CENTRE FOR APPLIED MACROECONOMIC ANALYSIS

The Australian National University

CAMA Working Paper Series **October, 2005**

AN AUSTRALASIAN CURRENCY, NEW ZEALAND ADOPTING THE US DOLLAR, OR AN INDEPENDENT MONETARY POLICY?

Viv B. Hall
Victoria University of Wellington
The Australian National University
Motu Economic and Public Policy Research

CAMA Working Paper 21/2005
http://cama.anu.edu.au

An Australasian currency, New Zealand adopting the US dollar, or an independent monetary policy?

Viv B. Hall*

School of Economics & Finance
Victoria University of Wellington;
Centre for Applied Macroeconomic Analysis (CAMA)
Australian National University; &
Motu Economic and Public Policy Research

Paper presented to:
Australian Conference of Economists
Melbourne, 28 September 2005

Abstract†

Arguments for and against abandoning independent national currencies and monetary policies have varied considerably over time and by country. For New Zealand, it can be argued that a key driving force behind recent debates has been the conduct of monetary policy and the need for improved overall economic performance in the longer term, rather than major dissatisfaction with its floating exchange rate system. In that context, this paper initially considers some issues considered important by other countries, and factors specific to New Zealand. It then utilises deterministic and stochastic simulation results from the RBNZ's core FPS model, to illustrate what New Zealand's inflation, output and trade outcomes might have been, had it faced US or Australian interest rate and exchange rate movements of the 1990s. The paper concludes with some implications for future research, and some ways forward for New Zealand policy.

JEL classifications: E58, F36, E31, E37, E17.

Key Words: Common currency; monetary policy; Australian dollar; US dollar; New Zealand.

---

* *Viv Hall, School of Economics and Finance, Victoria University of Wellington, P O Box 600, Wellington, New Zealand. Email:* viv.hall@vuw.ac.nz.

† For valuable discussions and comments, I thank Aaron Drew, Arthur Grimes, David Hargreaves, Angela Huang, Ashley Lienert, John McDermott, Robert St. Clair, Weshah Razzak, and participants in presentations at the Hong Kong Institute for Monetary Research, the Federal Reserve Bank of St Louis, and Motu Economic and Public Policy Research. The views expressed are solely the responsibility of the author.

1. Introduction

There has been considerable debate and research in recent years, as to whether New Zealand should maintain an independent currency, enter into monetary union with Australia, or adopt the Australian or US dollar as its currency.

In a political economy context, for example, stridently contrasting views have been advanced by Patrick Minford and by the Hon. Richard Prebble:

> "Currency union with Australia would be 'mad', increasing the risks of business boom and bust for only trivial gains. …You would lose the monetary policy that has been so effective…A single currency with the US was not the answer either." Patrick Minford, *The Dominion Post*, 1 July 2004

> "I think a country the size of New Zealand running its own currency is very expensive. It is why even though our inflation is low New Zealand interest rates continue to be significantly higher than in the US. It's currency risk, and it adds maybe 2 per cent to interest rates. For me, having the tui on my dollar isn't worth an extra 2 per cent on my mortgage rate, …" Richard Prebble, *The New Zealand Herald*, 5 May 2005

A wide range of research-based views have been put forward in Grimes (2005a, 2005b); Bjorksten *et al.* (BGKP) (2004); Drew *et al.* (DHMS) (2004); Hall and Huang (2004); Coleman (2001, 1999); Hartley (2001); Bowden (2000); Grimes (2000); Grimes, Holmes, and Bowden (2000); McCaw and McDermott (2000); and Hargreaves and McDermott (1999).

New Zealand has no single dominant merchandise-trading partner. Australia accounts for around 20 per cent of New Zealand's exports and is its largest and geographically closest trading partner, but other trading partners of significance are the United States (US), Japan, the United Kingdom, Germany, the Republic of Korea, the People's Republic of China, and Taiwan. Moreover, Bowden (2001) has suggested that at least 50 per cent of New Zealand's market traded commodity exports tend to be priced in US dollars. This makes the US dollar New Zealand's largest trading currency and the

US one of its top three merchandise-trading partners. An Australasian currency, or New Zealand adopting the US dollar (USD), are therefore the obvious counterfactuals against which to evaluate retaining an independent currency and monetary policy. Bowden has presented key arguments for and against adopting some form of USD currency arrangement[1]. Hartley (2001), as part of his extensive review of monetary arrangements in New Zealand, has also canvassed potential costs and benefits from New Zealand's abandoning its national currency and adopting the USD as its domestic currency. Grimes *et al.* (2000, p xiii), in an influential IPS study commissioned by the Australia New Zealand Business Council, have concluded that "The option of adopting a common currency area with the AUD [Australian dollar] and/or the USD must therefore be taken seriously by all those who seek to boost conditions for economic development within New Zealand."

There has been limited system-wide empirical research on the potential effects of a common currency on key New Zealand macroeconomic variables. However, Bjorksten *et al.* (2004, p S41) have recently put forward the view that the Taylor Rule evidence suggests, that the cost to New Zealand from abandoning its independent currency and monetary policy may not be greater than the costs associated with the individual Australian states having a common monetary policy. Transitional issues were excluded from their consideration, and consistent with the Taylor Rule approach their results are basically driven by the similarity in inflation rates and in employment gap cycles between Australian states and New Zealand.

Accordingly, the primary focus of the empirical results presented in this paper is more general equilibrium in nature, and on the potential cyclical or transitional macroeconomic costs and benefits from New Zealand's adopting an Australasian currency or the US dollar, relative to maintaining the New Zealand dollar and an independent monetary policy. Counterfactual deterministic and stochastic simulation results for 1990 to 1999 are presented, to see whether New Zealand could have had cyclically better inflation, output and trade balance outcomes, from facing US or Australian interest rate and currency movements. The simulation analysis is conducted with the core model of the Reserve Bank of New Zealand's (RBNZ)

[1] The arguments focus on currency based transactions costs and exposure uncertainty, portfolio impediments and interest rate risk premiums, exchange rate buffering or anti-buffering effects, and

Forecasting and Policy System (FPS)[2]. The results should be seen as complementing the judgements put forward in Grimes (2005a, 2005b); Bjorksten *et al*. (2004), Hartley (2001), Bowden (2000), Grimes (2000), Grimes *et al.* (2000), and others, as to whether New Zealand should adopt the USD or an Australasian currency.

The remainder of this paper is structured as follows. Section 2 summarises briefly some basic conceptual issues, factors considered particularly important by other countries and regions when evaluating common currency issues, and key factors considered specific to New Zealand. Section 3 presents macroeconomic counterfactual evidence, including the conditioning methodology, the historical US and Australian monetary conditions imposed, and the deterministic and stochastic simulation results. In section 4, empirical findings are summarised, and some broader monetary policy implications are drawn. Also presented are some implications for future research, and some ways forward for New Zealand policy.

2. Conceptual arguments, international perspectives, and factors specific to New Zealand

From a conceptual economics perspective, the issue of whether an individual country or group of countries should agree to a common currency, adopt another country's currency, or maintain an independent monetary policy, generally rests on potential static and dynamic microeconomic gains, relative to potential macroeconomic losses[3]. Resolution will ultimately be at the political level.

The static microeconomic gains are likely to be achieved by current exporters and financial institutions, and the dynamic gains by current and future exporters, including those from small to medium-size enterprises. Potential short run and longer run macroeconomic losses will include those associated with the loss of an independent monetary policy to choose ones' own inflation rate, the loss of a flexible exchange

---

political factors.

[2] Note that any comparative static or dynamic microeconomic gains of a common currency are not included in this analysis; nor is attention given to longer run and steady state macroeconomic issues.

[3] Bjorksten (2001) has categorised the various arguments on: (i) "traditional" Optimal Currency Area (OCA) grounds featuring welfare gains from increased trade; (ii) "new" OCA grounds such as removal

rate to help adjustment to (real) external shocks, and the greater pressure that may be placed on fiscal policy to assist economic stabilisation at the potential expense of medium term public debt sustainability[4].

From an international perspective, the key arguments for and against abandoning independent national currencies and monetary policies have varied considerably over time and by country. Bjorksten (2001) provides examples from the Swedish, Finnish and Canadian debates, emphasising the relatively different weights each of these has placed on asymmetric external shocks. Seen as additionally important for Canada were limited labour market flexibility and inter-country mobility, and insufficient accountability of a common monetary authority to the Canadian electorate. The UK still remembers vividly a very costly episode from a European currency linkage, yet Ireland would seem to have reaped very considerable economic benefits from its membership of the European Union and its adoption of the Euro. Drew *et al.* (2004, p 950) refer to the key factor behind currency union in Europe being the desire for tighter political union, and the driving forces in Latin America being dissatisfaction with floating exchange rates and a lack of monetary and inflationary control. For the wider Asian region, major economic, political and institutional differences between countries will limit common currency arrangements for the near term, despite increasing regional trade and somewhat more integrated business cycles in recent years,. Nevertheless, in the context of examining the potential suitability of a Greater China currency union (China, Hong Kong, and Taiwan), Cheung and Yuen (2004) have recently estimated potential output losses from such an arrangement to be moderate and likely to be less than efficiency gains estimated by previous studies.

For New Zealand, however, Drew *et al.* (DHMS), (2004, p 950) have suggested that a key driving force behind recent debates has been the conduct of monetary policy and improved overall performance of the economy in the longer term, rather than dissatisfaction with its floating exchange rate system. It could therefore well be transitional and steady state macroeconomic outcomes which will be the crucial

---

of currency risk premia in interest rates, improved portfolio allocation associated with more sophisticated financial capital markets and elimination of home bias; and (iii) crisis avoidance grounds.

[4]In the context of advancing the view that OCA theory has had a miserable record in explaining actual movements in and out of currency areas, Pomfret (2005) has suggested that arguments regarding the

economic determinants in any eventual common currency decisions, rather than the relatively predictable potentially small gains from comparative static microeconomic outcomes, and the potentially very much larger dynamic microeconomic gains.

