WHAT MOVES YIELDS IN AUSTRALIA?

Frank Campbell and Eleanor Lewis

Abstract

In this paper, we measure how the fixed-interest market in Australia assesses and responds to new economic information. We use high-frequency data, precise announcement times and market-based forecasts to measure the reaction of bill and bond yields to news. The period covered is from January 1994 to September 1997. We find that announcements about US economic news have had a large impact on yields in Australia – especially bond yields. Of the domestic announcements, the market responds to: monetary policy announcements, the CPI, the labour force and AWOTE, as well as a range of other economic statistics. We also find that the fixed-interest market seems to distinguish between the information contained in different economic announcements and that traders systematically respond to the size and direction of any unanticipated component of these announcements. The results suggest that the market perceives that information on prices, employment and wages is more important in the Reserve Bank's decisions about monetary policy than are other indicators of economic activity. Taken in sum, the results also suggest some consistency of response to news in the fixed-interest market in Australia.

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1.   Introduction

At the broadest level, asset prices and interest rates are determined by saving and investment, and the return on capital. These, in turn, depend to an important extent on underlying economic conditions and expectations about economic performance. Thus, news which influences these expectations can influence prevailing yields, as investors adjust their portfolios in response to any reassessment about the economic outlook. This paper examines how the arrival of new information affects yields for short- and long-term securities in Australia. We identify *ex ante* what information might be expected to affect interest rates, and measure announcement effects associated with the release of this information. The analysis is based on high-frequency data for market yields, and precise release times for relevant announcements. The focus is the regular stream of macroeconomic indicators as well as policy announcements.[1]

The paper does not seek a general explanation of interest rate behaviour. We simply attempt to measure how the fixed-interest market in Australia assesses and reacts to new economic information, the release of which is known in advance and the content of which can be forecast. We acknowledge that the market might respond to other economic and financial information or announcements – for example, an unforeseen move in the exchange rate or in bond yields abroad, or, say, an announcement by a rating agency. The current exercise is, nevertheless, of interest since it helps describe how Australian markets respond to an important set of economic information. It also sheds light on whether traders tend to react in a 'rational' way to new information – that is, are their responses in accordance with generally accepted views about how the economy and monetary policy work? Put

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[1] The paper parallels the approach taken by Fleming and Remolona (1997), of the Federal Reserve Bank of New York, who examined the announcement effects of new information on 5-year bond prices in the United States. The current study extends Fleming and Remolona's approach to search for effects on short-term yields (90-day bills) as well as long-term yields (10-year bonds).

differently, if these reactions were physical phenomena, it would be reassuring to find that they were consistent, say, with Newton's laws rather than chaos theory. The Australian case might also be of more general interest since, although the market is relatively small in global terms, it is open, active and highly deregulated.

The paper examines developments over the period from January 1994 to September 1997. This period is determined primarily by data availability but is also of interest because it was marked by a number of phases in interest rates. As well as investigating what news has been important for the period as a whole, we examine whether market reactions to particular items of news have varied between these different phases.

The paper is arranged along the following lines: Section 2 contains a brief description of how the literature on this topic has developed; Section 3 defines the data, episodes and news that are of interest; the relative influence of local and overseas news on Australian yields is discussed in Section 4; Section 5 refines the estimates for Australian news; and Section 6 draws some conclusions.

2.   Explaining Market Movements

The *efficient market hypothesis* suggests that asset prices reflect all available information and react only to unanticipated news that might be expected to affect fundamental asset values.[2] Investors and portfolio managers make decisions on the basis of expectations about performance over the term of their investments, and constantly seek new information that confirms, or challenges, existing assessments. The steady stream of news about the economy and financial conditions provides investors with a basis for comparing expectations against reality as it unfolds. Since policy settings are also likely to influence economic performance, policy announcements themselves are likely to affect returns on assets, especially financial assets.

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[2] There are three versions of the *efficient market hypothesis*: weak; semi-strong; and strong. These versions differ by their notions of what is meant by the term 'all available information'. For more detailed definitions of these versions, see Bodie, Kane and Markus (1993).

The arrival of new information can affect different markets in different ways. Fleming and Remolona (1997) note that the effect of new information on share prices has been difficult to quantify in most studies. They consider that this is because information about macroeconomic developments can have ambiguous implications for share prices: an upward revision to expected real activity, for example, would raise the expected cash flow for a stock (via increased dividend payments), thereby increasing its present value; but it would also increase the discount rate, which would tend to have an offsetting effect. The net effect on share prices would depend on whether the cash flow effect dominated the discount rate effect, or vice versa. Hardouvelis (1988) argues that some information, for example about inflation, could, in the short term, have similarly ambiguous effects on exchange rates.[3]

By contrast, cash flows from fixed-interest securities (coupon payments) are set in nominal terms, and are, therefore, independent of revisions to expectations about economic activity. Upward revisions to expected economic growth (which led to higher inflationary expectations) would be fully, and unambiguously, reflected as a fall in the price of a fixed-interest asset via an increase in the discount rate. Thus, 'announcement effects' from unexpected macroeconomic news might be more readily identified in fixed-interest markets than in share markets or in foreign-exchange markets.

Fleming and Remolona survey the evidence from a number of studies of announcement effects on the US bond market; some of these studies are based on *daily* data, with announcements measured exclusively in terms of their surprise element, i.e. deviations of published estimates from market expectations (measured in a variety of ways). The announcements most frequently cited as significant for bond prices in the US have been those for the money supply, industrial production, the Producer Price Index, the Consumer Price Index, the unemployment rate and non-farm payroll employment.

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[3] In Australia, de Brouwer and Ellis (1998) suggest that inflation surprises tend to lead to an appreciation of the exchange rate. This conclusion is based on estimating long-term behavioural relationships rather than on the search for virtually instantaneous market reactions – the approach in the current paper and earlier work from which it draws.

The evidence also points to a 'flavour-of-the-month' effect; i.e. some announcements seem to be in fashion for a time, before losing the market's attention. For example, without pre-empting the later discussion, the market reaction to the release of current account data in Australia has varied over the years. This may be more than a mere change of fashion; it may reflect genuine policy content such as a change in the monetary policy regime or better understanding of the policy regime. In the US, money supply announcements have declined in significance in studies conducted since the mid 1980s, a period in which the importance of financial aggregates as a guide to monetary policy progressively diminished.

Studies using *intra-day* price data have found a wider range of announcements to be significant, including announcements of changes in monetary policy by the Fed (Fleming and Remolona 1997), a practice introduced in 1994.[4] Fleming and Remolona find that market participants distinguish between announcements which contain inherently different information, irrespective of any surprise content, although they find that the magnitude of any surprise enhances the estimates of 'announcement effects' on bond prices. Urich and Wachtel (1981) had earlier concluded that survey data of market expectations (of the kind Fleming and Remolona use) were biased, or did not contain all available information. When expectations were modelled as an ARIMA process they found a stronger effect from the unanticipated element of news. We, following Fleming and Remolona, base our study on survey information because market participants are more likely to respond on the basis of their in-house economists' views, or from consensus forecasts, rather than from a more mechanical approach such as an ARIMA process.

3. Data, Episodes and News

3.1 Data

The data used for interest rates in this study are the yields on futures contracts for 90-day bank bills and 10-year bonds, which trade on the *Sydney Futures Exchange* (SFE). These data are for the 'next' contract to be delivered, which is a very close substitute for the underlying spot instrument, i.e. physical 90-day bank bills and

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[4] This practice was introduced in Australia in 1990, as discussed in Battellino, Broadbent and Lowe (1997), who also discuss market reactions to monetary policy announcements.

physical 10-year Treasury bonds. The markets in these instruments on the SFE are deep and liquid, and provide reliable readings for relevant yields.

The SFE has made available timed tick-by-tick readings of bill and bond yields, which are the basis of the current study.[5] The floor of the SFE opens for trading in these contracts at 8.30 am each day, and closes at 4.30 pm.[6] Accordingly, almost-continuous readings on yields are available between these times for the period of the study. We measure observations at intervals of five minutes throughout the day, although, since announcements typically occur on the stroke of the half-hour, each observation is taken as the first 'tick' in the minute immediately preceding the regular five-minute interval, to avoid missing any of the reaction of yields to news.[7]

3.2   Episodes

The starting point for the study is determined primarily by data availability: the tick-by-tick readings are available from 1993 but the coverage of the data-set on market expectations of economic statistics (discussed below) deteriorates noticeably as the period is extended much before January 1994. We conclude the study at end September 1997. For purposes of looking for 'flavour-of-the-month' effects, we divide the period between January 1994 and September 1997 into three episodes, each of 15 months duration:

- the first dates from the start of January 1994 to end March 1995;

- the second is from the beginning of April 1995 to end June 1996; and

- the third is from the beginning of July 1996 to end September 1997.

