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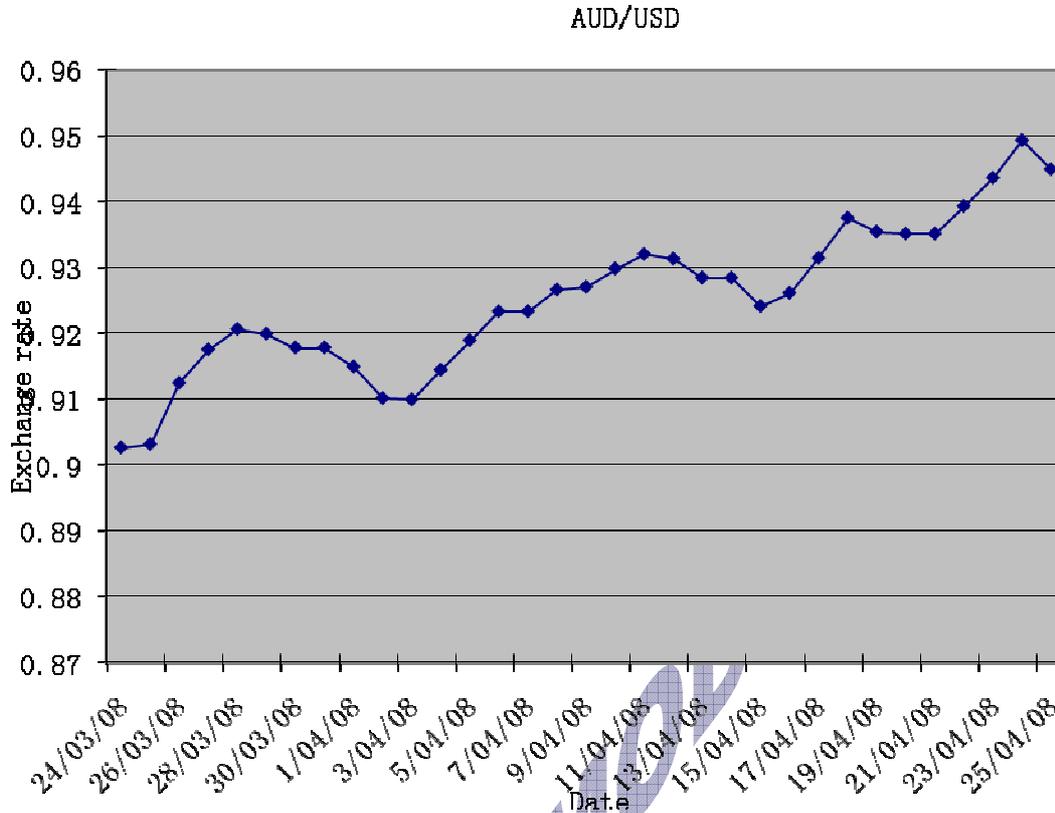
MODEL GROUP PROJECT

The group project consists of two parts. The first part consists of a 2000 word limit essay documenting the experience of the Australian Dollar (AUD) relative to the US dollar (USD) over the first 5 weeks of the session, plus an analysis and forecast of the AUD over the following 2weeks. It is expected that students will detail (in chronological order) the major political, financial, economic or other events which shaped the course of the AUD;

The second part is a 1000 word limit essay consisting of a comparison of your forecast with the realised AUD over the forecast period. Reasons for forecast errors and additional discovery should be explained.

PART I

MOVEMENT OF THE AUSTRALIAN DOLLAR (24 Mar – 25 Apr 2008)



Week 1: 24th March 2008 to 28th March 2008

The AUD fell to \$US0.8956 on Monday due to a drop in oil and gold prices. The AUD is a commodity currency with commodities making about 55% of Australia’s exports.¹ Any change in commodity prices impacts the AUD.

The AUD picked up on Tuesday reaching \$US0.9170² due to an improved appetite for higher yielding currencies and riskier assets.

The AUD continue to rise on Wednesday reaching \$US0.9241 amongst speculation that Australia’s interest-rate advantage

Use appropriate headings in order to divide the assignment into different components

¹The Australian Dollar <http://au.biz.yahoo.com/forex-education/australian-dollar.html>

² Dollar recovers from recent lows (25/03/08) <http://business.smh.com.au/dollar-recovers-from-recent-lows/20080325-21bw.html>

over the US will widen³. Negative American consumer numbers also helped the AUD.⁴

Rising prices of metals ensured that the AUD continued to strengthen on Thursday⁵ reaching a high of \$US0.9240.

Less dire than expected American growth figures released over night boosted the USD⁶. The AUD was further subdued as renewed losses in US⁷. The AUD closed lower at \$US0.9176.

Week 2: 31st March 2008 to 4th April 2008

The AUD lost 0.6% from previous trading to close at \$US 0.9172. Mounting risk aversion led investors to abandon higher-yielding currencies such as Australia's.⁸ A broad expectation of the RBA leaving the official cash rate unchanged in tomorrow's monthly meeting also factored into the Australian dollar's weak performance.

