

Monetary policy and the exchange rate: The Kiwi that had to fly

by Roger Bowden and Dawn Lorimer*

Abstract

June 2007 saw the first serious attempt by the Reserve Bank of New Zealand to exercise its currency intervention powers, in an attempt to put a cap on the soaring NZ dollar. Sceptics pointed out that this was inconsistent with the comfort to the foreign exchange carry trade conveyed by signals that the official cash rate would remain high or even tightened further, and intervention attempts could even perversely drive the currency higher. The problem for monetary policy has been that in an incomplete debt market, the only real channel for the official cash rate to impact on fixed rate home mortgage rates is via the indirect feedback from offshore NZ interest rates. This means that the exchange rate becomes the vector. We argue on the basis of forward interest rates that the problem is fixing itself, and from here on will only be hindered by currency intervention or further tightening signals from the central bank.

JEL numbers: E43,44,52,58; F31,41; G15

Key words: Carry trade, exchange rate intervention, NZ dollar, Uridashis, official cash rate, term structure.

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1. Introduction

Unaccustomed exchange rate intervention by the Reserve Bank of New Zealand during June 2007 attracted considerable publicity, not least because the Bank went out of its way to make a formal announcement that it was doing so. In the event, the intervention did not succeed in its announced intention of capping the NZ dollar. And true to form, the media latched on to the failure: “Japanese grannies trounce Kiwi bank’ ran a newspaper headline¹. We do not know precisely what the intention was - to smooth out an inevitable upward ride or to attempt to put a more lasting cap on the currency. However, one thing did seem self evident, that to bet against yourself is never going to be too safe. Thus some of the more defensive NZ commentators rationalised intervention in terms of the smoothing practices followed by other central banks (e.g. Sheen and Kim (2004) for Australia), under which they could even make money by selling into temporary highs. But the problem in the present episode was that interest rate settings via the official cash rate had widened the already considerable gap between funding in Japanese yen or euros and investing in Kiwi – the carry trade, in other words. To exacerbate their exposure, the RBNZ had constructively created investor comfort to the carry trade, by previous signals to the effect that the NZ official cash rate was likely to remain high in the future.

But was intervention a good idea anyway? In the present note we argue that letting the currency go where it might is a rational strategy in an environment where (a) monetary policy is vectored via interest rate targeting; and (b) where the underlying capital market is segmented and consequently inefficient. In such circumstances, exchange rates have to be the policy vector, and one might as well get it all over just as quickly as possible. Currency intervention is either going to be ineffective or it simply prolongs the agony of the export sector.

The argument can be summarised as follows. The central problem that the Bank has faced over the last few years is a failure of the official cash rate (OCR) to impact further out along the term structure of interest rates (Bowden 2006). It is necessary to achieve such an impact, for the housing market and related consumer and investment expenditure has become predominantly financed with fixed rate debt. Suppose now that the central bank announces a higher OCR, and moreover signals that this is likely to remain high for the foreseeable future, or could even rise. In a textbook world, this should be transmitted more or less immediately via forward rate agreements (FRA’s²) and the underlying bill or bond futures markets out to two year rates or even longer. But in a small illiquid capital market this may not occur. In

fact, much of the expenditure that the Bank is worried about is financed not by the local debt markets, but by those offshore. In the present episode this has been substantially uridashis, NZD denominated debt held by Japanese housewives (in the popular personification – it is their mothers who are supposed to be the carry traders!).

In such circumstances, the required term structure vectoring has to be done instead by the exchange rate. But the effect is very slow to develop because another perversity gets in the way. When the central bank signals that the OCR is likely to remain high, this creates comfort for the Japanese housewives who invest in uridashis. With little risk of capital loss on bond maturity they will not require higher yields. So the uridashi term structure stays obstinately put, and so do the rates faced by NZ homeowners. In the meantime the NZD will be rising, as offshore debt issuers realise the advantage in issuing uridashis and swapping them back to their own required funding currencies – making money along the way from a widening swap spread.

It is the speculating grannies who clear the logjam, aided by Californian and other hedge funds. The future OCR signals sent by the RBNZ likewise extend comfort to the more speculative carry trade, who aim to make money from the spot rate differential between NZ and Japan. The carry traders now see a rising currency that will stay strong or rise even further. Doji candlesticks³ are hardly needed to cast any light on this, though they could well add to the fire (see section 4). The rise in the NZD goes into overdrive; perhaps an afterburner would be a better analogy. It soars to the point where serious doubt sets in as to its sustainability. It is at this point that the uridashi forward rates start to rise, and along with them, the NZ homeowner mortgage rate and even the local NZ government bond rate. Monetary policy has finally started working.