As shown in Figures 1 and 2, a casual observer might characterise these periods in terms of some simple stylised facts: the first episode was dominated by a savage

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[5] Tick-by-tick means that a reading of yield is available for every trade carried out in these contracts over the period of the study.

[6] The trading floor is closed between 12.30 pm and 2.00 pm each day.

[7] For example, we measure the movement in yields, say, for the period from 11.30 am to 11.35 am as the movement from the first 'tick' at 11.29 am to the first 'tick' at 11.34 am.

Figure 1: US Interest Rates and Australian Bond Yield
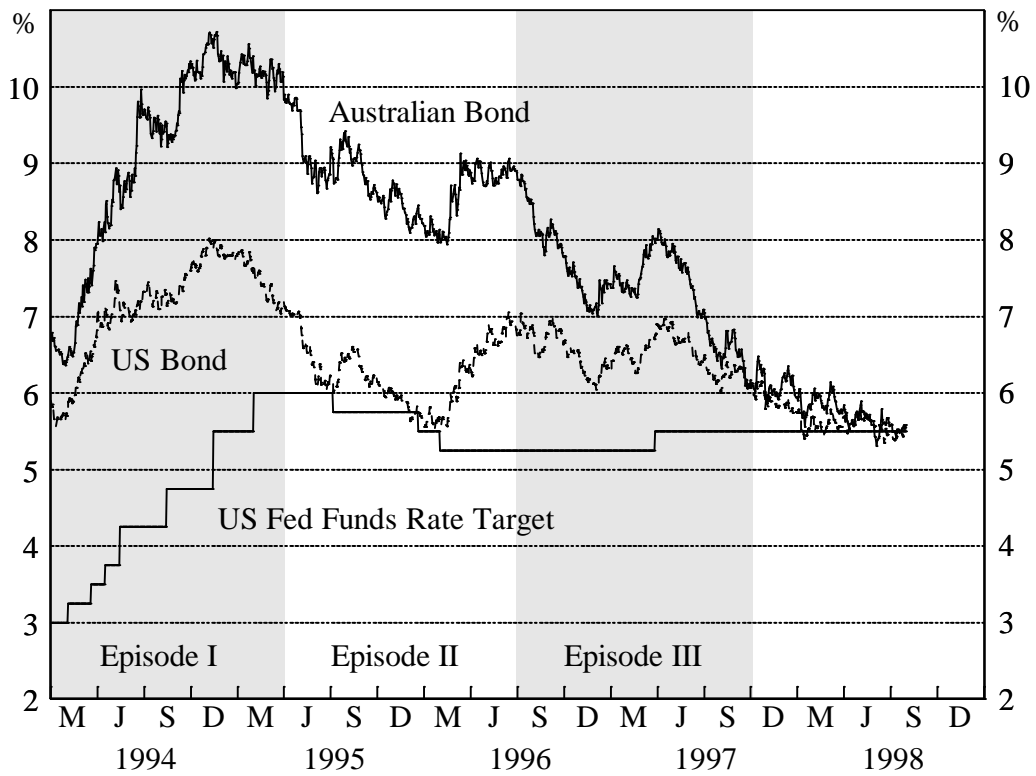
Figure 2: Interest Rates in Australia
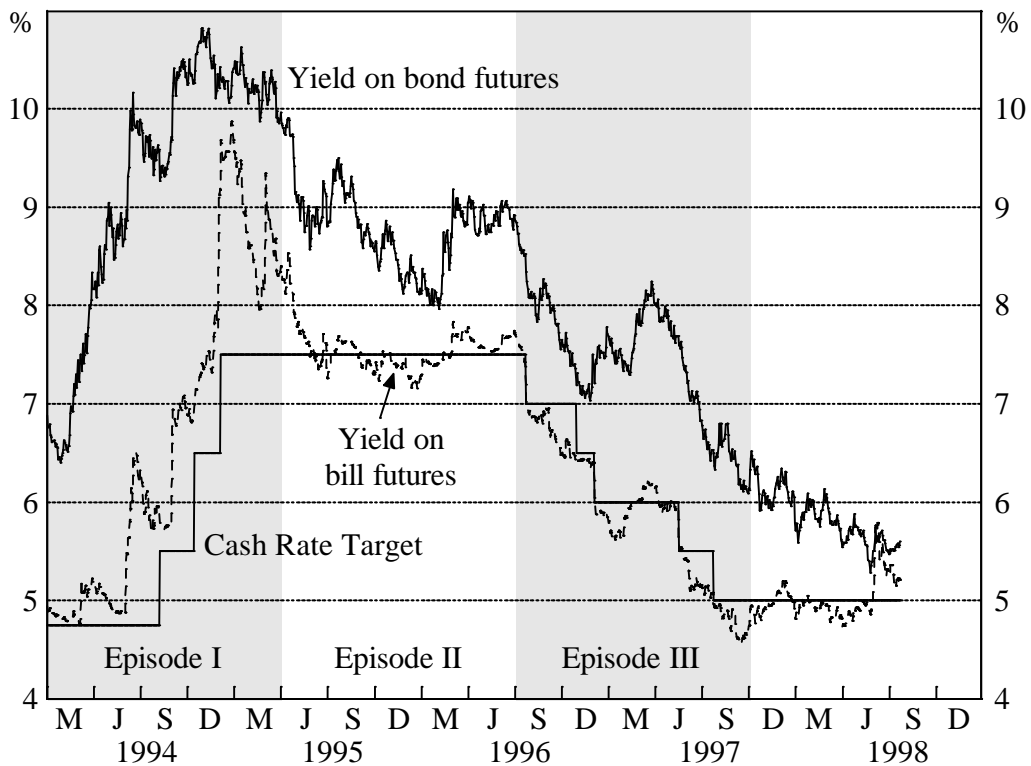
bear market; the second was initially a correction to earlier overshooting and subsequently a return to a measure of stability; while the third saw a rally in fixed-interest markets based on growing confidence that low inflation had returned globally.

The global bear market was triggered by the Fed's move to tighten monetary policy in early February 1994 in its pre-emptive strike against inflation (Figure 1). In Australia, the Reserve Bank tightened monetary policy in the second half of 1994, as reflected in the rise in the target cash rate; the sequence of moves was widely anticipated by the market, with the bill yield moving above the policy rate some time before the first (and each subsequent) tightening (Figure 2). After the third tightening in Australia in 1994, the market overshot, pricing further large tightenings into bills.

In the second episode, monetary policy was unchanged in Australia (Figure 2). But bill yields remained above the level of the target cash rate for some considerable period after the last move in the tightening phase. Once the bill yield eventually returned to the target cash rate, however, it oscillated around this level for the next year or so. At various times in this period, markets moved to price in small easings or tightenings according to the run of news. Bond yields in Australia moved down for most of the period before they rose from March 1996, initially on uncertainty about the outcome of the federal election, and subsequently on an upward revision to forecasts of the budget deficit. These trends in yields in Australia again were not dissimilar to those in the United States.

The third episode was characterised by falling bond yields globally as fears of inflation receded around the world. Monetary policy was eased in Australia (in five steps each of half a percentage point) as inflation declined and confidence rose that low inflation could be sustained. The extent to which markets moved ahead of these monetary policy adjustments was less marked than in 1994. In the instances in which a change in policy had not been fully anticipated, bill yields adjusted to reflect the new stance of monetary policy virtually as soon as the policy change was announced. Short-term interest rates generally hewed much closer to the policy target during this easing phase, rather than overshooting to the extent evident in the first episode.

3.3   News

What information is likely to be relevant for movements in interest rates? Hardouvelis (1988) argues that newly arriving information can affect interest rates through two channels – either through revisions to expectations about the setting of monetary policy, which he shows can dominate movements in short-term interest rates, or through revisions to expectations about inflation, which might dominate long-term interest rates. Since announcements about monetary policy are now explicit in a number of countries, including Australia, such announcements might also be important. Edison (1997) argues that information about economic activity as well as inflation is likely to be important because it can affect interest rates either directly, by influencing inflationary expectations, or indirectly, by encouraging expectations that such news might prompt the monetary authorities to adjust interest rates.

Bill yields are likely to be heavily influenced by expectations about the near-term setting of monetary policy. These expectations might be revised in response to news[8] about monetary policy itself or, more often, about other economic announcements that might influence the policy setting. On the other hand, bond yields might be expected to reflect longer-term influences. While temporary changes in monetary policy might be expected to have a smaller effect on bond yields than on bill yields, markets can never be certain about how temporary a change in monetary policy will turn out to be. Simple correlations also suggest that there is a tendency for bill and bond yields to move broadly in parallel. In practice, therefore, short-term and long-term factors are difficult to disentangle, especially since portfolio performance might be measured (and published) with a frequency as high as monthly. For these reasons, as discussed below, the list of news items tested for bond yields is the same as for bill yields.

As noted, in the spirit of Fleming and Remolona (1997), the current study identifies – in advance – the news items that might be expected to affect both yields, rather than adopting the approach of identifying individual large movements in these yields and then looking for 'causal' items of news.

