in favour of the idea, 36 per cent opposed to the idea, and the rest undecided.

supportive of monetary unions.[4] Rather, it approaches the issue of an Australasian monetary union from three different perspectives with the intention of raising the following questions:

(a)   why should Australia care?

(b)   what makes New Zealand different to Queensland?

(c)   when should a currency go quietly? and

(d)   can New Zealand have its cake and eat it too?

The first perspective is a comparison of the reasons why Queensland might want to adopt a separate currency with the reasons why New Zealand has its own currency. This analysis has two objectives: to identify the reasons why New Zealand may be sufficiently special to warrant not using the Australian dollar; and to identify the implications for Australia if New Zealand were to adopt the Australian dollar. The main implication for Australia is the possibility of a big increase in trade with New Zealand. The main reason for New Zealand to keep a separate currency is to have different nominal interest rates.

The second perspective concerns the lessons learnt from commodity futures markets. Currency markets have many features similar to commodity markets, in part because modern financial markets trace their antecedents to Chicago's wheat markets; but unlike currency markets, commodity futures markets cease to exist when they are no longer useful. This section outlines when a commodity futures market is no longer useful, and assesses how well the New Zealand dollar stands up to the comparison. Two essential criteria are that their yield curves remain distinct, and that the market remains liquid.

Finally, I wish to raise a question asked a century ago by Alfred Marshall (1923): should the state consider adopting new indexed units of account so that consenting parties could contract debt agreements in a unit other than money? If so, New Zealand could simultaneously adopt the Australian currency and continue to have peculiarly New Zealand financial contracts, thus gaining the microeconomic advantages of a single currency without losing the potential macroeconomic advantages of economic stabilisation. Fortunately there is some new evidence about the practicality of this vision from Chile's experience with the Unidad de Fomento.

Before beginning, I should define the phrase 'form a monetary union/adopt the Australian dollar'. I mean, 'adopt the Australian dollar'. The relative size of the economies means that an Australasian monetary union would be dominated by Australian concerns, and it is difficult to imagine how it would differ in practice from New Zealand simply adopting the Australian dollar. Moreover, no matter the formal constitutional arrangements of the monetary authority, it is unlikely to ignore the economy of a seventh of its monetary region even if it were only interested in the welfare of the remaining six-sevenths. Thus for the purposes of this paper, the

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4.   For example, see the papers by Dornbusch (2001), Rogoff (2001), Broda (2001), Alesina and Barro (2001), and Rose and van Wincoop (2001) in the May 2001 *American Economic Review*. Except Broda, these papers support monetary unification.

alternative to New Zealand maintaining a separate currency is for New Zealand to adopt the Australian dollar as its unit of account, and to declare the Australian dollar to be legal tender in New Zealand.[5] Naturally, for New Zealand to do this implies a great deal of trust in Australian political institutions, trust which may well exist given the close ties between the countries over the last century.

2.   Should Queensland Adopt a Separate Currency?

It proves insightful to compare the reasons why Queensland might want to adopt its own currency with the reasons why New Zealand might want to retain its own currency. The parallels are obvious:

- in population terms both are long thin countries whose three million residents are split about equally between a single large metropolitan area and a scattering of medium-to-large towns;

- both regions are separated by over a thousand kilometres from either Sydney or Melbourne;

- both have large agricultural industries with specialties different from the rest of Australasia (sugar and beef in Queensland and dairy and forestry in New Zealand); and

- in each region the service sector is three-quarters of the economy.

Of course, Queensland has a much larger mineral sector than New Zealand, but this is capital intensive and largely owned by non-Queenslanders.[6]

The literature assessing the costs and benefits of a region adopting a separate currency has evolved from that begun by Mundell (1961) and McKinnon (1963) forty years ago, but is still quite recognisable, and can be summarised in the following list.

(a)   Queensland would have its own medium of account (the 'quirk'[7]) in which wage, price and loan contracts would be denominated. Queensland would choose its own inflation rate and its own interest rate structure.

(b)   If Queensland's 'foreign' exchange earnings changed, an offsetting exchange rate change might occur, stabilising export incomes in terms of quirks and thereby stabilising demand in Queensland's non-tradable sectors.

(c)   Queensland's Government could order the Queensland central bank to print money as a means of repaying debt or of funding expenditure if it wished, a fund raising option that is occasionally useful and low cost.

(d)   There will be additional direct exchange rate costs for both Queensland and Australia.

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5.   New Zealand could adopt the Australian dollar as legal tender without making it the unit of account. Prior to the Civil War the US dollar and the Spanish real were both legal tender in the US.

6.   The mining sector produces 6.5 per cent of Queensland's GDP, but employs only 1.5 per cent of its workforce.

7.   Queensland interest rate krona.

(e) The volatility of the real quirk/Australian dollar exchange rate would increase, altering the distribution of income between the export, import, and non-tradable sectors.[8,9] There will be increased uncertainty about the value of Queensland's exports to the rest of Australia in terms of Queensland non-tradable products, possibly making Queensland firms less willing to export to Australia, and vice-versa. If some interstate trading arrangements were altered because firms were uncertain about future prices in the other region, there would be resource costs for Australia and Queensland.

(f) There would be indirect resource costs for Australia and Queensland if pricing decisions that are currently centralised and applied to the whole of Australia have to be made separately in Queensland.

The first two points represent the traditional macroeconomic advantages of having a separate currency, while the third concerns the political advantages of monetary sovereignty. The last three are the costs associated with having a separate currency, costs which are shared by both Australians and Queenslanders.

2.1   Benefits of monetary independence

An independent currency provides a country or region with the ability to achieve five main policy objectives. These are:

(1) the ability to alter the value of the currency to stabilise economic output;

(2) the ability to change interest rates to stabilise output;

(3) the ability to choose the inflation rate;

(4) the ability to change interest rates to alter income distribution; and

(5) the ability to commandeer resources by issuing legal tender.

2.1.1   *Monetary independence, exchange rate flexibility and economic stabilisation*

Monetary independence enables a region to stabilise output in the face of regionally specific economic shocks. By adjusting interest rates or the value of its currency, a region alters the relative value of wages and prices through time or between sectors, thereby altering the pattern of demand. The focus of the traditional optimum currency area literature is the way in which the exchange rate stabilises an

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8. Economists suppose that there is a distribution of possible exchange rate values at every moment. The distribution and its mean may vary through time. The statement simply means that the spread of the distribution around its mean value will increase.

9. When Queensland uses the Australian dollar as its currency, the real exchange rate is the ratio of the Queensland and rest-of-Australia price indices. Coleman and Daglish (1998) showed that the variance of annual changes in the Australia–New Zealand real exchange rate, 1966–1996 was approximately one hundred times as large as the variances of changes to the various state real exchange rates. Almost all evidence shows that the variance of the real exchange rate is much higher for flexible exchange rates than for fixed exchange rates: see for instance Flood and Rose (1995), Frankel and Rose (1995) or Flood and Taylor (1996).

economy in the face of economic shocks. It argues that exchange rate flexibility is useful when three conditions hold:

(1)   shocks are regionally specific;

(2)   alternative mechanisms for adjusting to shocks are weak; and

(3)   exchange rate changes are effective as a means of alleviating idiosyncratic shocks.

The case that either New Zealand or Queensland should have separate currencies begins by showing their economies are subject to regionally specific shocks. Several authors have examined the extent to which New Zealand's and Australia's economic cycles are correlated to ascertain if the temporary shocks affecting the two countries are similar. Typically GDP and the terms of trade have been analysed. One method is to examine whether new shocks to the economies occur at the same time, by analysing whether quarterly changes in output or the terms of trade are correlated. Another method is to see whether extended periods of booms or recessions occur at the same time, by analysing whether deviations from trend output are correlated. The former method is straightforward, but the latter depends on the way that trends in the data are treated. The results of these studies have been mixed, but it does not appear that the shocks to the New Zealand and Australian economies are that similar.[10]

Crosby and Otto (2000) examined the correlation of Australian and New Zealand GDP in both the 1980s and 1990s. They found little correlation between quarterly changes in GDP in either decade, the correlation coefficient being small and negative in the 1980s ($\rho=-0.20$), and small and positive in the 1990s ($\rho=0.19$). They argued, however, these correlations reflect both long-term supply shocks and short-term demand shocks hitting the economy, the latter being influenced by government attempts to stabilise the economy through monetary policy. By using statistical methods to isolate the supply shocks, they also showed that the correlation between the supply shocks was small, with $\rho=0.29$ in the 1990s.

Crosby and Otto also estimated the extent to which deviations from trend output levels were correlated. During the 1980s there was practically zero correlation; during the 1990s the correlation coefficient was 0.53, indicating some tendency for the two economies to move in tandem during the last decade. Hall, Kim and Buckle (1998) used a similar procedure for the 1977–1995 period, but estimated a correlation coefficient of 0.69 for the whole period. It is not clear why this estimate is so much higher, but possibly indicates that the results are sensitive to the way the trends in the data are treated.

