

Comparison of world price forecasts: the Reserve Bank, the NZIER and the National Bank of New Zealand

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Editor's note

Movements in the exchange rate are the main variable one thinks of with respect to import prices and their impact on CPI inflation. However, world prices of our imports can also have a large impact on imported inflation. For example, manufacturing in Asia has brought down the price of many manufactured electronics. Oil prices can move in very large cycles, and have a big impact on our terms of trade, and on inflation. Petrol prices have a significant weight in the Consumer Price Index.

In this paper we compare our forecasts of world prices for our imports with the National Bank of New Zealand and the NZIER. Note, however, that the sample period available for this analysis is very short, making meaningful comparison difficult.

Executive summary

This note examines the Reserve Bank's performance when forecasting movements in world prices. Our forecasting performance is compared to that of the NZIER and the National Bank of New Zealand. We find that:

- Since December 1994, our forecasts of world price movements have tended to be statistically unbiased at most forecasting horizons. However, near term forecasts have, on average, tended to under-predict the movements in world prices, while forecasts for longer horizons have tended to over-predict them. The average size of our forecast errors has been high at all of the horizons considered, reflecting the volatility of the series.
- No significant differences exist between the Reserve Bank's forecasts and those from the NZIER and the National Bank of New Zealand, which may be partly a result of the very limited sample available.

1 Introduction

Previous research has shown that for medium to long forecasting horizons our CPI inflation forecasts have been out-performed in terms of bias and accuracy by those from the NZIER and the National Bank of New Zealand.¹ To explore the reasons for this we have examined forecasts of a number of key economic variables from all three organisations. In this final paper we examine movements in the world prices of our imports.

World prices are backed out of domestic import price forecasts (Overseas Trade Indexes) and TWI forecasts. We examine the Reserve Bank's forecasts of world price movements between December 1994 and September 2002. When making comparisons between the Reserve Bank

¹ This is examined in "[Inflation forecast errors: Preliminary findings](#)".

and external agencies, the sample period is determined by the availability of forecast data from external forecasters.

Forecasting performance is assessed in terms of forecast bias (as measured by the mean forecast error) and accuracy (as measured by the mean absolute forecast error and root mean squared error)². Errors are defined as “forecast minus actual.” Hence, a positive mean forecast error reflects a tendency to over-predict movements in world prices, while a negative error reflects a tendency to under-predict.

Caution is needed when interpreting our results as reflective of general tendencies. It is likely our findings are strongly influenced by the sample period, which includes the Asian Crisis, for example. In addition, world prices for our imports will be strongly influenced by oil price developments. Further, a very limited number of comparable observations between organisations make a detailed assessment of forecasting performance difficult.

The remainder of this note is structured as follows: Section 2 examines the Reserve Bank’s forecasts of quarterly world price movements. Section 3 compares our forecasting performance to those of the NZIER and the National Bank of New Zealand. Section 4 concludes.