On Tuesday the AUD lost 0.8% closing at 0.9103. The RBA held the cash rate at 7.25% as expected by the market. The Australian dollar fell 30 points immediately after the decision.⁹

The Reuters/Jefferies CRB Index of 19 commodities fell 2.3% and the [UBS Bloomberg](#) Constant Maturity Commodity Index of 26 items lost 1.5%.¹⁰ The fall in prices results in lower demand for the Australian dollar, depreciating it.

Look at and answer the assignment question carefully- note it asks for detail (in chronological order) the major events which shape the course of the AUD; structure your answer in that way

Notice how even though the assignment is divided up amongst group members so each group member was responsible for one week each, the format/layout of the whole assignment stays the same

Footnoting is an excellent way to show the marker where you obtained the information from

³ Australian, N.Z. Dollars Advance as Rate Advantage May Widen (26/03/08)

<http://www.bloomberg.com/apps/news?pid=20601081&sid=aaeBxfVDxhLE&refer=australia>

⁴ Australian dollar ends day firmer (26/03/08)

<http://www.news.com.au/business/story/0,23636,23434959-31037,00.html>

⁵ Australian Dollar Rises to One-Week High; N.Z. Dollar Weakens (27/03/08)

<http://www.bloomberg.com/apps/news?pid=20601081&sid=aXySm0Uf5Nko&refer=australia>

⁶ Dollar ends firmer (28/03/08)

<http://www.news.com.au/business/story/0,23636,23446582-31037,00.html>

⁷ Aussie dlr hobbled by stock jitters, bonds slip (28/03/08)

<http://au.biz.yahoo.com/080327/19/1o7pj.html>

⁸ Aussie dollar under pressure, bonds bounce (31 march 2008)

<http://money.ninemsn.com.au/article.aspx?id=419309>

⁹ DJ Australian Bond Futures Rallied (1 April) Dow Jones Chinese Financial Wire

¹⁰ Australian, N.Z. Dollars Decline on Concerns Growth Will Slow (1April 2008)

<http://www.bloomberg.com/apps/news?pid=20601081&sid=a9M6Afec5kyQ&refer=australia>

The AUD continued to decline closing 0.03% lower at USD0.9078 on Wednesday as better than expected U.S. March nonfarm payrolls boosted the U.S. dollar.¹¹

The AUD closed 0.6% higher at 0.9133 on Thursday buoyed by stronger equities and commodity prices, as well as the first official admission by Federal Reserve Chairman Ben Bernanke of a possible US recession which placed the USD under pressure.¹²

The AUD lost 0.14% to close at 0.9120 on Friday. The semi-annual testimony by RBA Governor Glenn Stevens sent a clear signal that the economy is beginning to slow, indicating interest rates may have peaked. The Australian dollar dipped US\$0.0030 after his remarks.¹³

Another contributing factor is the release of worse-than-expected retail sales figures of -0.1% for February by the Australian Bureau of Statistics. The Australian dollar slid to \$US0.9116 compared with \$US0.9141 immediately before the report.¹⁴

Week 3: 7th April 2008 – 11th April 2008

Throughout the week commodity prices continued to climb which strengthened the AUD. On Wednesday news leaked that China was interested in purchasing a stake in BHP Billiton.¹⁵ This news combined with reports that coal prices could rise by as much as 240%¹⁶ gave the AUD a boost.

US jobs data was weak with payrolls falling by 80,000 and unemployment rates climbing from 4.8% to 5.1% in March.¹⁷ Australian total employment rose by 14,800 which was above

¹¹ DJ DJ Australian Bonds Future Sharply Lower Ahead of US Payrolls Data (4 April 2008) Dow Jones Chinese Financial Wire

¹² DJ Australian Bonds Mixed On Volatility And Liquidity (3 April 2008) Dow Jones Chinese Financial Wire

¹³ DJ DJ Australian Bonds Future Sharply Lower Ahead of US Payrolls Data (4 April 2008) Dow Jones Chinese Financial Wire

¹⁴ Rates may have peaked - 'wait and see' (4 April 2008) The Age

¹⁵ The Australian dollar steadied as commodities rallied (April 9 2008) <http://www.fxstreet.com/fundamental/market-view/daily-us-forex-summary/2008-04-09.html>

¹⁶ Aussie dollar closes higher, (April 9, 2008) The Age

¹⁷ Dollar closes slightly higher, (April 11, 2008), The Australian

market forecasts¹⁸. The combination of recessionary fears in the US with strong Australian labour markets strengthened the AUD.

Speculation and consumer sentiment, despite having a deflating effect on the Australian dollar, could not compete with the surging commodity prices. On Tuesday, private business surveys found that business confidence in March had fallen to its lowest level since September 11.¹⁹ The Westpac- Melbourne Institute index of consumer sentiment, released on Wednesday, fell to its lowest level since 1993.²⁰ However, an improved appetite for risk and speculation of high domestic interest rates going forward, as well as the other positive news, meant that these results were drowned out in the market.