Grimes and Holmes (2000) compared Australia's and New Zealand's terms of trade, adjusted for trend, between 1986 and 1998 and found them to be highly correlated ($\rho=0.69$). Using the same methodology, they showed that the correlation between New Zealand's trade-weighted exchange rate index and the terms of trade was small and negative ($\rho=-0.06$) indicating that the New Zealand dollar did not offset external price shocks. In fact there was a higher correlation between the Australian trade-weighted exchange rate index and New Zealand's terms of trade,

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10. See the review by McCaw and McDermott (2000).

although this was still small (ρ=0.28). While they did not estimate the correlation coefficient between the quarterly changes in Australia's and New Zealands' terms of trade, this is also small, approximately ρ= 0.16.

The Queensland State Government publishes estimates of the state's trade with the rest of Australia, so it is possible to calculate the correlation between Queensland's GDP and the GDP of the rest of Australia, and the correlation between Queensland's terms of trade and the terms of trade of the rest of Australia. Note that Queensland's terms of trade are calculated in terms of Queensland's trade with the rest of the world including the rest of Australia. Table 1 summarises these correlations. The data are graphed in Figures 1 and 2.

## Table 1: Correlation Coefficients of Shocks with Australia

	Queensland	New Zealand
GDP		
Trend correlation[a]	0.68	0.69
	(Coleman, 1984–2000,	(Hall, Kim and Buckle,1977–1995)
	vs Australia excl Queensland)	0.53
		(Crosby and Otto, 1990s)
		0.01
		(Crosby and Otto, 1980s)
Quarterly change correlation	0.09	0.19
	(Coleman, 1984–2000,	(Crosby and Otto, 1990s)
	vs Australia excl Queensland)	–0.20
		(Crosby and Otto, 1980s)
Terms of trade		
Trend correlation[a]	0.25[b]	0.69
	(Coleman, 1984–2000,	(Grimes and Holmes, 1986–1998)
	vs Australia excl Queensland)	0.56[b]
		(Coleman, 1984–2000,
		vs Australia excl Queensland)
Quarterly change correlation	0.25	0.17
	(Coleman, 1984–2000,	(Coleman, 1984–2000,
	vs Australia excl Queensland)	vs Australia excl Queensland)

(a)   Each series has a trend removed before correlation coefficients are calculated. Coleman removes a simple time trend from the logarithm of the data. Other authors use more sophisticated procedures.

(b)   The residuals may contain unit roots. If so, there is no long-term relationship between the terms of trade of Queensland, the rest of Australia, and New Zealand.

Sources: Queensland data – Office of the Government Statistician. Available at <http://www.oesr.qld.gov.au/views/economy/publications/qsa/qsa_fs.htm>. GDP data are seasonally adjusted. Terms of trade data are 'trend' data, ratio of all exports to all imports. New Zealand data – Statistics New Zealand, Terms of Trade Index, Series ref OTISTTZZ5. Available at <http://www.stats.govt.nz/b1statsnz.htm>.

Figure 1: Queensland and Rest of Australia – Quarterly Production
1984–2000, seasonally adjusted
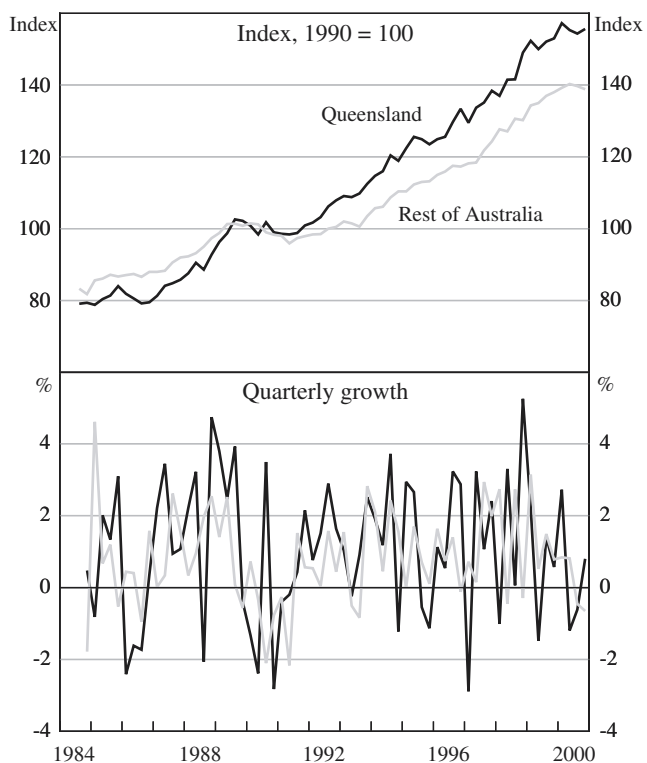
**Figure 2: Queensland, New Zealand and Rest of Australia –
Terms of Trade**
1984–2000
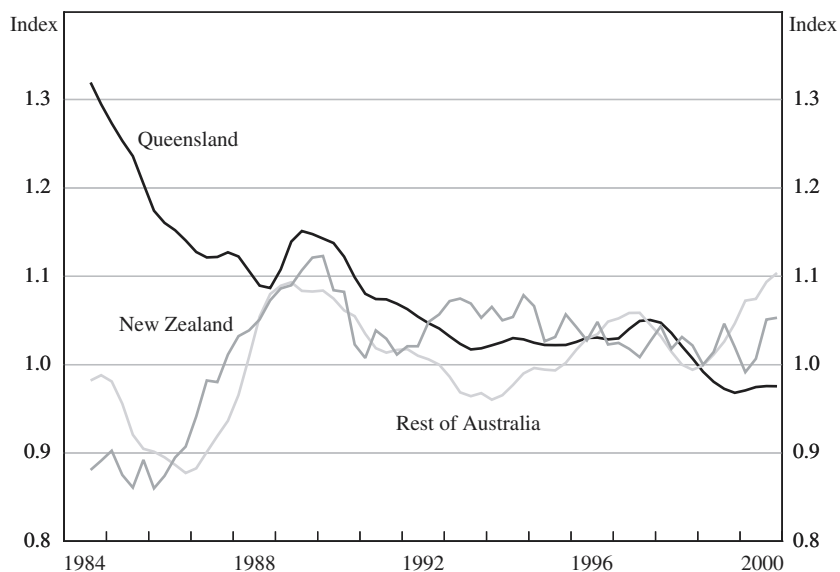
It is evident from Table 1 that neither the shocks affecting Queensland nor the shocks affecting New Zealand are highly correlated with those affecting the rest of Australia. On the basis of the New Zealand evidence, several authors have questioned whether the two countries are suitable for a monetary union (e.g. Crosby and Otto (2000), Wilson (2000)). They may be correct in raising such doubts; but as the Queensland data shows, having highly correlated economic cycles is not a necessary condition for successful inclusion in a monetary union.

If the shocks hitting Queensland and New Zealand are reasonably distinct from those hitting Australia, it is useful to consider whether the mechanisms for adjusting to shocks under a fixed exchange rate are similar. The extent to which a regionally specific economic shock affects income and output in a fixed exchange rate regime depends on wage and price flexibility, factor mobility across sectors and regions, and the degree to which private capital markets and government transfers smooth income and expenditure patterns. If wages and prices are flexible, exchange rate flexibility is redundant as goods and labour markets will adjust rapidly to ensure that total output (but not the composition of output) is stable in the face of shocks. If factors are mobile between sectors, the decline of one sector will be offset by the expansion of others as resources move. If factors are mobile across regions, regional unemployment (but not output) will be stable as people and firms migrate in response to a shock. If private capital markets operate efficiently, capital income will be distributed widely and regional expenditure patterns will adjust by little, so that an income loss in one sector will not be translated into lower demand for other sectors. If there are government transfers to and from an outside region, regional expenditure will be less affected by shocks than regional income, also reducing the transmission of an income loss from one sector to another.

Much can be and has been said about the importance of these conditions in determining whether two regions are suitable for a monetary union. The difficulties of making a case for separate currencies solely on these grounds are increasingly recognised, however. To do so, four propositions need to be believed:

(i)   that an economy is substantially more stable in a flexible exchange rate environment than a fixed rate environment;

(ii)   that this increased stability justifies the accompanying accelerated adjustment of the tradable sector in response to economic shocks;

(iii)   that the exchange rate will actually adjust in the required direction in response to economic shocks; and

(iv)   the potentially stabilising effect of exchange rate flexibility will not be offset by destabilising 'random' movements in the exchange rate.