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[8] 'News' in the economic literature is generally defined as the unanticipated information contained in any announcement. This convention is followed in the current study.

The announcements which are the focus of this paper fall into three categories:

(i)   announcements about, and official commentary on, monetary policy;

(ii)   statistical releases on inflation, wages and economic activity likely to be perceived by investors as affecting the policy, inflation or economic outlook; and

(iii)   some statistical releases, such as for the balance of payments and financial aggregates, which have not recently figured prominently in discussion about monetary policy but which are perceived as having been important in the past.

We also investigate, to a limited extent, whether the Commonwealth Budget speech has an announcement effect.

As to the first category, the following announcements are investigated:

- the Bank's monetary policy announcements; and

- the Bank's regular report on *The Economy and Financial Markets* (including, since May 1997, the Governor's *Semi-Annual Statement on Monetary Policy* to the House of Representatives Standing Committee on Financial Institutions and Public Administration) and speeches by Governors.

- In addition, the Bank's Board meets once a month, on a timetable well known to the market, to consider monetary policy. Given normal routines, the first opportunity for the Bank to announce a change in policy after a Board meeting is at 9.30 the next morning, when it announces its dealing intentions for that day. Even though fewer than half of the policy announcements since January 1990 have occurred on this schedule, the market sometimes looks for such announcements at this time, especially during periods of heightened uncertainty. A routine statement of the Bank's dealing intentions, with no accompanying policy announcement, can itself be 'news', since it would flag that policy is on hold, if only for that day. In the empirical tests discussed in Section 5, we therefore examine whether the announcement of the Bank's dealing intentions on the day after Board meetings contains market-moving information. As to timing

of the Bank's commentary and Governors' speeches, we assume the main messages are transmitted from the time of their official embargo.

On the second group of announcements, the items of particular interest are those related to inflation and, more importantly, the formation of inflationary expectations. The *Consumer Price Index (CPI)* and measures of *wages* are vital. Currently, the most widely observed measure of wages in Australia is average earnings of full-time employees working a standard week (*AWOTE*).

As discussed, indicators of economic activity can also have implications for interest rates. Since no single measure of activity is adequately comprehensive or timely, we look for effects from:

- *employment* as the most timely major indicator of the state of the economy each month, and of intrinsic interest for policy;

- *retail trade* which provides relatively timely information on the largest single component of spending each month;

- the monthly release on local government *building approvals*, a leading indicator of housing investment, which can have a major influence on the economic cycle;

- the monthly release on *merchandise imports* which can provide an early reading on the tempo of domestic spending or on possible developments in the balance of payments; and

- the quarterly *GDP* release which, although the least timely of these indicators, is the most comprehensive measure of economic activity.

On the third set of announcements, a view held by some is that, from time to time, the stance of monetary policy has been determined by pressures on Australia's

balance of payments, specifically the deficit on the current account.[9] While the current account is not an objective of monetary policy, the belief that it is might still linger in some quarters. Moreover, it could be argued that the financing of the current account deficit could affect the risk premium on bonds, or that unexpected deterioration in it would lead to expectations of a depreciation of the Australian dollar and perhaps to higher interest rates. Also, between 1976 and 1985, monetary targeting was a feature of the monetary policy framework in Australia. While this regime has long since been abandoned, it might still be the case that financial markets regard financial aggregates as containing useful information about the outlook for interest rates. For these reasons, we investigate the announcement effects on bill and bond yields of monthly news on the *balance of payments* and *financial aggregates*.

'Unanticipated' information is calculated as the difference between the information as published and the *median* market forecast. For the first two episodes, median market forecasts were obtained from a survey of about 30 market economists conducted by *Dow Jones* the week before the release of each statistic.[10] For the third episode, the median forecasts were obtained from a similar survey carried out by *Reuters*. For monetary policy announcements, the unanticipated element is measured as the difference between the 30-day bill yield at noon the day before a policy change was announced and the new cash rate target after the policy announcement.

The news releases examined for market-moving influences are summarised in Table 1, with their frequency, normal time of release, and the approximate publication lag after the end of the reference period. We use the first-published (i.e. unrevised) estimates since these are the estimates to which markets initially respond.[11] All of the statistical news and monetary policy announcements are

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[9] The Australian Bureau of Statistics ceased publishing monthly estimates of the current account deficit in December 1996, and began publishing monthly figures on the balance on goods and services. Before January 1997, we use the figures for the current account deficit; thereafter, we use those for the balance on goods and services.

[10] A gap in these forecasts for AWOTE was kindly filled by *BT Economics* providing consensus market forecasts from their records.

[11] Markets can also respond to revisions to significant items of news, especially if these are released separately from preliminary estimates for subsequent time periods. In Australia's case, this mainly affects AWOTE. We have not investigated the effect of announced revisions.

released while the floor of the SFE is open for trading. Fiscal policy statements are usually an evening affair but the floor of the SFE opens for the Budget speech from around 7.00 pm to 8.15 pm.

Table 1: News Releases

Announcement	Frequency	Release time (am)	Approximate lag to reference month or quarter (weeks)
Monetary policy announcements	intermittent	9.30	–
RBA economic commentary	quarterly	(a)	–
– Governors' speeches	intermittent	variable	
RBA post-Board dealing intentions	monthly	9.30	–
Consumer price index (CPI)	quarterly	11.30	3–4
Avergage weekly ordinary time earnings (AWOTE)	quarterly	11.30	3–4
Employment	monthly	11.30	1–2
Retail trade	monthly	11.30	4–5
Building approvals	monthly	11.30	4–5
Imports	monthly	11.30	2–3
Gross domestic product (GDP)	quarterly	11.30	9–10
Balance of payments	monthly	11.30	4–5
Financial aggregates	monthly	(b)	4–5
Fiscal policy statements	intermittent	variable	–

Notes: (a) The report on *The Economy and Financial Markets* is released in the Bank's *Bulletin* at 3.00 pm; the *Semi-Annual Statement on Monetary Policy* for May 1997 was embargoed until 10.00 am; that for November 1997 was embargoed until 10.15 am.
(b) The Reserve Bank's *Financial Aggregates* media release was issued at 9.30 am until December 1996, when – to bring it into line with the practice of the Australian Bureau of Statistics – the Bank began to issue this media release at 11.30 am.

The items of news in Table 1 are carried by all of the major screen services virtually instantly at the time of their planned publication. The Australian Bureau of Statistics (ABS) and the Reserve Bank of Australia – the authorities responsible for their publication – are highly conscious of their market sensitivity and ensure that their public release occurs precisely on schedule. Monetary policy announcements aside, the timing of the release of each of these items is publicised in advance in regularly

issued publication schedules. Monetary policy announcements and the Bank's daily dealing intentions always appear at 9.30 am; given their nature, no schedule of monetary policy announcements is possible.

A summary of the frequency of news is contained in Table 2.

Table 2: Summary Statistics on News Releases

	Episode I	Episode II	Episode III	Whole period
Number of news items	121	122	127	370
Number of days with news	90	98	101	289
Number of days with no news	222	211	213	646

Taking the period as a whole, there were 370 items of news, on 289 days, leaving 646 days when no announcements were made.

4. A Diversion: International Influences

The news in Table 1 all hits the screens during the domestic trading day, which is the focus of this paper. Australia, however, is highly integrated with the global financial system, being completely open to international capital flows: Australia has a deregulated financial system, a floating exchange rate and no exchange controls. Consequently, Australian financial markets are potentially exposed to the gamut of influences on international capital flows and to any news likely to move major overseas markets.

While the important overseas news from the United States and Europe is almost always released when Australian markets are closed, yields on Australian securities can respond directly to such news since the SFE's bill and bond futures contracts are traded overnight on SYCOM, the SFE's electronic trading system.[12] Thus, by executing trades on SYCOM, traders of the 10-year bond futures contract in Australia, for example, can (and do) react as soon as, say, US non-farm payrolls data appear on screens in New York. In the first instance, such a reaction is almost

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[12] SYCOM is the Sydney Computerised Overnight Market, which is a computerised trading system open between 4.40 pm and 6.00 am Eastern Standard Time (7.00 am Eastern Daylight Saving Time) for trading in futures and options contracts on a number of financial instruments.

always a 'reflex' response to any move in US yields at the time of this news. More generally, however, the close links between the Australian and US economies, including the well-documented similarity in the respective business cycles, mean that US news may contain information fundamentally relevant for changes in Australian interest rates.

Tick-by-tick readings for bill and bond yields from overnight trading on SYCOM are available. But overnight trading lacks the breadth of participation of daytime trading and volumes on SYCOM are much lower than during the day. Accordingly, movements in Australian yields on SYCOM might be less reliable than those recorded during the day. For this reason, we have not made use of the high-frequency overnight readings but have adopted a different, somewhat less precise, approach to estimating the effect on domestic yields of major releases of US news.

