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Exchange rates, interest rates and current account news: some evidence from Australia

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This paper investigates the effects of the Australian current account news on exchange rates and interest rates for the period July 1985 to December 1992. The results indicate that the Australian dollar depreciated and interest rates rose as a result of an announcement of a larger than expected current account deficit. This is consistent with the view that market participants expected a foreign exchange market intervention sale of the Australian dollar by the Reserve Bank of Australia and they used the portfolio balance model of exchange rate determination when responding to the news. In addition, significant structural breaks were found and the analysis shows that after January 1990 the news affected neither exchange rates nor interest rates. (JEL F30).

Once a month the Australian Bureau of Statistics (ABS) releases the current account balance figures for the one month prior in the balance of payment publication. The monthly publication is embargoed until 11:30 am on the day of the announcement and as soon as it is released and the figures become publicly known, financial markets respond to the announcement. Markets react to the announcement because it contains new information or news about the performance of the economy. Since 1985, when the growing current account deficits and the resulting external debt accumulation attracted public concern in Australia, the news element contained in the announcement had gained importance in financial markets. The usual market efficiency argument applied

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to event studies requires that if financial markets are informationally efficient, only the unanticipated part of the announcement should significantly affect financial prices; that is, the announcement has an effect only if the market expectations were not fulfilled. In addition, the speed of adjustment of financial prices to the news must be fast enough to discourage arbitrage.

We identify three models of exchange rate determination that market participants might have in mind when they respond to the current account deficit news; the flexible price monetary model (FPMM), the sticky price monetary model (SPMM), and the portfolio balance model (PBM). The idea of the FPMM is that changes in exchange rates are due to a change in relative inflation rates between countries, and the SPMM is based on the notion that exchange rate and nominal interest rate movements are caused by a change in the expected future real interest rates. Unlike the two monetary models which assume perfect international asset substitutability, the PBM assumes imperfect substitutability and attributes changes in exchange rates to a change in the relative supplies of money and bonds at home and overseas. These models are used to predict the likely effects of the news on exchange rates and interest rates under three possible hypotheses. Table 1 summarizes the predictions.

An announcement of a larger than expected current account deficit, which is probably attributable to unanticipated exogenous positively autocorrelated changes in the foreign demand for domestic products, signals a future increase in deficits and hence a contraction in the demand for domestic currency in the future. This is based on the observation that the deficits are positively autocorrelated implying that a current larger deficit signals future increases in the deficits.[1] This is consistent with the view that a current shock causes market participants to revise their expectations of future deficits (See Hardouvelis, 1988, p. 31; also Hogan *et al.*, 1991, p. 91). If market participants believe that the future relative excess supply of domestic currency created by a current shock would fuel inflation, the inflation expectation would be revised upwards leading to a current increase in nominal interest rates and an immediate exchange rate depreciation (the FPMM). Alternatively, if they believe that future real interest rates would fall due to the expected future excess domestic money supply, current nominal interest rates would also fall and spot exchange rates depreciate (the SPMM). Given that higher future deficits lead to international redistributions in financial assets in favour of foreign residents, the

TABLE 1. The summary of the effects of a larger than expected CAD announcement.

	Positive autocorrelation hypothesis			Foreign exchange market intervention hypothesis			Tight monetary policy anticipation hypothesis		
	FPMM	SPMM	PBM	FPMM	SPMM	PBM	FPMM	SPMM	PBM
Interest rates	Rise	Fall	Rise	—	—	Rise	Fall	Rise	Rise
Exchange rates	Dep.	Dep.	Dep.	—	—	Dep.	App.	App.	App.

PBM's imperfect asset substitutability assumption implies an expected future exchange rate depreciation. As a result, the risk premium on domestic currency denominated assets would rise leading to current higher domestic interest rates and an immediate exchange rate depreciation.

The effects of the news can also be analyzed by studying the market expectations of the Reserve Bank of Australia's (RBA) policy response to the news. If the shocks to the deficits are expected to persist, for example when the deficits are positively autocorrelated, and/or if the RBA is perceived to be concerned about the adverse effect of the deficit on external debt, markets might expect an appropriate policy measure to reduce the deficit when an unexpectedly large deficit is announced. The next two hypotheses outline possible implications.

An unexpectedly large deficit announcement may cause markets to expect a foreign exchange market intervention sale of domestic currency by the RBA aimed at reducing the value of the currency to help reduce the deficit. Throughout the sample period the RBA's policy was to sterilize any intervention; that is, the purchases and sales of foreign currency were accompanied by appropriate monetary policy measures designed to leave domestic money supply unchanged.[2] Thus, the relative currency holdings of domestic and foreign investors would not be affected but the composition of assets they hold would change (investors will hold more domestic currency bonds and less foreign currency bonds, and vice versa for the RBA). Both the monetary models predict that the news has no effect on exchange rates and interest rates since domestic currency and foreign currency assets are assumed to be perfect substitutes. On the other hand, the PBM suggests that, due to the expectation of the excess supply of domestic currency bonds and the excess demand for foreign currency bonds created by the intervention, current interest rates would rise and spot exchange rates depreciate.

If market participants believe that the unexpected deficit is due to an unanticipated increase in the domestic demand for foreign goods instead of an unanticipated drop in the foreign demand for domestic commodities, they might expect a future corrective monetary policy action by the RBA. If this were the case, an unexpected deficit might signal a future contraction in monetary policy aimed at reducing the domestic demand. The resulting reduction in the inflation expectation would lower current nominal interest rates and appreciate spot exchange rates (the FPMM). Alternatively, current nominal (and real) interest rates would rise and the resulting capital inflow would appreciate spot exchange rates (the SPMM). Assuming the contractionary monetary policy would be carried out through an open market sale of domestic currency bonds, the PBM predicts that future domestic interest rates would have to rise to clear the expected excess supply of domestic currency bonds and future exchange rates would appreciate to clear the expected excess supply of foreign currency bonds created by the rise in domestic interest rates. These expectations are discounted in current rise in interest rates and spot exchange rate appreciation.

The rest of the paper is organized as follows: Section I summarizes the

literature. Section II contains a discussion on the methodological issues, and the data descriptions. The empirical results are presented in Section III, and some conclusions are offered in Section IV.

I. Literature

The earliest empirical results on the current account announcement effects can be found in Goodhart and Smith (1985). They report the effects of the UK visible trade balance announcements on UK pound exchange rates and interest rates for the period January 1977 to December 1983. Although none of the estimated coefficients for the trade news term is significant, they seem to suggest that the pound appreciates and the three month inter-bank rate increases in response to a larger than expected trade deficit announcement.