So should the Reserve Bank try to cap the currency? We argue that currency intervention on the sell side is a mistake. Better to let the currency rise naturally. That way, uncovered interest parity expectations and currency risk premiums can do their work unimpeded, dragging up the uridashi and euro forward rates and hence the rates on local two and three year fixed rate debt. To be sure, NZ exporters will be hurting from the high dollar; but in this context short and sharp is better than long and aching – easier to hedge and easier to endure otherwise.

There is plenty of detail to fill in, notably the role played by the swap markets and swap spread, and this will be attempted progressively in what follows. But the episode has become a striking instance of the need for macroeconomists to appreciate what is going on in

the international capital markets, extending to derivatives and the basis for asset pricing, as well as to the physical debt markets.

The scheme of the rest of the paper is as follows. Section 2 provides some background in recent history of interest and exchange rates, including monetary policy settings and the more recent intervention experience. Section 3 reviews the problems that have been experienced with monetary policy arising from the imperfect articulation of local and offshore debt markets. But it goes on to suggest on the evidence of forward rates that things are starting to fix themselves and will do so without currency intervention. Section 4 offers some concluding remarks on intervention and on future prospects for the NZ dollar.

2. Background

The run up of the NZ dollar as against the US dollar as benchmark is illustrated in figure 1, which uses a longer time frame encompassing the recovery of the NZD from the depths of despond accompanying the Asian crisis of the later nineties. The economic and financial influences that created the longer term rise are surveyed in sources such as Bowden (2004, 2005, 2006), Hall and McDermott (2006), Drage *et al* (2005). It was a feature of that process that much of the strength of the NZ dollar was at first created not by the carry trade, but by a resurgent housing market as commodity price gains spread through the economy as a whole. Figure 1 makes it clear that the rise in the NZD v the USD was well in train well before the RBNZ commenced the current cycles of OCR hikes from 2004. The strength of the housing market was underpinned to an increasing extent by fixed rate mortgages. The ability of the local banks to write such large volumes of fixed rate mortgages originated from the swaps market, the other leg of which came from offshore institutions raising NZ dollar funds in the form of eurodollars and increasingly in Japan. Fixed rate mortgage payments from NZ householders were being passed through to become coupon payments on Uridashis. It has been primarily Japanese housewives, and not Belgian dentists, whose demand for NZD denominated debt has underwritten NZ mortgages. In recent times Eurodollar funding has been largely in the form of longer term zero coupon or deep discount bonds, with a capital gains preoccupation⁴. Thus in what follows, the focus will be on uridashis as the ultimate source of funding for NZ households.