This approach involves dividing the 24-hour period into two parts: the daylight session between 8.30 am and 4.30 pm when the floor of the SFE is open for trading, and the overnight session (from 4.30 pm to 8.30 am the next day) when any movement in yields would occur on SYCOM. We then estimate a pooled regression, with the absolute change in yields during both the daylight and overnight sessions regressed on two dummy variables (Equation 1 below). The first dummy variable takes a value of 1 during the daylight session on days when any of the announcements in Table 1 are made, and 0 otherwise (that is, it takes a value of 1 in the daylight session when there is 'domestic' news). The second dummy variable takes a value of 1 during the overnight session on days when US economic announcements are made, and 0 otherwise.

The overnight dummy variable is defined for the US economic announcements which Fleming and Remolona (1997) found to have an important effect on US bond prices. These are (in descending order of importance): non-farm payrolls, the Producer Price Index, Fed monetary policy announcements, retail sales, the Consumer Price Index, the National Association of Purchasing Managers' (NAPM) index, industrial production and GDP.[13]

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[13] The size of the announcement effect of individual items of US news on Australian yields would, presumably, be highly correlated with the effect on US yields. We exclude some financial information also found to have an effect on US bond yields, such as the

We also include two synthetic variables in the regression to capture any relationship between the movement in yields during a particular trading session and the movement in yields in the preceding session. For example, although Australian yields respond to US news during the overnight session, there is sometimes a 'second round' effect when Australian markets open the next morning, as local traders assimilate the US news. Similarly, when markets in the US open, traders may respond to the movement in yields during the daylight session in Australia.

$$|Y_{ns}| = a_o + b_1 D_{ns_1} + b_2 D_{ns_2} + b_3 S_1 + b_4 S_2 + e_{ns} \tag{1}$$

where:

$|Y_{ns}|$ is the absolute change in yields on day n for both the daylight and overnight trading sessions, s; where s_1 = daylight session and s_2 = overnight session.

$S_1 = |Y_{ns_2}|_{-1}$ in the daylight session, 0 in the overnight session.

$S_2 = |Y_{ns_1}|_{-1}$ in the overnight session, 0 in the daylight session.

In this section, the focus is on US economic announcements, since experience shows that they consistently affect global markets, whereas European statistical news has a more isolated incidence. Regular economic announcements from Asia often occur during the trading day in Australia but rarely had much effect on Australian markets in the period being reviewed. Over the period, there were 285 days when local announcements were made and 242 days when US announcements were made.

The important difference between the approach undertaken in this section and that in the following section is that the absolute value of daylight and overnight changes in Australian bill and bond yields are, respectively, regressed on a common dummy variable for any Australian announcement and a common dummy variable for any

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announcement of results of some regular Treasury Auctions – partly because Fleming and Remolona (1997) find them to be of less importance than the run of economic news.

US announcement. In the next section, by contrast, a dummy variable is created to measure the separate effects of each item of local news in the five minutes after it is released.

While the approach adopted here has obvious deficiencies, it might, at least, provide some indication of the relative information content of domestic and US announcements for yields in Australia. The estimated effects of Australian and US announcements on volatility in Australian bill and bond yields are shown in Table 3.

Table 3: Impact of US and Australian Announcements
on Yields in Australia[a]

	Bill yields			
	Episode I	Episode II	Episode III	Whole period
Australian news	2.7**	1.2*	2.5**	2.1**
US news	2.0**	1.8**	0.6*	1.5**
	Bond yields			
	Episode I	Episode II	Episode III	Whole period
Australian news	0.7	1.5**	1.6**	1.2**
US news	4.3**	2.5**	2.9**	3.3**

Notes: (a) The formal results from these regressions are contained in Table A1 of Appendix A.
             * and ** denote significance at the 5% and 1% levels, respectively.

The estimates in Table 3 can be interpreted as the average absolute movement in yields, in terms of basis points, on days when fresh news arrived in the respective trading session, compared with days when no fresh news arrived. For example, over the whole period, Australian announcements were estimated to have induced an average absolute movement of 2.1 basis points in bill yields in Australia during the daylight trading session; similarly, US announcements were estimated to have induced an average absolute movement of 1.5 basis points overnight in bill yields in Australia. The corresponding estimates for bond yields were 1.2 basis points for Australian announcements and 3.3 basis points for US announcements. This implies that Australian announcements had a larger impact on bill yields in Australia than did US announcements, whereas US announcements had a larger impact on bond yields in Australia than did local announcements. The estimated coefficients on the synthetic variables (as shown in Appendix A) suggest some small 'second round'

effects, on both bill and bond yields, from US news when the Australian market opens, and from Australian news when the US market opens.

Other features of Table 3 are:

- the effect of Australian announcements on bill yields declined in the second episode, perhaps because of the period of stability in monetary policy in Australia, which encouraged expectations that policy would remain 'on hold'. By contrast, the effect of Australian news on bond yields increased during this period – a period in which news about inflation was virtually pre-eminent; and

- the size of the impact of US announcements on bond yields in Australia was largest in the first episode when US monetary policy was being tightened. It was also larger than the effect of Australian news in the other episodes, although the gap between the relevant coefficients was smaller. The insignificant effect of local news on bond yields in the first episode – and the large effect from US news – implies that US developments simply overwhelmed local news in the global bear market of 1994.

These results are consistent with the idea that domestic factors are more important than international influences in the consideration of monetary policy. On the other hand, the global bond market has become increasingly highly integrated and, especially in a world of universally low inflation, movements in bond yields internationally have become more tightly synchronised (see Kortian and O'Regan (1996) and Kortian and Thompson (1998)). As the US market is the largest and most liquid in the world, developments there inevitably set the tone elsewhere.

As noted, the estimates in Table 3 are crude and are perhaps most useful as an indication of the relative information content for the local fixed-interest market of the release of local as opposed to US news. They underscore a point, however, now more widely recognised about the significance of the US market for developments in Australian interest rates, especially bond yields. While in 1994 the effect of US developments on Australian yields may have been extreme, US news had a smaller, but still large influence on short- and, especially, long-term interest rates in Australia in the later periods of more orderly markets.

With this background, the remainder of this paper focuses on the impact of Australian news on bill and bond yields during the daylight trading session.

5. Announcement Effects on Yields in Australia

This section first discusses any general intra-day pattern of volatility in yields, then examines whether specific large movements tend to be associated with the announcements nominated, and finally, examines the extent to which there are systematic influences on yields from these announcements.

5.1 Patterns of Intra-day Volatility

Figures 3 and 4 show a strong intra-day pattern of volatility in yields on days when announcements were made compared with days on which there was no announcement.[14] Volatility is defined as the standard deviation of the change in the yield in five-minute intervals over the trading day for the period from January 1994 to September 1997. The impact of news on bill and bond yields is clearly visible in the spikes in volatility at times when announcements were made, i.e. at 9.30 am for monetary policy announcements, and at 11.30 am for most other news.[15] On days when no announcements were made, volatility was much flatter.

Other patterns evident from Figures 3 and 4 are:

- monetary policy announcements, as would be expected, had a notably larger effect on volatility in bill yields than on bond yields, whereas releases of economic news had roughly the same effect on volatility of both yields; and

- economic news releases had a larger effect on bond yields, relative to monetary policy announcements (and post-Board dealing intentions), whereas the reverse was true for bill yields.

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[14] Intra-day bill and bond yield volatility for each episode reviewed is illustrated in Figures B1 and B2 in Appendix B.

[15] There is also a rise in volatility, at around 3.00 pm, on days when the Bank's *Bulletin* is released.

