

# TRENDS IN POST-TAX REAL INTEREST RATES

*In this article, Andrew Bascand examines recent trends in real interest rates in New Zealand.*

## Executive Summary

During the course of New Zealand's disinflation process there have been frequent claims (from borrowers) that nominal interest rates have been excessive. On the basis of post-tax real rates, however, it is apparent that returns have been negative over much of the period since 1984, and that it is only since nominal rates have declined that post-tax real rates for both borrowers and lenders have turned positive.

This article examines recent trends in post-tax real interest rates in New Zealand and considers the outlook through to March 1989. The focus of the analysis is on the effects that personal and corporate tax rates and changes in inflation expectations have had on the post-tax real return to lenders and the post-tax cost of funds to borrowers, given the movements in nominal interest rates which have occurred. A brief discussion of post-tax real interest rates in other countries which have also been through the disinflation process is included to provide a basis for comparison. First, however, the methodology used to construct post-tax real interest rates is outlined.

## Methodology

Real interest rates provide a measure of the return on savings and the cost of borrowing after allowing for the expected level of inflation. However, where lenders and borrowers are subject to taxation, it is necessary to distinguish between pre-tax and post-tax real interest rates.<sup>1</sup> Many borrowers in New Zealand, and particularly corporates, are able to offset interest payments against tax liabilities; therefore the pre- and post-tax costs of borrowing can differ markedly. Similarly, with most small personal investors (lenders) being subject to taxation on investment income, a post-tax real interest rate gives the

most accurate rate of return measure.

Because there are several nominal interest rate series to choose from, and a range of methods available to create data for expected rates of inflation and expected tax rates, there is no unique post-tax real interest rate. Instead there is a wide range of real interest rates facing borrowers and lenders. In this note, only two possible post-tax real interest rate series are presented; one facing small private lenders and the other confronting large corporate borrowers. Short-term (one year) rates are derived rather than long-term rates principally because of the greater difficulty in identifying long-term inflation expectations, but also because most lending and borrowing in New Zealand is conducted over relatively short maturities.

Two nominal interest rate series are selected: the mid-point of the one year rates offered by the former trading banks<sup>2</sup> on small deposits (representing the gross interest rate return for small investors); and the 90 day bank bill rate (representing the gross cost of borrowing for large corporates). To match interest rate maturities with annual inflation expectations, ideally a one year rate for borrowers should have been chosen. However, because most corporate borrowing is conducted over 90 day maturities, a one year rate has instead been derived by assuming that three month maturities are rolled over. The nominal interest rate for corporate borrowers is therefore the 90 day bank bill rate compounded over four quarters.

The adjustment for inflation used in this note is simplistic in comparison with alternative models (e.g.

error learning or rational expectations models). However, the method has occasionally been used elsewhere<sup>3</sup> to derive simple proxies of inflation expectations because there is no clear first choice between alternative inflation expectations models. The inflation expectations series has been derived by taking the average of the current twelve month rate and the actual out-turn for a year ahead.<sup>4</sup> Tentative analysis using recent New Zealand data indicates a relatively close correlation between the resulting expectation series and the actual inflation expectations of small businesses captured by the National Bank's Survey of Expectations.<sup>5</sup>

To match the maturity length of the nominal interest rate series and the one year out inflation expectations proxy, the adjustment for expected taxation (to derive post-tax real interest rates) should be an average of the expected year ahead tax rate. The personal tax rate used is an estimated series for the average marginal tax rate applying in the current and following three quarters and is derived by applying an assumed tax elasticity to the average rate of tax paid by wage and salary earners. For large corporate borrowers the forward looking four quarter average corporate tax rate

<sup>1</sup> Formulae for calculating post-tax real interest rates:

$$r = \frac{1 + i(1 - t^e)}{1 + \beta^e} - 1$$

where:

- $r$  = the post-tax real interest rate
- $i$  = the corresponding pre-tax nominal interest rate
- $t^e$  = the relevant expected tax rate
- $\beta^e$  = the expected inflation rate

<sup>2</sup> Post-June 1987, an average of three major banks' interest rates for small depositors was used.

<sup>3</sup> See 'Trends in Real Interest Rates' Bank of England Quarterly Bulletin, May 1988, pg 225-231.

