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Inflation news in Australia: its effects on exchange rates and interest rates

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The effects of the Australian quarterly inflation news on $A exchange rates and interest rates for the period June quarter 1984/85 to December quarter 1992/93 are investigated. The results indicate that the Australian dollar depreciated and interest rates rose as a result of an announcement of a higher than expected consumer price inflation before April 1988, and the dollar appreciated and interest rates rose thereafter. This difference in market response to the news is due to the different market perceptions regarding the role of monetary policy by the Reserve Bank of Australia (RBA). Prior to April 1988, an unexpected inflation caused markets to expect further future inflation. Post April 1988, an unexpected inflation was regarded as a signal for an impending tight monetary response by the RBA.

I. INTRODUCTION

This paper investigates the role of inflation news in Australian financial markets. More specifically, the effects of the quarterly announcements of Australian Consumer Price Index (CPI) changes by the Australian Bureau of Statistics (ABS) on financial prices are analysed.[1] Financial markets must make a prediction regarding the future announcement of inflation rates so as to determine current prices of assets, and so a significant effect of the announcement on financial prices must imply a significant deviation of announced inflation rate from market expectations. That is, the extent to which market expectations do not materialize constitutes news and the effects of this inflation news depend on market perceptions regarding economic policy makers' attitudes towards unexpected inflation.

The literature on inflation news begins with Goodhart (1985) who finds that a higher than expected UK retail price inflation causes the Pound to depreciated and interest rates to rise during the period January 1977 to December 1983. However, none of the estimated news coefficients is significant. The evidence for the US are provided in Urich and Watchel (1984), Hakkio and Pearce (1985), Ito and Roley (1987), Hardouvelis (1988), and Dwyer and Hafer (1989). An unexpected inflation seems to raise US interest rates, however, the news effect on them is not significant in general and neither is the effect on US dollar exchange rates. Thus, it would appear that inflation news does not have a robust effect on financial prices in the UK and in the USA.

The rest of the paper is organized as follows: the econometric methodology and the nature of data involved are discussed in Section II; the empirical evidence of the effects of inflation news are discussed in Section III; and summary and some concluding remarks are offered in Section IV.

II. METHODOLOGY AND DATA

Econometric model

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

$$\Delta P_t = a + b \cdot Exp_t + c \cdot News_t + u_t \qquad (1)$$

where

ΔP_t = changes in financial prices, namely the five Australian dollar exchange rates, and short- and long-term interest rates

Exp_t = expected inflation proxied by market survey by MMS

[1] Due to lack of space, details of the findings could not be included. However, interested readers may obtain the working paper version of the paper from the author, upon request.

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$News_t$ = inflation news measured as the absolute difference between the announced and expected consumer price inflation (if positive, it means a higher than expected inflation announcement).

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

If financial markets are informationally efficient and inflation news has a significant effect, we expect both a and b to be insigificantly different from zero, c to be statistically significant, and u_t to be a white noise; that is, only the unanticipated part of the inflation announcement should significantly affect financial prices since the expected part has already been discounted into current prices.

Data description

The sample period for the analysis is from June quarter 1984/85 to the December quarter 1992/93. The quarterly inflation figures, which are the percentage changes in the quarterly CPI figures, are published in the ABS quarterly CPI publication (Call No. 6401) which was released to the press at 9 am on the day of the announcement until the announcement of the figures for the December quarter 1988/89, and at 11:30 am afterwards. The medians of market survey for the announcements by Money Market Services (MMS) were used as the market expectations of the quarterly inflation announcements.

The exchange rates considered are the wholesale Australian dollar rates against the US dollar, the Deutsche Mark, the Japanese yen, the UK pound, and the Swiss franc. They are defined in foregin currency price terms so that an increase in the rates indicates an appreciation of $A. Changes in exchange rates are measured as the logarithmic difference between the closing rates on the day of the announcement and the closing rates on the day before the announcement for the 9 am announcements, and the logarithmic difference between the closing and opening rates on the day of the announcement for the 11:30 am announcements. The short-term interest rate is measured by the 90-day authorized 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 rate. Both interest rates are observable after the announcement. Changes in interest rates are measured as the absolute difference between the observed rates on the day of the announcement and the rates on the day before the announcement. 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 1. Except for the expected inflation series in the two subsamples, all series are found to be $I(0)$s. Despite being $I(1)$, the expected term is not dropped from Equation 1 in the two subsample regressions for consistency in comparison. This does not cause serious econometric problems since dropping it does not produce qualitatively different results.[2]