Other factors specific to New Zealand which should be given due consideration, include the following. (1) New Zealand has no dominant trading partner, but around 50% of its commodity exports are priced in US dollars. (2) New Zealand's Closer Economic Relations (CER) free trade agreement with Australia has led, for over two decades, to substantially integrated trade, considerable labour market mobility, commendable financial capital mobility, and increased investment opportunities. (3) New Zealand's mid-1980s crisis led to initially radical microeconomic reforms, and to legislated fiscal and monetary policy regimes conducive to providing medium term macroeconomic stability. The RBNZ is required to conduct monetary policy in an operationally independent manner, to treat stability in the general level of prices as its primary goal, and under its current Policy Targets Agreement (PTA) to keep CPI inflation between 1 and 3 % on average over the medium term. It is also required, in pursuing its price stability objective, to implement monetary policy in a sustainable, consistent and transparent manner and to seek to avoid unnecessary instability in output, interest rates and the exchange rate[5]. (4) Currently, there seems no political interest, and no majority public support for New Zealand to participate in an Australasian currency or to adopt the US dollar, but there is clear specific-interest support on microeconomic grounds and considerable enthusiasm for improved harmonisation in taxation and certain other areas.

Hence, against the background of no major dissatisfaction with New Zealand's floating exchange rate system, the concern of some about the conduct of monetary policy and many about long run relative standards of living performance, and the limited amount of system-wide empirical research to date on the potential effects of a common Australasian or US dollar currency on key macroeconomic variables, illustrative deterministic and stochastic simulation results are now presented and evaluated.

---

control of monetary policy and of fiscal policy differ from OCA theory's emphasis on micro-macro tradeoffs.

3. Macroeconomic counterfactual evidence[6]

3.1. Issues addressed and conditioning methodology

The simulations which follow are designed to shed light on two basic questions: (1) what are the counterfactual macroeconomic costs and benefits, as measured through (a) the positive and negative *deviations*, relative to the FPS model's baseline, of inflation and output, and (b) the increased or decreased *variability* of inflation and output, relative to baseline?; (2) what are the implications of these results, for New Zealand's continuing to set monetary policy, independent of that set in the US or Australia?

Deterministic and stochastic simulations were carried out with the RBNZ's FPS core model[7]. These allowed us to trace out how, according to the FPS model, New Zealand inflation, output and trade balances might have evolved[8]. FPS has five economic agents: households, firms, government, a foreign sector, and the monetary authority. Its two-tiered structure has a standard neoclassical steady-state framework that determines the long-run equilibrium to which the model will converge. Along the long-run equilibrium growth path, forward looking consumers maximise utility using an overlapping generations framework with non-Ricardian features, firms maximise profits subject to production function, costs of adjustment and time-to-build constraints, and the economy achieves exogenously specified target ratios for government net debt, government expenditure, and net foreign assets. The second tier is the dynamic adjustment structure, embodying both expectational and intrinsic dynamics, that traces out how the economy converges towards that long-run equilibrium.

---

[5] See section 4(b) of the Reserve Bank of New Zealand's September 2002 Policy Targets Agreement (PTA), (Cullen and Bollard, 2002).

[6] The empirical results presented in this section draw significantly on those presented in Drew, Hall, McDermott and St. Clair (2004), and in Hall and Huang (2004).

[7] Overviews of FPS have also been presented in DHMS (2001, Appendix; 2004, section 2.1), Hall and Huang (2004, section 2.1), and Hunt *et al*. (2000). More complete descriptions are available in Black *et al.* (1997), and from the RBNZ's website, www.rbnz.govt.nz/research/fps/fps2004.pdf.

[8] The empirical results are also conditional on the particular deterministic simulations carried out. Equivalent simulations conducted with the New Zealand Treasury's NZTM model, which has very similar steady states to FPS, are likely to produce somewhat different shorter run responses (Szeto *et al.* 2003). See, for example the suggestions in footnotes 10 and 11 below.

Inflation can potentially arise from many sources in the model[9], but it is essentially the difference between the economy's supply and demand for goods and services that governs inflationary pressure. Specifically, FPS represents this goods market disequilibrium through an output gap measure. This is defined as actual output (reflecting the level of aggregate demand) less potential output, potential output being the output level capable of being produced on a sustainable basis and as driven by the current productive stock of capital. Also, the relationship between goods market disequilibrium and inflation is specified to be asymmetric, such that excess demand generates more inflation than deflation caused by an equivalent amount of excess supply.

There are two types of household in FPS. The majority are forward-looking households who ultimately hold all of the economy's financial assets and foreign debt, and on average, save. The rule-of-thumb or liquidity constrained households spend all of their disposable income each period and hold no assets. In essence, therefore, aggregate private consumption (which in FPS includes residential investment) is driven substantially by expected future real (human and financial) wealth, real interest rates, and current real disposable income.

FPS's representative firm produces single good output under Cobb-Douglas, constant-returns-to-scale technology, pays wages for labour inputs and makes rental payments for capital inputs. Its profit maximising conditions incorporate adjustment costs for capital and a time-to-build constraint, so that in the short run firms are able to determine the level of output, the level of employment, and the real wage. In FPS, investment therefore comes on line quite slowly, and implies supply conditions do not adjust rapidly to macroeconomic shocks.

Hence, in FPS, one would *a priori* expect that (a series of) exogenous interest rate shocks would have quite material, relatively rapid effects on aggregate consumption, and relatively modest, quite slow impacts on business fixed investment[10].

---

[9] The four main sources are the output gap, cost pressures, foreign prices and the exchange rate, and inflation expectations.

[10] The comparative responses to a temporary short-term interest rate shock presented in Szeto *et al.* (2003, section 3.5) show the extent to which, in FPS, private consumption reacts somewhat more

The exchange rate channel in FPS has two components, one direct, the other indirect. For both components, a rise in the real interest rate will lead to an appreciation of the exchange rate. This makes imports cheaper in New Zealand dollar terms and so CPI inflation falls – the *direct* channel. The *indirect* channel works by reducing the demand for New Zealand exports as the currency appreciates, and by increasing demand for the now-cheaper imports. The fall in aggregate demand reduces pressure on resources, which eventually reduces inflation. Our endogenously computed real exchange rate, driven by our (series of) exogenous nominal exchange rate movements, and the relative movements in domestic and foreign inflation, could therefore be expected to affect real exports and imports, and together with real interest payments on net foreign debt, would have modest influences on the net foreign assets to GDP ratio[11].

Three further factors should be borne in mind when interpreting our illustrative results. Firstly, the utilisation of core FPS for both common currency and non-common currency regimes implies that structural changes[12] and alterations to the economy's long run steady state properties, would take place only very slowly over time. Moreover, as is the case to varying degrees for almost all operational macroeconomic models, the FPS model is not immune to the Lucas critique[13]. In our case, that critique would mean there is the possibility that had New Zealand adopted the US dollar for the 1990s, then economic agents in New Zealand could have reacted somewhat differently to US Federal Reserve policy determinations than to RBNZ pronouncements[14]. In other words, FPS is assumed here to be a reasonably valid reflection of the economy, whether New Zealand were running a common currency or

---

rapidly and business fixed investment responds in a considerably less volatile fashion, than in the NZTM model.

[11] In these simulations, the latter effects will be particularly modest, as the steady state net foreign assets to GDP ratio and the exogenous country risk premium have not been allowed to change. It can also be noted that exports and imports generally respond somewhat more strongly and rapidly to temporary real exchange rate movements in NZTM than in FPS. See Szeto *et al*. (2003, section 3.6)

[12] For example, a possibly important omission from this macroeconomic-based analysis could be our not accounting explicitly for potentially significant gains to trade. These could result from reduced financial transactions costs, and the removal of exchange rate uncertainty as non-tariff barriers to exporting by smaller firms. See Grimes (2000).

[13] For example, see Lucas (1976).

[14] Note also for the FPS model though, that the monetary authority is postulated to be able to influence private agents' expectations and decisions through directly influencing short term interest rates, and in

not. Secondly, again as is the case for most small open economy macro models, monetary policy is assumed to affect nominal but not real variables in the long run, and can have significant effects on real activity over short to medium terms. Thirdly, results from deterministic simulations for New Zealand over the 1990s provide counterfactual outcomes solely for that particular historical experience.

3.2. The historical US and Australian monetary conditions

FPS was simulated with US and Australian monetary conditions imposed from March 1990 to December 1999. These monetary conditions reflect an exogenously imposed nominal yield curve (Figure 1) and an exogenous nominal exchange rate growing at the same rate as representative US and Australian trade weighted indexes (TWI) (Figure 3).[15]

[Figures 1 & 2 about here]

US nominal long interest rates were lower than those for NZ throughout the 1990s (Figure 2), and the US and Australian yield curves would have provided considerably looser interest rate settings over almost all that period[16]. Moreover, for the first half of the 1990s, US interest rate settings would have contributed to more stimulatory monetary conditions than those provided from Australian settings.

NZ experienced relatively large nominal exchange rate movements over the 1990s, appreciating markedly from 1992 to 1997, and depreciating quite rapidly from 1997 onwards (Figure 3). A NZ TWI tuned to the US TWI would also have appreciated markedly from 1995 to 1999, but overall would not have led to a consistently lower nominal effective exchange rate.

[Figures 3 and 4 about here]

But what of *real* effective exchange rate movements, which are computed endogenously in FPS? Figure 4 shows the real TWI exchange rate actually faced by NZ, together with those that NZ would have faced from both US and Australian nominal exchange rate movements. Inheriting Australian exchange rate movements

---

this sense the use of forward-looking expectations would go some way towards addressing the Lucas critique.

[15] The Bank of England's US TWI was used.