Week 4: 14th April 2008 to 18th April 2008

The AUD opened lower at \$US0.9265 after a communiqué released by G7 hinted the USD as undervalued. This prompted strong US dollar buying while all the other currencies, including the AUD come under selling pressure. The statement also conceded that exchange rate volatility could be damaging for the world economy, putting downward pressure on "commodity currencies" such as the AUD because it suggested global demand for exports may slow.²¹

The release of the RBA minutes on Tuesday²² hinted remaining inflationary risks which helped the AUD climb as traders interpreted the minutes to mean another interest rate rise was still possible.²³

The AUD closed marginally weaker on Wednesday as the USD was boosted overnight after the US Labor Department revealed the producer price index rose by 1.1% in March, almost double market expectations. The AUD faced selling as traders downgraded their expectations for a US interest rate cut on April 30.²⁴

¹⁸ Australian, N.Z. Currencies Gain This Week as Commodities Rise, (April 11, 2008),

<http://www.bloomberg.com/apps/news?pid=20601081&sid=aKfTUEaz4BT8&refer=australia>

¹⁹ High rates here to stay, says expert, (8 April, 2008), The Age

²⁰ Consumer sentiment 'nears 15-year low', (9 April 2008) SMH

²¹ G7 Statement drives aussie dollar lower (15th April 2008) SMH

²² Dollar profits from greenback's slide (15th April 2008) SMH

²³ See the international fisher effect: D. Eiteman et.al, *Multinational Business Finance*, 1st Edition, Pearson Education Australia.

²⁴ Aussie dollar closes weaker (16th April 2008) SMH;

On Thursday the AUD opened stronger as the USD faced downward pressure²⁵ from the revelation that American underlying inflation have risen by 0.2% in March.²⁶

The AUD appreciated on Friday aided by better appetite for higher-yielding currencies and expectations that commodity prices will continue to help the Australia's terms of trade. Australia's exports jumped 3.5% last quarter, and its terms of trade increased by about 0.7 to 0.8 percentage points.²⁷

Week 5: 21/04/08 to 25/04/08

The AUD strengthened against the USD on Monday after the producer price index was released. Price paid to Australian producers rose 1.9%.²⁸

The high PPI released on Monday lead to broad expectation of high CPI figures to be released on Wednesday. The highest inflation rate of the year was anticipated. This boosted the Australian Dollar to over \$US 0.95.

The US currency fell on Tuesday after a report showed that sales of existing US homes fell 2.0 percent in March.²⁹

The AUD climbed to \$US 0.9517 on Wednesday after a government report showed the CPI in the March quarter rose at the fastest annual rate in seven years. The inflation rate rose 1.3% from the 4th quarter.³⁰

The AUD continue its declined on Thursday as commodities price fell.

²⁵ Note how the movement is inconsistent with the theory of purchasing power parity. But it makes sense considering PPP holds well over the very l/r and better for countries with relatively high rates of inflation and undeveloped capital markets.

²⁶ Again, note the international fisher effect, US interest rate is 2.25% cf. EU's 4%

²⁷ *Risk appetite drives dollar* (18th April 2008) SMH

²⁸ Australian Dollar Rises as Prices Surge; N.Z. Dollar Advances (21 April 2008)

<http://www.bloomberg.com/apps/news?pid=20601081&sid=aZK9uutJSKlk&refer=australia>

²⁹ Existing home sales fall 2 percent (22 April 2008)

<http://www.reuters.com/article/ousiv/idUSN2229728520080422>

³⁰ CPI pressures rise, but rates on hold (23 April 2008)

http://www.livenews.com.au/Articles/2008/04/24/CPI_pressures_rise_but_rates_on_hold