2 The Reserve Bank’s performance when forecasting world price movements

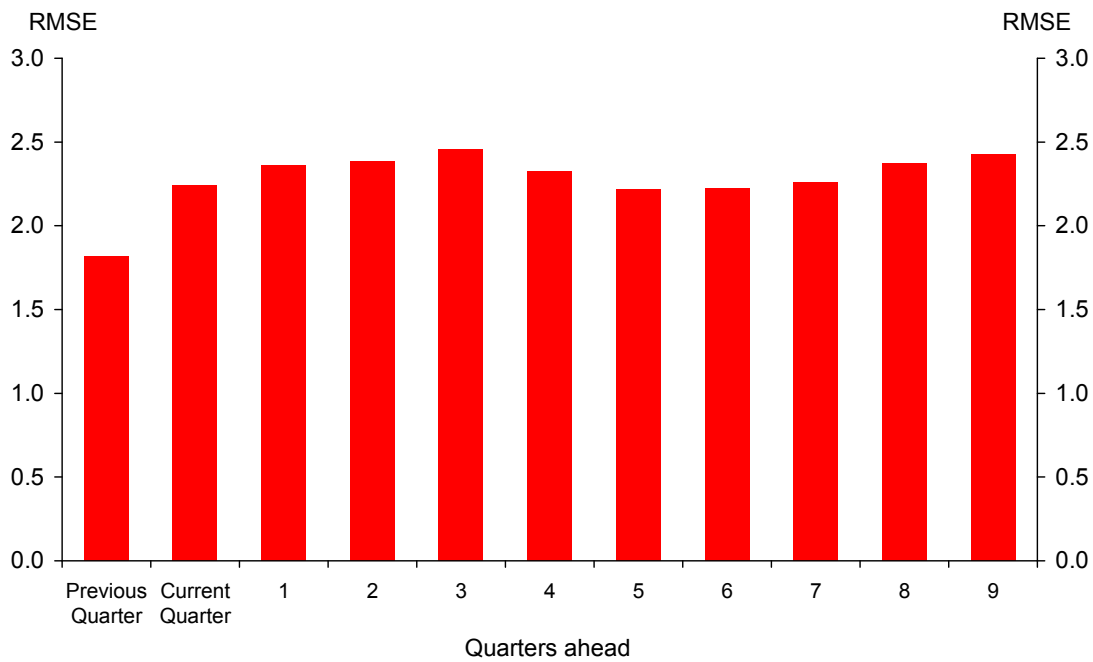
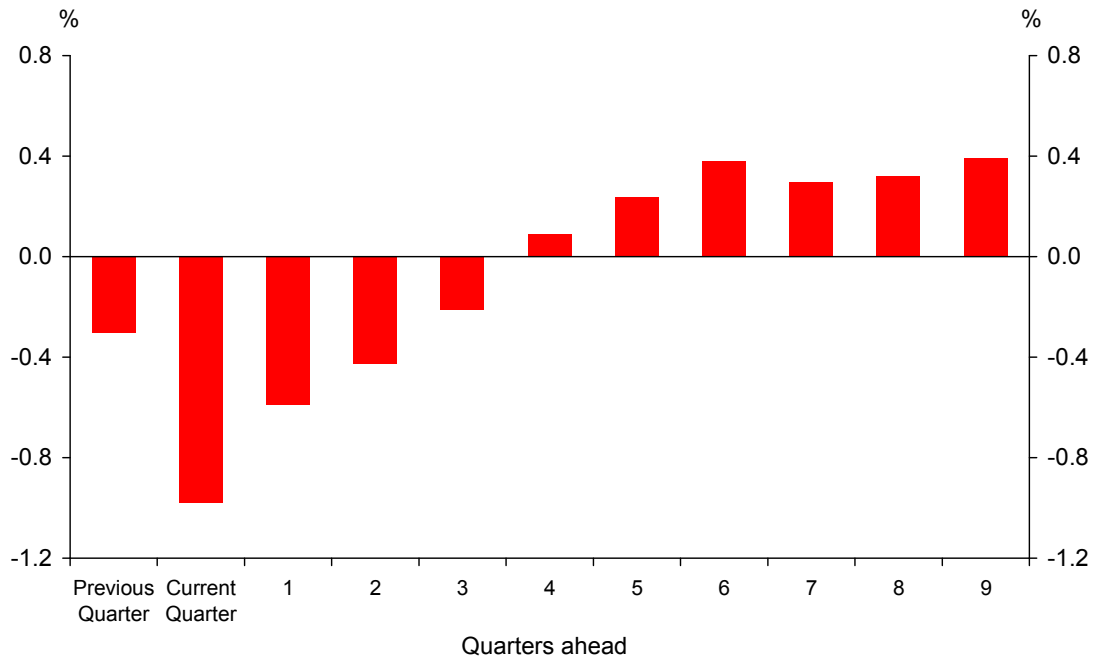
We initially examine the Reserve Bank’s forecasting performance in relation to the quarterly change in the level of world prices over the full period for which we have forecasts. Summary statistics for our forecasting performance are presented in figure 2.1 and in the appendix to this paper. The Reserve Bank’s forecasts of world price movements have tended to be unbiased at most forecasting horizons. However, since December 1994, the Reserve Bank’s near-term forecasts have, on average, tended to under-predict the movements in world prices. Forecasts for the previous and current quarter and up to 3 quarters ahead have, on average, been between 0.2 and 1.0 percentage points lower than the actual change in world prices. However, only mean forecast errors for the current quarter are significantly different from zero.

For longer horizons we have tended to over-predict movements in world prices. Five or more quarters ahead our forecasts have, on average, been higher than the actual quarterly change in world prices by approximately 0.3 per cent. We note that world prices are particularly volatile. As a result, the average size of our forecast errors is high at all of the horizons considered.

Our findings are likely to be influenced strongly by events specific to the sample period. Figure 2.2 displays our forecasts errors for the current quarter. We note that while on average we have tended to underestimate world price movements at this horizon, during the Asian crisis we tended to over predict them.

² Details of how these statistics are calculated provided [here](#).