[16] On average, the US yield curve is approximately 150 basis points more stimulatory and the Australian yield curve 140 basis points more stimulatory.

would have led to a lower real TWI over the great bulk of the 1990s (on average 4% lower, and over 1995-1997 2 % lower), but the US real TWI displays significantly different movements and is likely to have generated considerably different outcomes. It would have been considerably less favourable to exporters and potentially more beneficial to NZ's inflation rate, between 1992 and 1994, and in an even more pronounced fashion from mid-1997 onwards.

Hence, the combination of NZ adopting either a US yield curve and TWI movements or an Australian yield curve and TWI movements would almost certainly have led to looser monetary conditions. The "on balance" macroeconomic outcomes for inflation, output and the nominal trade balance would not, however, seem *a priori* as clear cut for the US conditions as those that could be expected from imposing Australian conditions.

3.3. Deterministic simulation results

The simulations reported here are essentially static. They therefore illustrate direct impulse effects from our postulated US and Australian nominal interest rate and exchange rate paths, and are not 'true' dynamic. Meaningful dynamic simulation results would require specification of hypothetical new long run steady state values and exogenous parameters, and are beyond the scope of this paper[17].

Under US monetary conditions, the estimated output gap would have been on average around 0.4 percentage points higher over the 1990s, compared with NZ's historical experience (Figure 5). This is only marginally higher than the 0.3 percentage points reported for Australian monetary conditions. The output gains are modest, and relatively similar for both currency regimes from 1995 through to 1998, but adopting the US dollar could have produced somewhat less unfavourable growth outcomes from early 1991 through to late 1993. The associated deficient demand pressures would have been correspondingly less for this sub-period.

[Figure 5 about here]

[17] Dynamic simulations under unchanged steady state conditions would also not be meaningful, as inflation and output gap paths would be much more volatile, and with no RBNZ monetary policy reaction function operational under a common currency regime, and no significant medium term capital-labour substitution and other feedback possibilities, the model would not have solved beyond very near term horizons.

The modest output gains under US monetary conditions[18] reflect somewhat higher consumption, especially during the early 1991 to late 1993 period (Figure 6), and small boosts to business investment over that same period (Figure 7). These are offset by noticeably less favourable real net exports over almost the whole period (Figure 8). To the extent that our business fixed investment responses to substantially lower real interest rates are considered too modest, our illustrative output gains could be somewhat under-predicted[19]. But these in turn would also be associated with under-predicted inflationary pressures.

[Figures 6, 7, and 8 about here]

The somewhat higher levels of aggregate activity, associated with relatively looser monetary conditions for most of the period, generate the CPI inflation outcomes in Figure 9. Under US monetary conditions, annual inflation would have been noticeably higher over the whole of the 1990s, and between 1 and 1.5 percentage points higher from 1995 onwards. Peak inflation would have been 3.6 per cent for the year ended December 1996, falling to about 2.4 per cent by the end of the 1990s. These outcomes are considerably less favourable than those emanating from Australian counterfactual conditions (with outcomes around 1% point higher from 1997 onwards), and substantially worse than those obtained under actual New Zealand monetary conditions. The RBNZ's then CPI inflation target band of 0 to 2 per cent would have been exceeded as early as December 1992 under US conditions, and would have persisted for a much longer time period than under Australian conditions. The subsequent 0 to 3 per cent target band, agreed to from the December 1996 year, would also have been exceeded, initially from March 1995, and then by a materially greater amount and for a longer period than from Australian conditions. In short, considerably less favourable inflation outcomes would have resulted from US monetary conditions and materially less favourable outcomes under Australian conditions. The adverse nature of the inflationary outcomes presented here for both scenarios is likely also to be under-predicted. This would be due partly to the fact that in this particular simulation in FPS, the significantly lower Australian TWI exchange rate and the

[18] A similar dissection analysis could be presented for Australian monetary conditions.

variously higher and lower US TWI exchange rates are not allowed to *directly* increase (and decrease) import prices. It would also be because output gap movements may have been somewhat under-predicted, as noted in the previous paragraph.

[Figure 9 about here]

Adopting the USD is likely to have led to a considerably worse nominal trade balance overall (Figure 10), coinciding particularly with the effects over 1997 to 1999 from the Asian financial crisis and New Zealand's two successive periods of drought[20]. This outcome contrasts with the modestly better trade balance overall, that might have occurred from adoption of the Australian dollar.

[Figure 10 about here]

3.4 Stochastic simulation results[21]

Despite New Zealand, Australia and the US having traditionally experienced quite strongly synchronised business cycles[22], New Zealand has experienced a number of materially different domestic and foreign shocks, and experienced quite wide ranging movements in interest rates and exchange rates over the 1990s. The deterministic results presented above are therefore considered sufficiently representative to be reasonably informative about subsequent periods.

However, to provide a more robust basis for evaluating the common currency issue, results from a wider range of economic shocks are ideally required. The historical experience of the 1990s is unlikely to represent the full gamut of shocks that the economy may experience. In an actual economy, multiple shocks occur simultaneously, and often interact with each other in a way that deterministic simulations could never capture. We observe outcomes that are a combination of exogenous shocks and policy actions. Stochastic simulations match this reality more closely than do deterministic simulations, providing a vehicle to analyse what the implications of currency union might be more generally. A stochastic simulation

---

[19] Note, however, that under conditions of sticky nominal wage adjustment, lower real interest rate effects on capital-labour substitution and business investment could also be tempered by lower real wage movements.

[20] See 'Business cycle developments and the role of monetary policy over the 1990s', pp 54-77 in Reserve Bank of New Zealand (2000).

[21] Stochastic results are presented for the Australian case only. A different 'feasible modelling framework' would be required for an equivalent analysis for the US counterfactual.

[22] See Hall *et al.* (1998), Grimes *et al.* (2000), and McCaw and McDermott (2000).

analysis enables us to explore 'all likely' counterfactual outcomes for the New Zealand economy, operating with a monetary policy set in Australia.

In the stochastic simulation experiments each alternative path is a function of randomly generated 'typical' macroeconomic disturbances that New Zealand is likely to experience, and a policy reaction. The disturbances include domestic demand, real exchange rate, inflation, terms of trade and foreign demand shocks. To generate these disturbances a three-step procedure outlined in Drew and Hunt (1998) is followed. First, the relevant behavioural equations of FPS are inverted to solve for the first year of the impulse response functions of a VAR model of the New Zealand economy, given one standard deviation impulses.[23] This implies that each disturbance with which the model is hit will impact on a number of the model's equations over one year – thereby preserving the short-term auto- and cross-correlation structure estimated in the data.[24] Next a sequence of normally distributed disturbances is drawn and used to generate shock paths to be applied to the model's behavioural equations. The model is then hit with these shocks each quarter over a 25-year simulation period. This counts as one model 'draw'. In total, 100 draws are run to provide 10,000 observations for calculating measures of average dispersion from trend.

Before outlining the stochastic experiments conducted, it is useful to outline an 'ideal modelling framework' that would capture key elements for analysing the impact of currency union (Figure 11). If the New Zealand economy had a foreign economy controlling official interest rate settings under a common currency, then the principal transmission mechanisms it would be desirable to model would include: real flows, such as trade patterns, migration, and investment flows with the rest of the world, and between New Zealand and the foreign economy; both temporary and permanent shocks from the rest of the world, which impact on both the New Zealand economy and the foreign economy; and temporary and permanent shocks, idiosyncratic to both the New Zealand and the foreign economy.

[23] For example, under a domestic demand impulse the models behavioural equations for consumption, investment, inflation and the real exchange rate are all inverted to solve for the paths required to replicate the VAR domestic demand impulse.

[24] In Drew and Hunt (1998) it is shown that the ability of the model economy to match the moments of the New Zealand data, and produce cycles in output that match the length and amplitude of the New Zealand business cycle, is considerably improved when the cross-correlation structure of the impulses

Modelling this ideal system would require developing comprehensive models of a foreign economy, the rest of the world, and New Zealand.

[Figures 11 and 12 about here]

Rather than tackle this relatively large and complex problem, however, we have focused our attention on the monetary policy channel, given that seems to be the area that has generated most of the debate. This allows us to simplify the problem considerably (Figure 12). The standard FPS model is used to represent the New Zealand economy, augmented by a stylised representation of a foreign economy[25]. The foreign economy, which may be thought of as Australia, has its own objective for monetary policy and meets that objective by controlling its own interest rates. Finally, the rest of the world is simply a source of shocks that impact on both New Zealand and the foreign economy.

We further simplify the ideal system by placing two restrictions on the shock processes. First, it is assumed that all shocks are temporary, in the sense that they do not have any long-run affects on the model economy. Second, there are no idiosyncratic shocks to the foreign economy. The transmission mechanisms are also simplified by assuming that the foreign sector model is not affected by developments in the domestic economy – an assumption that is realistic when considering New Zealand's economic importance to the United States, but less realistic when considering the relationship to Australia.

As a whole, the analysis that follows sheds some light on how important country-specific shocks are, and whether that would change in a currency union. It does not, however, consider how alternative adjustment mechanisms can alleviate the costs of shocks, nor how effective they may be.[26]

Four stochastic simulation experiments are conducted. Under each experiment two simulations are run. First, New Zealand operates under 'status quo' independent (fully endogenous) monetary policy. Second, monetary policy is exogenous to New

---

is accounted for. However, given the dynamics already inherent in the equations of FPS, the auto-correlation structure is not nearly as important in this respect.

[25] See Drew *et al.* (2004, s. 3.2) for a short summary.

[26] Alternative means of adjustment through prices and wages, capital and labour mobility, and fiscal policy are discussed in McCaw and McDermott (2000).

Zealand, being controlled by a foreign monetary authority. That is, the foreign sector yield curve (solved for in the endogenous foreign sector of FPS) is imported into the New Zealand model economy.