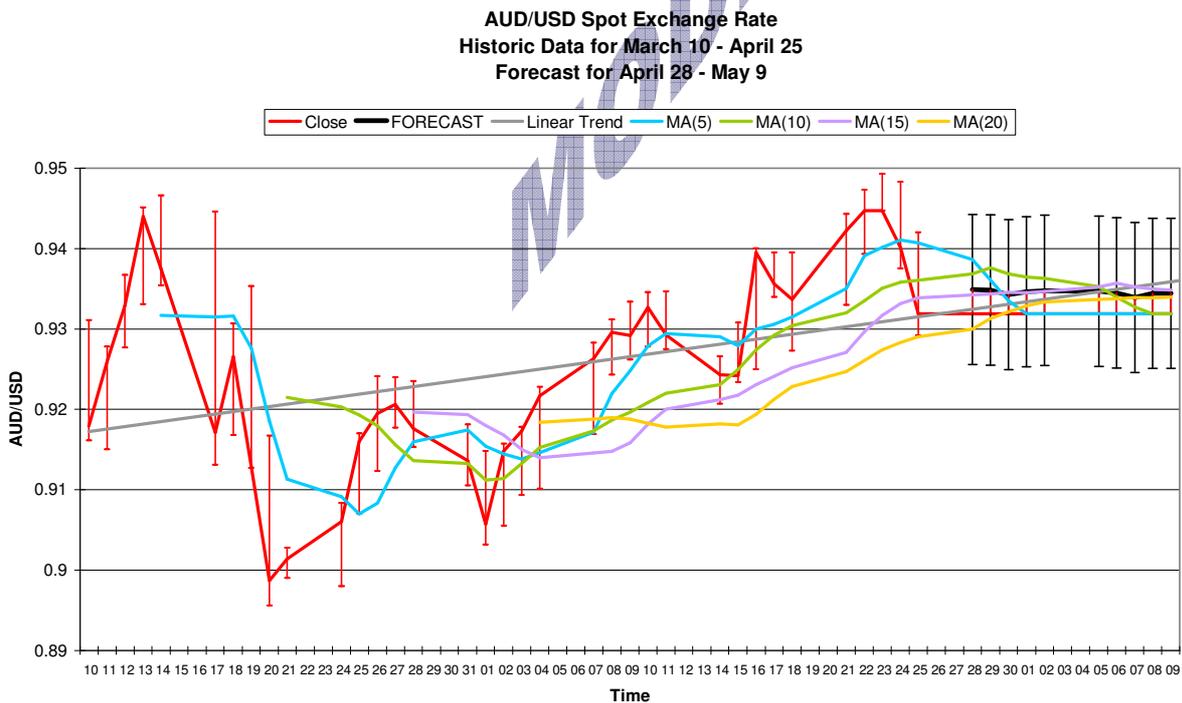
FORECASTING

There are several different approaches to forecasting, such as the technical analysis approach, the asset market approach, the balance of payment approach and the monetary approach. We have decided to focus on the technical approach.

Technical Analysis

Technical analysis assumes trends in past price behaviour can be extrapolated forward. Microsoft Excel and another statistical software package, R, were used to identify historic behavioural trends and make forecasts.

The technical analysis performed in Excel is encapsulated in the following graph. The red line is the closing price of the AUD/USD Spot Exchange rate, with red high-low lines giving an indication of the daily variation in the market. The grey line is the linear trend over the entire period, while the other coloured lines are the moving averages with lags of 1, 2, 3 and 4 weeks. We notice that the smaller the lag, the closer the curve hugs the actual close price. Therefore, overall trends are more



indicative from moving averages with larger lags.

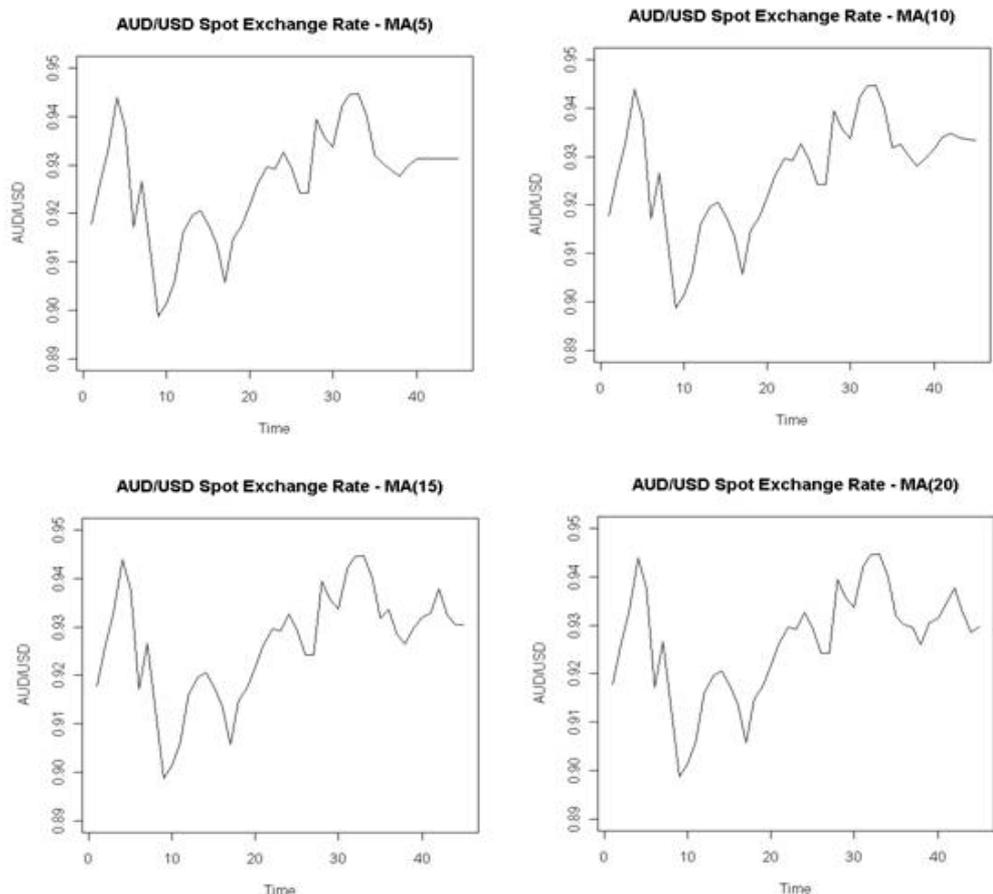
An apparent flaw in our analysis is that to make a forecast using moving averages; we need to make an assumption regarding the closing spot rate during the forecast period.