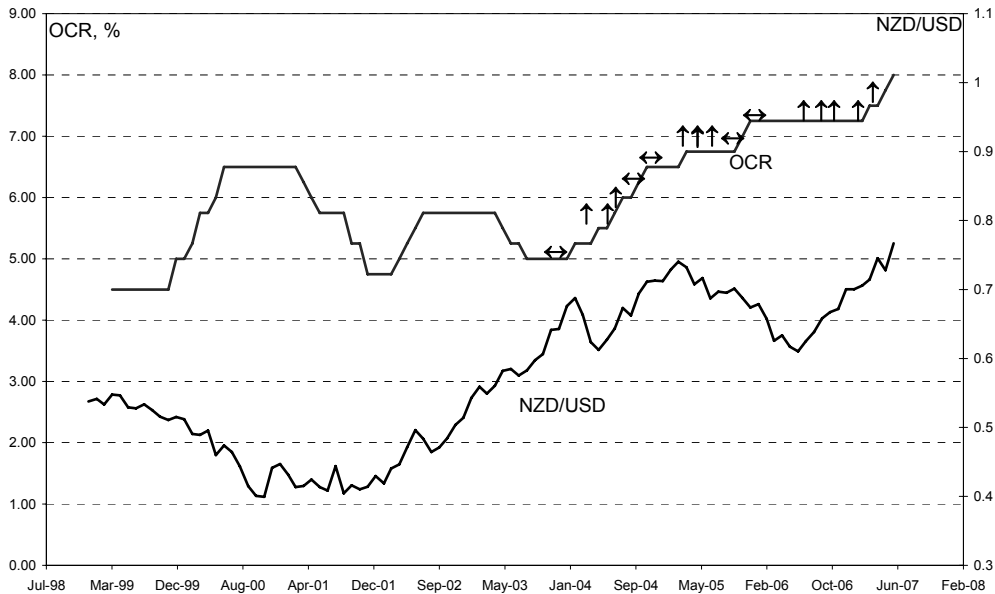


Figure 1: OCR and exchange rate

Concerns about inflation arose as the economy strengthened, especially on the part of the Reserve Bank, which under policy target agreements with the government, is required to adhere to a targeted inflation rate band. The primary instrument for the purpose is the OCR, though a case could be made that the Bank has de facto a second instrument, namely expectations of future OCR's (Bowden 2004). Guthrie and Wright (2000) had earlier pointed out the evident power of announcements as such. Appendix Table A1 is a summary of monetary policy announcements over the last few years. The specific interest in this table attaches not only to the official cash rates, but to the Governor's views as to the future. The OCR itself is graphed over the longer term in figure 1, on which we have annotated arrows that represent foreshadowed tightening as up arrows, or sideways arrows where future tightening was not indicated.

The Reserve Bank's general power to intervene in the currency markets dates from the time that the NZ dollar was floated, in 1985. The stated intent at that time was to intervene in more or less emergency situations, in times of 'extreme disorder' in the foreign exchange market. The policy was modified in March 2004, under an agreement with the government, itself under pressure from an unhappy export sector (Eckhold and Hunt (2004)). The Bank could now intervene for the purpose of smoothing out peaks and troughs in the exchange rate cycle (note the assumption that there was a cycle). The market was also assured that the Bank's foreign currency reserves would, be open for all to see at the end of each month⁵. The first serious application of the new policy came on June 11 2007. Although the official

wisdom was that intervention was simply an application of the smoothing operation, the publicity sought in the Governor’s announcement, together with the scale of the intervention, suggested something more active. Figure 2 uses a much shorter time scale (in hours) to illustrate the intervention process, starting with the initial impact of June 11, followed by a series of progressively smaller impacts over the ensuing days. Commentator scepticism was as always informed mainly by hindsight and concentrated on the bounce backs that followed each of the downward spikes apparent in figure 2. At each of these steps, the Reserve Bank was effectively losing money. Of course this is just on a mark to market basis. Unlike other currency operators, the Bank is in the fortunate position of being able to carry forward its USD positions for some time, and realise its gains when the Kiwi does eventually come back to earth. They would hope that the carry trade and uridashi buyers would know this, and realise that the Bank had a strategic weapon that they do not, namely time – the ability to wait it out. The snag is that the Reserve Bank is at the same time also signalling a higher OCR, and therefore a currency that will continue high or even higher. It is this inconsistency that is the Banks’ strategic weakness, and currency traders have been quick to point it out⁶. Section 4 has further remarks on the intervention process.