The last three of these arguments apply equally to Queensland and New Zealand, but there are some differences in the first that mean Queensland has less to gain from exchange rate flexibility than New Zealand. Suppose under a fixed exchange rate regime there was a negative shock affecting the income earned by one export sector (say sugar). If wages and prices were inflexible, and if those experiencing the decline in income did not borrow, the loss of income will cause demand for goods and services sold in Queensland to fall, thereby lowering output generally. Some of the

flow-on effect would be mitigated by a decline in tax payments to the central government. The low output and high unemployment would continue until sugar industry resources move into other sectors, or some of the Queensland economy migrates to New South Wales, or wages and prices in other sectors adjust downwards.

In contrast, if an exchange rate depreciation occurs, incomes for other export industries (in quirks) will increase and the ratio of domestic prices to foreign prices will decrease, offsetting the demand flow-on effect on domestic industries. While output will have been stabilised, several adjustments will nonetheless still occur. First, wages in Queensland will have decreased compared to those in New South Wales, so some parts of the Queensland economy might still migrate south. Secondly, the sugar sector will still have suffered a decline in income compared to other export sectors, so resources will migrate to other sectors. The pressure for the sugar sector to adjust will be smaller, however, since its decline in profitability relative to the domestic sector will have been smaller.

A similar story applies to New Zealand, but with two differences. First, the migration to New South Wales will be less rapid, because it is financially and psychologically more expensive to cross the Tasman than to slip by Point Danger. That said, it is not expensive for New Zealanders to cross the Tasman, there are few legal restrictions preventing them crossing, and large numbers of New Zealanders have done so. Migration, while not as elastic as that between states, is still very elastic (Poot 1995). Secondly, a negative shock will not change the amount of tax sent from New Zealand to Australia, or the transfers sent the other way. This is not important if the New Zealand government can borrow, run down its reserves, or simply accumulate fewer reserves; in short, it is not important. In fact, because the New Zealand government can borrow more easily than the Queensland government, it could undertake greater countercyclical fiscal activity than is possible in Queensland. Consequently, adjustment in New Zealand under a fixed exchange rate regime should not be much slower than in Queensland.

There is, therefore, a possible answer to the first of the four questions: neither the Queensland or New Zealand economies are likely to be substantially more stable under a flexible exchange rate system than a fixed rate system. The Queensland economy is not notably unstable; the New Zealand economy is not notably stable; and each economy has several means of adjusting to economic shocks that do not involve exchange rate changes. This simple comparison has of course not proved this assertion, but it is consistent with the international evidence that the exchange rate regime is not an important determinant of output variability (Baxter and Stockman 1989; Flood and Rose 1995).

Moreover, even if the economy were more stable in response to external shocks, the other three questions need to be answered. In opting for flexible exchange rates, Queensland or New Zealand would be implicitly deciding that the benefits of more stable aggregate output outweighed the potential disadvantages of the different adjustment dynamic on the tradable sector. Two problems associated with adjustment under flexible exchange rates are possible. The first is the famous 'Dutch disease', when the expansion of one export sector causes such a rapid exchange rate appreciation that firms in other tradable sectors quickly shut down, resulting in

substantial unemployment. Such exits would occur under a fixed exchange rate regime, but they would take longer as firms in these sectors left in search of higher profits elsewhere, rather than being driven out by their own diminished profitability. The second is when exchange rate depreciations in the face of persistent negative price shocks slow down the movement of resources from the declining sectors by so much that an extensive reallocation to profitable sectors does not occur.[11]

The last two points are more problematic still. It is possible that an exchange rate is excessively volatile in the sense that it takes on values not warranted by economic fundamentals. If so, changes in the exchange rate may be the cause of shocks to the economy rather than a means of stabilising the economy; for instance, exchange rate movements unrelated to fundamentals may cause factories to shut down in one country and reopen in another. Economists have taken this argument seriously in the last decade, in response to both the volatility of exchange rates and a new theoretical understanding of the operation of incomplete financial markets. The incomplete financial markets literature is important for the optimum currency area literature because it suggests and formalises reasons why a separate currency can be welfare reducing. The main insight is that if the value of a currency is partially determined by factors unrelated to economic fundamentals, the use of the currency distorts the ability of agents to enter contracts aimed at reducing the fundamental risk they face. Moreover, if the 'noisiness' of the currency is sufficiently great, agents forced to use the currency will be worse off than if they were able to use a different currency.[12] This idea is one of the main economic reasons forwarded by the European Commission for forming a monetary union (Emerson *et al* 1992). As they wrote:

> The performance of flexible exchange rates is generally considered disappointing for several reasons… [the] stabilising properties of floating exchange rates are only apparent while facing country-specific i.e. asymmetric real shocks; symmetric shocks, especially supply shocks, give rise to beggar-thy-neighbour exchange rate policies as each country tries to export inflation or unemployment; moreover, monetary shocks to the exchange rate itself, which arise from failures in the international financial markets, are a source of instability. (p 56)

To summarise, therefore, it seems unlikely that a convincing case can be made for Queensland or New Zealand to maintain a separate currency simply on the basis of using the exchange rate to buffer the economy against shocks. The marginal benefits of such buffers may be small, and these benefits may be undermined by shocks stemming from unwarranted movements in the exchange rate. Other reasons are needed.

2.1.2 *Monetary independence, interest rates and the inflation rate*

Monetary independence enables a region to choose its own inflation rate and yield curve. In the past this often meant high inflation, but in the last decade most developed countries have achieved low inflation due to improvements in central

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11. Grubel (1999) argues that Canada is still overly dependent on commodity exports because the relative decline in the value of these exports has been disguised by a declining exchange rate.

12. Coleman (1999) offers a brief summary of this literature. See also Neumeyer (1998).

banking practice. As such, monetary independence is now both more practical and less useful, since most countries will have low inflation if they use a different currency. There are exceptions to this rule, countries such as Ireland or Hong Kong which have experienced extremely rapid productivity growth within a monetary union or fixed exchange rate regime and which have consequently experienced high 'Balassa-Samuelson' inflations. While New Zealand has lower productivity than Australia, the differences are not extremely large and it is not obvious that New Zealand would have noticeably higher inflation than it has now if it adopted the Australian dollar.[13] All the Australian states have almost identical inflation, for example, despite quite different economic structures. Consequently, a desire for low inflation is no excuse for New Zealand not to join the Australian dollar zone, assuming it trusts Australia to remain a low-inflation country.

The major problems with these Balassa-Samuelson inflations is not the price changes *per se*; such price changes do not represent a central bank failure to maintain the value of the currency in the wider monetary region. Rather it is the very low real interest rates available to agents living in the region. Local investors not wanting to purchase assets have no alternative but to receive very low, and possibly negative, real rates of return on debt instruments; consequently those whose ordinary preference is for debt instruments will find that high local inflation diminishes their real wealth. If a region is unhappy with the income distribution implicit in such low real interest rates, it may prefer monetary independence.

The argument for a region to have its own currency in order to influence income distribution is more general than this, however. Even if a region is not experiencing Balassa-Samuelson inflation, but the local inflation rate has a different cyclical pattern to that of other regions, people may prefer to have their own currency in order to determine their own local real interest rates. If local interest rates change in response to local economic conditions, asset prices will act countercyclically and thus agents can use contracts denominated in the local currency to provide themselves with income insurance. Conversely, as argued by Helpman and Razin (1982), a monetary union reduces the ability of agents to make financial contracts in a variety of units of account, and thus reduces the insurance possibilities open to these agents. The loss of these opportunities may entail a substantial loss of welfare.[14]

Monetary independence also gives a region the ability to implement countercyclical monetary policy. By altering the shape and level of the yield curve, the central bank can affect the rate of economic activity across the whole economy. The value of independent countercyclical monetary policy depends on the extent to which economic cycles are independent. In practice, however, whether monetary policy

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13. However, New Zealand would probably have slightly higher inflation than Australia because of differences in the way the two countries calculate inflation, particularly the housing component of inflation. Calculations by the author using disaggregated inflation data show that New Zealand CPI inflation between 1991 and 1996 would have been 9.2 per cent rather than 11.5 per cent if it were calculated using Australian methodology.

14. This need not be the case, however. If the value of the unit of account is excessively volatile, it can reduce welfare by increasing in a random manner the distribution of income (see Neumeyer (1998)).

can be fine-tuned to counteract the differences between New Zealand's and Australia's economic cycles, or the differences between Queensland's and Australia's economic cycles, is a moot point. Moreover, monetary independence can be costly, if foreign lenders demand an interest rate premium in return for holding domestic-denominated debt.