Hardouvelis (1988) examined the monthly US trade balance announcement news on exchange rates and interest rates for the period October 1979 to August 1984 and found that, in general, an unanticipated increase in the trade deficit decreases interest rates and depreciates the US dollar. However, as in the UK case, none of the estimated news coefficients is significant, except for the changes in the three month Treasury-bill rate in the second subsample estimations (October 1979 to October 1982). Deravi, Gregorowicz and Hegji (1988) used the announcement data for the period February 1980 to July 1987 and concluded that prior to 1985 there was little evidence of significant foreign exchange market response to the trade balance announcements. However, in the post 1985 sample period, there was strong evidence of market response, the dollar depreciated in both the spot and forward markets in response to an unexpectedly large deficit announcement. Irwin (1989) used observations from January 1980 to June 1988 and found that only the full sample and the post-1985 subsamples showed significant market responses, the dollar depreciated in response to an unexpected deficit. His results are consistent with those obtained by Deravi *et al.* (1988). Hogan, Melvin and Roberts (1991) examined the announcement effects for the period February 1980 to March 1989 and found that a worse than expected trade balance announcement depreciates US dollar exchange rates and drives down interest rates. Their findings are consistent with their hypothesis that the Fed has a target for the minimum trade deficit and is prepared to intervene if required. Aggarwal and Schirm (1992) examined the informational impact of the trade balance announcements on asset prices for the period 1980–1988. Their results indicate that while the announcements only influence interest rates prior to 1985, in the post-1985 sample, they also affect exchange rates and share prices. They found a larger than expected deficit announcement associated with dollar depreciation and higher interest rates. This finding is at odds with those of Hogan *et al.* and Hardouvelis. In sum, the empirical evidence coming from the US is mixed. In general, while Hogan *et al.* and Hardouvelis found that a larger than expected deficit causes a depreciation and a fall in interest rates, Aggarwal and Schirm found a depreciation and a rise in interest rates.

In Australia, Wong (1988) found that a larger than expected current account deficit announcement depreciated the \$US/\$A rate during the period July

1985 to April 1987. The effects on interest rates have not been studied by Australian researchers thus far. Therefore, the contribution of this paper is that it provides detailed up-to-date Australian empirical evidence of the effects of the current account deficit news on exchange rates and interest rates.

II. Methodology and data

II.A. Econometric model

The model used to test the effects of the current account news on exchange rates and interest rates is as follows:

$$\langle 1 \rangle \qquad \Delta P_t = a + b \cdot \mathrm{Exp}_t + c \cdot \mathrm{News}_t + u_t,$$

where: ΔP_t = Changes in financial prices, namely the five Australian dollar exchange rates defined in terms of foreign currency price (FC/DC, an increase in the rate indicates an appreciation of \$A), and short- and long-term interest rates, measured over two consecutive time horizons. Logarithmic changes are used for exchange rates.

Exp_t = Expected current account deficit announcement, in \$A billions.

News_t = Current account news measured by the absolute difference between the announced and expected current account deficit (if positive, it implies larger than expected deficit announcement).

u_t = A stochastic disturbance term with the usual Gaussian properties.

If financial markets are informationally efficient and the news has a significant effect, we would expect both a and b to be insignificantly different from zero, c to be statistically significant, and u_t to be a white noise; that is, only the unanticipated part of the current account announcement should significantly affect financial prices since the expected part has already been discounted into current prices. Furthermore, the speed at which prices adjust to the news should be fast enough to discourage any arbitrage activities.

II.B. Data description

The sample period is from July 1985 to December 1992. The data for the analysis include announced actual and expected deficits, the bilateral Australian dollar exchange rates against five major currencies, and short- and long-term interest rates.

The announcements are for the seasonally unadjusted preliminary estimates of the current account balance, for one month prior to the announcement, reported in the monthly ABS balance of payment publications (Catalogue number 5201). Since the current account was always in deficit throughout the sample period, deficit figures are used to avoid having negative time series. Deficits are measured in \$A billions.

Since July 1985 Money Market Services Australia (MMS) has been carrying out surveys on the financial markets' expectations on the Australian current account balance announcements. It surveys approximately 20–25 economists in various postings and financial market participants every week and the results of the survey are released to subscribers usually on Fridays. The survey participants are asked twice in successive surveys before the announcement of the size of the current account imbalance. The second survey is the revision of the first and reported in the last survey release before the announcement. Lower and upper bounds as well as median responses are reported, and only the seasonally unadjusted medians from the second survey are used as the expected announcements in the analysis. If we are to use the MMS median predictions as a proxy for the market expectations of the announcements, we need to know whether the medians are unbiased predictors of the announced figures: The results of the unbiasedness test are given below:

$$\text{Announced} = 0.15 + 0.92\ \text{Expected}$$

$$\text{s.e.} \quad (0.12)\ (0.096)$$

$$t\text{-ratio} \quad (1.24)\ (9.54)$$

$R^2 = 0.51$, D-W = 2.33, SEE = .311, $F(2,88) = 1.41$, P − P's $Z(t)$ with trend: Announced = −6.71, Expected = −5.17.

The F-statistic of 1.41 for the joint hypothesis of a zero constant and unit slope coefficient indicates that the hypothesis cannot be rejected at the 5 percent level of significance, implying that the medians are unbiased and can be used as a proxy for the market expectations of the announcements.

The five major bilateral exchange rates are the values of the Australian dollar against the US dollar, the Deutsche mark, the Japanese yen, the UK pound and the Swiss franc. Changes in exchange rates are measured as the logarithmic difference between the closing and opening wholesale rates on the day of the announcement (Horizon 1), and between the opening rates on the day following the announcement and the closing rates on the announcement day (Horizon 2).[3] The short-term interest rate is the 90-day authorised bank bill rate which is observable at noon every business day, and the 10-year Commonwealth bonds index rate is used as the long-term interest. Both interest rates are observable after the 11:30 am announcement. Changes in interest rates are measured as the absolute difference between the observed rate on the day of the announcement and the rate on the day before the announcement (Horizon 1), and between the observed rate on the day after the announcement and the rate on the day of the announcement (Horizon 2). These were collected from various issues of the Australian Financial Review.

All the data series in the form used in the regression equation (1) were tested for unit roots and the results are reported in Table 2. With the exception of the expected deficit series in subsample one, which is I(1), all series are found to be I(0). In order to avoid possible spurious results the expected deficit term is dropped from ⟨1⟩ in all subsample one regressions.[4] The discussions on the partition of the sample are in subsection III.B.