However, by selecting a base case with a constant spot rate at the previous closing price of \$US0.9319, we are able to draw conclusions. Noticing that the black line, which is a weighted

Use headings in order to divide assignment into different parts-making it easier for the marker to see that you have answered the question.

average of the resulting moving average forecasts under the base case (with slightly more weight on larger lags), hovers *above* our assumed base case level, we can comfortably conclude that the AUD/USD spot rate will continue to enact its previous upward trend. The black high-low lines represent a 1% allowance for error. Therefore, our forecast will be around the \$US93.5cents.

A similar process to that employed above was undertaken using the high-power statistical software package, R. The general procedure involves fitting the 7 weeks of historical data (35 data points) to a model and then using that model to forecast for 2 weeks (10 data points). Before undertaking any analysis, the data was simple differenced. Examining the auto-correlation function plot, it was deemed that a moving average model would be appropriate. Technically an MA(1) model should suffice, however models of higher order were also used to compare results. More sophisticated models, with higher lags tend to fit to the data marginally better for each added parameter, at the cost of increasing complexity and losing valuable data points. Below are the plots of the historic and forecasted data for the same moving average models as those used in Microsoft Excel³¹.



³¹ Code used to develop these plots (after the data was entered):
N<- [insert desired lag here]

These forecasts are less flat than that developed using Microsoft Excel, ranging roughly between \$US0.93 and \$US0.94.

It is important to note that technical analysis alone should not be relied upon for forecasting such information-sensitive data as the AUD/USD spot exchange rate. Reference should be made to news that the market expects within the forecast period, as detailed below.

In the first week, The Housing Price Index of Australia will be released and is expected to rise³² thus contributing to inflation. The figure for international trade will also be released during this week. Australia is confident to boost its trade as evidenced by the comparative advantage of Australian's exports³³ as well as the continuing resource boom. On the other hand, the U.S. Consumer confidence index to be released on April 29th is expected to drop as record fuel prices and rising unemployment threatened to reduce spending.³⁴ This will result in a lower inflation rate in the U.S.

The anticipated inflation differential of the two countries is likely to widen up to 2.5% in the first week. Therefore, our regression model gives us an appreciation of AUD against USD by 0.00852 U.S. Cents, which is consistent with the International Fisher's Effect.

In the second week, the Australian Housing finance figure and lending figure will be released³⁵. These two figures are likely to increase since the Housing Price Index is expected to rise as a result of an increased demand for housing. Thus, interest rates are likely to increase. During the second week, the Labour Price Index will also be released and is expected to increase following the rise in Producer Price Index which was released on April 21st. This will lead to higher inflationary pressure on Australia, prompting the RBA to tighten its monetary policy. Meanwhile, it is likely that the Federal Reserve will stop

```
model<-ARIMA(x, order=c(0,1,N))
xpred<-predict(model, n.ahead=10)$pred[1:10]
plot(c(x,xpred), type='l', main='AUD/USD Spot Exchange Rate - MA(N)',
ylab="AUD/USD", xlab="Time")
```

³²

<http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aBw4FAvNOtLY>

³³ See The South-East Food and Hospitality Show

³⁴ <http://business.smh.com.au/us-consumer-confidence-slumps/20080426-28oz.html>

³⁵ On May 12th and 13th respectively

cutting interest rates³⁶ amongst speculation from Wall Street that the U.S. credit crisis will come to its end. As a result, the U.S. interest rate will not be changed.

Thus, the interest rate differential is likely to widen in the second week, According to interest rate parity, the exchange rate will increase with the rise of the interest differential. Thus, we can expect that the 30 day interest rate differential will increase by 0.25%, and conclude that the exchange rate will increase by a further 0.001716.

Conclusion

Therefore, the expected news hitting the market during our forecast period seems to have a net appreciating effect on the AUD/USD. Assuming that the foreign exchange market is efficient, any deviation from expected news will result in additional fluctuations in the AUD/USD. Nonetheless, it seems that the exchange rate shows little sign of falling.

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³⁶

<http://www.bloomberg.com/apps/news?pid=newsarchive&sid=akAJ01Gx3yws> (accessed on 27/04/08)

¹DJ Australian Bonds Mixed On Volatility And Liquidity (3 April 2008)
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PART II

Introduction

Our forecast of the AUD/USD over the period of April 28 to May 9 proved fairly accurate. The quantitative methods employing the use of technical analysis predicted that the exchange rate would hover around the US93.5cent range. We commented on the net appreciating effect of the widening interest rate and inflation differentials due to upcoming news in the market, but, for lack of an efficient method of doing so, did not build these expectations into our quantitative model.