Figure 3: Bill Yield Volatility
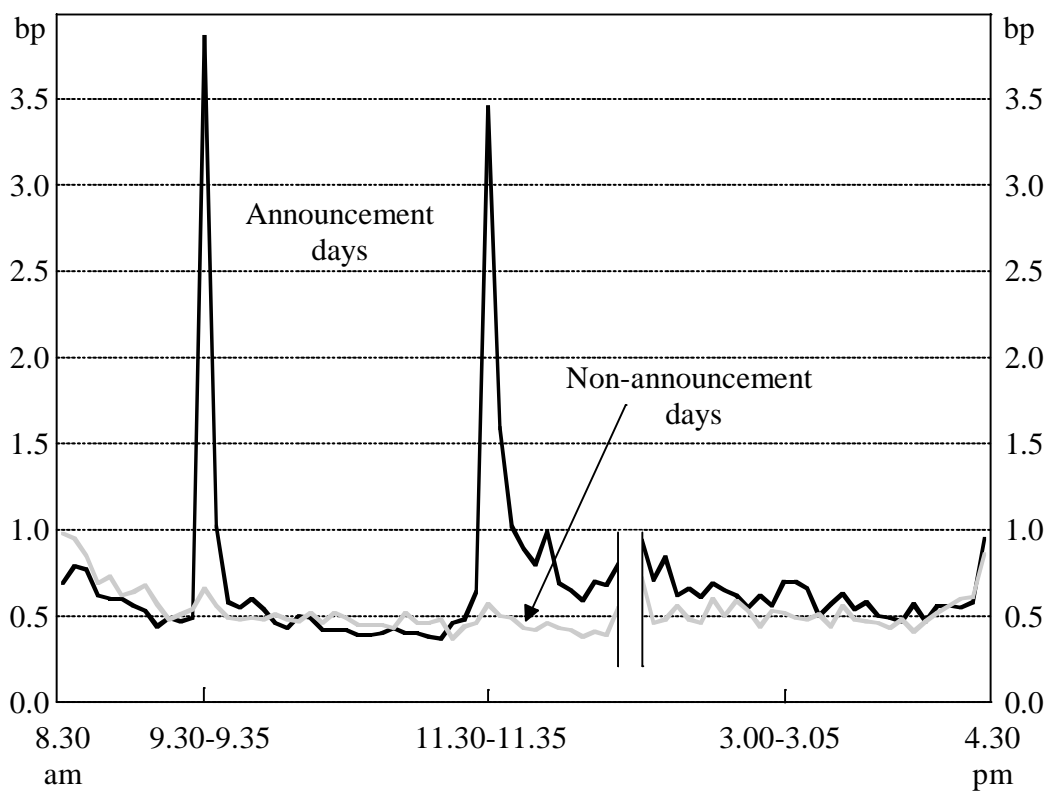
Figure 4: Bond Yield Volatility
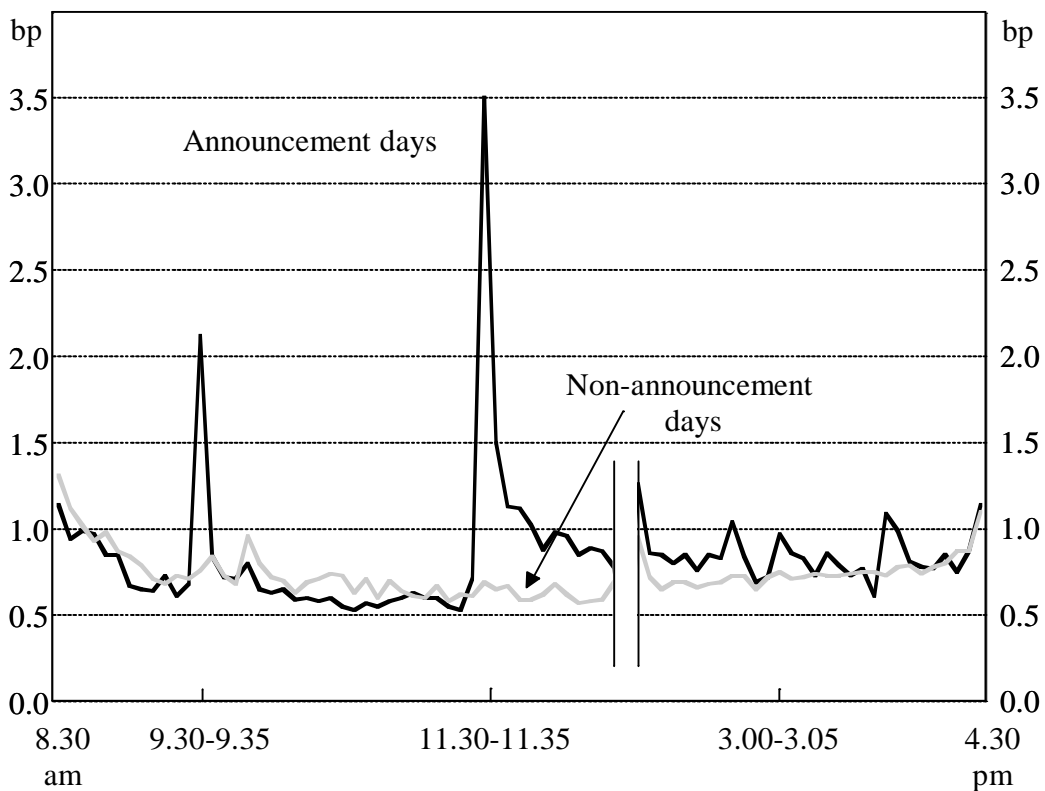
Volatility in yields was also higher at the open and close of trading than at other times. This feature is slightly more evident on days when announcements were not made, possibly because, on days when announcements were made, investors were focusing on forthcoming news, while on other days the domestic market looks for direction from trading in overseas markets. There is also more pronounced volatility on both sets of days as the SFE opens for afternoon trading.

5.2   The Largest Movements

The 25 largest movements in five-minute intervals in each episode are listed in Appendix C.[16] There is no science in the choice of the number 25. However, the twenty-fifth largest movement takes the large movements near a level that might be regarded as a 'normal' response of yields to any announcement, while also giving a reasonable representation across the range of news items. The largest move in bill yields in a five-minute interval over the whole period was 40 basis points, while the smallest 'large' move was 4 basis points; the corresponding figures for bond yields were 26 basis points and 4 basis points.

A high proportion of the 25 largest moves in bill and bond yields has been associated with the announcements nominated in Table 1, as illustrated in Table 4 below. They are also widely spread over the range of news. The announcements which have most frequently affected bill yields by a large amount are (in descending order): the labour force, monetary policy announcements, the CPI and AWOTE. The corresponding announcements for bond yields are: the labour force, the CPI and monetary policy announcements. While the CPI and AWOTE announcements have affected bill and bond yields less frequently than the *monthly* labour force news, the proportion of the *quarterly* CPI and AWOTE announcements contained in the list is higher than for other items of statistical news, including labour force news.

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[16] Tables C1, C2 and C3 for bill yields, and Tables C4, C5, and C6 for bond yields.

Table 4: Number of Times each Announcement Contributes to the Largest Movements in Yields[a]

	Bill yields			
	Episode I	Episode II	Episode III	Total
RBA policy announcements	4	–	4	8
RBA commentary	0	1	3	4
Post-Board dealing intentions	1	0	3	4
CPI	2	3	2	7
AWOTE	$1/2$	2	$3\,1/2$	6
Labour force	$2\,1/2$	6	$2\,1/2$	11
Retail trade	$5/6$	0	$1/2$	$1\,1/3$
GDP	$1\,1/2$	0	0	$1\,1/2$
Imports	0	3	0	3
Building approvals	$1\,5/6$	2	1	$4\,5/6$
Balance of payments	$2\,5/6$	2	0	$4\,5/6$
Financial aggregates	0	0	$1/2$	$1/2$
Fiscal policy statements	0	1	1	2
Unidentified	8	5	4	17
	25	25	25	75

	Bond yields			
	Episode I	Episode II	Episode III	Total
RBA policy announcements	2	–	4	6
RBA commentary	0	0	$1\,1/2$	$1\,1/2$
Post-Board dealing intentions	1	0	0	1
CPI	3	$4\,1/2$	2	$9\,1/2$
AWOTE	0	$1\,1/2$	3	$4\,1/2$
Labour force	3	3	4	10
Retail trade	$5/6$	0	$3\,1/2$	$4\,1/3$
GDP	$2\,1/2$	1	0	$3\,1/2$
Imports	0	1	0	1
Building approvals	$1\,1/3$	$1\,1/2$	$1/2$	$3\,1/3$
Balance of payments	$1\,1/3$	$1\,1/2$	0	$2\,5/6$
Financial aggregates	0	0	$1\,1/2$	$1\,1/2$
Fiscal policy statements	1	1	2	4
Unidentified	9	10	3	22
	25	25	25	75

Notes: (a) A score of $1/2$ is assigned to an announcement released jointly with *one* other announcement contained in the table. A score of $1/3$ is assigned to an announcement released jointly with *two* other announcements contained in the table.

Most of the largest moves associated with these announcements came in the interval immediately after they were made. There are, however, a number of exceptions: for bill yields, a large move in the 5–10 minute interval after the news of the tightening in policy in December 1994; a lagged reaction of five minutes to the CPI (released simultaneously with AWOTE) in April 1995 and again in January 1997; and large moves within quarter of an hour of labour force news in May 1995, and in September 1997.[17] A large move in both bill and bond yields in July 1997 immediately *preceding* building approvals and retail sales news; and a large move in bond yields between 11.40 am–11.45 am on the morning of the Governor's first semi-annual appearance before the Parliamentary Committee in May 1997, which coincided with the release of labour force news at 11.30 that morning.

5.2.1 *Comparison between bills and bonds*

While similar items of news seem to affect bill and bond yields, there appears to be some difference of emphasis:

- 'monetary policy' news – monetary policy announcements, regular Reserve Bank economic and market commentary and announcement of post-Board dealing intentions – has been more often associated with a large move in bill yields than in bond yields;

- information about the CPI, AWOTE and economic activity has been equally likely to be associated with large moves in bill yields and bond yields; and

- fiscal policy announcements were more likely to produce a large move in bond yields than in bill yields.