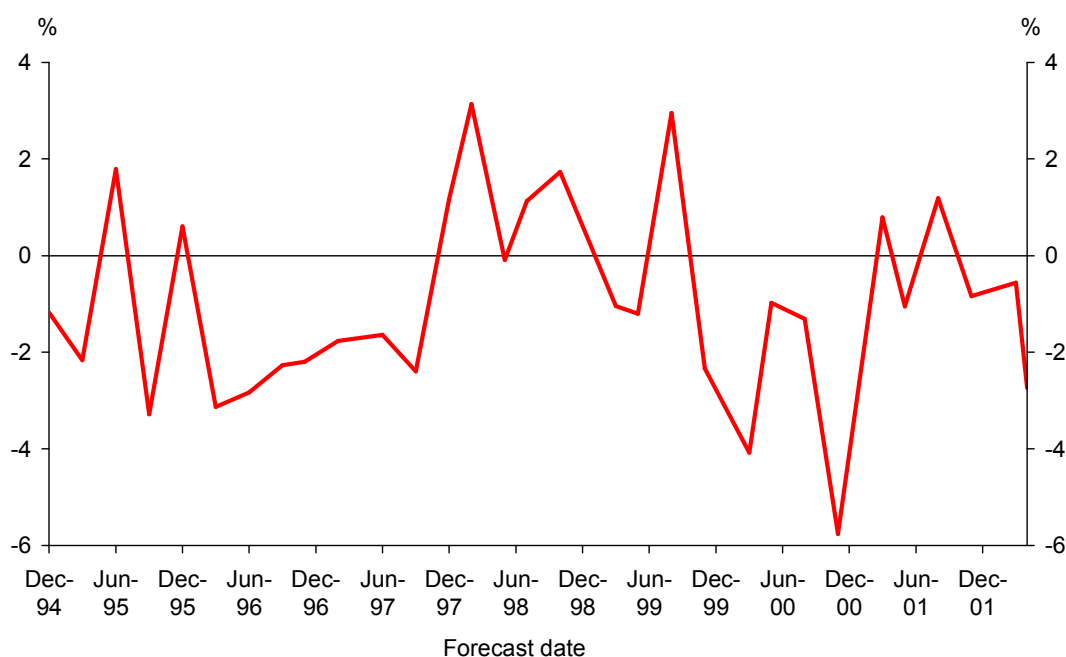
Figure 2.1
Summary statistics for the Reserve Bank world import price quarterly per cent change forecast errors (December 1994 to September 2002)³



³ Due to delays in the publishing of data, the calendar quarter prior to the date of the publication of forecasts is a forecasting quarter for world price movements.

Figure 2.2

Reserve Bank forecast errors for the quarterly per cent change in world prices of our imports (current quarter): Forecasting rounds between December 1994 and September 2002



3 Comparison to external forecasters

Forecasts of inflation from the National Bank of New Zealand and the NZIER have tended to out-perform our own for mid to long-term horizons. We examine their forecasts of world prices as one possible contributor to this. However, caution is needed when generalising from these findings as our examination is hampered by a lack of data. Because of this limited sample size, we focus on the qualitative aspects of our findings. When making comparisons between organisations, we use only observations from those quarters in which both organisations produced forecasts. Summary statistics for the comparisons are presented in the appendix to this paper.

3.1 Comparison with the National Bank of New Zealand

Our sample period when making comparisons to the National Bank of New Zealand is limited to recent years only: June 1998 to September 2002.⁴ Due to this limited sample size, we consider forecasts only up to 5 quarters ahead. For the previous and current quarters and 1 quarter ahead forecast horizons, the National Bank's forecasts have been similar to our own in terms of bias. Two to 5 quarters ahead our forecasts have been less biased than those from the National Bank of New Zealand. Over this period the accuracy of forecasts from the two organisations has tended to be similar at all of the forecasting horizons considered.

⁴ To determine the National Bank's forecasts of world prices for much of our sample, an approximation is necessary. The National Bank do not publish their import price forecasts in levels form. We used their forecasts of quarterly changes to determine the forecast import price index with reference to historical data. These approximations were compared to historical data and to unpublished forecasts of the import price index provided by the National Bank. The approximations were found to be very close to actual historic values. However, caution is still needed when interpreting our findings as we do not have the National Bank's exact forecasts. Where possible we have used the exact data provided by the National Bank.