An independent yield curve means an independent currency, so the benefits of independent interest rates are accompanied with the potential costs and benefits of exchange rate flexibility. It is important to distinguish the two. By altering interest rates, the central bank alters the relative price of goods and services through time, affecting sectors which are time (interest rate) sensitive; when exchange rates change, the relative prices of goods and services between sectors are altered. These effects can reinforce one another, although they do not always do so. Interest rate changes affect a potentially wider range of sectors than exchange rate changes, and are thus a potentially more useful tool in stabilising economic output.

2.1.3 *Monetary independence and sovereignty issues*

Monetary independence provides a region with political powers, namely the ability to issue legal tender to raise funds. The inflationary consequences of raising funds in this manner normally mean it is a poor long-term option; but it can be extremely useful in emergencies. Many governments have issued legal tender to mobilise resources in the event of war; indeed, governments have historically controlled mints to prevent internal rivals from being able to do the same (Glasner 1997). More generally, control over money has been a right jealously guarded by governments as it provides them a means to redistribute income in the national interest from time to time. In the United States, for instance, the right to coin money and regulate its value was vested to Congress in the Constitution, and the US Government deliberately used this power to extensively change private contracts and redistribute income during the Great Depression.[15]

This is a major difference between Queensland and New Zealand. The Federal Australian government is not renowned for granting significant fund raising powers to the states, and Queensland has little use for the power to rapidly raise funds to wage war. In contrast, the New Zealand government may value the options provided by the control of the money supply. The value of these options depends on the marginal attractiveness of issuing legal tender in an emergency over the best alternative means of raising funds (e.g., a bond issue), or the value of being able to regulate the financial value of the currency over the next best means of regulating contracts. It would

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15. On June 5 1933, the US Congress passed a resolution stating that any debt contracts that had been written in terms of gold rather than dollars would be settled in terms of dollars. Consequently, when the government changed the value of the dollar from $20.67 to $35 per oz on January 31 1934, such 'gold clause' debt contracts were settled at a 40 per cent discount, that is, as if they had been contracted in dollars, not gold. Some $75 billion worth of contracts were affected. See Nussbaum (1957, pp 188–191).

appear the value of these options is small, given the readiness of European countries to forego them.[16]

The seigniorage earned by the government from the central bank is a different matter: while not extremely large, it is an appreciable sum, of the order of $NZ130m per annum in New Zealand. Australia could offer a proportionate share of the seigniorage earned by the Reserve Bank of Australia to New Zealand if New Zealand were to adopt the Australian dollar. The New Zealand government would have alternative options to obtain some of the seigniorage should Australia not willingly offer it: for example, it could allow banks operating in New Zealand to issue their own Australian-dollar-denominated banknotes, and tax some or all of the resultant revenue.[17] Nonetheless, New Zealand could rightfully wonder about the extent of cooperation between the countries were Australia not to share seigniorage.

2.2   The costs of a separate currency

Monetary and currency independence comes with two possible costs. First, the cost of trade with people outside the currency region rises, changing trade patterns. Secondly, an issue discussed in Section 3, agents may have to pay an interest rate premium in order to issue local-currency debt to foreign lenders. If these costs are sufficiently high, it may prove to be the case that there are better ways for a country to achieve its policy objectives.

2.2.1   *Queensland and New Zealand trade patterns*

When a country enters or exits a monetary union, its trade patterns change, altering foreign exchange costs and resource use. The basic trade patterns for New Zealand and Queensland for the 1998/99 financial year are presented in Table 2. Queensland's exports of goods and services to the rest of the world (including the rest of Australia) were 33 per cent of gross state product, compared to 31.5 per cent in New Zealand; Queensland's imports were 41 per cent of gross state product, compared to 33.5 per cent in New Zealand. In short, Queensland's trade with the rest of the world was larger than New Zealand's but not notably so. However, Queensland had much larger trade with the rest of Australia than New Zealand had with Australia: exports were 11.4 per cent versus 6.8 per cent for New Zealand, while imports were 25.1 per cent versus 7.8 per cent for New Zealand.

These data suggest two things. First, even if Queensland adopted the quirk and maintained its current trade patterns, the direct exchange costs would not be particularly large. Queensland's trade with the rest of Australia totals $35 billion per year; if Queensland had a separate currency, and direct costs were 0.4 per cent, there would be foreign exchange costs of $70 million each for Australia and

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16. Given the size of New Zealand's defence industry, the value of the New Zealand Government printing money to mobilise domestic resources to deal with a military emergency must be small.

17. Scottish banks issue their own banknotes, but all of the seigniorage is kept by the Bank of England.

Table 2: Trade Patterns of Queensland and New Zealand
1998/99

	Queensland		New Zealand	
	$billion	%	$billion	%
GSP/GNP	98.7		78.6	
Exports				
– Australia	11.3	11.4	5.4	6.8
– Rest of world	21.3	21.6	18.6	23.7
– Total	32.6	33.0	24.0	31.5
Imports				
– Australia	24.8	25.1	6.1	7.8
– Rest of world	15.6	15.8	20.2	25.7
– Total	40.4	40.9	26.3	33.5

Note: New Zealand figures converted to Australian dollars assuming 1A$ = $1.25 NZ
Source: Office of the Government Statistician (2001), Table 1

Queensland. Exchange rate transactions associated with financial transactions would raise these totals, but even if they were tripled they are only 0.2 per cent of Queensland's state product, and a much smaller fraction of Australia's GDP.[18] If New Zealand were to adopt the Australian dollar, the direct exchange rate savings would be smaller still, since trade is smaller; however, the 'shadow' savings could be of this magnitude, if trade patterns between Australia and New Zealand changed to resemble those between Queensland and the rest of Australia.

Secondly, some of Queensland's trade with the rest of Australia might end if Queensland were to adopt a new currency. This is an issue upon which economists have been unable to reach a conclusion: to what extent do regions with separate currencies trade less than they would if they used a single currency? Until recently, the consensus opinion was that the exchange rate regime was an unimportant determinant of trade patterns. For instance, there is a large empirical literature examining whether exchange rate volatility reduces trade, but because the results have not been consistent the consensus was that high exchange rate volatility has only a small negative effect on trade volumes.

This consensus has been subject to some recent re-evaluation. Research using Canadian and US data has shown that trade between regions within a country is much greater than trade between countries. For example, inter-provincial trade between any two Canadian provinces is approximately twelve times as great as trade between

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18. These totals would be higher if indirect costs associated with purchasing foreign exchange, including management costs and time spent transacting, were included.

Canadian provinces and US states, once distance and economic size are taken into account (McCallum 1995; Helliwell 1998).[19] The analysis of provincial 'exports' shows that Canadian firms do not find US destinations to be close substitutes for Canadian destinations; similar analysis for 'import' flows shows that US products are not close substitutes for Canadian products in Canadian provinces.

Helliwell (1998) showed that the Canadian 'home bias' was more pronounced for the industrial eastern provinces than for the western provinces that specialise in the production and export of natural resource commodities. In particular, it appears that intra-industry trade, not inter-industry trade is more sensitive to the effect of borders. He also found some evidence that the bias was in part a consequence of distribution chains that are organised along national lines, as goods are imported first into one province and then redistributed to others.[20]

Other evidence is broadly consistent with this result. Wei (1996) estimated a gravity model for OECD nations and found that on average a country's internal goods trade is 10 times as large as its external trade, conditional on distance and economic size. A more sophisticated estimation procedure suggested that this 10-fold home-bias reduced to 2.5 once additional allowance was made for the fact that countries typically have much greater trade with countries which share a common land border and which speak the same language.

New Zealand is yet to seriously countenance joining Australia, so the relevant question is how much external trade is reduced because different countries have different currencies. Helliwell does not answer this question; he argues that the home bias is caused by a combination of domestic distribution systems, foreign exchange costs, and the costs of dealing with different regulations and legal codes in different countries. In contrast, Rose (2000) estimated a gravity model of trade between countries, making an allowance for pairs of countries that were in a currency union and those that were not. While many of these countries are tiny (for instance the currency unions include Australia with Kiribati, Nauru, and Tuvalu, and New Zealand with Niue and the Cook Islands), others are not. Despite extensive re-estimation to take into account one set of controls or another, Rose, and subsequently Frankel and Rose (2000), consistently found that countries in a currency union trade three times as much as countries not in a currency union, conditional on all other factors. In addition, they estimate that over a 20-year period, this increase in trade converts into higher GDP per person, with a 1 per cent increase in the trade/GDP ratio leading to a $^1/_3$ per cent increase in GDP per capita.

These estimates were further revised by Rose and van Wincoop (2001). They estimated how trade would expand if two countries were to form a monetary union, taking into account the effect of existing multilateral trade relationships. The

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19. McCallum estimated a 'gravity' model which links trade flows between regions to the size of each region's GDP and the distance between them. His estimates, for 1988, suggested that province–province trade was 20 times as large as province–state trade. Helliwell subsequently showed that this bias reduced to a factor of 12 after the North American Free Trade Agreement was passed.