These features would be consistent with markets viewing short-term interest rates as being tied down by the setting of monetary policy whilst revisions to expectations about the inflation or economic outlook have implications for both short- and long-term interest rates. All fiscal policy announcements in the period affected bond

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[17] In each of these instances, there was also a large move in the interval immediately after the announcement. This explains why there are four large movements in bill yields associated with policy announcements in the first episode, while there were only three policy tightenings. Most of these lagged large reactions were continuations of the initial movements, although some were reversals.

yields (whereas only half affected bill yields), suggesting that the bond market reacted to information about the supply of bonds implied by the Budget balance.

5.2.2 Comparison of episodes

Almost all monetary policy announcements had an effect on both measures of yield.[18] Beyond that, the CPI and labour force releases were the two announcements which consistently and frequently affected both measures of yield. Both series have direct relevance for monetary policy; and, as noted, the *Labour Force Survey* is the most timely reading on the economy of major significance.

These announcements aside, there are notable changes of pattern between episodes. News on AWOTE became progressively more prominent, affecting bill yields and bond yields with increasing frequency as time passed. This perhaps reflects greater experience of investors and funds managers with the inflation-targeting framework, and the vital role of wages as a forward-looking indicator of inflation. The incidence with which Reserve Bank economic commentary and post-Board dealing intentions affected bill yields also increased. Monthly news on retail sales was associated with more large movements in bond yields in the third episode than earlier, but announcement effects from GDP became less prominent. Import news was important in the second episode, soon after this release was introduced, but not at other times. This may have been because imports provided a more timely reading on domestic spending than retail sales, at a time when policy-makers were looking for signs of slowing in the economy.

Balance of payments announcements became much less important over the period studied. This item was associated with a number of large movements in yields in the first episode but with none in the last. This may reflect several factors such as: improvement in the balance of payments situation in Australia over the third period, which took this indicator out of the headlines, i.e. there was a negative 'flavour-of-the-month effect'; or, better understanding of the inflation targeting framework meant that this factor was simply no longer seen as directly relevant for monetary policy; or, traders came to appreciate that monthly balance of payments statistics

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[18] The exceptions were the tightening on 14 December 1994 (for bond yields) and the easing on 6 November 1996 (for bill and bond yields). In both episodes, the policy adjustment was already fully priced into the relevant yields ahead of the announcement.

were soft ground on which to rest policy or investment decisions. It is also possible that, more recently, news on the balance of payments had its main market impact on the exchange rate, not interest rates.

5.2.3 15-minute intervals

We also examined the 25 largest movements in 15-minute intervals in each episode. The large moves, and the frequency distribution of announcements, are listed in Tables D1 to D7 in Appendix D. In the first and second episodes, the number of large moves associated with news declines noticeably from the five-minute intervals – particularly for bill yields. The majority of these large moves not associated with announcements occurred within a half-hour of the morning open of trading, or in the quarter-hour reopening after lunch.

Broadly speaking, the items of news associated with large moves in yields are similar to those for the five-minute intervals. There are, however, two important exceptions: monetary policy announcements and labour force news produced fewer large movements in bill yields over the 15-minute intervals than over five-minute intervals. This may suggest that any large 'knee jerk' reactions to changes in monetary policy or labour force news tended to be quickly, at least partially, reversed.

5.3   Information Content of Announcements

The next step is to assess which announcements systematically affect yields. There are two aspects of interest. Firstly, we attempt to measure whether the market systematically differentiates between the information content of different announcements. A lay-person might refer to this as trying to establish the 'importance' of different items of news. Secondly, any market response should also reflect the size and direction of any surprise in the news. Putting these two points together simply says that it might be expected that a large surprise in the CPI would move bond yields by more than a comparable surprise in, say, building approvals since, for a variety of reasons, the information contained in the CPI is of inherently more value to bond and bill traders (or policy-makers) than that contained in building approvals.

We measure the information content of announcements by conducting a pooled regression, regressing the absolute movement in the relevant yield on a constant and dummy variables defined for each news item listed in Table 1 (Equation 2):

$$|Z_{nt}| = a_o + \sum_{k=1}^{K} b_k D_{knt} + \sum_{t=1}^{T-1} a_t D_t + u_{nt} \qquad (2)$$

$|Z_{nt}|$ is defined as the absolute value of the change in the yield (we loosely refer to this as yield volatility), on day n in interval t; where $t = $ 9.30 am–9.35 am (for monetary policy announcements and post-Board dealing intentions), 11.30 am–11.35 am (for economic statistics) and 3.00 pm–3.05 pm (for the Reserve Bank's *Bulletin*). K is the number of different announcements included in the regressions. D_{knt} is the set of dummy variables defined for each announcement listed in Table 1.[19] $D_{knt} = 1$ if announcement k is made on day n during interval t, $D_{knt} = 0$ otherwise.

We include an additional set of dummy variables to control for general yield volatility during the three time intervals. $D_1 = 1$, for interval 9.30 am–9.35 am, 0 otherwise; $D_2 = 1$, for interval 11.30 am–11.35 am, 0 otherwise.

The coefficient b_k provides an estimate of the impact of announcement k on yield volatility. Hence, we can 'rank' announcements in order of their average impact on yield volatility.

One factor that determines the degree of market reaction to an announcement is how hard it is to forecast the relevant variable. Indicators with large forecasting errors, i.e. those which tend to be associated with large surprises, might tend also to have large announcement effects, reflected in a large estimated coefficient in Equation (2). (The surprise element in news is discussed more fully in Section 5.4 below.) But an indicator might still be important for the operation of monetary policy (or for investment decisions) even if it has a very small coefficient in this regression: for example, if inflation could be forecast perfectly, there might be no

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[19] A dummy variable is not defined for fiscal policy statements or Governors' speeches as their release times are variable.

effect on yields from CPI releases, yet inflation would, of course, still be important in considering monetary policy. (Presumably, in such a case, changes in yields would occur at the time market forecasts were changed.)

While acknowledging this point, it is also true that if, say, the coefficient for a particular variable were larger than that for another variable, while the forecasting error of the former were the same as (or smaller than) the latter, this would be *prima facie* evidence that the former variable contained more information for the market than the latter. We return to this point below.

The impact of announcements on yield volatility is summarised in Table 5. The estimated coefficients in the table show the average difference in yield volatility during the five-minute interval after an announcement, as compared with the same period on days on which announcements are not made. For example, the announcement of the CPI is estimated to have been associated with a move of about 4 basis points, on average, in the 90-day bill yield in the following five minutes, compared with days on which no such announcement was made.

These results suggest strongly that investors and portfolio managers do differentiate between information contained in different items of news; they are also broadly consistent with the pattern in Table 4.

Taking the whole period, the largest effect on yield volatility has come from monetary policy announcements, followed by the CPI. There is then a tier of news composed of AWOTE, the labour force and GDP. There has also been a smaller systematic response from announcements about the balance of payments, imports, retail trade and building approvals, which had similar effects to the release of the Bank's commentary and announcement of its post-Board dealing intentions. It is of interest that, as summarised in Table E2 of Appendix E, forecasting errors for the major economic statistics – the CPI, AWOTE and employment – are smaller than for other statistics, reinforcing the point that the market perceives that there is more information contained in these statistics than in the others.

Table 5: Impact of Announcements[a]

	Bill yields			
	Episode I	Episode II	Episode III	Whole period
RBA policy announcements	11.7**	–	21.9**	18.1**
RBA commentary	0.9	0.8**	2.2*	1.3**
Post-Board dealing intentions	1.0	0.1	2.0**	1.0**
CPI	5.3*	6.1**	1.4*	4.3**
AWOTE	-0.6	3.5	6.6**	3.4**
Labour force	2.9*	2.4**	2.1**	2.2**
Retail trade	2.2*	0.0	1.2**	1.1*
GDP	5.5*	0.8*	0.6	2.3*
Imports	0.7	1.8**	0.1	1.1**
Building approvals	0.1	1.4*	0.0	1.1**
Balance of payments	3.4*	1.8**	0.2	1.6**
Financial aggregates	0.4[b]	0.0[b]	-0.3[b]	0.1[b]
	–	–	0.8*[c]	0.7*[c]

	Bond yields			
	Episode I	Episode II	Episode III	Whole period
RBA policy announcements	7.4**	–	10.2**	9.2**
RBA commentary	2.0*	0.6	1.0*	1.2**
Post-Board dealing intentions	0.4	-0.1	0.3**	0.2
CPI	6.9**	6.7**	2.6*	5.5**
AWOTE	-1.8	2.8	4.3**	1.9*
Labour force	3.6**	3.0**	3.3**	3.1**
Retail trade	1.0*	0.1	2.5**	1.0**
GDP	5.7**	1.6	0.5	2.5**
Imports	0.7*	2.5**	0.1	1.5**
Building approvals	0.6	1.2*	-0.9	0.9**
Balance of payments	2.3**	1.9**	0.2	1.4**
Financial aggregates	0.1[b]	0.0[b]	-0.1[b]	0.0[b]
	–	–	1.5*[c]	1.5[c]

Notes: (a) The formal results from these regressions are contained in Table E1 of Appendix E.