Technical analysis, as the underlying approach that shaped our forecasts, is the use of past price behaviour to guide trading decisions in asset markets. Despite its apparent widespread use in foreign exchange markets, there remains considerable scepticism regarding its value.³⁷ Its success relies on the assumption that exchange rates are not, in fact, always determined by economic fundamentals. Rather, technical analysis presupposes that all relevant information about the exchange rate is already incorporated into its price history and that not only does the exchange rate follow trends, but those trends will repeat themselves due to market psychology.³⁸ An obvious major shortfall of technical analysis is that it is explicitly extrapolative, which is an extremely dangerous form of statistical inference.

We therefore acknowledge that technical analysis should be employed with caution. Nonetheless, for such a short forecasting period, it seems that our technical analysis, despite not encapsulating all the available information, was fairly accurate. Once we built our market news expectations into our technical analysis models, our forecast did prove fairly accurate.

Let's now examine the AUD/USD movements over the forecasting period.

Week 1

On Monday the AUD closed weaker at US\$0.9370 due to broad speculation that the Federal Reserve would end its easing

³⁷ Christopher J. Neely, *Technical Analysis in the Foreign Exchange Market: A Layman's Guide*,

<http://research.stlouisfed.org/publications/review/97/09/9709cn.pdf>

³⁸ See technical analysis provided by Murphy, *Technical Analysis of the Financial Markets: A Comprehensive Guide to Trading Methods and Applications* Prentice Hall Press; (January 4, 1999)

of interest rates. The AUD was stable on Tuesday, ending at US\$0.9356.³⁹ as US commodity prices fell and the USD rallied for the first time in almost five weeks.⁴⁰ On Wednesday the AUD traded at US\$0.9326 and was little changed on speculation that a decline in commodities prices will reduce the nation's export earnings. An unexpected seventh interest rate cut by the US Federal Reserve on Thursday raised the AUD to above US\$0.94 in the morning.⁴¹ The AUD closed weaker due to the release of the Australian Building Approval Report revealing lower building approvals.⁴² The AUD fell on Friday on speculation that the nation's export earnings would decline as the price of raw materials slid to a six week low. In addition the USD jumped to a seven-month high against six major currencies. The Australian dollar fell and closed at US\$0.9298.⁴³

Week 2

Rising commodity prices on Monday and speculation on the better estimated U.S equity saw the A\$ rise to US\$0.9405. Tuesday saw further growth in the A\$ as the RBA left interest rates unchanged at 7.25%⁴⁴ despite Australia's upward spiraling inflation, with the AUD closing at US\$0.9444/\$A. A rise in crude oil prices, on Wednesday saw the A\$ reach an intraday high of above 95 cents⁴⁵. The A\$ lost its shine in the afternoon following an announcement by a US central bank official regarding a potential rate rise in the US due to inflation. Thursday saw the A\$ decline to \$US0.9400 as Asian shares slumped and declining commodity prices weakened export earnings⁴⁶. The unemployment rate drop from 4.1 percent in March to 4.2 percent in April⁴⁷, also contributed to the decline in the AUD. The week closed out with the A\$ trading at

³⁹ RBA Australia

⁴⁰ Commodities slump as greenback rebounds SMH, 30/04/08

⁴¹ Aussie dollar stronger after US rate cut

⁴² 'Australia's Building Approvals Fall 5.7% on Rates – Bloomberg'
<http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aVheBUOKX0GQ>

⁴³ 'Australian Dollar Weakens on Commodities; N.Z. Dollar Falls'
<http://www.bloomberg.com/apps/news?pid=newsarchive&sid=avk2FhEiTxCA>

⁴⁴ RBA leaves rate unchanged at 7.5% SMH 06/05/08

⁴⁵ Oil bolsters Aussie dollar, SMH 07/05/08

⁴⁶ 'N.Z. Dollar Falls as Employment Drops; Australian Dollar Slips'
<http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aRC8uRwCu.7s>

⁴⁷ 'ABS spells cuts to jobs data collections' <http://news.smh.com.au/abs-spells-cuts-to-jobs-data-collections/20080508-2c6e.html>

\$US0.9417 on Friday as the central bank raised its forecast for inflation in a quarterly policy statement⁴⁸.

Evaluating our forecast

Let us now statistically analyse our forecasted time series over the April 28 to May 9 period to evaluate just how accurate our forecasts were.

In graph 1, the red line represents the actual AUD/USD exchange rate movements over the period of interest. The black line is time series as forecast using Microsoft Excel, while the blue, green, purple and orange lines represent the forecasts conducted using the statistical package, R, with an MA(5), MA(10), MA(15) and MA(20) model, respectively.