<sup>4</sup> Formulae for inflation expectations series:

$$\beta_t^e = \left[ \left( \frac{P_t}{P_{t-4}} \right) - 1 \right] \times 50 + \left[ \left( \frac{P_{t+4}}{P_t} \right) - 1 \right] \times 50$$

where:

- $\beta_t^e$  = the expected inflation rate at time  $t$
- $P_t$  = price index (CPI) at time  $t$

<sup>5</sup> See Leslie, P. (1988): 'Some Empirical Approaches to Constructing a Real Interest Rate Series', Reserve Bank mimeo.

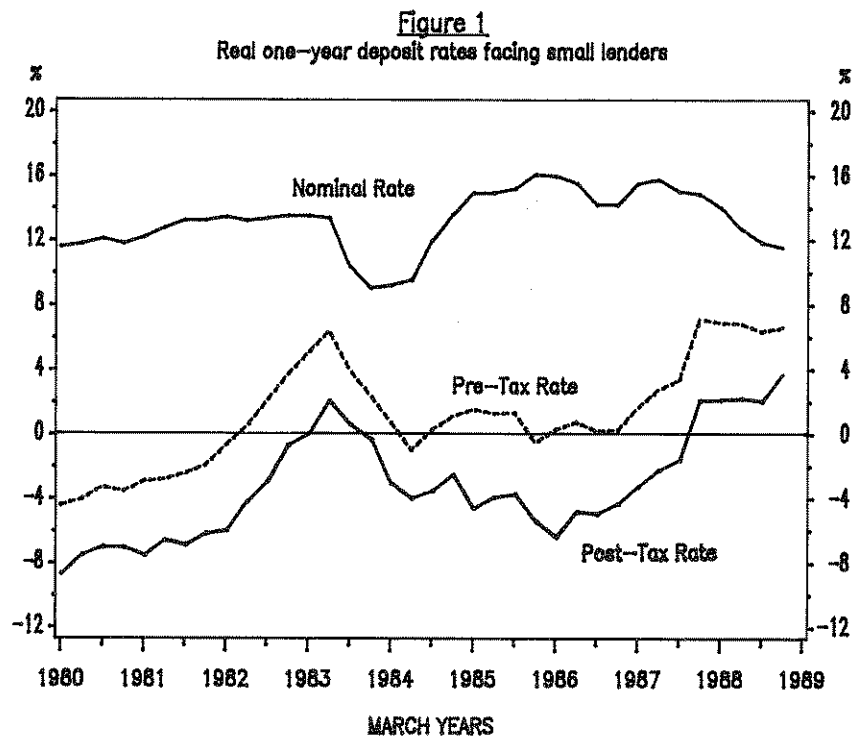
has been used. It has been suggested that an adjustment for taxation may not be appropriate in years where tax exhaustion occurs (i.e. when total company income is insufficient to allow a full offset of interest). For borrowers in those circumstances, the pre-tax real rate of interest would probably be a better guide as to the marginal cost of capital.

As indicated above there are several limitations in the application of the above methodology. Therefore, the real interest rates shown should be regarded as being only indicative of those faced by lenders and borrowers.

### Recent Trends

Figure 1 evinces series for the nominal, the pre-tax real and the post-tax real interest rates relevant for *small lenders* in New Zealand. This decomposition highlights firstly the eroding influence of inflation on nominal interest returns (i.e. the gap between the top and middle lines) and secondly the further impact of personal taxation on investment income (i.e. the gap between the middle and bottom lines). Small depositors faced relatively constant nominal interest rates between March 1980 and June 1983 of around 12-13 per cent. Over the following two years nominal deposit interest rates fell and then rose in association with the placement of ceilings on mortgage interest rates and the subsequent removal of interest rate controls and the adoption of a firmer monetary policy. During 1986 and 1987, nominal one year trading bank deposit rates generally remained in the range of 14-16 per cent; some institutions, however, offered small depositors substantially higher returns. Over the first half of 1988, nominal deposit rates fell by around 2 percentage points and continued to decline in the September quarter.

Whereas nominal deposit interest rates remained flat between 1980 and mid-1983, both pre-tax and post-tax real deposit rates firmed and turned positive, largely reflect-



ing the short term impact of the Government's wage and price freeze on inflation expectations. More significantly, while real rates followed nominal rates down in the last half of 1983, real rates continued to decline during the first half of 1984 as expectations of future inflation rose. Furthermore, throughout 1984 and 1985, post-tax real deposit rates remained negative, reaching a low of  $-6\frac{1}{2}$  per cent in March 1986, when average marginal tax rates peaked.