3.2 Comparison with the NZIER

When making comparisons between the Reserve Bank and the NZIER our sample period is December 1994 to September 2002. The NZIER publish the relevant forecasts only in 'year to March' form. Hence, we compare our forecasts of the annual change in world prices to those from the NZIER. Again, a detailed examination is difficult due to a lack of data; at each horizon we have between 7 and 9 comparable observations. Given this limited sample size, the findings of 'on average' measures of forecasting performance need to be interpreted cautiously.

In terms of bias, the NZIER's forecasts appear to have slightly out-performed our own for short-term horizons. At longer forecast horizons our forecasts have been less biased than those from the NZIER. In terms of accuracy, the two sets of forecasts are similar at most horizons.

4 Conclusion

The Reserve Bank's forecasts of world price movements have tended to be statistically unbiased at most forecasting horizons. The size of our errors, however, has tended to be large (reflecting volatility in world price movements). For short forecasting horizons we tend to under-predict such movements, but we over-predict them for longer horizons.

A limited amount of data makes a detailed comparison of forecasting performance difficult. We do not find evidence of a significant difference between our forecasting performance and those of the NZIER and the National Bank of New Zealand.

Appendix: Comparison of the Reserve Bank's forecasts of world price movements to external forecasts: summary statistics

The tables below present summary statistics for the forecasting performance of the Reserve Bank relative to individual forecasting agencies. These figures are calculated using a matched observations approach. This means that when constructing each data set we include only observations for those quarters when both the Reserve Bank and forecaster of interest produced forecasts. These tables only compare individual forecasters to the Reserve Bank and should not be used to make comparisons between external forecasting agencies.

Caution is needed when interpreting the findings. In many cases there are relatively few comparable observations. In such cases, the findings may be highly susceptible to distortions due to events specific to particular sample periods. As a result, summary statistics based on a limited number of observations may not accurately represent forecasters' general performances.

Note that the dates referred to indicate to the final month of the relevant quarter, not the dates at which forecasts were prepared.

Table A1
Forecast error summary statistics for the Reserve Bank: Quarterly world import price movements (December 1994 to September 2002)

Quarters ahead	Mean Errors	RMSE	Observations
Previous Quarter	-0.30	1.81	32
Current Quarter	-0.98**	2.24	31
1	-0.59	2.36	30
2	-0.43	2.39	29
3	-0.21	2.46	28
4	0.09	2.32	27
5	0.24	2.22	26
6	0.38	2.23	25
7	0.30	2.26	24
8	0.32	2.37	23
9	0.39	2.42	22

Notes:

Asterisks indicate the significance which the null hypothesis: Mean Forecast Error = 0 can be rejected:

- *** = Significant at the 1% level
- ** = Significant at the 5% level
- * = Significant at the 10% level

Table A2**Forecast error summary statistics for the Reserve Bank and the National Bank of New Zealand: Quarterly world import price movements (June 1998 to September 2002)**

Quarters ahead	MEAN ERRORS		RMSE		Significant Difference in ME	Significant Difference in MAE	Sample size
	RBNZ	NBNZ	RBNZ	NBNZ			
Previous quarter	-0.22	0.35	1.88	2.43	-	-	18
Current Quarter	-0.83	-0.61	2.27	2.38	-	-	17
1	-0.58	-0.62	2.58	3.38	-	-	16
2	-0.76	1.06	2.59	3.17	-	-	15
3	-0.63	1.64***	2.62	2.79	Yes	-	13
4	-0.20	1.72**	2.54	3.06	Yes	-	12
5	0.02	1.64*	1.73	2.64	Yes	-	10

Notes:

Asterisks indicate the significance with which the null hypothesis: Mean Forecast Error = 0 can be rejected:

*** = Significant at the 1% level

** = Significant at the 5% level

* = Significant at the 10% level

We test for a difference in mean errors and mean absolute errors at the 10% significance level.

Table A3**Forecast error summary statistics for the Reserve Bank and the NZIER: Annual world import price movements (December 1994 to September 2002)**

Quarters ahead	MEAN ERRORS		RMSE		Sample size
	RBNZ	NZIER	RBNZ	NZIER	
Previous quarter	-0.23	-0.73	2.15	3.13	9
Current Quarter	-1.18	-1.15	3.50	2.96	7
1	-2.26	-0.79	4.23	2.70	7
2	-1.77	0.68	3.68	2.75	7
3	-2.05	0.90	4.12	3.53	7
4	-1.02	1.61	3.37	5.07	7

Notes:

Asterisks indicate the significance with which the null hypothesis: Mean Forecast Error = 0 can be rejected:

*** = Significant at the 1% level

** = Significant at the 5% level

* = Significant at the 10% level

There were no differences in mean errors and mean absolute errors at the 10% significance level.