In the analysis, when interest rates are foreign controlled, there is no UIP effect to cause the nominal exchange rate to move between the domestic and foreign economies. However, the real exchange rate will still adjust, given shocks applied to it in the stochastic simulation experiments. In general, the shocks applied result in the real exchange rate moving in a counter-cyclical fashion, or put alternatively, the real exchange rate acts as a macroeconomic 'stabiliser'.[27]

We explain the four shock experiments in turn. In the first experiment, labelled 'all shocks', the New Zealand economy is hit with domestic specific shocks to consumption, the real exchange rate, inflation, and investment. It is also hit with shocks to world export prices and world demand which impact on both the New Zealand economy and the foreign economy.

The second experiment, called 'domestic shocks', subjects the New Zealand economy to shocks solely of domestic origin. This gives a better indication of what the costs of a fixed currency arrangement might be when the foreign monetary authority 'looks through' New Zealand specific macroeconomic disturbances.

The third experiment, termed 'world shocks', subjects the New Zealand economy and the foreign sector to shocks emanating solely from 'the rest of the world'. These terms of trade and world demand shocks do not originate in the potential currency union.

[27] In the VAR system used to create the shocks, the real exchange rate acts in a stabilising fashion. For example, as is seen in Drew and Hunt (1998), it appreciates following a positive impulse to domestic demand, world demand, and the terms of trade. Similarly, the VECM-based work of Conway and Franulovich (2002) concludes that the NZD/AUD real exchange rate acts as an effective shock absorber rather than as a source of shock. This is in contrast to econometric evidence of 'orbitals' presented in Bowden and Grimes (2000), who conclude that the real exchange rate does not buffer movements in the terms of trade. The VAR and VECM evidence also runs against Coleman's (1999) evaluation of the modern literature on currency union, which suggests that in a low inflation environment exchange rate volatility may be a cause rather than a means of adjusting to economic shocks.

The fourth experiment assumes that the New Zealand economy and the foreign sector experience world shocks all of the time, but three out of ten years the New Zealand business cycle is out of phase, and so is hit with domestic specific shocks only in those three years. This experiment reflects empirical evidence surrounding the degree of synchronisation of New Zealand's business cycle with the rest of the world. For example, Hall, Kim and Buckle (1998) find that New Zealand's business cycle is around 70 percent correlated with that of the USA over the late 1970s to the mid 1990s. Furthermore, concordance analysis by McCaw and McDermott (2000) over the period 1960-99 revealed that the proportion of time that New Zealand's business cycle was in the same phase with those of Australia and the United States was about 70 percent. We have called this scenario 'mixed shocks'.

Table 1 provides the absolute and relative deterioration in the central bank's 'societal loss' under the four shock scenarios, while Table 2 and Figure 13 present the average volatility outcomes. In Table 1, the losses are calculated using a standard quadratic loss function of the form:

$$L = \sum_{t=1}^{\infty} (1-\lambda)\left(y_t - y^*_t\right)^2 + \lambda\left(\pi_t - \pi^T\right)^2$$

where $\left(y - y^*\right)$ is the percentage output gap, π is annual CPI inflation, π^T is the Reserve Bank target rate of inflation (1.5 percent)[28], and λ is the relative weight on inflation versus output variability. This is set at 1/2, which presumes the central bank cares as much about inflation being away from the target as output being away from the economy's supply potential.[29]

The societal loss function described above is used as an illustrative metric and is not part of any formal optimisation problem. Moreover, the choice of λ is somewhat arbitrary and not derived explicitly from any optimisation problem. However, the assumption of equal weights is common to many studies and consistent with empirical

[28] The mid-point of the target band was 1.5 percent in the latter half of the sample period. The target band has since been changed to make the mid-point 2 percent.

[29] Econometric evidence presented in Drew and Plantier (2000) is not inconsistent with the Reserve Bank of New Zealand placing an equal weight on output and inflation deviations when setting monetary policy.

work on central bank loss functions (see for example Rudebusch and Svensson (1999) and Drew and Plantier (2000)).

The volatility in both output and inflation is the lowest, and therefore the loss is also the lowest, under the scenario where the New Zealand economy experiences only domestic shocks and operates a separate monetary policy. At the opposite end of the spectrum, the loss is the highest when all shocks occur and monetary policy is foreign controlled.

To obtain a feel for how significant these differences are, it is worth considering a numerical example. The 80 percent confidence interval for the output gap is -1.7 to 1.7, for the case of domestic shocks and domestic monetary policy. The corresponding interval, for domestic shocks only and foreign monetary policy, is -2.6 to 2.6 percent. The 95 percent confidence intervals for these cases are -2.6 to 2.6, and -4 to 4. Given a rate of potential growth in New Zealand of around 3 percent, these outcomes imply that if there are only domestic shocks, the probability of entering a recession (i.e. getting negative growth) is less than 5 percent, if policy is domestic. Under foreign monetary policy, however, the probability of entering recession is considerably higher, at around 15 percent of the time, or once in every 6 years.

Intuitively, the loss under the domestic shocks and separate monetary policy scenario should be the lowest, as there are the least amount of shocks to contend with, and policy is geared towards responding to them. In stark contrast, in the case where only domestically generated shocks occur, and the foreign central bank sets policy, the variability in inflation is the highest (Table 2). In losing monetary policy setting ability, inflation variability increases four-fold, from 0.5 to 2 percent, while output variability increases from 1.3 to around 2 percent. The overall deterioration in performance is such that the loss arising from inflation and output variability increases around 300 percent (Table 1). The reason why inflation is notably more volatile under this scenario is because it is the only one where monetary policy is playing no buffering role. Under all other simulations, whether it is the foreign or domestic central bank setting interest rates, there is some leaning against inflation pressures.

Out of all the cases where monetary policy is set in the foreign sector, the volatility in output and inflation is the lowest when the model is hit with solely world shocks. Not surprisingly, this implies that under common shocks from the rest of the world, foreign monetary policy is more appropriate. However, the deterioration in loss associated with losing policy independence in this case is still economically significant at over 100 percent.

A final inference that can be drawn from the stochastic analysis is that, given the shocks applied and the model, the cost of losing monetary policy independence is felt more in terms of deterioration in inflation performance than output performance. The increase in output variability lies in a band of around 0.4 to 0.6 percent, whereas the increase in inflation variability lies between 0.8 to 1.5 percent. These results suggest that, overall, the more a central bank and society care about inflation control, the less advisable it would be to enter into a common currency arrangement. Conversely, if the costs of inflation variability are low, and there are large efficiency gains to be had from entering into a common currency arrangement, then that could well outweigh any increase in the variability of output associated with a loss of monetary policy control.

4. Conclusions and implications

4.1. Conclusions

The macroeconomic modelling in this paper has been aimed at assessing whether the New Zealand economy might have performed better over the 1990s, if it had been subject to US or Australian interest rate and exchange rate movements. Both US nominal yield curves and TWI exchange rate movements, and the corresponding Australian movements, would have been associated with New Zealand facing more stimulatory monetary conditions than New Zealand's historical experience.

Illustrative deterministic simulations for the US case show New Zealand's output gap measure to have been on average 0.4 percentage points higher, marginally better than the modest 0.3 percentage points improvement obtained from adopting Australian monetary conditions. For the US counterfactual, the modestly improved output gap would have been associated with relatively sustained, somewhat higher aggregate

consumption, consistently less favourable real net exports, and very limited additional business investment during the early 1990s, followed by relatively lower investment in the mid-1990s.

The modestly stronger excess demand pressure from US monetary conditions would, however, have produced noticeably higher CPI inflation throughout the 1990s. Annual inflation would have been 1 to 1.5 percentage points higher from 1995, considerably less favourable than annual movements obtained from Australian counterfactual conditions, which saw CPI inflation around 1% higher from 1997 onwards. Both outcomes might have raised concerns from the mid-1990s about the possibility of ongoing higher inflationary expectations.

Movements in the US dollar relative to the NZ dollar in the late 1990s would have led to a substantially greater nominal trade deficit than would have occurred from adoption of the Australian dollar, or was historically the case for New Zealand. Or put another way, the inability of New Zealand to operate its own monetary policy in response to the Asian financial crisis could have been associated with significantly more negative trade balances.

Hence, under US and Australian monetary conditions of the 1990s, key cyclical consequences are that New Zealand could have had modest short run output gains, greater excess demand pressures, noticeably higher CPI inflation rates sustained over the whole of the 1990s, and for the US case less favourable trade balance outcomes.

These deterministic macroeconomic outcomes of a cyclical nature, in the context of the counterfactual monetary conditions of the 1990s, are consistent with New Zealand retaining its ability to set monetary policy independent of that set in Australia or the US.

The stochastic simulation results, for counterfactual Australian conditions, show that the volatility in output and inflation is lowest under the case where the New Zealand economy experiences domestic shocks and operates its own monetary policy. In contrast, volatility is the highest when domestic and world shocks occur, and New Zealand's monetary policy is controlled offshore. Moreover, irrespective of the shock

scenario considered, model results show the volatility in output and inflation to be greater under a common currency policy environment than with New Zealand operating its own monetary policy.

These counterfactual stochastic outcomes therefore suggest that when forming judgements from a macroeconomics perspective on whether New Zealand should consider adopting some form of common currency, it is important to consider (1) outcomes from a representatively wide range of possible stochastic shocks, as well as from the shocks which have occurred during one specified historical period; and (2) results not just for output and inflation deviations from baseline, but also for their relative variability**.**

Moreover, from our cyclical macroeconomic monetary policy perspective, our judgement on a common currency or not rests importantly on the relative weighting assigned to: modest short run output gains; potentially persistent, extra inflation costs; and greater output and inflation variability. For US monetary conditions of the 1990s, macroeconomic outcomes have been shown less favourable than those from adopting Australian conditions.

Hence, a combination of materially higher inflation and a temporary output boost, together with greater variability of both inflation and output, suggests that for the foreseeable future New Zealand should retain its ability to set monetary policy independent of that set in the US and Australia. Medium to long-term net benefits to New Zealand from a common currency have yet to be demonstrated.