Declining inflation expectations, together with only slight reductions in average marginal tax rates, resulted in a firming of post-tax real deposit interest rates during the 1986/87 March year, with rates turning sharply positive in December 1987 (largely reflecting the pass through of the GST effect). Pre-tax real deposit interest rates then eased slightly through the March, June and September 1988 quarters. However, the progressively greater feed through effect of the 1 October 1988 tax cuts on money deposited for one year resulted in post-tax interest rates holding up at around 2 per cent.

More recently, data for the month of October indicated a firming in pre-tax deposit rates for small lenders, with nominal interest rates remaining close to the September quarter average level despite further declines in inflationary expectations. A maintenance of the October nominal rate through the December quarter would result in post-tax real yields of around  $3\frac{1}{2}$  per cent, highlighting the fact that even though nominal interest rates have declined over the past six months, after tax rates of return have nevertheless increased.

Figure 2 provides a decomposition of the factors influencing the post-tax real interest rate series relevant for *large corporate borrowers*. Although trends in the forward looking four quarter average 90 day bank bill rate have been similar to those of the nominal deposit rate, the corporate borrowing rate peaked in September 1985 and March 1987 at much higher levels. During 1986 and the first half of 1987, the four quarter forward looking average nominal borrowing rate generally remained between 19-21

per cent before declining to around 14-15 per cent in the first half of 1988. Data from the September 1988 quarter Reserve Bank Survey of Expectations suggest that the annual forward looking nominal cost of borrowing at 90 day maturities is expected to continue to fall, perhaps reaching around 13 per cent by June 1989.

Between March 1984 and September 1987 corporate borrowers in New Zealand faced negative post-tax real interest rates (i.e. the real cost of borrowing over this period was negative). From September 1987, however, it appears that the real cost of borrowing over one year rose, largely reflecting the anticipated feed through over the year ahead of the decline in the corporate tax rate from 48 per cent to 28 per cent. In fact, between December 1985 and June 1988, the post-tax real cost of borrowing, using 90 day bank bills and rolling them over for one year, rose by around 10 percentage points to 5 per cent. Although indicating an anticipated reduction in nominal 90-day bank bill rates, data from the September quarter 1988 Reserve Bank Survey of Expectations suggest that the post-tax real cost of borrowing may remain at between 4-5 per cent through until March 1989.

### International Comparisons

The Bank of England has conducted a similar analysis to this one using data from the G7 countries<sup>6</sup> between March 1975 and March 1988. These calculations show that during March 1988, post-tax real rates in domestic currency terms for small depositors lay in a tight range of between 0 and 2½ per cent, while for large corporates the range was

<sup>6</sup> The United States, the United Kingdom, Japan, Germany, France, Italy and Canada.

between 1 and 2 per cent. During the course of the past 14 years, however, post-tax real interest rates amongst the G7 have varied considerably; over 1975-1979 negative rates were recorded by most countries but in 1981 post-tax real interest rates turned sharply positive.

The peak post-tax real rate achieved by some G7 countries during the 1980s to-date was around 4 per cent, while the average peak level was 3 per cent. Therefore, although current post-tax real interest rates in New Zealand are high by our own historical standards, they currently lie at levels similar to peak levels reached overseas during periods of disinflation. Moreover, other countries have also experienced periods of falling nominal interest rates and rising real interest rates, largely reflecting the lagged reduction in inflation expectations to an announced tightening in a country's monetary policy stance. For instance, in the United King-

dom, the interbank 3-month rate fell sharply between December 1979 and June 1981 (from around 17 per cent to 12 per cent), while over the same period the corresponding pre-tax real rate firmed from zero to 4 per cent.

### Conclusion

Although there are several limitations in deriving pre- and post-tax real interest rate series, this article has provided estimates which highlight the recent rise in real interest rates facing small savers and large borrowers. The analysis has also indicated that the recent lowering of personal and corporate tax rates has served to effectively increase post-tax real rates; however, international comparisons indicate that the current levels of post-tax rates are not out of line with those experienced in other countries during periods of disinflation.

**Figure 2**  
Real annualized 90-day rates facing large borrowers