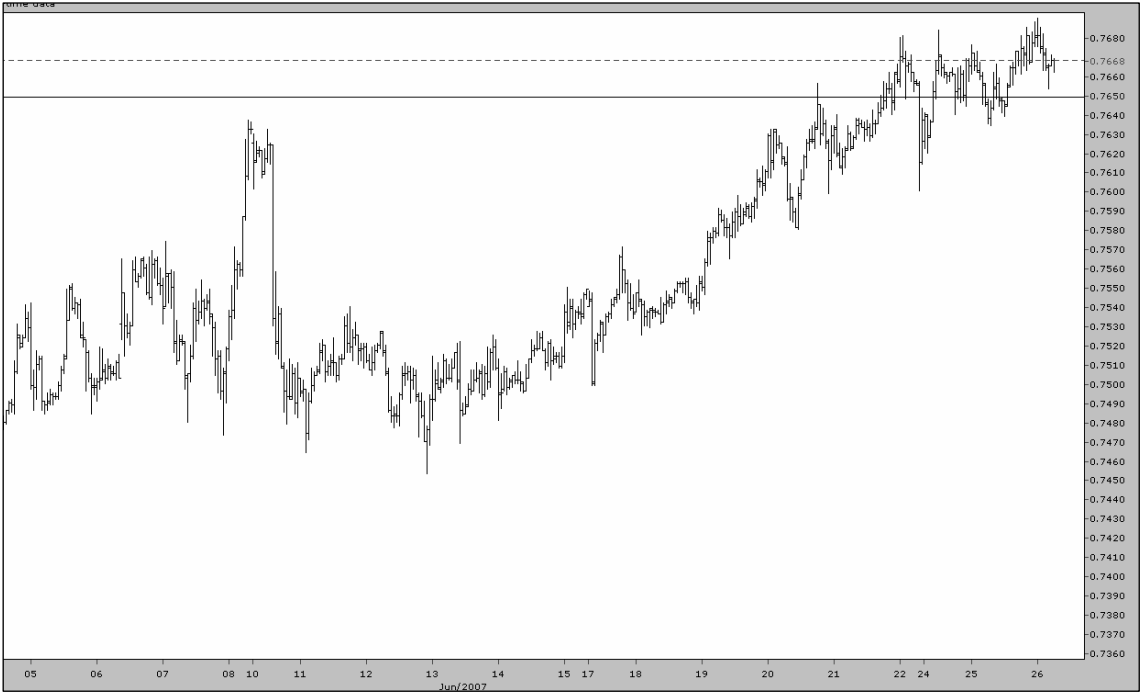


Figure 2: NZD/USD 4 hour intervals, June 5-27 2007

(Source: <http://www.forexdirectory.net/nzd.html>)

3. The term structure of interest rates

As floating interest rates rose on the back of the OCR, the term structure inverted and homeowners turned more and more to fixed rate mortgages. In this section we review some history of the interest rates that in recent years have become the most relevant for purposes of mortgage funding, and consumer expenditure financed by home mortgages, namely the 2-3 year maturity band. The object is to relate the shifts in these rates to currency movements, and the feedback mechanisms that connect offshore interest rates to domestic in the sensitive maturity bands.

Figure 3 is a historical overview of some relevant interest rates, taken as the two year yields to maturity that have been the most popular uridashi issues. The uridashi series is an average of issues in each month, using only bonds that were issued at or very close to par. There are typically about three or four such issues in each month. This series is taken back to March 04 which is the date from when an unbroken sequence of monthly issues is first available.

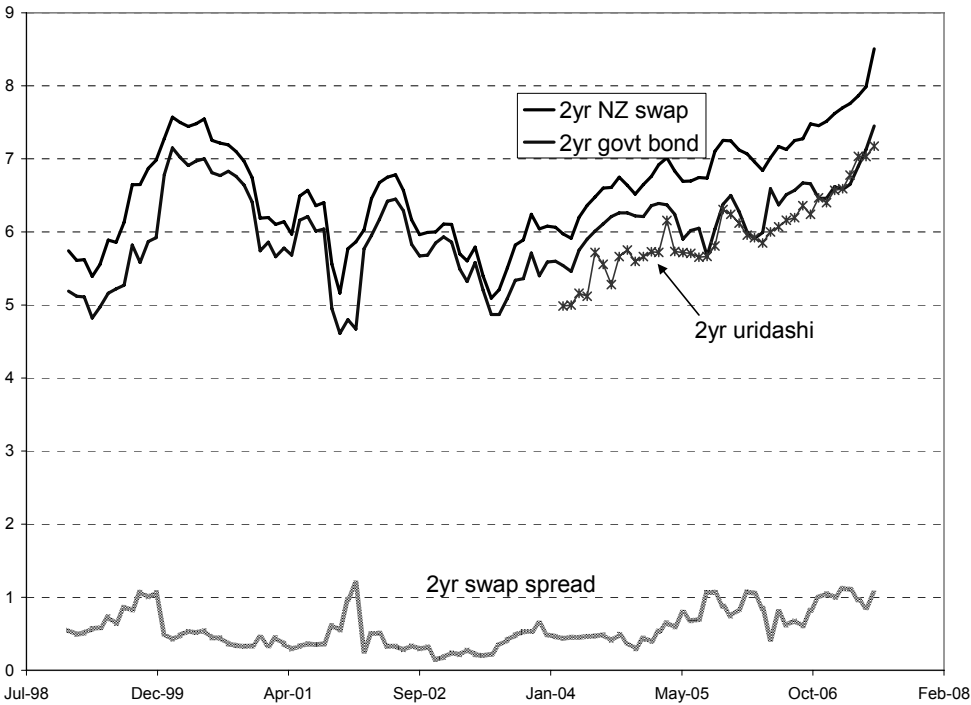


Figure 3: Comparative interest rates

Sources: Uridashi issues from RBNZ, other data from Thomson Financial Datastream

An initial aspect of interest in figure 3 is the swap spread, conventionally measured as the difference between the two year swap rate and the two year government bond rate. The

spread arises largely as a consequence of supply and demand in the swap market. When NZ homeowners want more fixed rate mortgages, this will drive up the spread, for it amounts to a demand to pay fixed and fixed rates must therefore rise. What was happening throughout the period was that offshore investment banks were taking advantage of the appetite for high coupons in Japan, where interest rates were extremely low, and issuing at rates which would have been cheap as a domestic NZ issue. This left plenty of spread, not just over the NZ government bond rate (as in the official swap spread), but also over the uridashi rate, to be ‘divided up’ between the counterparty banks in the course of the swap deals off the back of the uridashi issues. This naturally increased the incentive to mount such issues.