4.2. Implications

In terms of implications for further research work, it can first be noted that, as the FPS macroeconomic model does not allow for either structural changes or new steady state values which might emerge over the longer term under a common currency regime, a fuller judgement on monetary policy implications should ideally reflect future exploration of these issues as well. Similarly, complementing our illustrative deterministic impulses with dynamic simulations under postulated new steady state and exogenous parameter assumptions might also throw additional light on the

transition paths of inflation, output, trade balances and other key macroeconomic variables towards desired new steady state values. More specific things we would also want to know include: the cyclical and long run effects of a material reduction in New Zealand's country risk premium, relative to the US; the potential *dynamic* gains to trade and real GDP growth, from removing of exchange rate uncertainty for small and medium-sized enterprises; and the macroeconomic implications of any trans-Tasman fiscal stabilisation mechanisms[30].

In the above context, therefore, it is suggested that for the foreseeable future, the policy path forward for New Zealand should be based on: retaining its independent monetary policy and currency; ongoing fiscal prudence; ongoing attention to alleviating labour market and physical capital constraints to real GDP growth; continued focus on reducing trade barriers, via multi-lateral processes, CER enhancement, and bi-lateral trade agreements; and a "world-best" approach to Single Economic Market (SEM) harmonisation with Australia.

References

Bjorksten, Nils (2001), 'The current state of New Zealand monetary union research', *Reserve Bank of New Zealand Bulletin*, 64 (4), 44-55.

Bjorksten, Nils, Arthur Grimes, Özer Karagedikli and Christopher Plantier (2004), "What does the Taylor Rule say about a New Zealand-Australia Currency Union?", *Economic Record*, 80, Special Issue September, S34-S42.

Black, R, V Cassino, A Drew, E Hansen, B Hunt, D Rose and A Scott (1997), 'The Forecasting and Policy System: the core model', *Reserve Bank of New Zealand Research Paper* (43).

Bowden, R (2000), 'Tasman or Pacific? The case for a multilateral USD connection', *Victoria Economic Commentaries*, October, 8-16.

Cheung, Yin-wong and Jude Yuen (2004), 'The suitability of a Greater China Currency Union', Hong Kong Institute for Monetary Research Working Paper No. 12/2004, June.

Coleman, A (1999), 'Economic Integration and Monetary Union', New Zealand Treasury Working Paper 99/6, Wellington.

[30] As suggested, for example, in Bjorksten *et al.* (2004, p S41)

Coleman, A (2001), 'Three Perspectives on an Australasian Monetary Union' *Future Directions for Monetary Policies in East Asia*, D. Gruen and J. Simon, eds., Reserve Bank of Australia, Sydney, 156-188.

Cullen, Michael and Alan E. Bollard (2002), *Policy Targets Agreement*, Wellington.

Drew, Aaron, Viv Hall, John McDermott and Robert St. Clair (2001), 'Would adopting the Australian dollar provide superior monetary policy in New Zealand?' *Reserve Bank of New Zealand Discussion Paper* 2001/03.

Drew, Aaron, Viv Hall, John McDermott and Robert St. Clair (2004), 'Would adopting the Australian dollar provide superior monetary policy in New Zealand?', *Economic Modelling*, 21(6), December, 949-964.

Grimes, A (2005a), 'Regional and industry cycles in Australasia: Implications for a common currency', *Journal of Asian Economics*, 16(3), May-June, 380-397.

Grimes, A (2005b), 'Sources and Transmission of Regional Industry shocks: New Methods Applied to Australasia', Paper presented to Annual Conference of the New Zealand Association of Economists, Christchurch, June.

Grimes, A (2000), 'Case for a world currency: Is an ANZAC Dollar a Logical Step?' *Victoria Economic Commentaries*, October, 17-26.

Grimes, A, F Holmes and R Bowden (2000), *An ANZAC Dollar? Currency Union and Business Development*, Institute of Policy Studies, Wellington.

Hall, Viv B. and Angela Huang (2004), "Would adopting the US dollar have led to improved inflation, output and trade balances, for New Zealand in the 1990s?", *New Zealand Economic Papers*, 38(1), June, 49-63.

Hall, V B, K Kim and R A Buckle (1998), 'Pacific Rim Business Cycle Analysis: Synchronisation and Volatility', *New Zealand Economic Papers*, 32 (2), 129-160.

Hargreaves, D and C J McDermott (1999), 'Issues relating to optimal currency areas: theory and implications for New Zealand', *Reserve Bank of New Zealand Bulletin*, 62 (3), 16-29.

Hartley, P (2001), 'Monetary arrangements in New Zealand', New Zealand Business Roundtable, Wellington, May.

Hunt, B, D Rose and A Scott (2000), 'The core model of the Reserve Bank of New Zealand's Forecasting and Policy System', *Economic Modelling*, 17, (2), 247-274.

Lucas, R E Jr. (1976), 'Econometric policy evaluation: a critique", in K Brunner and A Meltzer (eds.), *The Phillips Curve and Labour Markets*, Carnegie-Rochester Conference Series on Public Policy, Vol.1, Amsterdam: North-Holland.

McCaw, S and C J McDermott (2000), 'How New Zealand adjusts to macroeconomic shocks: implications for joining a currency area', *Reserve Bank of New Zealand Bulletin*, 63 (1), 35-51.

Pomfret, Richard (2005), 'Currency Areas in Theory and Practice', *Economic Record*, 81(253), 166-176, June.

Reserve Bank of New Zealand (2000), *Independent Review of the Operation of Monetary Policy: Reserve Bank and Non-Executive Directors' Submissions*, Wellington, October.

Szeto, K L, P Gardner, R Gray and D Hargreaves (2003), 'A Comparison of the NZTM and FPS models of the NZ economy', New Zealand Treasury Working Paper 03/25, Wellington.

Figure 1: Nominal Interest Rate Yield Spreads (Short – Long Rates)