Excel Forecast

Our Excel forecast was relatively flat, and it seems that we were successful in forecasting the lower limit of the AUD/USD exchange rate over the forecast period. This is, however, what we strived to do, having noted previously that the expected news to hit the market would have a net appreciating effect on the Australian Dollar. We simply did not feel confident in any particular way to quantify these expectations and fluctuations into our forecast model. The black hi-low bars are the same 1% error level we employed in our original forecast. As can be seen, the actual time series lies mostly within 1% of our Excel forecast.

Graph 2 plots the residuals of the Excel (black) forecasted time series. We have implicitly assumed that the residuals should be normally distributed and so we expect to see a random scatter plot. As evident, the residuals are not randomly scattered, hinting that our forecast was not a good model. Then again, the sample data we had at our disposal was only small, and the forecast period was also not very long. Had we built the market news expectations into our quantitative model, these residuals may have looked better. Besides, the residual sum of squares is a very small 0.00039174.

R Forecast

The R forecasts, especially those with larger lags, seem to capture the technical trend better than our aggregate black forecast. Despite not valuing the AUD high enough across all

⁴⁸ Australian Dollar Has Weekly Gain; New Zealand Currency Falls, Bloomberg, 09/05/08

times and hence having a higher (worse) residual sum of squares and un-random residual scatter plot, the higher sophistication of these models seemed to do a better job of extracting the relative movements based purely on a technical analysis of past behaviours. This seems to suggest that technical analysis works to a certain degree. Then again, this was a small data set, so we cannot be definitely conclusive and must remain sceptical and cautious with its employment.