20. This was particularly evident in the transport sector.

expansion in trade is different for every prospective monetary union; for instance they estimate that the euro will cause a 58 per cent increase in trade within Europe, and if Canada were to dollarise this would increase Canada–US trade by 38 per cent. They estimated that an Australia–New Zealand monetary union would increase trade by 125 per cent, although the welfare effects of this increase would be small, about 2 per cent.

Both of these empirical literatures are consistent with the differences between Queensland's and New Zealand's trade patterns. As a fraction of GDP, Queensland's exports to the rest of Australia are 65 per cent larger than New Zealand exports to the whole of Australia, while imports are 220 per cent larger. While these numbers are consistent with Rose's estimates of the effect of a currency union on trade, they are smaller than the differences between inter-provincial and inter-country trade noted for Canada and the United States. Nonetheless, two aspects of Canada–US trade are consistent with the Queensland–Australia trade pattern. First, interstate trade is smaller in the Canadian states that specialise in resources rather than in manufacturing – and it will be recalled Queensland's exports are dominated by primary products, for which there is a smaller demand in Australia than abroad. Secondly, Queensland imports a very large fraction of its goods from the rest of Australia. Many of these imports are presumably imported into Sydney and Melbourne and then redistributed to Queensland through national distribution chains, just as transport equipment is distributed throughout Canada through Ontario.

The extent to which Queensland's markets are integrated with those of the rest of Australia is also evident in prices. Coleman and Daglish (1998) examined the prices of 30 items sold in supermarkets in each state capital and in New Zealand over the period 1984–1996. They found that prices in each state capital moved very closely with each other, whereas prices of identical items sold in New Zealand moved quite independently, even if the item were only produced in Australia. Many pricing decisions appear to be made centrally within Australia, but made differently in New Zealand. It may be the case that the potential for large changes in the Australia–New Zealand exchange rate means it is too risky to change New Zealand prices only when Australian prices change.

The big differences in the Queensland–Australia trade patterns and the New Zealand–Australia patterns is the major reason why Australia should care about forming a monetary union with New Zealand, and why Queensland might have reason to be concerned about monetary succession. If a large part of these differences is caused by the different exchange rate relationships, then New Zealand and Australia can expect a large increase in trade if they form a monetary union. It may be the case that many of New Zealand's import networks change, with imports increasingly distributed via Sydney and Melbourne.[21] Retailers on both sides of the Tasman may begin to look even more similar than they currently do, and some

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21. However, such centralisation might not occur if customs procedures in the two countries mean that goods going to New Zealand via Australia still have to be inspected twice.

distribution functions may migrate from New Zealand to Australia as New Zealand and Australian firms take advantage of economies of scale. At the same time, intra-industry trade between the manufacturing sectors should increase.

3.   Commodity Markets and Currency Markets

The similarities between commodity markets and currency markets frequently go unnoticed. Part of the reason is that commodities markets are not usually considered to be debt markets, even though the quintessential commodity market transaction, a commodity hedge, and the quintessential foreign exchange contract, a foreign exchange swap, have exactly the same characteristics. A foreign exchange swap agreement is when someone simultaneously purchases a currency for spot delivery and sells it for forward delivery, making or receiving a payment that depends on relative interest rates. This is equivalent to lending one currency while borrowing another. A commodity hedge is when someone simultaneously purchases the commodity for spot delivery and sells it for forward delivery, making or receiving a payment that depends on relative interest rates. This is equivalent to lending currency while borrowing the commodity. In this case, however, the second interest rate is not a currency rate, but the implicit 'own-interest rate' of the commodity.[22]

Own-interest rates were first noted by Sraffa (1932) and Keynes (1936), and have been subject to periodic research ever since. They are mainly implicitly defined – if you borrow a barrel of oil, the number of oil barrels you repay is calculated as the ratio of the spot price to the forward price adjusted for the money interest rate – but sometimes they are explicitly defined, as is the case with uranium.[23] Commodity futures markets have an array of possible forward contracts, so there is an implicit yield curve for each commodity, just as there is a yield curve for each separate currency. Commodity interest rates are volatile, in part because they are not controlled by central banks.

Some agents wish to borrow or lend a commodity and repay or be repaid in the same form since they have an underlying use for the commodity and find it easier to structure their business in terms of the commodity rather than money. For a commodity loans market – a futures market – to flourish, there need to be sufficient agents who benefit from lending or borrowing in that particular commodity rather than in some other commodity or currency. It appears that a necessary condition for such a market to exist is that the commodity futures prices are not highly correlated with other prices, so that holders of the commodity would be exposed to considerable price risk when repayment were due if their loan was contracted in another commodity or currency. In addition, transactions costs in the market need to be low. If there are more 'natural' borrowers – such as oil refineries wishing to access stocks of oil – than lenders, a premium will be paid and oil interest rates will be high.[24]

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22. Williams (1986) expands on this point at length.

23. $\left(1 + r_{commodity}\right) = \dfrac{P_{spot}}{P_{forward}} \times \left(1 + r_{money}\right)$

24. In particular, the spot price will be higher than the futures prices, so the market will be in backwardation.

Conversely, if there are more natural lenders than natural borrowers, interest rates will be low to induce people to borrow in a form that is not naturally convenient for them.

There is currently a natural demand for many New Zealanders to borrow and lend in New Zealand dollars because their other obligations are denominated in New Zealand dollars and they do not want to be bothered by exchange rate fluctuations or exchange rate transaction costs. Since New Zealanders are net borrowers on international markets, foreign lenders typically charge a premium. Hawkesby, Smith and Tether (2000) estimated the currency component of this risk premium against both the Australian and US dollars between 1990 and 2000. For 90-day rates, the premium exceeded 1.0 per cent against the Australian dollar, and 2.8 per cent against the US dollar; for 1-year rates, the premiums were 0.8 per cent and 2.4 per cent respectively; and for 10-year bond rates, the premium was near zero (and possibly –0.4 per cent) against Australia, but 1.9 per cent against the US. On the whole the premiums were much lower in the last two years of the period than the earlier years.

These commodity markets are of interest to the question of New Zealand forming a monetary union because commodity futures markets regularly start up and shut down. Carlton (1984) analysed the 180 different futures markets that operated between 1921 and 1984 and found that 57 per cent of them finished within 10 years of either their start date or 1921, and 78 per cent of them finished within 20 years. Including markets that already existed in 1921, the median life expectancy of a futures market was seven years; of those markets that began after 1921, the median life expectancy was only five years. In short, a large number of these markets simply ceased to exist when they were no longer considered useful. Some of these markets shut down because there was no interest in having two or more spatially separated futures markets for the same commodity; others shut down because technological developments made redundant previously important differences in sub-varieties of a single commodity.

Carlton (1984) used this historical experience to consider the salient features of successful and unsuccessful futures markets. Williams (1986) extended this analysis to consider why some maturities and not others were traded on successful futures markets. The answers consistently point to two factors:

(i)   a commodity yield curve's *spreads* need to move independently of other commodity yield curves; and

(ii)   a futures market needs sufficient liquidity that participants can be confident that they can trade without waiting excessively.

These two conditions are related, because if the yield curve for one commodity is highly correlated with another, or the futures price for different months of the same contract are highly correlated with one another, agents will substitute from one contract to the most liquid one. This is the reason why futures markets in commodities like gold tend to exist in one or two cities only. Yield curves are highly correlated if the cross-price demand or supply elasticities of the commodities are high. Note that

if two commodity yield curves simply differed by a constant amount, the above conditions would imply redundancy for one market: agents could arrange futures contracts in the other market knowing that the appropriate premium or discount would not change.

These criteria can be translated into several questions about New Zealand dollar debt markets. Since an extra currency is potentially useful if either its foreign exchange value or its interest rate structure are predictably different than other currencies in different states of the world, the first question is whether New Zealand interest rates have differed from foreign interest rates, and whether there is a good reason to expect them to be different in the future. The second question is whether the value of the currency in terms of other currencies (particularly the Australian dollar) is constant, or whether it systematically varies with the state of the world. The third question is whether New Zealand dollar debt markets are likely to remain sufficiently liquid that trading in New Zealand dollar paper remains low cost.

Full answers to these questions are beyond this paper, and I shall not attempt to address the second question other than to note that the New Zealand dollar is obviously not constant in terms of the value of other currencies, but its value is not clearly systematically related to the state of the world either.[25] Nonetheless, it is of interest to address the first question because, if New Zealand were to adopt the Australian dollar, it would no longer have separate interest rates.