III. EMPIRICAL ANALYSIS

Table 2 summarizes the exchange rate estimation results for Equation 1. In the whole sample regressions, none of the estimated coefficients is significant and the diagnostics show no evidence of model inadequacy. None of the five exchange rates responded significantly to the inflation news. The effects of the news on interest rates are shown in Table 3. For the whole sample, both regressions show a significant interest rate response to the news at the 1% significance level, and the positive sign for the news coefficients implies that a 1% higher than expected inflation rate announcement raised the 90-day rate and the 10-year rate by 0.31 and 0.37 percentage points, respectively. The 90-day debt market shows some evidence of inefficiency since the expected term is significant at 5%. The results for the whole sample are consistent, in spirit, with the inflation risk hypothesis of Cornell (1983). The idea is that an unexpected inflation would raise the inflation risk premium on domestic currency denominated assets leading to a rise in long-term domestic interest rates, and the effects on short-term rates would be weaker than long-term ones since the degree to which they are exposed to the inflation risk is lower. The lack of exchange rate response is explained by invoking market efficiency and argue that the higher risk premium would already be incorporated in domestic real interest rates, and so exchange rates would not change because no capital inflow or outflow would occur.

If the sample included structural breaks that represent changed market perceptions regarding the impact of inflation news on financial prices, the whole sample regression results would be misleading since they would show the neutralized effects of different market reactions over the whole sample period. The structural break point may well be April 1988 when the Reserve Bank of Australia (RBA) began tightening monetary policy which had been expansionary up to that point. The sequential Chow test confirmed that there was a significant structural break around the announcement of the March quarter 1987/88 figures which was made on 4 May 1988. Accordingly, the sample was broken into two subsamples, the first from June quarter

[2] In addition, the estimated autocorrelation function of the series, after removing a linear trend, shows that autocorrelation is insignificant at all lags in both subsamples. Thus, considering the small number of observations available for unit root testing in each subsample (11 and 20 for subsample 1 and 2, respectively) and the insignificant autocorrelations, the expected inflation term may in fact be $I(0)$ in both subsamples.

Table 1. *Phillips–Perron Z(t)-test*[a]*: whole sample: June-85 quarter to Dec-92 quarter, 31 observations*

Data	*Act. Inf.*	*Exp. Inf.*	*Inf. News*	ΔUS	ΔDM	ΔJY	ΔUK	ΔSF	ΔSR	ΔLR	5% CV[b]
Trend	− 5.002	− 3.846	− 7.118	− 6.934	− 8.103	− 6.253	− 5.260	− 6.312	− 6.045	− 5.809	− 3.561
No trend	− 2.631	− 2.003	− 5.792	− 6.395	− 8.147	− 6.429	− 5.460	− 6.340	− 6.124	− 4.807	− 2.959
Lags[c]	2	1	2	4	4	4	4	4	2	3	
Conclusion	$I(0)$[d]	$I(0)$[d]	$I(0)$	$I(0)$	$I(0)$	$I(0)$	$I(0)$	$I(0)$	$I(0)$	$I(0)$	

Subsample 1: June-85 quarter to Dec-87 quarter, 11 observations
Subsample 2: March-88 quarter to Dec-92 quarter, 20 observations

	Subsample 1			Subsample 2		
Data	*Exp. Inf.*	*Inf. News*	5% CV	*Exp. Inf.*	*Inf. News*	5% CV[b]
Trend	− 3.202	− 4.740	− 3.927	− 3.112	− 9.762	− 3.659
No trend	− 2.804	− 4.695	− 3.180	− 1.631	− 5.002	− 3.020
Lags[c]	0	4		0	2	
Conclusion	$I(1)$	$I(0)$		$I(1)$	$I(0)$	

Act. Inf.: Announced Inflation as measured by the percentage change in quarterly CPI figure.
Exp. Inf.: Market expectation of inflation announcement.
Inf. News: Inflation news as measured by the absolute difference between the actual and expected inflation announcement.
US: \$US/\$A.
DM: Deutsch Mark/\$A.
JY: Japanese Yen/\$A.
UK: UK Pound/\$A.
SF: Swiss Franc/\$A.
SR: 90-day Australian authorized bank bill interest rate.
LR: 10-year Commonwealth of Australia government bond index rate.
Δ in *S*pot *E*xchange *R*ates: Logarithmic difference between the opening and closing wholesale rates on the day of inflation announcement.
Δ in *I*nterest *R*ates: Absolute difference between the closing rates on the day of inflation announcement and the closing rates on day before the announcement.