TABLE 2. Phillips–Perron $Z(t)$-Test*.

Data	Exp. CAD	CAD News	ΔUS	ΔDM	ΔJY	ΔUK	ΔSF	ΔSR	ΔLR	5% C.V.(2)
				Whole sample: July 85 to Dec 92 (Mar 87 to Dec 92 for LR)						
Trend	−5.169	−11.365	−11.168	−11.573	−10.474	−10.817	−10.713	−10.390	−8.715	−3.470
No trend	−5.019	−11.423	−11.046	−11.119	−10.233	−10.673	−10.320	−10.434	−8.734	−2.894
Lags(1)	8	2	4	4	2	2	2	5	4	
Conclusion	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	
				Subsample one: July 85 to Nov 89 (Mar 87 to Nov 89 for LR)						
Trend	−2.631	−8.739	−9.114	−8.961	−8.645	−8.219	−8.571	−8.320	−4.935	−3.495
No trend	−2.195	−8.755	−8.724	−8.738	−8.148	−7.982	−8.052	−8.132	−4.402	−2.917
Lags(1)	1	2	2	2	2	2	2	5	1	
Conclusion	I(1)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	
				Subsample two: Dec 89 to Dec 92						
Trend	−5.182	−7.165	−5.134	−6.126	−4.847	−7.652	−5.966	−4.753	−6.280	−3.535
No trend	−4.488	−7.278	−5.084	−6.110	−4.884	−7.439	−5.898	−4.753	−6.314	−2.942
Lags(1)	1	2	1	1	1	2	2	1	1	
Conclusion	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	I(0)	

Notes: (1) The number of truncation lag paramater is set as the highest significant lag order from either the ACF or PACF of the first differenced series.

(2) Critical values are taken from tables derived by MacKinnon (1991).

*All the unit root tested series have either positive or insignificant moving average terms. This implies that the Phillips–Perron test generally has high power and does not suffer from a substantial size distortion as a result of the series having significant negative moving average terms, see Banerjee *et al.* (1993, p. 113).

TABLE 3. $\Delta ER_t = a + b \cdot \text{Exp}_t + c \cdot \text{News}_t + u_t$.

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	S.C.(1)	Het(2)	Norm(3)	Reset(4)
			Whole sample: Jul 85 to Dec 92, 90 observations						
ΔUS	−.38E-03	.63E-03	−.12E-01**	0.2373	0.0067	6.87	1.49	13.23**	13.76**
(S.E.)	(.26E-02)	(.21E-02)	(.23E-02)						
ΔDM	−.11E-02	.85E-03	−.10E-01**	0.1376	0.0075	13.03	2.67	2.63	8.31*
	(.29E-02)	(.23E-02)	(.26E-02)						
ΔJY	−.66E-04	.74E-03	−.11E-01**	0.1719	0.0073	10.72	0.80	1.35	4.85*
	(.28E-02)	(.23E-02)	(.25E-02)						
ΔUK	−.86E-03	.86E-03	−.86E-02**	0.1228	0.0068	7.14	2.10	3.05	4.51*
	(.26E-02)	(.21E-02)	(.23E-02)						
ΔSF	−.10E-03	.35E-03	−.95E-02**	0.1211	0.0075	6.85	2.70	2.70	7.63**
	(.29E-02)	(.23E-02)	(.25E-02)						
	Constant	CAD News	R^2-Adj.	S.E.E.	S.C.(1)	Het(2)	Norm(3)	Reset(4)	Chow(5)
			Subsample one: Jul 85 to Nov 89, 53 observations						
ΔUS	.99E-03	−.20E-01**	0.3908	0.0073	5.67	0.7	14.52**	6.02*	15.02**
(S.E.)	(.10E-02)	(.33E-02)							
ΔDM	.12E-02	−.18E-01**	0.2938	0.0084	16.75	0.26	1.09	3.32	15.69**
	(.12E-02)	(.38E-02)							
ΔJY	.17E-02	−.18E-01**	0.2894	0.0082	16.22	0.45	0.46	2.27	9.24**
	(.11E-02)	(.37E-02)							
ΔUK	.82E-03	−.15E-01**	0.2451	0.0076	13.20	0.29	0.63	0.79	9.23**
	(.11E-02)	(.35E-02)							
ΔSF	.14E-02	−.17E-01**	0.2673	0.0083	18.05	0.31	1.70	3.81	13.04**
	(.12E-02)	(.38E-02)							

TABLE 3. (Cont.)

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	S.C.(1)	Het(2)	Norm(3)	Reset(4)
			Subsample two: Dec 89 to Dec 92, 37 observations						
ΔUS	−.20E-02	.14E-02	−.32E-02	0.0228	0.0040	19.43	3.67	0.12	3.24
(S.E.)	(.28E-02)	(.22E-02)	(.20E-02)						
ΔDM	−.37E-02	.16E-02	−.42E-03	−0.0405	0.0041	10.02	1.58	0.21	0.44
	(.29E-02)	(.22E-02)	(.21E-02)						
ΔJY	−.24E-03	.70E-03	−.34E-02	−0.0039	0.0049	7.11	1.52	4.76	0.39
	(.34E-02)	(.26E-02)	(.25E-02)						
ΔUK	−29E-02	.19E-02	−.13E-02	−0.0291	0.0044	14.61	5.36	0.02	0.02
	(.31E-01)	(.24E-01)	(.23E-01)						
ΔSF	−.31E-02	.17E-02	−.45E-03	−0.0426	0.0044	12.24	1.11	1.44	0.17
	(.31E-02)	(.24E-02)	(.23E-02)						

Notes: *significant at 5 percent level.
**significant at 1 percent level.
(1) Breusch–Godfrey LM test of serial correlation of up to 12 lags, asymptotically distributed as $\chi^2(12)$. Critical values at 5 percent and 1 percent level of significance are 21.03 and 26.22, respectively.
(2) Breusch–Pagan–Godfrey LM test of heteroskedasticity, asymptotically distributed as $\chi^2(2)$ for whole and subsample one, $\chi^2(1)$ for subsample two.
(3) Bera–Jaque LM normality test, asymptotically distributed as $\chi^2(2)$. Critical values at 5 percent and 1 percent level of significance are 5.99 and 9.21, respectively.
(4) LM version of Ramsey's RESET Misspecification Test, asymptotically distributed as $\chi^2(1)$. Critical values at 5 percent and 1 percent level of significance are 3.84 and 6.63, respectively.
(5) LM version of Chow's test of stability of the regression coefficients, asymptotically distributed as $\chi^2(2)$.