A second aspect of interest in figure 3 is that the uridashis tended to be issued at yields less than the NZ government bond rates. This would be understandable if the issuers involved had better credit ratings than the NZ government, which in some cases was probably so. Yet it is of significance that the yield curve gap closed right up as 2006 progressed, until the two became virtually indistinguishable.

A more revealing comparison can be cast in terms for the one period ahead implied forward interest rates. If uncovered interest parity (UIP) held, the relative forward rates between the bonds of two different currencies would be an indicator of expected currency movements a year down the track. Let time now be $t = 0$, so that time $t = 1$ is at the end of the coming period (year in this case), and time $t = 2$ is two years down the track. The one year forward UIP relationship can be cast as

$$s_2^e - s_1^e = r_2 - r_{*2} - \pi_2,$$

where:

s denotes the log NZD/USD exchange rate;

s_1^e denotes the expected value of s_1 formed now at $t=0$;

s_2^e denotes the expected value of s_2 formed now at $t=0$;

r_2 denotes the second period NZ forward rate, formed as of now ($t=0$);

r_{*2} is the corresponding second year implied forward rate for the US;

π_2 is the two period ahead risk premium on the NZD v. USD. It can be of either sign.

The question to be explored is what the observed two year forward interest rates tell us about currency expectations or else the risk premium. The interest rates depicted in figure 4 are the estimated forward rate one year out, i.e. the implied future second year rate that the market has built into the current two year yield⁷. At the start of the period, early to mid 2004, there was a fairly significant substantial difference between NZ and US forward interest rates. One

could interpret this as a view that the NZD could fall down the track, which indeed it did. But as the cycle of OCR tightening got under way (see the up signals in figure 1) and US interest rates rose, the forward rate gap steadily closed. Over this period the uridashi market was either (a) predicting a future rise in the Kiwi or else (b) deriving comfort from the signals coming out of the RBNZ, leading to a negative risk premium, creating a certainty equivalent for much the same thing. Over all this period, the uridashi forward rates stay much the same.

The change came from mid 2006. With reference to figure 4, the uridashi forward rates have started to rise, picking up speed in 2007. Meanwhile, the USD forward rates remain constant, or even fall slightly. But by now the carry trade is in full swing under the influence of some strong forward signals from the RBNZ, and the NZD is climbing. It is a reasonable hypothesis that the uridashi holders have become concerned that the NZD has risen too far and a correction is likely down the track, no matter what the stance might then be of the RBNZ. Moreover, the higher the Kiwi rises, the more its volatility influences the risk premium term (π_2 in the above equation). The effect has spread via the swap rate to the local NZ government bond market, where the two year forward rates are also rising. And the swap rate has likewise pushed up the NZ fixed mortgage rates.