[a] All the unit root tested series have either positive or insignificant moving average terms. This implies that 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).
[b] Critical values are taken from tables derived by MacKinnon (1991).
[c] The number of truncation lag parameter is set as the highest significant lag order from either the ACF or PACF of the first differenced series.
[d] $I(0)$ since the trend is significant.

1984/85 to December quarter 1987/88 with 11 observations, and the second is from March quarter 1987/88 to December quarter 1992/93 with 20 observations.[3] In order to obtain more precise estimates of the coefficients, two dummy variables representing each subsample were introduced and estimations carried out utilizing all available observations. This is preferable to estimating the model separately for each subsample.

In subsample 1 estimations, the news coefficient is negative and significant at least at 5% in all cases except for the Japanese yen. On average, a 1% higher than expected inflation announcement depreciated the dollar by 1.7% on the day of the announcement. The significant expectations term for all the rates might be suggestive of market inefficiency. However, because of the small size of the sample it may not be possible to ascertain the true cause of the significance. In subsample 2, only the news coefficient is significant at 5% in all cases except for the UK pound rate, and the positive sign indicates that, on average, a 1% unexpected inflation appreciated the dollar against the five major currencies by around 0.84%. All the diagnostics show no evidence of model inadequacy and the test statistic for model stability is highly significant in all cases confirming the existence of one structural break.

[3] Another possible break is the loosening of monetary policy that began in January 1990, however, this turned out to be insignificant.

Table 2. $\Delta ER_t = a + b \cdot expected_t + c \cdot News_t + u_t$: *Whole sample: June-85 quarter to Dec-92 quarter, 31 observations*

	Sample	Constant	*Exp. Inf.*	*Inf. News*	R^2-Adj.	S.E.E.	SC[a]	Het[b]	Norm[c]	Reset[d]	$F_{(3,25)}$[e]
ΔUS	Whole	− 0.17E − 03	− 0.92E − 04	0.58E − 03	− 0.0707	0.0081	0.84	2.32	5.55	0.01	
(SE)		(0.38E − 02)	(0.24E − 02)	(0.43E − 02)			[0.359]	[0.127]	[0.062]	[0.905]	
	1	− 0.34E − 01**	0.16E − 01**	− 0.15E − 01*	0.4942	0.0056	1.02	0.36	0.38	0.42	11.42**
		(0.92E − 02)	(0.45E − 02)	(0.71E − 02)			[0.313]	[0.546]	[0.825]	[0.517]	[0.000]
	2	0.35E − 02	− 0.94E − 03	0.70E − 02*							
		(0.30E − 02)	(0.21E − 02)	(0.34E − 02)							
ΔDM	Whole	− 0.39E − 03	0.21E − 03	0.17E − 02	− 0.0639	0.0086	0.47	0.00	4.72	0.03	
		(0.40E − 02)	(0.25E − 02)	(0.45E − 02)			[0.495]	[0.962]	[0.094]	[0.0861]	
	1	− 0.29E − 01**	0.14E − 01**	− 0.21E − 01**	0.5065	0.0059	1.64	0.77	0.28	0.26	11.79**
		(0.97E − 02)	(0.47E − 02)	(0.74E − 02)			[0.200]	[0.381]	[0.869]	[0.610]	[0.000]
	2	0.35E − 02	− 0.77E − 03	0.94E − 02*							
		(0.31E − 02)	(0.22E − 02)	(0.35E − 02)							
ΔJY	Whole	− 0.13E − 03	0.51E − 03	0.24E − 02	− 0.0513	0.0081	1.44	1.76	5.47	0.16	
		(0.38E − 02)	(0.23E − 02)	(0.43E − 02)			[0.230]	[0.185]	[0.065]	[0.693]	
	1	− 0.38E − 01**	0.19E − 01**	− 0.11E − 01	0.4694	0.0057	0.78	0.30	0.13	0.56	10.16**
		(0.94E − 02)	(0.46E − 02)	(0.73E − 02)			[0.376]	[0.587]	[0.935]	[0.456]	[0.000]
	2	0.49E − 02	− 0.20E − 02	0.89E − 02*							
		(0.30E − 02)	(0.22E − 02)	(0.34E − 02)							
ΔUK	Whole	− 0.18E − 02	0.13E − 02	− 0.34E − 03	− 0.0624	0.0097	0.09	3.78	3.45	0.22	
		(0.45E − 02)	(0.28E − 02)	(0.51E − 02)			[0.769]	[0.052]	[0.178]	[0.769]	
	1	− 0.36E − 01**	0.17E − 01**	− 0.22E − 01*	0.4201	0.0072	0.12	0.41	0.77	0.09	8.76**
		(0.12E − 01)	(0.58E − 02)	(0.91E − 02)			[0.728]	[0.524]	[0.682]	[0.770]	[0.000]
	2	0.24E − 02	0.22E − 03	0.75E − 02							
		(0.38E − 02)	(0.28E − 02)	(0.43E − 02)							
ΔSF	Whole	− 0.56E − 06	− 0.82E − 04	0.15E − 02	− 0.0671	0.0091	0.13	0.01	5.12	0.54	
		(0.42E − 02)	(0.26E − 02)	(0.48E − 02)			[0.722]	[0.928]	[0.077]	[0.462]	
	1	0.33E − 01**	0.16E − 01**	− 0.18E − 01*	0.4329	0.0066	1.01	0.17	0.66	0.15	9.23**
		(0.11E − 01)	(0.53E − 02)	(0.84E − 02)			[0.315]	[0.680]	[0.720]	[0.698]	[0.000]
	2	0.40E − 02	− 0.12E − 02	0.89E − 02*							
		(0.35E − 02)	(0.25E − 02)	(0.40E − 02)							