III. Empirical analysis

III.A. Empirical results for exchange rates and interest rates

The OLS estimation results of equation (1) for exchange rates are reported in Table 3. The reported results refer mainly to Horizon 1; the results for Horizon 2 are available from the authors upon request. The evidence shows that for the whole sample period the markets show informational efficiency in all cases. The coefficients for the news term are all significant at the 1 percent level, and they all have a negative sign implying that exchange rates would depreciate in response to a worse than expected announcement. On average, exchange rates changed by 1 percent as a result of an unexpected deviation from the market expectations by $A one billion, and the average adjusted R^2 is around 0.16.[5] None of the estimated coefficients in the Horizon 2 regressions is significant at the 5 percent level. In sum, the Australian foreign exchange market appears to be not only efficient in processing the news but also fast in responding to it so that arbitrage profit windows close as quickly as they open.

The estimation results for interest rates are summarized in Table 4. The sample period for the 10 year rate is from March 1987 due to lack of available data. For both the interest rates only the coefficient for the news term is significant and positive at the 1 percent level of significance in the whole sample regressions. The positive signs imply that an unexpected deficit raised interest rates: a $A1 bn larger than expected deficit announcement increased the 90-day and the 10-year rates by 0.22 and 0.13 percentage points, respectively.[6] Moreover, no significant coefficients are observed in Horizon 2 which is suggestive of the debt market efficiency.

The results in the whole sample estimations are consistent with the predictions made by the FPMM and the PBM under the positive autocorrelation hypothesis. Also, the PBM under the foreign exchange market intervention hypothesis is supported. The next two subsections discuss the empirical plausibility of the two hypotheses.

III.B. Stability analysis

As can be seen from Tables 3 and 4, the whole sample regressions for all five exchange rates and the 10-year interest rate show evidence of misspecification. This might be due to the instability of the news coefficient. Hogen *et al.* mention that if positively autocorrelated deficits imply market participants revising their future deficit forecasts in response to current shocks, there is no a priori reason to expect time changing response of exchange rates and interest rates to the news.

In order to ascertain the stability of the estimated equations throughout the sample period, rolling regressions with 30 observations starting from July 1985 were estimated (the first estimation used observations from 1 to 30, the second from 2 to 31, and the third from 3 to 32, and so on) and the time series plot of the news coefficients is shown in Figure 1. As is obvious from the figure, the absolute size of the news coefficients continue to decrease until early 1989 and

TABLE 4. $\Delta IR_t = a + b \cdot \text{Exp}_t + c \cdot \text{News}_t + u_t$.

Whole sample: Jul 85 to Dec 92, 90 observations for SR
Mar 87 to Dec 92, 70 observations for LR

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	S.C.[1]	Het[2]	Norm[3]	Reset[4]
ΔSR	−0.0944	0.0577	0.2229**	0.1679	0.15	9.85	0.39	19.67**	2.07
(S.E.)	(0.0577)	(0.0460)	(0.0508)						
ΔLR	−0.0321	0.0235	0.1299**	0.1369	0.10	9.30	6.03*	4.18	14.53**
(S.E.)[a]	(0.0383)	(0.0262)	(0.0478)						

Subsample one: Jul 85 to Nov 89, 53 observations for SR
Mar 87 to Nov 89, 33 observations for LR

	Constant	CAD News	R^2-Adj.	S.E.E.	S.C.[1]	Het[2]	Norm[3]	Reset[4]	Chow[5]
ΔSR	−0.0285	0.3898**	0.3201	0.17	10.83	0.10	1.39	1.11	17.85**
(S.E.)	(0.0237)	(0.0772)							
ΔLR	0.0062	0.2423**	0.4203	0.09	11.11	0.32	0.65	8.04**	11.38**
(S.E.)	(0.0152)	(0.0492)							

Subsample two: Dec 89 to Dec 92, 37 observations

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	S.C.[1]	Het[2]	Norm[3]	Reset[4]
ΔSR	−0.0958*	0.0552	−0.0061	0.0143	0.06	10.72	1.07	4.22	2.12
(S.E.)	(0.0455)	(0.0349)	(0.0331)						
ΔLR	−0.0174	0.0028	0.0338	−0.0435	0.09	6.18	2.51	4.79	6.83**
(S.E.)	(0.0660)	(0.0507)	(0.0481)						

Notes: (1)–(5) see notes for Table 3. (a) White's heteroskedasticity adjusted standard errors.

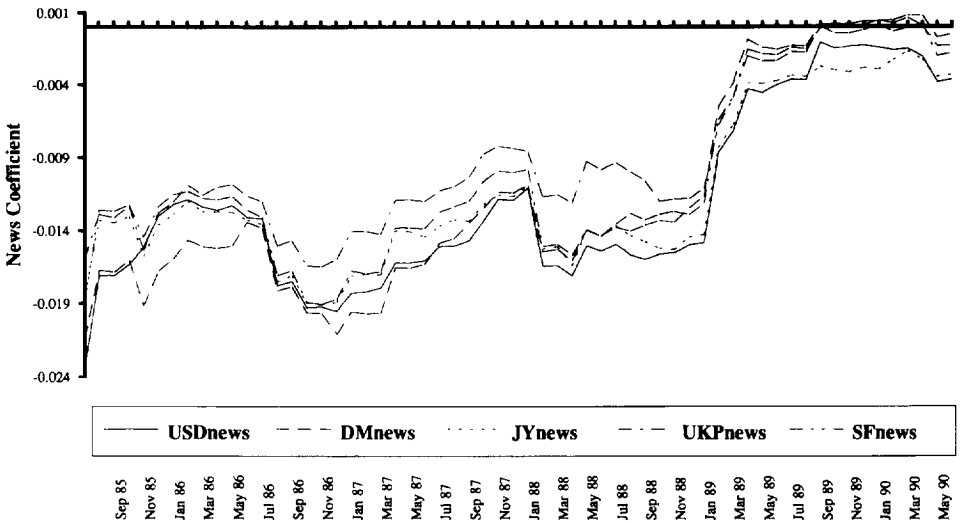

FIGURE 1. The time series plot of the news coefficients from the rolling regression.