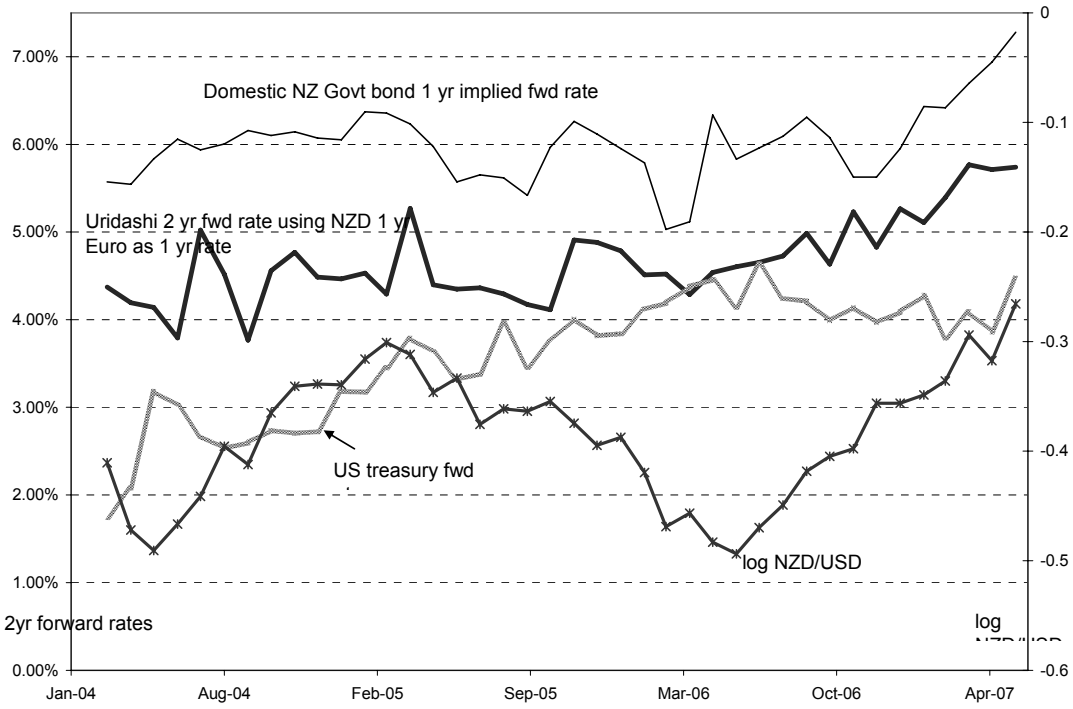


Figure 4: Implied second year forward rates

4. Concluding remarks

The history of the intervention as of the date of writing suggests that if anything, it has stoked the fire, rather than dampening it. One wonders, in fact, if the Bank ever anticipated that doji traders might climb on board. For if the currency spikes downwards as a result of intervention then recovers to finish a little higher, then that would seem to create a bullish doji signal: white body for up over the day, longer tail for the down spike.

When technical traders do climb on board the whole ship gets a little wacky. And in that spirit let us offer a contrary conjecture of our own, that in the finest Panglossian tradition, it might all be for the best. There is even a case that the Bank should have *bought* Kiwi, not sold it, with the object of driving up the risk premium for the prospective buyers of uridashis, and faster flow of the higher yields through to NZ mortgages. Of course that would be a highly risky manoeuvre for the bank's balance sheet, with the risk that it could get caught short in US dollars when the NZ does fall, as it eventually must. But not to worry, for the Doji traders are doing it all for us, free of charge.

At any rate, it is the thesis of the present paper that things have been fixing themselves, without the need for central bank intervention. To be sure, the NZD has been climbing too far and too fast, driven by the investor comfort extended by the OCR signals coming out of the RBNZ and more latterly by technical analysis. For the carry trade, it is business as usual, for their forward rate horizons are short. But the one year forward rates suggest that the Japanese housewives who underpin the longer term uridashi market are getting worried that what goes up must eventually come down, and the higher it has climbed, the lower it must fall. As a result, uridashi yields are climbing and that is ultimately delivering what the Reserve Bank want, namely higher fixed rate mortgages. Uridashi holders or their advisers will know that as well, as a feature of what might well be a rational expectations equilibrium spanning a year or two out.

Commentators have pointed out the inconsistency between currency intervention and OCR policy; it is pointless to try to hold the lid down on the pot while stoking up the fire underneath. But there is in addition a more macroeconomic case for no intervention. If the currency has to climb then let it, for that creates the risk premiums that in an incomplete capital market will raise NZ mortgages rates and vector monetary policy along the term structure curve. With the currency risen so far so fast, it might also be a good idea to cease projecting further OCR rises, on the grounds that the operation has been successful and the patient now has to be allowed to recover.

The currency episode has been one of the more visible macroeconomic manifestations of an underlying lack of internal balance as between saving and investment, and of the misdirection of the latter towards consumer investment, notably housing. Politicians do respond to such pressure points, and occasionally even in the right way. At long last we do have tax incentives for long term contractual saving; Kiwisaver might be modest, but it's the thought that counts. And perhaps when the dust does settle and the Kiwi dollar has remembered that it's not supposed to fly, it might be time to reopen the whole debate about a common currency with Australia. The price of that will likely be a bit of local inflation from time to time. But to a NZ exporter that might be the lesser of two evils.

As to the longer run, it is not altogether clear that when the NZ dollar does settle it will be back to its old mark. The extraordinary strength of dairy commodity prices and an incipient recovery in the forestry sector, suggest a stronger currency, and one can certainly anticipate a stronger real exchange rate arising from current trends in nontraded prices. We can probably expect more of the same depressing spectacle of further industrial outsourcing. But given the upward drift in the Chinese Renmimbi Yuan, we might be treated to a reverse takeover of the US.