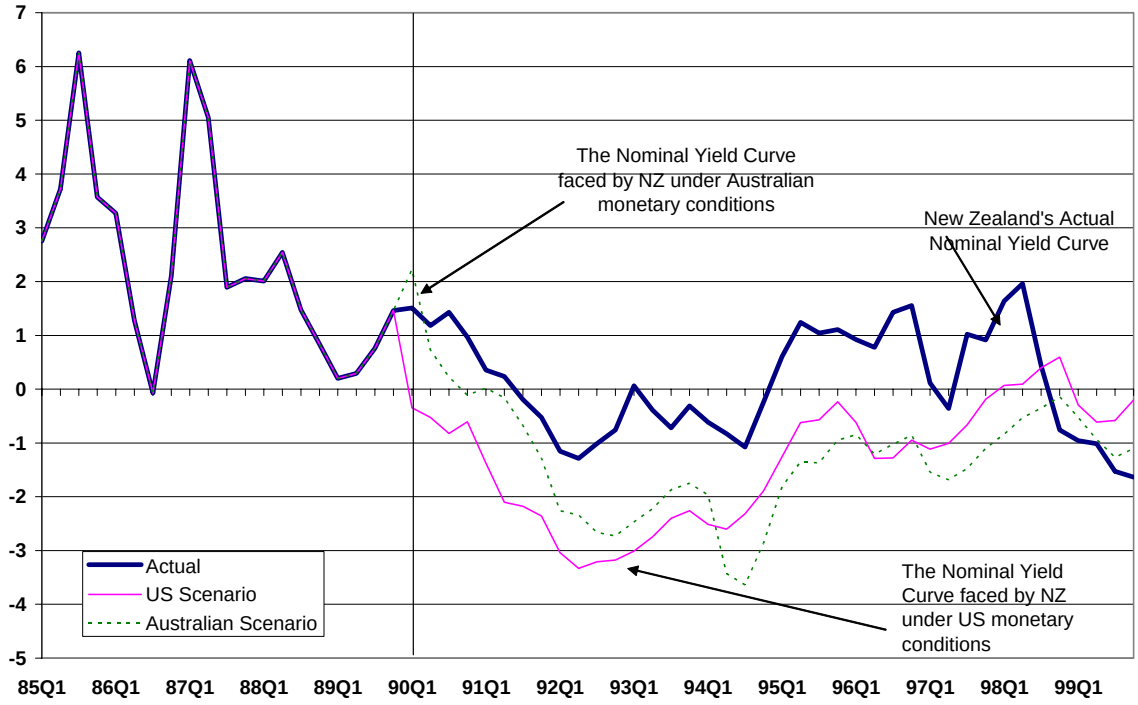

Figure 2: Nominal Long Term Interest Rates

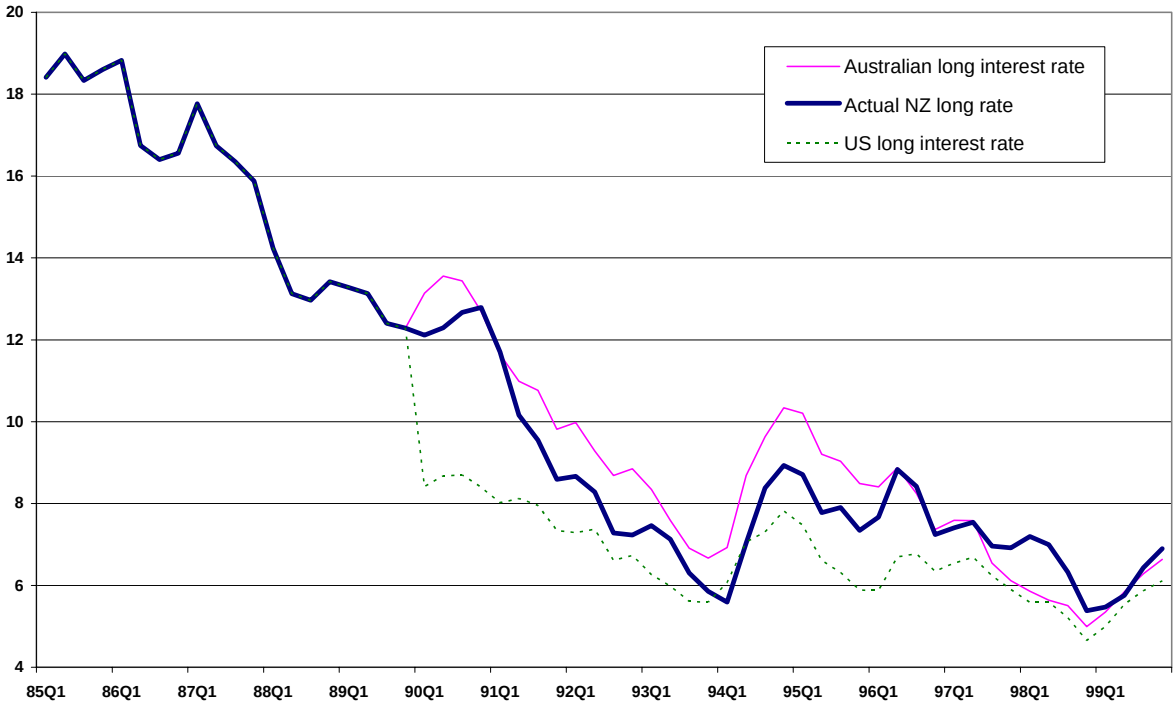

Figure 3: Nominal TWI Exchange Rates

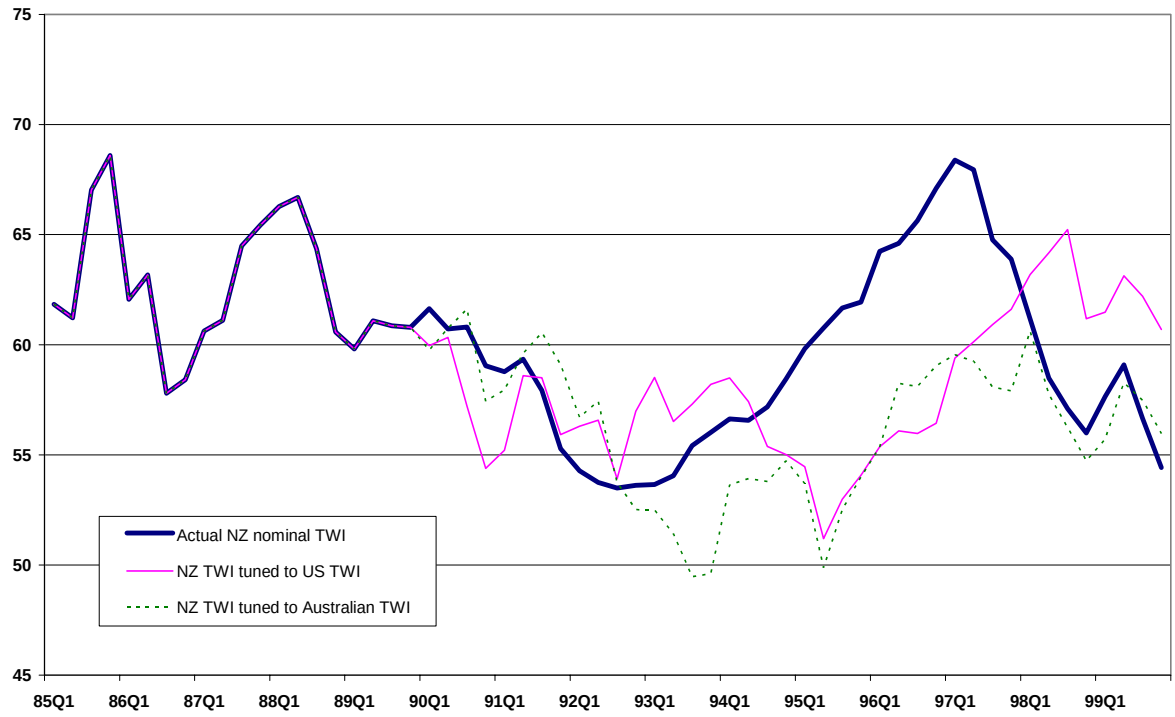

Figure 4: Real TWI Exchange Rates

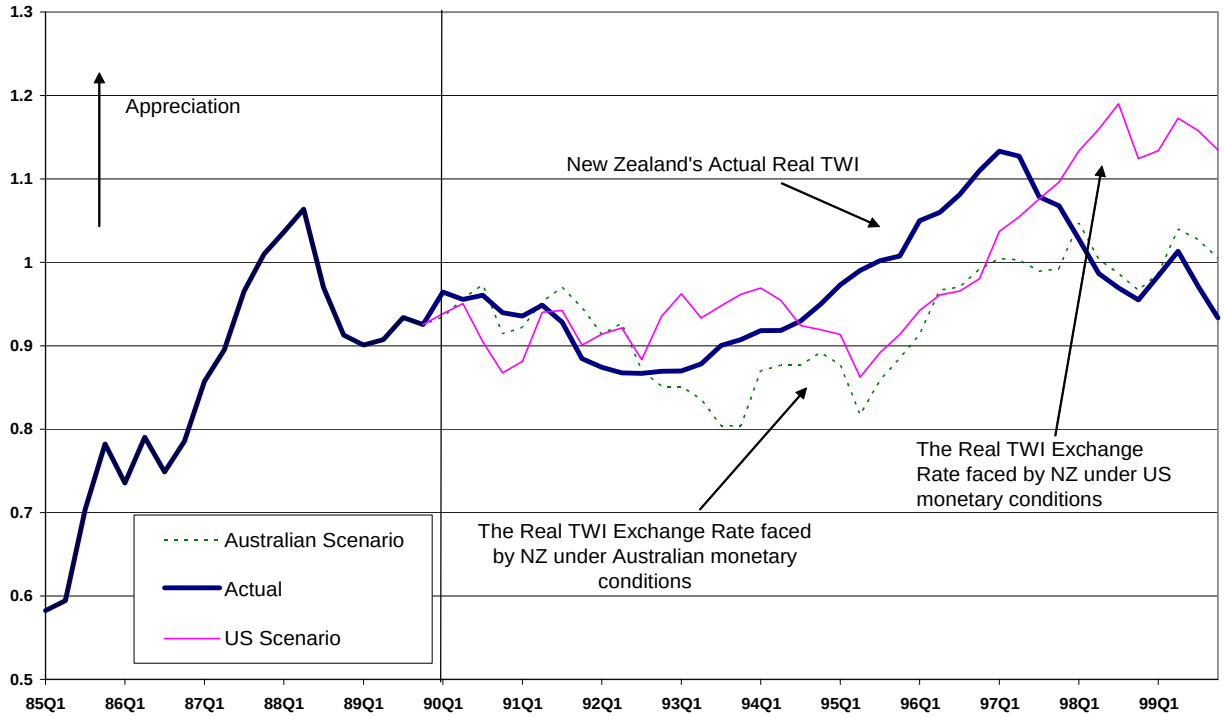

Figure 5: Output Gaps

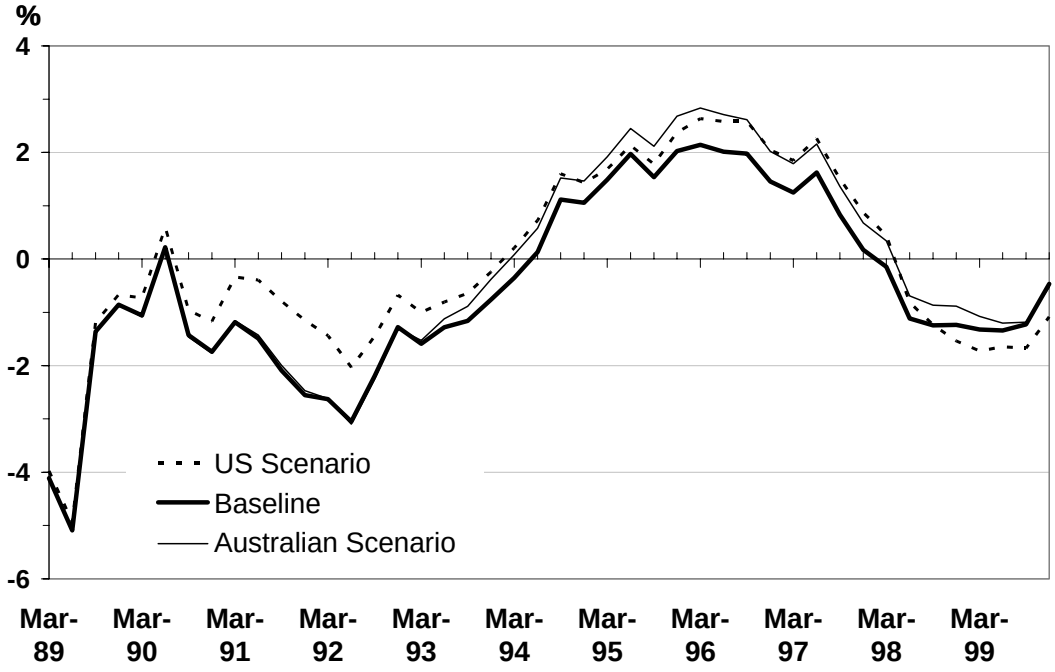

Figure 6: Consumption as a Proportion of Potential Output