later subsamples produce coefficients which are insignificantly different from zero. With a view to identifying precise structural breaks the sequential Chow tests of the stability of regression coefficients were carried out for each exchange rate and interest rate regressions, and the results are that all the regressions produced significant breaks around October 1987 and January 1990. The former coincides with the worldwide stock market crash and the latter with the change in the stance of Australian monetary policy from contractionary to expansionary. Due to the limit imposed by the size of the sample the second structural break is used to divide the sample into two subsamples. Subsample one is from July 1985 to November 1989 with 53 observations, and subsample two is from December 1989 to December 1992 with 37 observations.[7]

The OLS estimation results for exchange rates in each subsample are presented in the second and the third subtables in Table 3, respectively. The subsample one estimation results show that the news coefficient is significant at the 1 percent level, and the magnitude of the coefficient and the adjusted R^2 are nearly doubled compared with the whole sample estimations in all cases. On average a \$A1bn unexpected current account deficit announcement depreciated exchange rates by around 1.8 percent, and the average adjusted R^2 is around 30 percent. The Chow statistic is significant at the 1 percent level for all the exchange rates justifying the partition of the sample. In subsample two, no exchange rates responded significantly to the deficit news. In both subsamples the Horizon 2 results show no significant coefficients.

The regression results for interest rates in each subsample are presented in the second and the third subtables in Table 4, respectively. The subsample one results show that a \$A1bn unexpected deficit raised the 90-day rate and the 10-year rate by 0.39 and 0.24 percentage points, respectively. The news coeffi-

cients are significant at the 1 percent level, and the magnitudes of the coefficients and the adjusted R^2s are doubled compared with those of the whole sample results. The Chow statistics are also significant at the 1 percent level. As in the case of exchange rates, interest rates did not respond to the news in subsample two, and the Horizon 2 regressions include no significant coefficients in both subsamples. However, the news coefficient for the 90-day rate, although insignificant, now has a negative sign suggesting that the interest rate fell as a result of bad current account news.[8]

We offer two explanations for the insignificant response of exchange rates and interest rates to the news in subsample two. First, market participants may have noticed that the major component of the current account deficit towards the late 1980s was the importation of capital goods. Although this would temporarily deteriorate the current deficits the situation would eventually improve because the country might be investing in its future prosperity. Therefore, a larger than expected deficit announcement may not have been considered bad news in subsample two. An empirical support for this view might be that the post 1989 period is associated with a fall in the ratio of external debt interest payments to GDP and to export meaning that Australia's debt repaying capability has improved, and therefore the deficit news no longer affected exchange rates and interest rates. Second, the monetary policy stance of the government changed in January 1990 as described by INDECS (1992, p. 161), 'the vice-like grip of monetary policy on the economy was progressively loosened ... the question was continuously not *if* (interest) rates would fall, but *when and by how much* the Reserve Bank would allow them to fall.' Both the 90-day and the 10-year rates continued to fall throughout subsample two. On this basis it can be argued that an upward pressure on interest rates put on by an unexpectedly large deficit announcement would be expected to be defused by a further future easing of monetary policy, and hence current interest rates and exchange rates would not be affected.

The evidence in this subsection confirms the existence of structural breaks and that the effects of the deficit news on exchange rates and interest rates are different depending on the time period considered. We argue, therefore, that the positive autocorrelation hypothesis is not a plausible explanation of the effects of the news, and so the motivation behind the markets' expectation of a deficit reduction policy by the RBA was that it was perceived to be concerned about the negative impact of an unexpected deficit on external debt.

III.C. Modelling good and bad news

The remaining hypothesis that has empirical support is the foreign exchange market intervention signalling hypothesis. Jüttner and Tonkin (1992) identify improving international competitiveness by depreciating nominal exchange rates as one of the motivations behind the RBA's foreign exchange market intervention operations. If market participants regard the deficit news as a signal for an impending intervention sale of domestic currency by the RBA, the portfolio balance model predicts that current domestic interest rates would rise and spot exchange rates would depreciate. More importantly, only larger than

expected deficit announcements would have an effect since there is no reason to expect the intervention if the news is good. To ascertain the empirical validity of this asymmetrical response to the news, the sample is partitioned into two separate groups; the good news (smaller than expected deficit announcement) and the bad news (larger than expected deficit announcement) observations. We expect that while the bad news group would entail significant market reaction, the good news announcements would not affect financial prices much, if at all.[9]

The results of the bad news estimations for exchange rates in the whole and the two subsamples are summarized in Table 5A. Since the partitioned data are no longer strictly time series the LM statistic for testing serial correlation is not reported. As before, in the whole sample only the news coefficient is significant in all cases. On average a $A1bn unexpected deficit depreciated the Australian dollar against the five currencies by 2.2 percent, and this represents more than a twofold increase in magnitude from the average of 1 percent response of exchange rates to both the good and the bad news taken together. The subsample results show that market participants were sensitive to the news in subsample one, the average exchange rate change was 2.9 percent. By contrast, none of the estimated coefficients is significant in subsample two. The effects of the good news announcements are summarized in Table 5B. In all three different sample periods, none of the estimations includes a significant news coefficient. For both types of news the Horizon 2 estimates are insignificant in all cases.

The effects of the bad news announcements on interest rates are reported in Tables 6A. As in the case of exchange rates, the responses of interest rates to the bad news are larger than the responses to both types of news taken together. For the sample as a whole a $A1bn larger than expected deficit raised the 90-day and the 10-year rate by 0.29 and 0.34 percentage points, respectively; and 0.41 and 0.38 percentage points, respectively in subsample one. The news had no effect in subsample two. For the 10-year rate the efficiency is achieved; however, for the 90-day rate the speed test of market efficiency is not met since the news coefficient is also significant at the 5 percent level in Horizon 2 in the whole sample and the subsample one regressions. This suggests a delay in the market's reaction to the bad news announcements.[10] Table 6B contains the estimation results for the effects of the good news. Both the 90-day and the 10-year rates did not respond to the good news in all three sample periods. For the 90-day rate, there is evidence of market inefficiency as indicated by the significant expected term in subsample one which implies that markets were not fully using available information. No significant coefficients was found in the Horizon 2 regressions for both interest rates.

The evidence in this subsection is consistent with the predictions made by the PBM under the foreign exchange market intervention signalling hypothesis. The market participants responded differently to the good and the bad news, only the latter affected exchange rates and interest rates for the sample as a whole. This asymmetry in response to the news is intensified in subsample one as evidenced by the larger magnitude of the news coefficients and the higher

explanatory power of the model. However, in subsample two, the bad as well as the good news did not cause a significant response, and so the asymmetry disappears.