(b) Announced at 9.30 am.

(c) Announced at 11.30 am.

* and ** denote significance at the 5% and 1% levels, respectively.

The rescheduling of the financial aggregates release – which is published by the Reserve Bank – from 9.30 am to 11.30 am seems to have been associated with the market showing more interest in this announcement, although evidence over a longer period would be needed to test whether this is a robust conclusion.[20]

5.3.1 Comparison between bills and bonds

The effect of monetary policy announcements was larger on volatility in bill yields than on bond yield volatility, as was AWOTE in the second and third episodes. The CPI and labour force news had a larger effect on volatility in bond yields than in bill yields over the entire period.

Only announcements of monetary policy changes, the CPI and the labour force had statistically significant effects on volatility in bill and bond yields in each episode. While the Bank's economic and market commentary and announcements of its post-Board dealing intentions had significant effects on bill yields over the whole period, these effects were relatively small. The Bank's post-Board dealing intentions had no significant effect on bond yields.

5.3.2 Comparison of episodes

The announcement effect of monetary policy changes on both bill and bond yields was larger in the third episode than in the first, notwithstanding smaller moves in the cash (policy) rate. This mainly reflected the fact that, in the first episode, the market moved well ahead of the policy announcement, and had typically overshot the eventual policy change. A major feature of the second episode is that, in the absence of any monetary policy announcements, the CPI had by far the largest announcement effect on bill yields and bond yields.

Merchandise imports were again newsworthy only in the second episode – apparently as an indicator of domestic spending, at the expense of retail sales. The

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[20] As well as changing the release time, the Reserve Bank also announced in advance the date of release. This foreknowledge may have been a factor in the increased significance of this news. The change in timing brought this release into line with the normal scheduling of information released by the Australian Bureau of Statistics. The change was made following a review prompted by the IMF's recommendations on international data standards.

importance of balance of payments news was much diminished from the first through to the third episode.

Again consistent with Table 4, AWOTE was much more newsworthy in the second and third episodes than in the first. In the later episode, such announcements had a bigger effect on volatility in bill and bond yields than any other news item, save monetary policy announcements.

The progressively more pronounced announcement effect of AWOTE may reflect the evolution of wage-setting and the monetary policy framework in Australia as well as the unfolding economic cycle in the 1990s. For much of the decade subsequent to 1983, wage-setting in Australia was determined under the Accord – an agreement between the Government and the ACTU, the peak trade union council. Under these arrangements, the main news about wages was typically contained in announcements about renegotiation of the Accord, rather than in the time series on AWOTE.

Early stages of the process of deregulating wage-setting in Australia overlapped with a period of recession, so that wages growth fell to historically low levels, which tended to remove this news from the financial headlines. Thus, for the best part of a decade, the release of statistics on average weekly earnings did not attract much comment, certainly much less in the mid and late 1980s than, say, news about the balance of payments. It was not until 1995, in response to unsustainable economic growth in 1994, that the latent threat of wages growth again exercised commentators' attention. Within the forward-looking inflation-targeting framework, AWOTE has since remained an important factor in discussions about the outlook for inflation. As the newly introduced *Wage Cost Index* builds up a track-record, however, it is possible that it will replace AWOTE as the main focus of public discussion of trends in wages.

5.4 Surprises

As noted, the *efficient market hypothesis* implies that only unanticipated news should influence yields, since asset prices should already reflect prevailing market expectations about the economic outlook. In this section, we investigate the impact of the unanticipated news that an announcement contains, as distinct from the information content of the announcement itself, as in the previous section. The

approach adopted in this section assumes that yields respond according to the size of surprises in the news and that this response is symmetrical. In other words, an unexpectedly large rise in AWOTE would be expected to increase market yields, and the size of the rise in yields would reflect the extent of the surprise.

Although some statistical releases contain a range of information, we limit our analysis to the statistic which we judge to be of most interest to the market. For the *Labour Force Survey*, this means the employment data, not the unemployment rate. Underlying inflation, rather than the 'headline' rate, is used for the CPI. Because of difficulties in quantifying expectations, we exclude from this analysis: Reserve Bank commentary, announcement of the Bank's post-Board dealing intentions, the Budget and financial aggregates.

To estimate the effect on bill and bond yields of unanticipated news, we again conduct a pooled regression, regressing the *signed* change in the yield on the *signed* surprise, measured as the published statistic minus the median market forecast (Equation 3):

$$S_{knt} = ACT_{knt} - FOR_{knt} \tag{3}$$

ACT_{knt} is the published estimate for series k as announced on day n in interval t. FOR_{knt} is the corresponding forecast. $S_{knt} = 0$ on days when no announcement is made.

To compare more easily the 'surprise coefficients' between variables – ensuring that they are representative of typical surprises – the surprise variable, S_{knt}, is scaled by the absolute average surprise for the relevant series; a list of 'average' surprises is contained in Table E2 of Appendix E. The equation estimated then becomes Equation (4):

$$Z_{nt} = a_o + \sum_{k=1}^{K} c_k \frac{S_{knt}}{\bar{S}_k} + u_{nt} \tag{4}$$

where:

$$\bar{S_k} = \frac{1}{N_k} \sum_n |S_{knt}| \quad (N_k \text{ is the number of releases of announcement } k \text{ in the sample});$$

and Z_{nt} is the signed change in the yield. The coefficient c_k measures the effect of an average surprise on bill and bond yields.

Estimates of the effect on yields of average surprises in the news are summarised in Table 6.

Table 6: Reactions to Average Surprises[a]

	Bill yields			
	Episode I	Episode II	Episode III	Whole period
Policy announcements	8.8**	–	23.3**	17.4**
Underlying inflation	5.3*	7.8**	0.6**	4.6**
AWOTE	0.8	1.4*	6.1**	2.4*
Employment	3.1**	2.7**	2.0**	2.5**
Retail trade	1.7*	0.3	0.9**	1.0**
GDP	5.2	0.7*	0.0	1.9
Imports	-0.1	1.7**	0.3*	0.9**
Building approvals	0.8	1.7**	0.5*	1.0*
Balance of payments	2.6**	2.1*	0.1	1.5*

	Bond yields			
	Episode I	Episode II	Episode III	Whole period
Policy announcements	-2.1	–	10.6**	5.3
Underlying inflation	5.7**	7.9**	2.0**	5.0**
AWOTE	0.2	3.3**	3.5**	2.0*
Employment	3.3**	3.2**	3.6**	3.2**
Retail trade	1.2*	0.9**	1.8**	1.3**
GDP	6.1**	2.2	-0.1	2.7**
Imports	0.0	2.3**	0.2	1.2**
Building approvals	0.7	1.5*	0.5**	0.9*
Balance of payments	2.3**	2.1**	0.3	1.5**

Notes: (a) The formal results of these regressions are contained in Table E3 of Appendix E.
* and ** denote significance at the 5% and 1% levels, respectively.

For the period as a whole, all coefficients are significant at the 5 per cent level or lower, except those for GDP surprises on bill yields, and monetary policy surprises on bond yields. The estimates can be interpreted along the following lines: a published outcome for, say, the underlying CPI which was above the median expectation by 0.2 of a percentage point – the average forecasting error – would be expected to increase both bill and bond yields by about 5 basis points within five minutes of the announcement.

The pattern of coefficients in Table 6 is familiar. The average monetary policy surprise had the biggest effect on bill yields followed by the average surprise for underlying inflation, employment and AWOTE. For bond yields, the largest coefficient was for the CPI; average surprises in news about employment had the next largest effect.

The declining newsworthiness of the balance of payments and GDP, and the rising prominence of AWOTE, is again evident. It is also notable, as discussed previously, that inflation surprises had a larger effect on yields in the second period when the market considered changes in monetary policy to be off the agenda. To an extent, the rising effect of AWOTE seems to have been at the expense of the CPI in the third period. This may reflect the market's recognition that the two pieces of information are intimately linked for policy decisions. Since, in three quarters out of four, AWOTE is released the day after the CPI, market participants may have come to the view that any reassessment of the policy or investment outlook should be made on the basis of the two pieces of information considered jointly. If this were the case, most of the market reaction might be expected to come after the AWOTE release.

The fact that a significant 'surprise' coefficient is not found for monetary policy announcements in the case of bond yields can largely be attributed to the experience in the first episode when the bond market rallied on the announcement of the first and second tightenings in 1994 but sold off on news of the third. This produced a negative (and statistically insignificant) coefficient on bond yields in this period.