Since 1985, both New Zealand and Australia have had different interest rates to most other countries. Australasian interest rates, shown in Figure 3, have been broadly similar over the period, in part because the two countries have had similar disinflation experiences. There were sizeable differences in both bill and bond rates prior to 1989, but since then bond rates in the two countries have paralleled each other closely. In contrast, Australasian bill rates differed substantially between 1993 and the end of 1998, despite being similar in 1991 and 1992. Since the end of 1998, and following the adoption of new operational procedures by the Reserve Bank of New Zealand, both 90-day bill rates and 10-year bond rates have been very similar in the two countries. This is evident from the means and standard deviations of the differences in Australian and New Zealand interest rates, calculated for sequential two-year periods and presented in Table 3.

While these data show that Australasian interest rates were not the same over the period, interest rates have been nearly identical since late 1998, and were this to continue it would raise doubts about the need for two currencies. The relevant question, therefore, is whether New Zealand dollar and Australian dollar interest rates can be expected to differ significantly in the future. To answer this question,

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25. The New Zealand dollar cross-rate with the Australian dollar is notably less volatile than other bilateral rates, however. The more general question of whether a separate currency can be justified because it is not perfectly correlated with other currencies is problematic because of the excessive volatility of exchange rates. It may be the case that currency variation is mainly extraneous noise. There is little evidence that movements in any exchange rate can be systematically related to macroeconomic variables over horizons shorter than two or three years, for instance.

Figure 3: Interest Rates
1985–2001
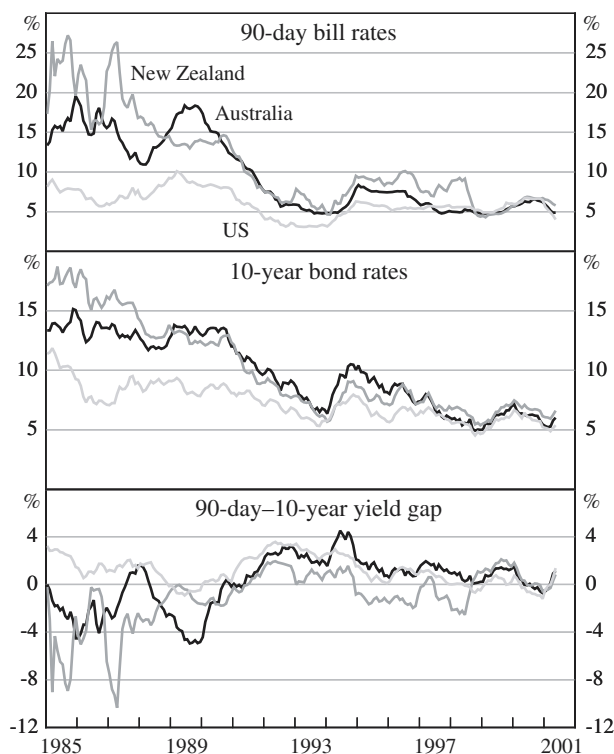
Table 3: Mean-difference between New Zealand and Australian Interest Rates

	90-day bank bill		10-year bond		Yield gap	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
1985–1986	4.97	3.92	3.37	1.13	−1.61	3.12
1987–1988	4.97	3.23	1.81	0.86	−3.17	2.58
1989–1990	−2.36	2.19	−0.67	0.50	1.69	2.11
1991–1992	0.00	0.49	−0.77	0.43	−0.77	0.51
1993–1994	1.13	0.61	−0.88	0.62	−2.01	0.89
1995–1996	1.72	0.68	−0.83	0.74	−2.55	0.35
1997–1998	2.31	1.45	0.54	0.43	−1.76	1.25
1999–2000	0.08	0.32	0.46	0.21	0.38	0.24

Notes: New Zealand interest rates minus Australian interest rates. Yield cap is the bond rate minus
          the bill rate. Standard deviation is calculated from monthly level data.
Sources: Reserve Bank of Australia; Reserve Bank of New Zealand

the reasons why Australian and New Zealand interest rates ever need to differ should be considered.

There are three reasons why New Zealanders might want different interest rates.

First, they may prefer to borrow and lend in New Zealand dollars because the interest rates on these contracts are pro-cyclical with the New Zealand economy, providing them with insurance against shocks that would not be available if they contracted debt in the currency of another country.

Secondly, the Reserve Bank of New Zealand might wish to counteract shocks that are specific to New Zealand, altering the yield curve to offset local booms and busts or to ensure the value of the currency in terms of New Zealand prices is maintained. This is not a sufficient condition for separate currencies, however, for neither Queensland's nor New Zealand's real GDP are highly correlated with the real GDP of the rest of Australia, and European countries experience different real shocks. Nonetheless, if the Reserve Bank of New Zealand believes that it can accurately offset real shocks to the New Zealand economy by shifting the yield curve, that these interest rates shifts will be different to those implemented in Australia, and that there will be few adverse effects from such shifts (such as excessive exchange rate volatility), it has a reason why the New Zealand dollar should be kept.

Thirdly, the government may want to control the real interest rate structure in order to influence local income distribution. For instance, if Australia and New Zealand have different productivity growth rates, the inflation pressures will be different even in a monetary union, and under these circumstances New Zealand might want different interest rates, perhaps to ensure local real interest rates are positive. A related reason concerns the possibility of different house price inflation in each country. While this has not prevented a successful monetary union within Australia, central banks (and their subjects) in the two countries may have different opinions on the appropriate relationship between interest rates and asset price inflation. For example, New Zealanders may have a stronger preference for interest rates to be sensitive to house price inflation than Australians, so that the real value of debt in terms of house prices is more stable. If so, New Zealand may wish to have different interest rates to reflect this in the future. House price inflation has been important in New Zealand in the past: short-term interest rates and the exchange rate have been highly correlated with house prices since 1986. Grimes and Holmes (2000, p 65) estimated the correlation between the New Zealand trade weighted exchange rate index and the New Zealand house price index was $\rho=0.94$. In contrast they estimated the correlation between the Australian trade-weighted exchange rate index and the Australian house price index was $\rho=0.56$.

Notwithstanding these reasons for New Zealanders to want their interest rates to be different to those of Australia and the rest of the world, it is also possible that interest rates will be different to Australian interest rates even though this situation is not wanted. They will be different so long as cross-price elasticity of supply or demand for debt in the two currencies is not particularly high: that is so long as Australian dollar debt denominated contracts are not close substitutes for New Zealand dollar debt contracts. There are at least two reasons why this may be

the case. First, New Zealanders may wish to borrow in New Zealand dollars because their incomes and assets are in New Zealand dollars, and they prefer to match their liabilities in the same currency because they are concerned about exchange rate volatility or the cost of transacting in another currency. Even if everyone preferred the foreign currency, no one would use it because of the convenience of using the local currency when everyone else was using it. Secondly, New Zealanders may have little choice, because banks will only lend to them in New Zealand dollars, in part because concern about exchange rate volatility means the banks want to ensure the assets and liabilities of their customers are in the same currency as their incomes.[26]

These reasons for having a separate currency are artificial in the sense that the existence of a currency automatically creates its own demand by introducing additional transactions costs and volatility that make other alternatives costly. In this case, it is possible that interest rates and inflation rates would be different in the two countries because of different approaches to monetary policy in the two banks. Put crudely, interest rates might be different because of different responses to economic shocks, rather than different underlying shocks. This is not a good reason to preserve separate currencies, even if the yield curves in the two countries were quite distinct. Rather, welfare would be improved by eliminating the currency (Neumeyer 1998).

To summarise, there are some reasons why New Zealanders may continue to want to have their own yield curve. They may want to engage in counter-cyclical monetary policy against peculiarly New Zealand shocks; they may want the value of their assets to move counter-cyclically with the state of the economy; or they may want some hand in choosing their own real interest rates, for reasons of income distribution. Unfortunately, empirical evidence that the yield curve is independent is not sufficient evidence of these desires. The yield curve could have been independent inadvertently; it may have been independent because of the difficulty of maintaining the value of the currency in a small economy; and the fact that New Zealanders use New Zealand dollar debt may simply be a preference for local currency debt, whatever the local currency may be.

The second of Carlton's criteria concerns the liquidity of each market. Liquid markets have lower transactions costs than illiquid markets, as large trades can take place without altering prices. The Australian dollar foreign exchange market is much larger than New Zealand's foreign exchange market, and there has been some comment that liquidity in the New Zealand dollar market is becoming problematic. This may be so; unfortunately data on the topic are collected only periodically, and data for 2001 year are yet to be released. The best data come from the Bank for International Settlements. Daily turnover figures by currency for several small countries are presented in Table 4. The data show that turnover in New Zealand dollars is small by the standards of currencies of other small countries; whether it is sufficiently small to make trading difficult is unclear.

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26. Most New Zealand banks, predominantly Australian-owned, will not lend Australian dollar mortgages against New Zealand residential property.