$\Delta ER_t = a_1' D_{1t} + a_2' D_{2t} + b_1' Exp_t \cdot D_{1t} + b_2' Exp_t \cdot D_{2t} + c_1' News_t \cdot D_{1t} + c_2' News_t \cdot D_{2t} + u_t$
where: $D_{1t} = 1$ for $i \leqslant 11$, and 0 otherwise,
$D_{2t} = 0$ for $i \leqslant 11$, and 1 otherwise
Subsample 1: June-85 quarter to Dec-87 quarter, 11 observations
Subsample 2: March-88 quarter to Dec-92 quarter, 20 observations

* Significant at the 5% level.
** Significant at the 1% level.
Numbers in square brackets are *p*-values.
[a] Breusch–Godfrey LM test of Serial Correlation, asymptotically distributed as $\chi^2(1)$.
[b] LM test of heteroskedasticity based on the regression $\hat{e}^2$ on χ's, asymptotically distributed as $\chi^2(1)$.
[c] Bera–Jarque LM Normality Test, asymptotically distributed as $\chi^2(2)$.
[d] LM version of Ramsey's RESET Misspecification Test, asymptotically distributed as $\chi^2(1)$.
[e] Test statistic for the hypothesis of no structural break, H_0: $a_1' = a_2'$, $b_1' = b_2'$, and $c_1' = c_2'$.

Table 3. $\Delta IR_t = a + b \cdot Expected_t + c \cdot News_t + u_t$: *Whole sample: June-85 quarter to Dec-92 quarter, 31 observations*

	Sample	Constant	*Exp. Inf.*	*Inf. News*	R^2-Adj.	S.E.E.	SC[a]	Het[b]	Norm[c]	Reset[d]	$F_{(3,25)}$[e]
ΔSR	Whole	0.1018	− 0.0904*	0.3059**	0.4226	0.12	1.54	1.03	5.92	1.82	
(SE)		(0.0559)	(0.0349)	(0.0633)			[0.215]	[0.310]	[0.052]	[0.177]	
	1	0.1025	− 0.1087	0.4083*	0.3964	0.1225	1.55	1.01	7.24*	0.19	0.59
		(0.2021)	(0.0988)	(0.1557)			[0.214]	[0.314]	[0.027]	[0.660]	[0.624]
	2	0.0671	− 0.0528	0.2721**							
		(0.0650)	(0.0471)	(0.0736)							
ΔLR	Whole	0.0110	0.0100	0.3708**	0.4083	0.16	0.00	0.12	0.49	0.00	
(SE)		(0.0763)	(0.0476)	(0.0863)			[0.961]	[0.733]	[0.782]	[0.966]	
	1	0.1836	− 0.0508	0.6030**	0.5095	0.1489	0.80	0.72	1.13	0.02	2.93
		(0.2455)	(0.1200)	(0.1892)			[0.371]	[0.398]	[0.569]	[0.891]	[0.053]
	2	0.0227	− 0.0372	0.3164**							
		(0.0790)	(0.0572)	(0.0894)							