The Australian evidence is different from that of the UK study since an

TABLE 5A. $\Delta ER_t = a + b \cdot \text{Exp}_t + c \cdot \text{News}_t + u_t$.

Bad CAD news: whole sample: 45 observations

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)
ΔUS	.39E-02	.25E-03	−.24E-01**	0.3421	0.0060	3.33	8.39*	6.12**
(S.E.)	(.37E-02)	(.26E-02)	(.50E-02)					
ΔDM	.14E-02	.16E-02	−.21E-01**	0.2091	0.0071	1.72	7.23	1.31
	(.44E-02)	(.31E-02)	(.59E-02)					
ΔJY	.20E-02	.21E-02	−.22E-01**	0.2460	0.0068	2.00	3.36	1.09
	(.42E-02)	(.29E-02)	(.56E-02)					
ΔUK	.29E-02	.75E-03	−.19E-01**	0.2108	0.0063	1.47	0.49	2.50
	(.38E-02)	(.27E-02)	(.52E-02)					
ΔSF	.49E-02	.17E-04	−.23E-01**	0.2489	0.0069	2.01	2.28	1.56
	(.43E-02)	(.30E-02)	(.57E-02)					

Subsample one: Jul 85 to Oct 89, 26 observations

	Constant	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)	Chow(5)
ΔUS	.52E-02*	−.32E-01**	0.4769	0.0063	1.84	1.25	1.05	8.57*
(S.E.)	(.24E-02)	(.65E-02)						
ΔDM	.44E-02	−.28E-01**	0.2714	0.0084	0.07	1.53	0.00	3.77
	(.31E-02)	(.87E-02)						
ΔJY	.57E-02	−.28E-01**	0.3302	0.0076	0.53	0.59	0.00	3.58
	(.28E-02)	(.78E-02)						
ΔUK	.43E-02	−.23E-01**	0.2752	0.0070	0.23	0.18	0.00	2.77
	(.26E-02)	(.72E-02)						
ΔSF	.69E-02**	−.32E-01**	0.3774	0.0077	0.84	0.51	0.04	5.74
	(.29E-02)	(.79E-02)						

Subsample two: Jan 90 to Oct 92, 19 observations

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)
ΔUS	.43E-02	−.20E-02	−.10E-01	0.0958	0.0041	1.69	0.21	3.72
(S.E.)	(.43E-02)	(.32E-02)	(.56E-02)					
ΔDM	.21E-02	−.63E-03	−.92E-02	0.0436	0.0041	1.91	0.50	2.51
	(.43E-02)	(.32E-02)	(.59E-02)					
ΔJY	−.16E-02	.33E-02	−.11E-01	0.0534	0.0054	1.76	8.27*	2.92
	(.53E-02)	(.39E-02)	(.69E-02)					
ΔUK	.22E-02	.49E-03	−.11E-01	0.0371	0.0049	1.17	0.43	7.01*
	(.51E-02)	(.38E-02)	(.66E-02)					
ΔSF	.28E-02	−.13E-02	−.70E-02	−0.0330	0.0046	1.53	1.30	1.30
	(.48E-02)	(.36E-02)	(.62E-02)					

Notes: (2)–(5) See notes for Table 3.

TABLE 5B. $\Delta ER_t = a + b \cdot \text{Exp}_t + c \cdot \text{News}_t + u_t$.

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het[2]	Norm[3]	Reset[4]
			Good CAD news: 45 observations					
ΔUS	.23E-02	.62E-05	−.20E-02	−0.0449	0.0069	1.19	0.89	6.93**
(S.E.)	(.42E-02)	(.31E-02)	(.60E-02)					
ΔDM	.26E-02	−.89E-03	−.16E-02	−0.0446	0.0077	2.29	3.93	1.79
	(.46E-02)	(.35E-02)	(.67E-02)					
ΔJY	.27E-02	−.14E-02	−.81E-02	−0.0080	0.0077	1.08	2.69	2.87
	(.46E-02)	(.35E-02)	(.67E-02)					
ΔUK	−.68E-03	.36E-03	−.78E-02	−0.0097	0.0072	1.51	6.49*	7.11**
	(.43E-02)	(.32E-02)	(.62E-02)					
ΔSF	.13E-02	.25E-03	−.36E-02	−0.0401	0.0077	2.59	2.48	3.81
	(.46E-02)	(.35E-02)	(.67E-02)					
			Subsample one: Aug 85 to Nov 89, 27 observations					
	Constant	CAD News	R^2-Adj.	S.E.E.	Het[2]	Norm[3]	Reset[4]	Chow[5]
ΔUS	−.23E-02	−.10E-01	0.0054	0.0079	1.98	1.82	7.11**	4.94
(S.E.)	(.24E-02)	(.98E-02)						
ΔDM	.24E-02	−.10E-01	−0.0009	0.0085	1.46	0.13	10.18**	9.61**
	(.25E-02)	(.10E-01)						
ΔJY	.16E-02	−.15E-01	0.0032	0.0087	1.04	0.05	5.97*	4.79
	(.26E-02)	(.11E-01)						
ΔUK	−.47E-03	−.17E-01	0.0723	0.0082	0.27	0.94	4.18*	5.55
	(.24E-02)	(.10E-01)						
ΔSF	.16E-02	−.12E-01	0.0097	0.0086	1.79	0.18	6.10*	6.46*
	(.26E-02)	(.11E-01)						
			Subsample two: Dec 89 to Dec 92, 18 observations					
	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het[2]	Norm[3]	Reset[4]
ΔUS	−.43E-02	.41E-02	.17E-02	0.0404	0.0036	2.64	0.16	0.39
(S.E.)	(.41E-02)	(.28E-02)	(.47E-02)					
ΔDM	−.73E-02	.42E-02	.24E-04	−0.0004	0.0040	3.68	0.34	0.60
	(.45E-02)	(.31E-02)	(.50E-02)					
ΔJY	.20E-02	−.23E-02	−.47E-02	−0.0444	0.0047	0.96	2.53	1.34
	(.55E-02)	(.37E-02)	(.61E-02)					
ΔUK	−.68E-02	.41E-02	−.30E-02	0.0027	0.0037	4.71	0.95	1.48
	(.43E-02)	(.29E-02)	(.48E-02)					
ΔSF	−.83E-02	.51E-02	.19E-02	0.0217	0.0042	2.92	0.65	1.86
	(.49E-02)	(.33E-02)	(.55E-02)					

Notes: (2)–(5) See notes for Table 3.