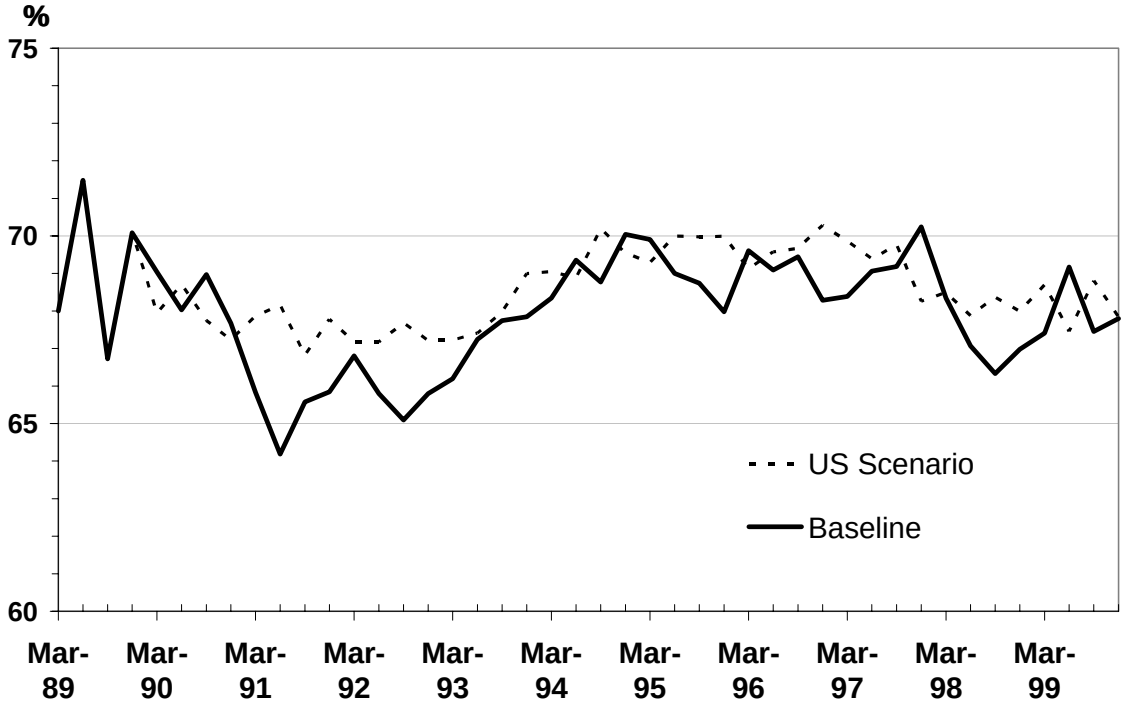

Figure 7: Business Investment as a Proportion of Potential Output

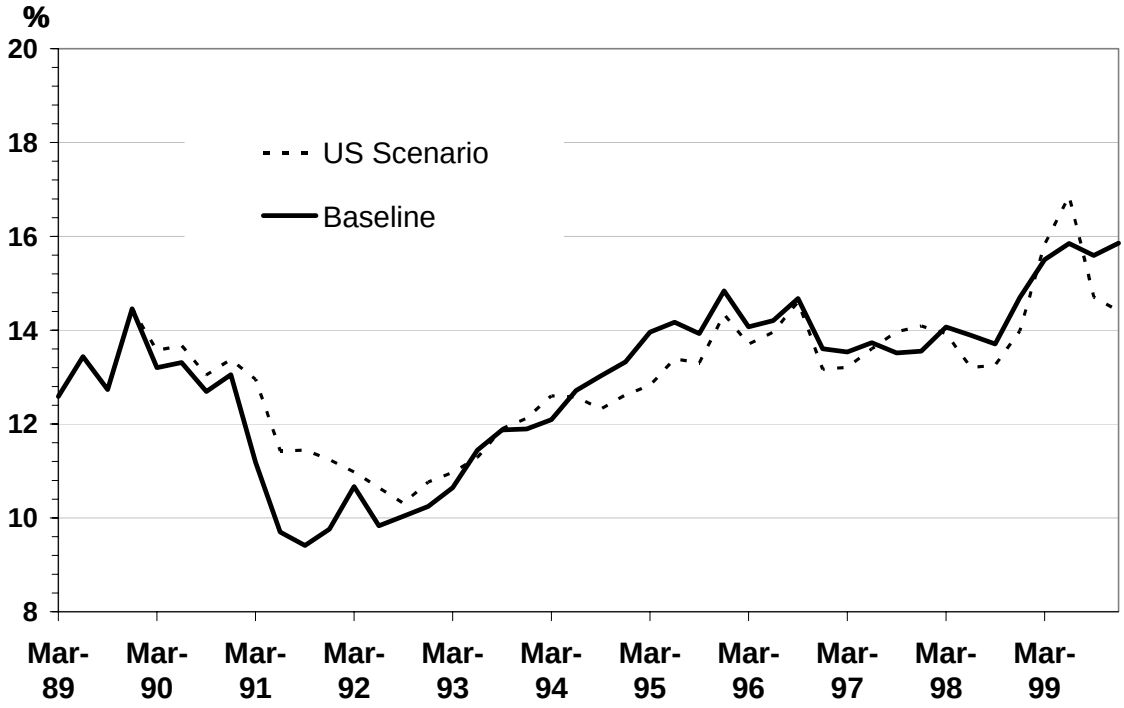

Figure 8: Real Net Exports ($m SNA Basis)

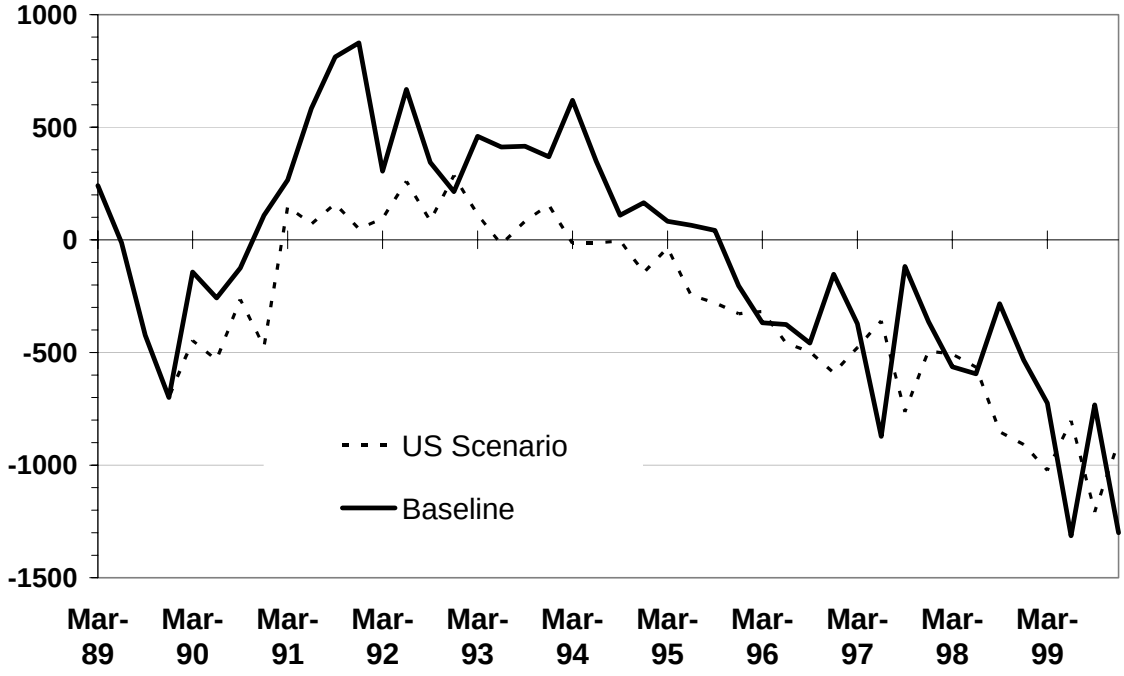

Figure 9: Annual CPI Inflation Rates, relative to Target Bands

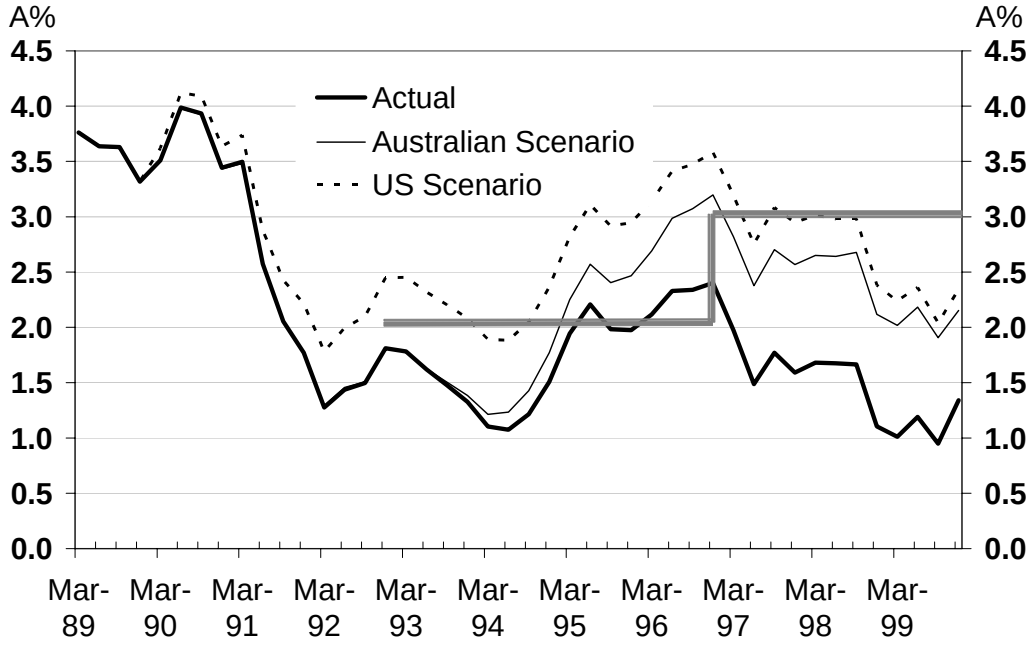

Figure 10: Nominal Trade Balances ($m SNA Basis)