$\Delta IR_t = a_1' D_{1t} + a_2' D_{2t} + b_1' Exp_t \cdot D_{1t} + b_2' Exp_t \cdot D_{2t} + c_1' News_t \cdot D_{1t} + c_2' News_t \cdot D_{2t} + u_t$
where: $D_{1t} = 1$ for $i \leqslant 11$, and 0 otherwise,
$D_{2t} = 0$ for $i \leqslant 11$, and 1 otherwise
Subsample 1: June-85 quarter to Dec-87 quarter, 11 observations
Subsample 2: March-88 quarter to Dec-92 quarter, 20 observations

* Significant at the 5% level.
** Significant at the 1% level.
Numbers in square brackets are *p*-values.
[a] Breusch–Godfrey LM test of Serial Correlation, asymptotically distributed as $\chi^2(1)$.
[b] LM test of heteroskedasticity based on the regression e^2 on χ's, asymptotically distributed as $\chi^2(1)$.
[c] Bera–Jarque LM Normality Test, asymptotically distributed as $\chi^2(2)$.
[d] LM version of Ramsey's RESET Misspecification Test, asymptotically distributed as $\chi^2(1)$.
[e] Test statistic for the hypothesis of no structural break, H_0: $a_1' = a_2'$, $b_1' = b_2'$, and $c_1' = c_2'$.

The subsample estimations for interest rates show that the results are fundamentally the same as the whole sample estimations; both interest rates responded significantly to the news, and the positive news coefficients indicate that in response to a 1% unexpected inflation, short- and long-term interest rates rose by 0.41 and 0.60 percentage points, respectively, in subsample 1, and 0.27 and 0.32 percentage points, respectively, in subsample 2. Although the response of the long-term rate is larger than that of the short-term rate the difference is statistically significant in all three sample periods.[4]

In subsample 1, the estimated negative response of exchange rates and the positive response of interest rates to a higher than expected inflation rate annnouncement is consistent with the idea that markets would respond to an unexpected inflation by adjusting future inflation expectations upwards leading to a spot exchange rate depreciation and a rise in a nominal, and not real, interest rates. In subsample, 2 the evidence suggests that an unexpected inflation signals a future tight monetary response by the RBA. This is because one of the policy objectives of the government in the late 1980s and early 1990s was to achieve and keep a low level of inflation since it was perceived that lower inflation could provide an economic environment in which the balance of payment situation could improve and the economic recovery from the early 1990s recession continue. Thus, an unexpected inflation raised the real and nominal interest rates and appreciated spot exchange rates. Also, the response of the long-term interest rate, which is as large as that of the short-term one, might imply that the increase in the inflation expectation was perceived to be relatively permanent in subsample 1 and that the liquidity effect of tight monetary policy was expected to be long lived in subsample 2.

IV. SUMMARY AND CONCLUSIONS

The effects of the quarterly Australian consumer price inflation news on five Australian dollar exchange rates and on short- and long-term interest rates have been investigated. The evidence suggests that market reactions to the news are different depending on the time period considered. For the sample as a whole, a higher than expected inflation caused both interest rates to rise but the effects on exchange rates were insignificant. However, the tightening of monetary policy that began in April 1988 meant that market perceptions regarding the RBA's likely monetary policy response to the inflation news and the likely effects of the news on exchange rates and interest rates changed around that time. Therefore, the empirical results for the sample as a whole are misleading.

Prior to April 1988, monetary conditions were easy, especially after the October 1987 share market crash, and the unemployment rate was relatively high. Thus, there was no case for expecting a tight monetary response by the RBA to an unexpected inflation. A higher than expected inflation announcement apparently raised the nominal interest rates through stimulating the inflation expectations leading to an exchange rate depreciation.

After April 1988, the relatively low rate of unemployment in the late 1980s meant that the costs of implementing a fight-inflation policy on the unemployment front was not substantial, and the need to have a low inflation rate necessitated that monetary conditions be tightened. As a direct consequence of this recent success in tackling inflation with tight monetary policy the inflation expectations have been gradually reduced over the sample period and the easing of monetary policy in January 1990 was not met with a concern for the return to a higher inflation environment. On the basis of this, it is not surprising to find support for the anticipated tight monetary policy hypothesis is subsample 2. A higher than expected inflation announcement was expected to be followed by a tightening in monetary conditions leading to a rise in real, and thus nominal, interest rates and an appreciation of exchange rates.

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