unexpected deficit tends to be associated with the pound appreciation in the UK. Compared to the US studies the Australian results are different from those of Hardouvelis since he reports a fall in interest rates in response to a larger than expected deficit, however Aggarwal and Schirm reports similar results to our finding. To a lesser extend Hogan *et al.*'s finding that interven-

TABLE 6A. $\Delta IR_t = a + b \cdot \text{Exp}_t + c \cdot \text{News}_t + u_t$

Bad CAD news: 45 observations for SR
35 observations for LR

Horizon 1

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)
ΔSR	−0.0499	0.0078	0.2922*	0.0739	0.15	1.40	18.46**	0.53
(S.E.)	(0.0926)	(0.0646)	(0.1250)					
ΔLR	−0.1226	0.0464	0.3355**	0.2489	0.10	3.29	0.68	7.13**
	(0.0680)	(0.0455)	(0.0932)					

Horizon 2

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)
ΔSR	−0.0621	−0.0263	0.2774*	0.0710	0.15	1.44	11.2**	3.07
(S.E.)	(0.0935)	(0.0653)	(0.1263)					

Subsample one: July 85 to Oct 89, 26 observations for SR
Jul 87 to Oct 89, 16 observations for LR

Horizon 1

	Constant	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)	Chow(5)
ΔSR	−0.0230	0.4059*	0.1575	0.17	0.46	2.20	0.00	12.03**
(S.E.)	(0.0617)	(0.1704)						
ΔLR	−0.0329	0.3782**	0.4549	0.08	1.55	1.11	4.67*	6.82*
	(0.0379)	(0.1029)						

Horizon 2

	Constant	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)	Chow(5)
ΔSR	−0.1364	0.4179*	0.1373	0.18	0.66	2.37	0.95	2.04
(S.E.)	(0.0678)	(0.1873)						

Subsample two: Jan 90 to Oct 92, 19 observations

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het(2)	Norm(3)	Reset(4)
ΔSR	−0.0731	0.0268	0.0430	−0.0926	0.07	0.38	6.16*	0.50
(S.E.)	(0.0729)	(0.0540)	(0.0947)					
ΔLR	−0.1803	0.0871	0.2263	0.1140	0.10	2.56	0.17	6.41*
	(0.1034)	(0.0765)	(0.1342)					

Notes: (2)–(5) *See notes for Table* 3.

tion causes an exchange rate depreciation and a fall in interest rates is similar to our support for the foreign exchange market intervention signalling hypothesis. This is because the interventions were sterilized in Australia.

IV. Summary and conclusion

The aim of this paper has been to investigate the effects of the current account deficit announcements on a number of Australian dollar exchange rates and

TABLE 6B. $\Delta IR_t = a + b \cdot \text{Exp}_t + c \cdot \text{News}_t + u_t$.

	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het[2]	Norm[3]	Reset[4]
	Good CAD news: 45 observations for SR, 35 observations for LR							
ΔSR	−0.2736**	0.1829*	0.0688	0.1351	0.16	0.75	13.67**	0.72
(S.E.)	(0.0978)	(0.0730)	(0.1414)					
ΔLR	−0.0618	0.0134	−0.0753	0.0322	0.08	3.99	0.37	0.45
	(0.0514)	(0.0378)	(0.0753)					
	Subsample one: Aug 85 to Nov 89, 27 observations for SR; Mar 87 to Nov 89, 17 observations for LR							
	Constant	CAD News	R^2-Adj.	S.E.E.	Het[2]	Norm[3]	Reset[4]	Chow[5]
ΔSR	−0.0806	0.1641	−0.0166	0.18	0.18	0.36	1.57	4.81
(S.E.)	(0.0526)	(0.2165)						
ΔLR	−0.0440	−0.0186	−0.0650	0.08	1.34	0.76	0.57	0.65
	(0.0294)	(0.1213)						
	Subsample two: Dec 89 to Dec 92, 18 observations							
	Constant	Exp. CAD	CAD News	R^2-Adj.	S.E.E.	Het[2]	Norm[3]	Reset[4]
ΔSR	−0.1700*	0.0951	−0.0920	0.1214	0.06	2.07	0.15	3.74
(S.E.)	(0.0712)	(0.0483)	(0.0796)					
ΔLR	0.0518	−0.0676	−0.0673	0.0088	0.08	1.65	0.08	1.15
	(0.0906)	(0.0615)	(0.1013)					

Notes: (2)–(5) See notes for Table 3.

interest rates. Three hypotheses were identified: the positively autocorrelated deficit series may imply that a current shock causes the market participants to revise their expectations of future deficits; an unexpected deficit signals a foreign exchange market intervention sale of domestic currency by the RBA; and the deficit news signals a future monetary contraction by the RBA. In general, it is found that an unexpected current account deficit is associated with a depreciation of exchange rates and a rise in interest rates. The effects of the news in general were significant only for the whole sample and subsample one, and for the bad news. The results also indicate that foreign-exchange and the long-term debt markets are informationally efficient for the whole sample and for the two subsample periods. On the other hand, there is evidence of inefficiency in the short-term debt market as suggested by the significant expected term in the whole sample good news estimations and the slow adjustments to the news in the whole and subsample one bad news estimations.

We conclude that the most likely explanation for the significant current account deficit news in subsample one is that markets believed in the adverse effect of an unanticipated deficit and that they expected foreign exchange market intervention by the RBA to improve competitiveness when an unexpectedly large deficit was announced. From these results we infer that market

participants had the portfolio balance model of exchange rate determination in mind when they responded to the news. In subsample two, the markets' attitudes towards the news might have changed as suggested by the insignificant effects of the news. This may be due to the markets' perception that a large deficit might not be bad since it might imply future prosperity as a result of increased domestic investment financed by running a current account deficit, and accordingly the RBA's intervention sale of domestic currency was not needed. In addition, the loosening of monetary policy that began in January 1990 meant that interest rates may not have been allowed to rise in response to a larger deficit announcement, and so the effects of the news on exchange rates and interest rates were insignificant.