Table 4: Daily Turnover in Local Currencies
US$billion

	1992	**1995**	**1998**
Australia	12.4	16.3	23.6
New Zealand	1.9	4.0	4.9
Norway	2.3	3.5	5.4
Singapore	2.4	5.9	17.6
Sweden	10.9	9.9	6.3
Switzerland	31.6	35.1	31.6

Source: Bank for International Settlements – 1992 data: *Central Bank Survey of Foreign Exchange Market Activity,* Table 2-D; 1995 and 1998 data: *Central Bank Survey of Foreign Exchange and Derivatives Market Activity*, Tables 1-G (1995 survey) and E-7 (1998 survey).

Figure 4: Australia–New Zealand Exchange Rate
1985–2001

Two points suffice to conclude this section. First, the parallels between commodity markets and currency markets can only be pushed so far. The government is a much more important factor in debt markets than in commodity markets. Unlike a redundant commodity market, the New Zealand dollar market will not slowly die from lack of liquidity; it has legal protection, and there are large externalities from the use of a single currency within a region that mean that New Zealanders will be slow to drop the dollar unless it is abolished by the Government (Dowd and

Greenaway 1993). Even if New Zealanders were better off if they all switched to the Australian dollar, it is extremely costly for an individual to switch when other New Zealanders do not.

Secondly, if New Zealand were to adopt the Australian dollar, this analysis predicts there would be two effects on Australian dollar financial markets. First, liquidity would increase, probably by a sixth, maybe more. This would be a positive advantage for Australia. Secondly, Australian dollar interest rates might rise (or the dollar might fall), as there would be an increased demand to borrow Australian dollars on international markets, and the risk premium for Australian dollar assets might increase. How one quantifies the size of this effect is difficult, because these premiums depend on factors other than just the volume of assets borrowed and lent.

4.   Indexed Unit of Accounts

The time has arrived for inquiring whether we cannot adopt the suggestion made early in this century, that the government should publish a tabular standard of value for optional use within the United Kingdom in all transactions which extend over a long period of time. It could be used, for instance, in long leases, in mortgages, and all other borrowings of capital for long periods…the index numbers with which we are already familiar would give a ten times better standard of value for optional use within the country in long-standing contracts than even a true bimetallic currency. (Marshall 1926, p 31)

An official index number, representing average movements of the prices of important commodities, might well afford the basis of a Unit of general purchasing power, in terms of which long term obligations might be expressed: and in this matter the State might advantageously lead. …A new contract for interest on loans and other long-standing obligations might then be arranged by free consent of both parties to it in terms of the standard unit, instead of money.

There might also be gradually set up special Units, each adapted to the conditions of particular classes of industries and trades: and any of these might be adopted, by consent of both parties, as the basis of a loan or other engagement: such bargains could be enforced without difficulty by Courts of Law. (Marshall 1923, p 36)

It is a curious fact that Marshall's vision of multiple units of account has been so wrong. There are liquid debt markets in a large number of different currencies, many of which have been badly prone to inflation; there are liquid loan markets in wheat, copper, oil, and live cows, all of which are used by specialists; but there are practically no liquid markets in indexed units of account. Yet a moment's reflection suggests such markets are potentially useful. CPI indexed debt provides protection against inflation, a cause of substantial wealth redistribution for most of the century. Debt indexed to nominal GDP would automatically generate pro-cyclical movements in nominal interest rates. Debt indexed to other indices could also be useful. If there were debt contracts indexed to Auckland house prices, for instance, people could save to purchase a house without fear that sudden house price increases would undermine their savings. Those borrowing to purchase a house, or their bankers, could do so without fear that a house price decline would leave them insolvent. Yet

such indexed units are conspicuous by their absence, and even when introduced have tended to be unsuccessful (Campbell and Shiller 1996).[27]

The major exception is the Unidad de Fomento (UF), a CPI indexed unit of account introduced in Chile in 1967. It became popular in the early 1980s and even though it is not legal tender it is used widely in the banking system. Most mortgages and car loans are denominated in UFs; long-term government securities and 90-day bank deposits are denominated in UFs (but 30-day deposits are typically denominated in pesos); houses offered for sale are often quoted in UFs; but smaller items, including cars and almost all retail items are quoted in pesos; and wages and salaries are quoted in pesos (Shiller 1998). The value of the UF is changed daily, using a formula that interpolates the previous month's CPI inflation rate. Given the way that the peso and the UF interact, most long-term contracts are protected from inflation while transaction costs for day-to-day economic activity are kept to a minimum. A person with one UF on deposit in a bank would be repaid $(1+r)$ UF on maturity, where r is an interest rate denominated in UFs, and the whole sum is then converted into pesos at the prevailing index rate and paid out in pesos. The parallel with a commodity loan is obvious.

Marshall's proposal is particularly intriguing in the context of a monetary union. The idea suggests a way that a country could gain the microeconomic advantages of a currency union without sacrificing all of the potential macroeconomic advantages of a separate currency and yield curve. The country could simultaneously adopt the currency of another country and introduce new units of account indexed to a local index such as GDP, the CPI, house prices, or the terms of trade. Those people who wanted contracts whose value depended on the state of the local economic cycle would be able to make such contracts assuming, of course, that the contracts were sufficiently liquid to justify a market. Those for whom such considerations were unimportant would simply make contracts in the new currency. If a large enough fraction of the population were interested in these contracts, changes in the indexed interest rates would have an effect on the economy. In this case a local central bank could use the contracts to counteract cyclical booms or recessions.[28]

Carlton's analysis of successful and unsuccessful commodity futures markets is directly relevant here. First, an indexed unit of account contract is only likely to be successful if its yield is not highly correlated with the yield on other contracts. House

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27. The reasons why such contracts have not been successful in the US are complex. Theis (1995) notes that in 1939 the Supreme Court extended its 1935 ruling on the Gold clauses [whereby Congress ruled that contracts denominated in gold had to be settled in devalued dollars] to rule void all forms of debt indexation. This ruling was not repealed until 1977. As he notes, 'The non-flood of debt indexation that followed could be because of the dependence of debt indexation on the will of the Congress' (p xii).

28. There are several unresolved issues inherent in this statement. There has been little analysis of the economics of multiple media of account within a single economy. An exception is Cowen and Kroszner (1994). A central bank is limited in the extent to which it can intervene to determine interest rates denominated in an indexed unit of account, because it cannot supply the unit perfectly elastically. Stabilising interest rates in this case is more akin to stabilising commodity prices.

price contracts and nominal GDP contracts would appear to have the necessary yield independence. However, a lack of yield independence may explain why ordinary CPI contracts have not been particularly popular. If the yield on currency deposits accurately anticipates inflation most of the time, the estimated correlation between the yields on indexed contracts and currency contracts will be high even if there is little correlation between the two yields because of rare bouts of extremely high inflation or deflation. In this case, interest in the contract may wane during ordinary periods when inflation was predictable. It is worth noting that the Unidad de Fomento was born in a period of high inflation, even though inflation in Chile is now moderate.

Liquidity is a second issue. On *a priori* grounds, there are no obvious reasons why contracts denominated in indices that have low correlation with currency yields do not exist in countries where they are legal. One explanation for the low popularity and general non-existence of such contracts is that there is little demand for contracts that protect individual income against inflation or relative price changes.[29] If so, it begs the question why governments find it important to maintain separate currencies to stabilise aggregate income. The second possibility, evident in the history of the Unidad de Fomento, in the histories of various failed commodity markets, and even in the history of the first indexed share market fund (introduced in the 1970s and phenomenally successful ever since) is that it takes considerable effort to create a successful, liquid market. Shiller (1993) argues this point in the context of indexed units of account; Williams (1986) makes the same point in the context of commodity futures markets. A new contract has to be specified properly, it needs to be well marketed to customers, and it needs to have low transactions costs. New contracts frequently fail early in life; for this reason they need nurturing during their early stages, even if there is high 'natural' demand for the contract. The history of the Unidad de Fomento is instructive; it took fifteen years and the introduction of daily indexing before the UF became widely used.

What then for New Zealand, or Australia? The question of indexed contracts raises curly questions and intriguing possibilities. If these contracts are not widespread because there is no demand for counter-cyclical asset price insurance, one of the main arguments in favour of either country maintaining a separate currency vanishes. To be sure, counter-cyclical monetary policy can be justified if it prevents downturns (or overly robust expansions) and not just provides insurance against them; but such belief in the potency of monetary policy is not universally held, even if it has been fashionable in the last decade. Moreover, even if it were true that central banks could effectively counteract large shocks affecting large areas, it is not clear that there are large gains to be had from small central banks, because it may not be possible to fine-tune monetary policy that finely.