Appendix: Summary of RBNZ OCR press releases January 2004-June 2007

Date	OCR Current	OCR Change	OCR Future direction	Domestic Demand Summary commentary	Export Sector Summary commentary
7-Jun-07	8.00%	0.25%		Strong growth since late 2006: housing market bouyant business indicators strong firms' capacity stretched govt spending increased	Marked increase in dairy prices (over past 6 mos) challenging conditions for some
26-Apr-07	7.75%	0.25%		Expanding strongly since 2006: bouyant housing market ongoing net immigration increases in govt expenditure stretched productive resources capacity stretched	Marked increase in dairy prices; challenging conditions for some growth in tourist arrivals
8-Mar-07	7.50%	0.25%	"Further tightening may be required" Alternative measures to support OCR	Strengthening domestic demand: resurgence in housing mkt firming net migration mortgage credit low margins expansionary fiscal policy	Lift in export commodity prices, particularly dairy.
25-Jan-07	7.25%	0.00%	"Further tightening likely if no clear moderation in housing domestic demand". Medium-term inflation risks for 2008-9.	Domestic demand rebounded: retail trade picking up resurgence in housing mkt business confidence recovering. Drivers: decline in petrol prices, pickup net immig, exp fiscal pol	
7-Dec-06	7.25%	0.00%	"Firmer policy stance could still be required" "Easing a long way off"	Resilient domestic demand; medium-term inflation pressures: housing market new momentum fiscal expansion short-term inflation easing current decline in oil prices	Many exporters under pressure but favourable commod prices
26-Oct-06	7.25%	0.00%	"Easing a long way off" maybe tightening ahead	Near-term inflation improving; expect low Dec CPI Medium-term inflation pressures: housing mrkt resilient net inward migration mortgage credit expansion tight labour market	Strength in NZ's intl mrkts
14-Sep-06	7.25%	0.00%	"No prospect OCR cut" "Further tightening might be required"	Expansion in employ 1st half 06 due to govt spending, exports housing mrkt slowed	Net exports strong first half 2006
27-Jul-06	7.25%	0.00%	"No further tightening expected this cycle but easing some way off"	Econ activity stronger than exptd Annual CPI inflation 4% in June Expected to return to 1-3% by late 2006	
8-Jun-06	7.25%	0.00%	"No scope for easing OCR this year" "Do not expect tighter policy in short term"	Weaker econ activity recently; short term inflation worsened. Higher oil prices, NZD fall but low growth expected for 2006; weaker housing mrkt	Expect export growth
27-Apr-06	7.25%	0.00%	"No cut in OCR - 2006" "No OCR rise expected"	Economy weakened faster than expected but short-term inflation pressures greater. NZD decline, oil shocks	Expect export growth
9-Mar-06	7.25%	0.00%	"No ease OCR - 2006" "No rise expected"	Econ growth slowing & business activity, confidence softer . Buoyant housing market has kept up household spending, strong growth in labour costs.	

26-Jan-06	7.25%	0.00%	"No rise expected, but not ruled out"	No sustained slowdown, wage and energy cost increases	
			"No easing prospect"		
8-Dec-05	7.25%	0.25%	"No Easing prospect"	Overall demand above capacity; main driver household spending; buoyant housing, increasing govt spending, strong business invest. One off oil price rises, labour & other bus costs up	
			"Further tightening will depend on housing & demand pressures"		
27-Oct-05	7.00%	0.25%	"Further tightening maybe"	Buoyant housing, consumption, expansionary fiscal policy, higher oil prices.	Weakening in export sector
			"No prospect of easing in foreseeable future"	Med term inflation risks strong household spending, dis-saving expect lower NZD	
15-Sep-05	6.75%	0.00%	"Further tightening maybe"	Slowdown in manuf & tourism (exposed to high NZD)	
			"No prospect of easing in foreseeable future"	Non-traded sectors high growth; housing strong, underpins strong consumption growth. Oil prices have surged - expect dampening effect medium term	
28-Jul-05	6.75%	0.00%	"Further tightening can not be ruled out"	GDP grwth ease, softening signs, manufacturing sector eased, household consumption growth down, housing market still firm. Surging oil prices.	
			"No prospect of easing in foreseeable future"		
9-Jun-05	6.75%	0.00%	"Firm policy stance needed"	Evidence economy slowing but household spending & housing market activity remain firm	Export prices some commods up
			"Further tightening might be required"		
			"No scope for easing in foreseeable future"	Growth in debt-financed household spending; increased cost of labour, energy, freight.	
28-Apr-05	6.75%	0.00%	"Further tightening might be required"	Productive resources stretched Soft GDP outturns retail trade, housing market data, imports robust Expect rebound in GDP grwth	
			"No scope for easing in foreseeable future"	Inflation pressures still strong	
10-Mar-05	6.75%	0.25%	"Further tightening might be required"	Vigorous Dec employment growth High level bus. & cons confdnce Housing activity contins easing	World demand, export prices projected to moderate over 2005
			"Little scope for easing in foreseeable future"	"Slowing in growth later in 2005"	
27-Jan-05	6.50%	0.00%	"Tightening over past yr currently looks sufficient; Further tightening later cannot be ruled out. Little scope for easing in foreseeable future"	Current momentum in household demand may hold up longer Rising wage & salary pressures Projected slowing in growth over the year ahead	
9-Dec-04	6.50%	0.00%	"Tightening over past yr currently looks sufficient but little headroom. Further tightening later cannot be ruled out"	Econ indicators contin to surprise Slowdown still expctd in 2005; easing in house sales. Current labour market tightness	Weakening exports picture Softer world growth, stronger NZD