Notes

1. The Box–Ljung statistic using 9 lags ($\equiv \sqrt{(N = 90)}$) for the announced deficits is 39.27 (p-value = 0.0); up to the 15th lag in the estimated ACF are positive, and the first five (0.31, 0.35, 0.35, 0.14, 0.11, respectively) are significant.
2. In its 1989 yearly report (p. 24), the RBA acknowledged that 'In its foreign exchange operations, the Bank endeavours as far as possible to prevent settlement of its foreign currency purchases or sales cutting across monetary policy objectives.'
3. Horizon 2 measures overseas financial markets' response to the news. Major international markets operating during this time horizon include Tokyo, Hong-Kong, London and New York. A significant market response in Horizon 2 implies Australian financial market inefficiency because it indicates that the necessary adjustment of financial prices to the news was incomplete and a part of this adjustment spilled over to overseas markets. Thus, a more stringent requirement for market efficiency is that only c in (1) should be significant in Horizon 1 only if the news has a significant effect.
4. For consistency in comparison, all subsample one regressions were re-estimated with the expected term included, however, this did not change the results in Section III at all. The expected term is insignificant and the magnitude of the news coefficient is virtually unchanged in all cases.
5. The significant non-normality found in the residuals of the US dollar regression is caused by an outlier, omission of which removes non-normality with virtually no change in the regression results (the news coefficient is now -0.011, and $\chi^2(2)_{\text{Norm}}$ is 2.86 for the whole sample; and -0.017 and 1.87 for subsample one, respectively). Due to the nature of data involved, deleting an observation does not create a serious statistical problem since continuity is not essential.
6. As in the case for the US dollar regression for the whole sample and subsample one, the significant non-normality in the residuals of the 90-day interest rate for the whole sample is due to an outlier. Estimation without the outlier produced the news coefficient of 0.19, and $\chi^2(2)_{\text{Norm}}$ is now 4.35.
7. Notice that the November 1989 deficit figure was announced on 22 December 1989, and the December 1989 figure on 1 February 1990. Therefore, the latter is the first observation in subsample two. The validity of the choice of the break point is confirmed by the fact that when (1) was estimated with a structural dummy as a new regressor (0's for subsample one and 1's for subsample two) all but the US dollar regression showed no evidence of misspecification. Reset statistics are now 4.04 (p-value = 0.04), 0.82, 1.80, 1.91 and 1.34 for USD, DM, JY, UKP, SF, respectively.
8. Although none of the news coefficients in subsample two is significant, the negative response of exchange rates and the 90-day rate, and the positive response of the 10-year rate might suggest that market participants considered the changes in real interest rates to be a more important short-term determinant of exchange rate

movements, while the changes in inflation expectation to be more important in the long run.

9. There is another reason for expecting insignificant responses for the good news. The balance of payment publication also includes the revisions of previous announcements. For the period January 1984 to December 1992, i.e. from the first month of the exchange rate float to the end of the sample period, the average one month revision of the deficit was $A3.2 million. The results of the revision bias test of the one month revisions are as follows:

$$\text{Revision} = 0.019 + 0.99\ \text{Announced}$$
$$\text{s.e.} \quad (0.03) \quad (0.02)$$
$$\text{t-ratio} \quad (0.75) \quad (47.72)$$

$R^2 = 0.96$, D-W = 2.19, SEE = 0.099 P – P's $Z(t)$ with trend:

Announced = −8.45, Revision = −8.92.

The constant term in the regression, although insignificant, has a positive sign suggesting a tendency towards under reporting in the first instance. We argue that if markets are efficient, market participants should be aware of this bias in the direction of future revisions, and so the effects of a good news announcement on exchange rates and interest rates may be expected to be weaker than otherwise since markets expect that the deficit might be revised upwards in the future, possibly turning the good news into an eventual disappointment.

10. This delayed response to the news may not, however, imply inefficiency in the market for the 90-day rate since the market's response depends on what the perceived RBA's reaction to the news will be. At 9:30 am each business day the RBA's opening cash position and its dealing intentions for the day are announced by electronic means which then determines short-term, including the 90-day, interest rates (See Hill, 1993). Because the RBA does not have prior access to the news, the full extent of its reaction to the news is not revealed until 9:30 am the next morning. Therefore, Horizon 1 for the 90-day rate measures the market participants' expectation of the likely response by the RBA on the day following the announcement; thus the significant positive response in Horizon 2 may indicate that they underestimate the RBA's response on the announcement day and when they realize the extent of its adjustment on the following day, they revise their positions accordingly.

References

AGGARWAL, RAJ AND DAVID C. SCHIRM, 'Balance of trade announcements and asset prices: influence on equity prices, exchange rates, and interest rates,' *Journal of International Money and Finance*, February 1992, **11**: 80–95.

BANERJEE, A., J. DOLADO, J. W. GALBRAITH, AND D. F. HENDRY, *Co-integration, Error-correction, and the Econometric Analysis of Non-stationary Data*, New York: Oxford University Press, 1993.

DERAVI, KEIVAN, PHILIP GREGOROWICZ AND CHARLES E. HEGJI, 'Balance of trade announcements and movements in exchange rates,' *Southern Economic Journal*, July 1988, **55**: 279–287.

GOODHART, CHARLES A. AND RICHARD G. SMITH, 'The impact of news on financial markets in the United Kingdom,' *Journal of Money Credit and Banking*, November 1985, **17**: 507–511.

HARDOUVELIS, GIKAS A., 'Reserve announcements and interest rates: Does monetary policy matter?,' *The Journal of Finance*, June 1987, **42**: 407–422.

HARDOUVELIS, GIKAS A., 'Economic news, exchange rates and interest rates,' *Journal of International Money and Finance*, March 1988, **7**: 23–35.

HILL, M. R., 'Short-term money markets,' in M. K. Lewis and R. H. Wallace, eds, *The Australian financial system*, Melbourne: Longman Cheshire, 1993.

HOGAN, KED, MICHAEL MELVIN, AND DAN J. ROBERTS, 'Trade balance news and exchange rates: Is there a policy signal?,' *Journal of International Money and Finance*, March 1991, **10**: S90–S99.

INDECS, *Stage of Play 7: the Australian Economic Policy Debate*, Sydney: Allen and Unwin, 1992.

IRWIN, DOUGLAS A., 'Trade deficit announcements, intervention, and the dollar,' *Economics Letters*, April 1989, **31**: 257–262.

JÜTTNER, D. J. AND ROGER TONKIN, 'Intervention in foreign currency markets: a task for sisyphus?', Research Paper No. 353, School of Economics and Financial Studies, Macquarie University, Australia, 1992.

MACKINNON, JAMES, 'Critical values for cointegration tests,' in R. F. Engle and C. W. J. Granger, eds, *Long-Run Economic Relationships*, New York: Oxford University Press, 1002.

RESERVE BANK OF AUSTRALIA, *Report and Financial Statements*: 30 June 1989, June 1989.

WONG, JASON, 'The role of news in the Australian foreign exchange market,' Discussion Paper No. 88.19, Dept. of Economics Univ. of WA, 1988.