In contrast, if indexed contracts are not widespread because they are difficult to introduce, even though there is considerable latent demand – a scenario which is suggested by the success of the Unidad de Fomento – the New Zealand government

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29. See the discussion in Shiller (1998).

should consider experimenting with the introduction of new indexed contracts. The government would be a natural issuer of debt indexed to nominal GDP, given that its tax revenues provide it with a natural hedge; it is therefore well placed to experiment retailing such contracts, or supporting financial institutions interested in creating private sector debt instruments. Such expenses would be warranted if a major fear of entering a monetary union were concern that real New Zealand interest rates would be too low in the future; the existence of these contracts would provide peculiarly New Zealand interest rates to those who wanted them.

The simultaneous introduction of new indexed units of account and the adoption of the currency of another country sidesteps the issue raised by Helpman and Razin (1982), that eliminating a currency reduces the ability of agents to insure against shocks when financial markets are incomplete. It also sidesteps the problem identified by Neumeyer (1998), that the insurance possibilities provided by large numbers of currencies may be undermined by the excessive volatility of these currencies, for there is no reason why indexed units of account should be volatile. Given the practical success of the Unidad de Fomento, it might be time to investigate Marshall's nineteenth century vision further.

5.   Conclusion

The paper began by posing four questions. I would like to end by furnishing four tentative answers.

5.1   Why should Australians care whether or not New Zealand adopts the Australian dollar?

There are several reasons. First, and most important, it is likely that there would be a big expansion in trade between the two countries; in fact a doubling of trade is not out of the question. This will raise incomes in both countries, although it will also generate winners and losers in each country, at least temporarily. Moreover, there will be a saving on foreign exchange costs; each country's firms are more likely to expand across the Tasman; and firms currently operating in both countries will be able to operate more efficiently. An increase in income is good for Australia, even if the increase is only modest; a richer New Zealand should also be good for Australia.[30]

Secondly, there will be an increase in the liquidity of Australian dollar financial markets. This increase will not be that large, but it should be welcome in a world where financial market consolidation is occurring. There may, however, be a rise in the currency risk premium paid by all Australian borrowers, although most likely it would be modest. Australia could also gain some seigniorage, although if the Australian government insisted on keeping all seigniorage it would prove expensive in terms of goodwill; in any case, New Zealand has some means of obtaining some

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30. This is not necessarily true either. A poorer New Zealand may be good for Australia if it means more New Zealanders migrate to Australia.

even if none were offered. Total net seigniorage in Australasia would increase, as the costs of operating one currency are lower than the cost of operating two currencies.[31]

Thirdly, Australia would benefit from finding out more about the operation of monetary unions. It may want to join a larger monetary union one day, and New Zealand's experience adopting the Australian dollar may be valuable. Of course, it may be more valuable for Australia to observe the effect of New Zealand adopting the US dollar, but that is a different question.[32]

5.2   What makes New Zealand different to Queensland?

In terms of some of the traditional criteria, Queensland is no better suited for a monetary union than New Zealand. The external shocks affecting Queensland are not similar to those affecting the rest of Australia; and GDP paths are quite different as well. While the economies of Queensland and the rest of Australia are more integrated than the economies of Australia and New Zealand, this is partly because they use the same currency, and to some extent this would change if Queensland were to adopt the quirk. Since no one is seriously advocating Queensland adopt the quirk, New Zealand should seriously reconsider the importance of exchange rate flexibility as a way of buffering economic shocks.

Obviously there are some differences, both political and economic, between New Zealand and Queensland. The economies of Queensland and the rest of Australia will remain more integrated than the economies of Australia and New Zealand, even if New Zealand adopts the Australian dollar, because Queensland and the rest of Australia share similar political institutions. They have the same taxes, the same central bureaucracies, the same regulations, and the same pension schemes. Consequently, Queensland and Australia will have more economic shocks in common than will New Zealand and Australia, and Queensland will have different risk-sharing mechanisms through the operation of the central government. The importance of fiscal transfers between Queensland and the rest of Australia in determining the suitability of a monetary union may not be very high, however; at least European governments, facing the same issues, do not think so. New Zealand does not need fiscal transfers to buffer regionally specific economic shocks as the New Zealand Government can readily change its asset position to buffer these shocks.

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31. The Reserve Bank of New Zealand would not need to be abolished, and to do so would probably be unwise. Banking supervision would remain, for instance; and the Reserve Bank of Australia would still need to understand the operation of the New Zealand economy to successful implement monetary policy.

32. This paper was written to explicitly consider an Australian–New Zealand monetary union. A US–New Zealand monetary union may also make sense for New Zealand. The advantages of this for New Zealand are the potential for much lower interest rates than are available if New Zealand adopted the Australian dollar. The trade expansion would be different, focused towards the US, Argentina, and Hong Kong rather than Australia. The trade expansion is likely to be less, however, as the countries are much further away, and currently there are many more barriers to trade than there are with Australia. The disadvantages concern the greater dissimilarity of the New Zealand and US economies. Nonetheless, it should not be assumed that an Australasian monetary union is the natural choice for New Zealand.

The political consequences of New Zealand adopting the Australian dollar are a major difference between Queensland and New Zealand. Queensland has no reason to want to print money in an emergency, and it implicitly gets a share of the seigniorage. Both New Zealand and Queensland politicians might desire the ability to choose their own inflation rates or otherwise determine the real value of money contracts, however, and there is no inherent reason why such powers should be a federal rather than regional prerogative. Giving up the right to coin money is a loss of power, and one which politicians may be loathe to do even if their subjects gain much convenience from them doing so.[33] Moreover, even if New Zealand does adopt the dollar, because it has the power to reverse the decision in the future the functioning of the monetary union may be seriously undermined, although it probably would not be so.[34]

5.3   When should a currency go quietly?

Currencies do not go quietly. Their existence is legally protected, they often enjoy a monopoly position, and local residents use them even if they would be better off if they all used a different currency. For this reason a lack of liquidity is rarely fatal, as local agents provide liquidity because it is too expensive to substitute to a different currency. In this sense currency markets are unlike commodity markets, although in rare cases ('dollarisation') agents will substitute to an alternative currency.

It is plausible, however, that currencies sometimes should vanish. The key condition appears to be that their yield curve becomes highly correlated with the yield curve of a different currency. As an empirical matter, this might be starting to happen to the New Zealand dollar with respect to the Australian dollar, and it might be starting to happen to the Australian dollar with respect to the US dollar. If so, the value of a separate currency diminishes, and so the cost/benefit ratio of having a separate currency rises. This condition is not a necessary condition, however, because yield curves that should be highly correlated may not be because of the way in which monetary policy is implemented.

Even if two yield curves are estimated to be highly correlated over short periods, it does not means that they are highly correlated, for the true correlation coefficient may depend on extremely important but rare differences. Thus New Zealand should consider why it might want to retain a yield curve that is different to that of Australia or the US. One reason is that it might want to change interest rates to ameliorate large regionally specific economic shocks. Switzerland appears to have made this choice. A more important reason is that it might want a different pattern of real interest rates because of concern about the welfare implications of nominal interest rates determined

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33. 'So much of barbarism, however, still remains in the transactions of most civilized countries, that almost all independent countries choose to assert their nationality by having, to their own inconvenience and that of their neighbours, a peculiar currency of their own' (Mill 1909).

34. Dooley (1998) argues that once in a monetary union it is extremely expensive to exit, as it is difficult for one country to unilaterally change the value of financial contracts in place with agents resident in the other country.

independently of local price movements. For example, a demand for positive real interest rates may be important if a large fraction of the population only invests in debt instruments.

It is unclear how New Zealanders perceive this issue. Survey evidence suggests a majority fraction wish to form a monetary union with Australia, but the reasons for this preference are far from clear. Perhaps this is an issue for further research.

5.4   Can New Zealand have its cake and eat it?

It should be obvious that this paper has been structured to answer this question, 'Yes'. It is plausible that New Zealand could simultaneously adopt the Australian dollar and introduce a new indexed unit of account, possibly in terms of nominal GDP, possibly in terms of the CPI index, and possibly in terms of house prices. Such a policy, if successful, would provide the benefits of greater integration with the Australian economy as well as a means for New Zealanders to insure against shocks peculiar to New Zealand. If such contracts were popular, the New Zealand central bank would also have some powers to engage in countercyclical monetary policy by altering the conditions on these contracts. In this scenario, even an independent Queensland Central Bank lies within the realms of the possible.

The success of the Unidad de Fomento provides some basis for imagining that 'Marshall's dream' could be implemented. Nonetheless, the evidence that indexed contracts are difficult to introduce should be taken seriously. People may not want them; even if they do want them it may be a long process to introduce the right type of contract and build minimal levels of liquidity; and they face political challenges from those who consider the right to control the currency to be of primary importance. Despite these problems, however, they appear to offer New Zealand the opportunity to reduce the cost of gaining the benefits of a monetary union with Australia, and for this reason they deserve serious investigation.

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