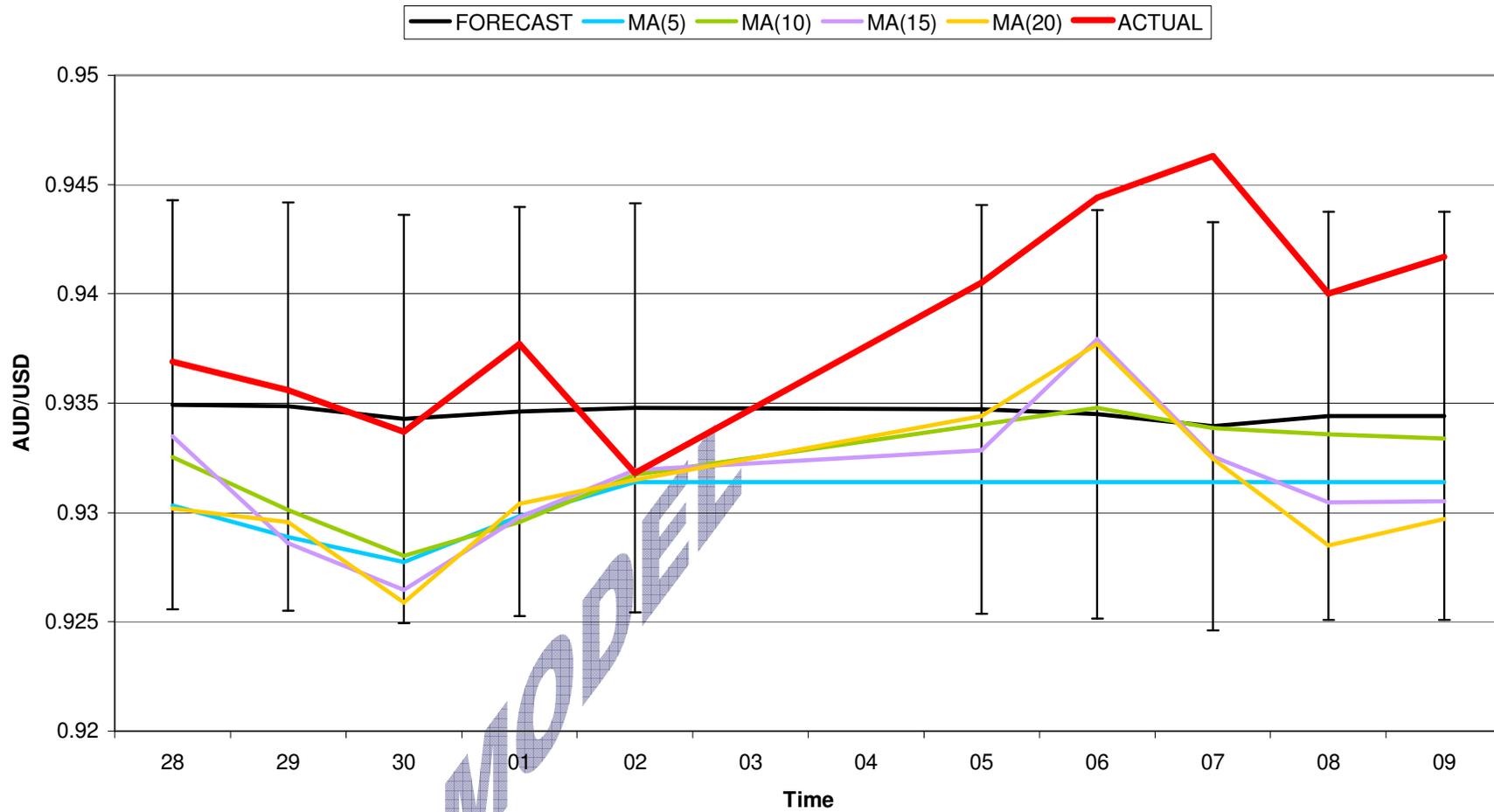
Conclusion

In determining our forecast we relied on the technical approach combined with elements of current events of financial significance. Given the limited data and knowledge of fundamentals and how the market reacts, we did a fair job of forecasting, but could not capture everything. Besides the expected news, there are always random fluctuations as well that simply cannot be predicted. Thus, errors in our forecast can also be attributed to unexpected variations in exchange rate market movements.



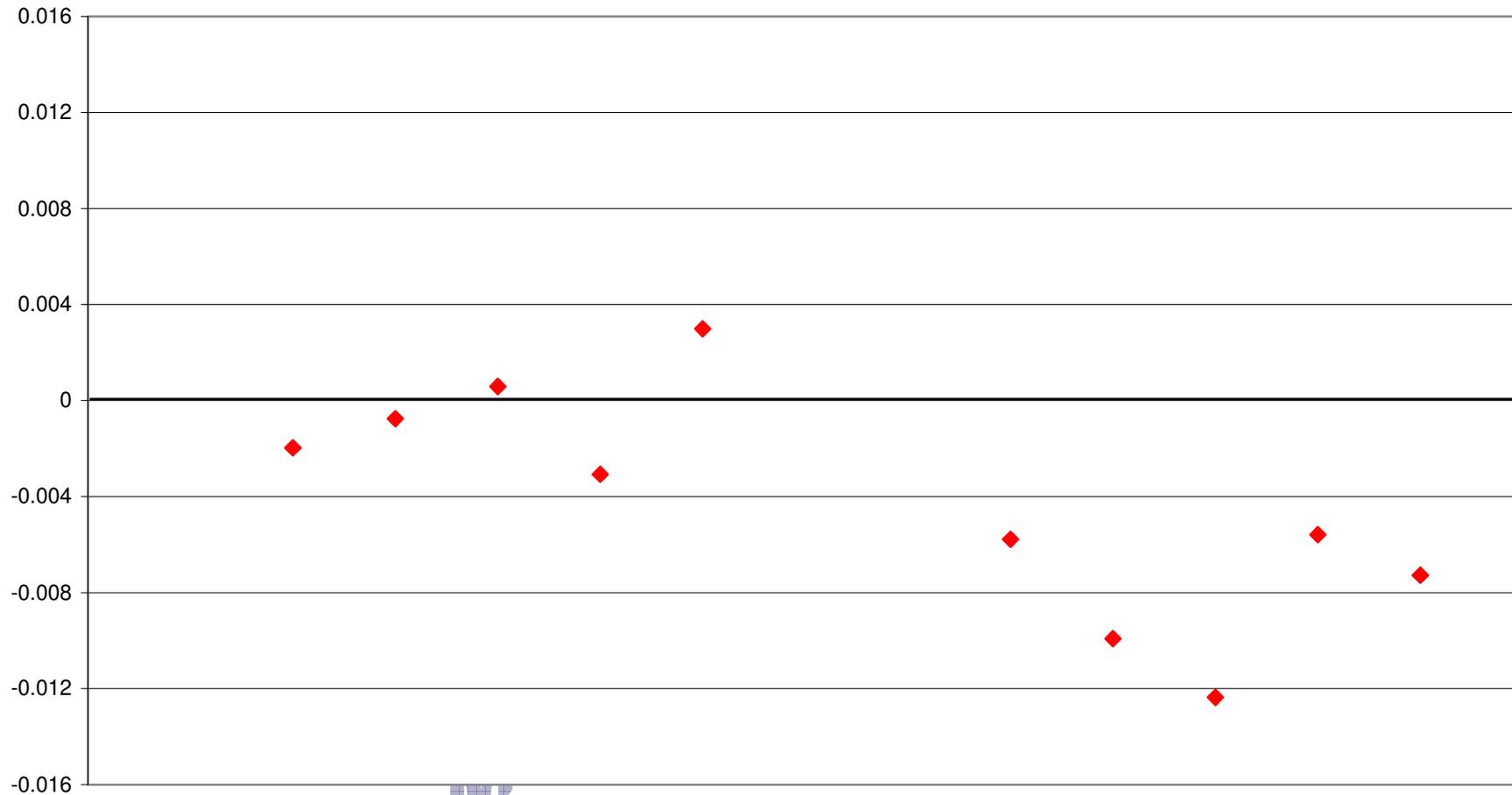
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**AUD/USD Spot Exchange Rate
Forecast analysis for April 28 - May 9**



Graph 1

**AUD/USD Spot Exchange Rate
Residual Analysis**



Graph 2