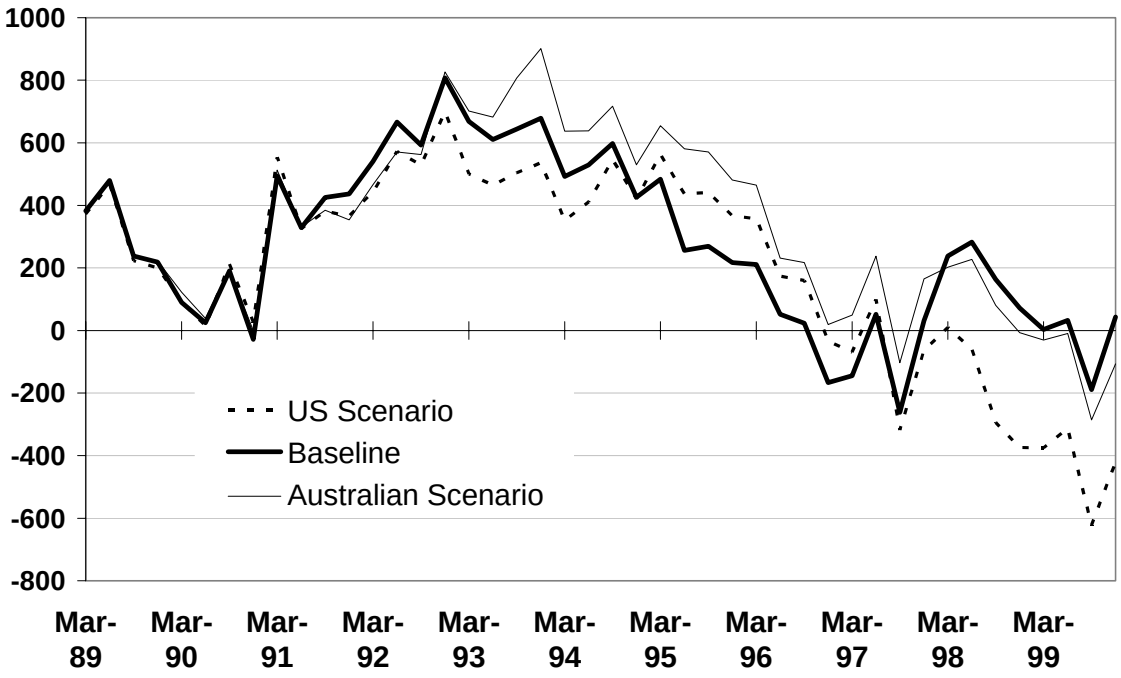

Figure 11
An Ideal Modelling Framework

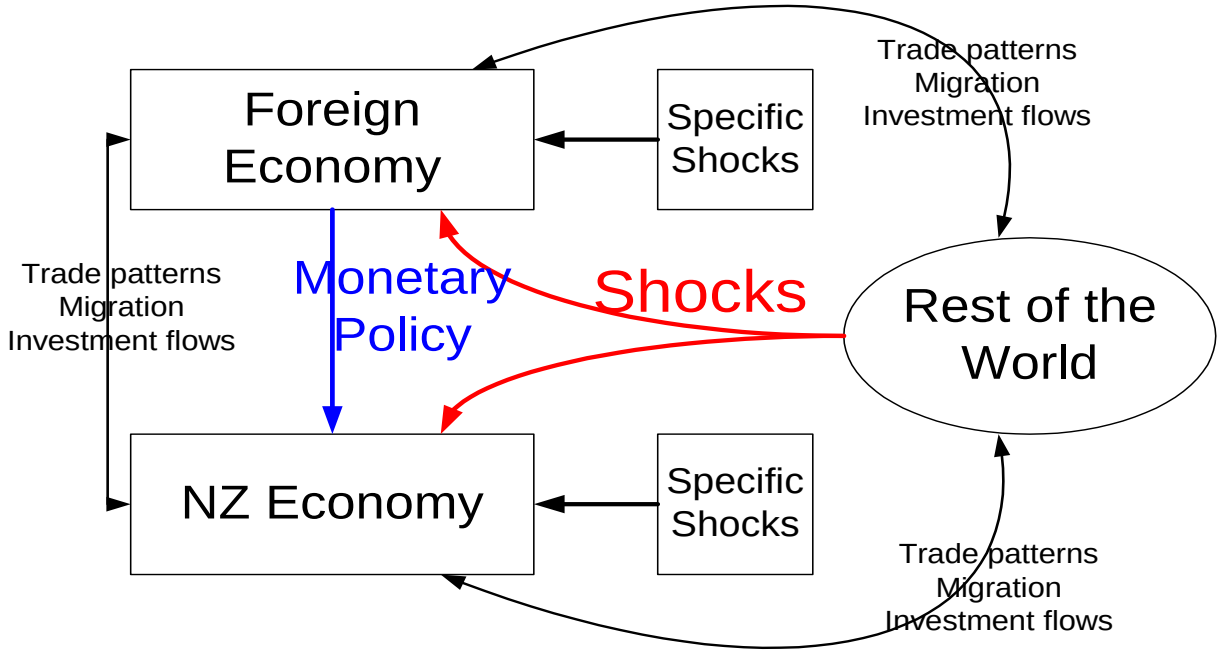

Figure 12
A Feasible Modelling Framework

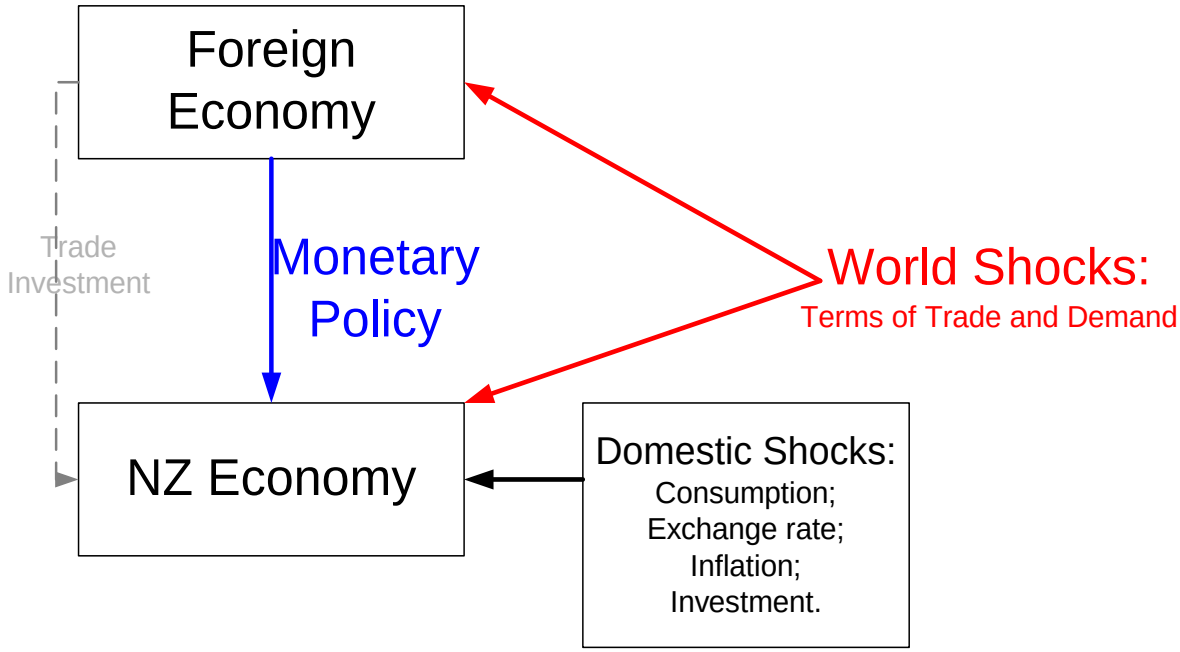

Table 1
Collation of stochastic simulation volatility properties into a standard loss function
(output and inflation variability are weighted equally)

Simulation	Loss under Domestic Policy	Loss under Foreign Policy	Percentage change in Loss
Domestic Shocks	1.0	3.8	273
World Shocks	1.3	2.9	120
Mixed Shocks	1.6	3.3	105
All Shocks	2.3	3.9	71

Table 2
Average volatility properties for output gap and inflation
(25 year simulation period – 100 shock draws – 10,000 observations)
(percentage point units)

Simulation:	80% Confidence Interval for Output Gap			80% Confidence Interval for CPI Inflation			RMSD Output*	RMSD CPI Inflation
Domestic shocks & domestic policy	-1.7	to	1.7	0.8	to	2.2	1.340	0.517
World shocks & domestic policy	-2.0	to	2.0	0.8	to	2.2	1.543	0.527
Mixed shocks & domestic policy**	-2.2	to	2.2	0.7	to	2.3	1.689	0.595
All shocks & domestic policy	-2.6	to	2.6	0.6	to	2.4	2.013	0.734
Domestic shocks & foreign policy	-2.6	to	2.6	-0.9	to	3.9	2.010	1.909
World shocks & foreign policy	-2.6	to	2.6	-0.2	to	3.2	2.011	1.346
Mixed shocks & foreign policy	-2.7	to	2.7	-0.3	to	3.3	2.143	1.409
All shocks & foreign policy	-3.0	to	3.0	-0.4	to	3.4	2.366	1.505

* Root Mean Square Deviation. This is the average squared deviation in the observed series from its control long-run equilibrium. The RMSD for output is the averaged squared deviation in output from potential, and the long-run equilibrium is zero ie the output gap is closed. The RMSD for inflation is the average squared deviation in the Bank's target measure of inflation from the mid-point of the target range i.e. 1.5 percent.

** Under the 'mixed shocks' simulations the average correlation (across the draws) between the domestic and the foreign sector output gap is 0.72. This suggests that our specification of mixed shocks captures the spirit of Hall *et al* (1998), and McCaw and McDermott (2000) ie the finding that the New Zealand business cycle is synchronised with that of the USA and Australia around 70 percent of the time.

Figure 13:
Long-run average inflation and output volatility
(percentage point units)