28-Oct-04	6.50%	0.25%	"Current policy settings doing enough. Recent tightenings still have to work their way through."	Econ still performing strongly Domestic data - positive surprises	
9-Sep-04	6.25%	0.25%	"Further tightening likely to be required"	NZ Econ performing v strongly Data delivered some +ve surprises Econ growth near its peak; expect housing to contin slowing tight production capacity.	
29-Jul-04	6.00%	0.25%	"Further tightening likely to be necessary"	Continued buoyancy in economy; strain on resource capacity; & labour markets tight.	Commodity prices rising; export incomes improving inspite of rise in NZ \$
10-Jun-04	5.75%	0.25%	"Further tightening likely to be needed in yr ahead (but modest by historical standards)"	Stretched productive resources	Rising commodity export prices; global demand up; fall in NZD Higher oil prices
29-Apr-04	5.50%	0.25%	"Further adjustment (up) cannot be ruled out"	Econ continues performg strongly Housing & construction indicators suggest cooling but not clear	Improvements in global economy Fall in NZ \$ over recent weeks
11-Mar-04	5.25%	0.00%	"Wait and see data to judge whether a further small increase required this year"	Domestic inflation pressures increase: housing, construction Expect slowdown in growth	Rising NZ \$ so weak imported inflation
29-Jan-04	5.25%	0.25%	"Rise in NZ \$ will likely reduce need for interest rates to rise as much as they otherwise might."	NZ econ impressive growth over past 2 yrs. Productive capicity & labour market becoming tight. Now prudent to begin returning l/rates to less stimulatory levels.	NZ \$ has risen sharply & placed pressure on export sector

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Endnotes

¹ The 20th June story, by business reporter Ambrose Evans-Pritchard, added a bit of human interest that attracted a lot of web attention. It started: "Japan's day-trading grannies and housewives have overwhelmed New Zealand's central bank, driving the Kiwi dollar to record highs against the yen despite heavy intervention. The bank's attempt to hold the line by flooding the market with Kiwis from its reserve fund appears headed for failure as Japanese investors and hedge funds renew the assault. Some 600,000 Japanese citizens have currency trading accounts. They are mostly women playing the futures markets, some making small fortunes using "Doji candlestick" chart techniques. Last year they traded an estimated \$11bn (£5.5bn) a day..."

² FRA's are arrangements whereby a company treasurer who anticipated a need for funding at some future date (e.g. 6 or 12 months out) can lock into a rate for that funding agreed on now. The counterparty to the agreement, often a bank, will hedge their known exposure by selling bill futures on a organised exchange e.g. LIFFE in the UK or the SFE in Australia.

³ Doji candlesticks are in fact a form of technical analysis, reputedly originating with 17th century Japanese rice traders. The standard reference is Nisons (2001). Suitably oracular web resources are Wikipedia, or <http://www.streetauthority.com/terms/doji.asp>.

⁴ Belgian dentists evidently prefer capital gains to coupons, reputedly for tax reasons. Capital gains would arise from the prospect of lower NZ interest rates down the track to supplement the natural gains from the time decay value effect as maturity draws closer. It is a judgement call as to whether gains from lower NZ eurodollar interest rates would be eroded by prospective losses from the NZ currency denomination. Certainly there would be no advantage to using long term currency swaps to protect the currency exposure - that would in effect create a euro zero coupon bond, much less attractive.

⁵ The Bank is very keen on 'transparency'. Most private sector players are not, especially when it might reveal the weakness of their position. Public ducks have evidently to be sitting ducks.

⁶ “It was contradictory to sell the NZ dollar while tightening credit the previous week”: Masashi Kurabe, senior manager FX trading, Bank of Tokyo-Mitsubishi UFJ, June 12. Or, “Like a red rag to a Kiwi bull”: Stephen Koukoulas of TD Securities.

⁷ To construct the two year forward rate one needs a one year rate as of now, in effect the current one year zero coupon rate. In the case of the uridashis this created a problem as they are not traded with a maturity of one year. As a proxy we used the one year eurokiwi rate.