This market reaction suggests that the tightenings of 1994 were, on the whole, viewed 'credibly' by the bond market, i.e. the policy tightenings were expected to work to contain inflationary pressures and, on two occasions, induced investors to buy bonds, in the process driving yields lower. The easings of 1996 and 1997 were

also viewed as being consistent with falling inflation and, hence, with falling bond yields. Rallies in the bond market in response to both tightenings and easings of monetary policy do not comply with the assumption on which the analysis is based, i.e. the effect of a surprise must be symmetrical. This result in relation to monetary policy announcements is similar to that found for the United States by Fleming and Remolona (1997).

The results for bill yields might shed light on how markets perceive the Reserve Bank's reaction function. These results suggest that the market reacts to news on the view that the Bank gives a greater weight to the underlying CPI, followed by employment and AWOTE, than to other individual indicators of economic activity. The rise in the market's reaction to AWOTE news might suggest that – since current growth in labour costs is likely to affect inflation some quarters hence – market participants have increasingly accepted that the Bank sets interest rates in a forward-looking way. Of the indicators of economic activity, the market seems to view the Bank as giving the largest weight to labour market indicators. This might be because either labour market conditions are of intrinsic interest to policy-makers, or they have a crucial bearing on the climate for wage-setting and inflationary expectations, or both.

5.5   Does the Market Respond Only to Unexpected News?

The similarity between the estimated coefficients in Tables 5 and 6 is a striking feature of the results – i.e. the results suggest that, over the period considered, the 'average' information contained in an announcement was almost identical to the effect on yields of the 'average' surprise in these announcements. Such a result may be consistent with an interpretation that the market reacted only to the unanticipated information contained in these announcements.

To test this hypothesis (albeit somewhat crudely), we extend Equation (2) to include *absolute* surprises for each variable for the whole period, to attempt to differentiate between reactions coming from announcements *per se* and from surprises they might contain, i.e:

$$\left| Z_{nt} \right| = a_o + \sum_{k=1}^{K} b_k D_{knt} + \sum_{k=1}^{K} c_k \left| \frac{S_{knt}}{\bar{S}_k} \right| + u_{nt} \qquad (5)$$

In a market which responded only to unanticipated news (and in which the response was proportional to the size of surprise), for each variable, we would expect a statistically significant estimate of coefficient c (on absolute surprises), and an insignificant estimate of coefficient b (on announcement dummy variables).

In interpreting the results, we ask: does the market respond only to unexpected news? The answers, as summarised in Table 7, are classified according to the following rules:

- 'yes', if the estimate of b is statistically insignificant and that for c is significant at the 5 per cent level;

- 'mainly', if both b and c are significant but c exceeds b; and

- inconclusive otherwise.

It is not possible to use this test to answer 'no' to the question posed. Since Equation (5) is specified in terms of absolute movements, it does not capture a key element of the market reaction to surprises – the *direction* of the move in yields; it also allows *only* for a linear relationship between the surprise and the market response.

Table 7: Does the Market Respond only to Unexpected News?[a]

	Bill yields	Bond yields
Policy announcements	Yes	Inconclusive
Underlying inflation	Yes	Mainly
AWOTE	Inconclusive	Inconclusive
Employment	Yes	Yes
Retail trade	Inconclusive	Yes
GDP	Inconclusive	Yes
Imports	Yes	Yes
Building approvals	Inconclusive	Yes
Balance of payments	Inconclusive	Inconclusive

Note: (a) The formal results of these regressions are contained in Table E4 of Appendix E.

On the basis of this test, there seems to be a tendency for fixed-interest markets in Australia to react only to unexpected information. Using the above criteria, reactions to nine of the 18 announcements contained in Table 7 are classified in this way. The results are, on the whole, stronger for the bond market than for bills. This might reflect the dominating influence of monetary policy announcements on bills, whereas the bond market adjusts more gradually to the content of underlying economic news as it comes to hand.

In the case of AWOTE, the results are inconclusive, i.e. the announcement itself appears to be the source of volatility, rather than the unexpected component of the announcement. There might be a number of strands to the explanation of this result. Firstly, it is influenced to an important extent by the earlier periods, when for reasons explained above, announcements of AWOTE were apparently regarded as containing little information and yields did not react systematically to surprises in the data. There is some evidence, however, from tests of the period since mid 1996, that the market has reacted mainly to surprises in AWOTE.

A second factor might be the interaction of two aspects of our approach: the frequency with which data on market expectations are published; and the fact that publication of AWOTE usually comes the day after the CPI. As noted, expectations for all of the series tested are published once a week, on the Friday before the relevant statistics are released.[21] This approach assumes that expectations are not then revised. For most statistics, this seems to be a reasonable assumption. In the case of AWOTE, however, the release of the CPI (usually) on the day before AWOTE might induce some revision to forecasts of AWOTE, especially if the inflation news contains a surprise. Any such reassessment would not be captured in our approach, so the standard median market forecast might be out of date by the time AWOTE is announced.

On the balance of payments, the inconclusive results may reflect flavour-of-the-month considerations, perhaps partly due to growing acceptance that news about the balance of payments is not a major factor in monetary policy decisions.

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[21] This approach is determined by data availability.

6.   Conclusion

The results presented in this study suggest that announcements of a wide range of economic information have systematically affected the volatility of bill yields and bond yields in Australia over the period reviewed, from January 1994 to September 1997. If anything, yields may have become more sensitive to the regular run of news over this period. Announcements about US economic news seem to have had a large effect on yields in Australia, especially on bond yields which – based on crude measures – have been more responsive to US news than domestic news.

The reaction in Australia of the fixed-interest market to economic announcements suggests that traders seem to distinguish between the information content of different economic statistics. Monetary policy announcements led to the largest absolute change in both short- and long-term yields, followed by the CPI. CPI and labour force announcements consistently affected yields over the period of the study. The effect of AWOTE on yield volatility has been far more prominent since mid 1996, whilst that of balance of payments and GDP news has diminished. The fixed-interest market also regarded announcements about building approvals, retail trade, imports and the financial aggregate as containing some information. Regular Reserve Bank commentary on the economy, and announcement of the Bank's dealing intentions the day after Board meetings, contained information for the market too, especially for bill yields.

Investors and traders systematically responded to the size and direction of unexpected information in economic announcements during this period, with monetary policy news (again) inducing the largest effect on short-term yields, as would be expected. Monetary policy surprises, however, did not have a systematic effect on bond yields, which tended to rally in immediate response to both tightenings and easings of monetary policy in the period examined. The CPI and employment news have had perennially significant effects on both bill and bond yields. The market reaction to surprises in AWOTE increased substantially from the beginning of the period to its end, while the effect of surprises in balance of payments news declined. On the whole, there is evidence to support the view that, as would be expected in an efficient market, traders react largely to the unanticipated component of new information.

The results suggest that the market perceives that announcements about inflation, employment and wages growth have had a larger weight in the Reserve Bank's decisions about monetary policy than other indicators of economic activity. Taken in sum, the results also suggest some order – i.e. some logic and consistency – in how the fixed-interest market in Australia responds to news.

Appendix A: International Influences

Table A1: Impact of US and Australian Announcements
on Yields in Australia

	Bill yields			
	Episode I	Episode II	Episode III	Whole period
Constant	2.1 (8.45)	1.3 (9.10)	1.5 (7.68)	1.5 (13.16)
Australian news	2.7 (2.71)	1.2 (2.47)	2.5 (3.80)	2.1 (4.89)
US news	2.0 (3.35)	1.8 (3.21)	0.6 (2.22)	1.5 (4.98)
S_1	0.4 (5.60)	0.4 (7.05)	0.3 (1.41)	0.5 (8.28)
S_2	0.2 (2.76)	0.1 (2.25)	0.0 (0.39)	0.2 (3.50)
Adjusted R^2	0.13	0.12	0.11	0.13
DW statistic	2.02	2.10	2.00	2.04
S E of regression	5.08	3.05	3.05	3.92
Number of observations	604	595	607	1 806

	Bond yields			
	Episode I	Episode II	Episode III	Whole period
Constant	5.2 (12.65)	4.1 (14.09)	3.3 (15.44)	3.9 (22.47)
Australian news	0.7 (0.97)	1.5 (2.69)	1.6 (3.31)	1.2 (3.40)
US News	4.3 (5.63)	2.5 (2.87)	2.9 (5.52)	3.3 (6.94)
S_1	0.2 (4.35)	0.1 (1.29)	0.0 (-0.04)	0.2 (4.62)
S_2	0.1 (2.75)	0.1 (1.17)	0.1 (0.85)	0.1 (4.68)
Adjusted R^2	0.07	0.03	0.08	0.07
DW statistic	1.95	1.96	1.91	1.96
S E of regression	5.98	4.79	3.44	4.97
Number of observations	604	595	607	1 806

Notes: T-ratios are in parentheses.
When heteroskedasticity is present, White's heteroskedasticity-consistent standard errors are used to calculate t-ratios.

Appendix B: Patterns of Intra-day Volatility

Figure B1: Bill Yield Volatility
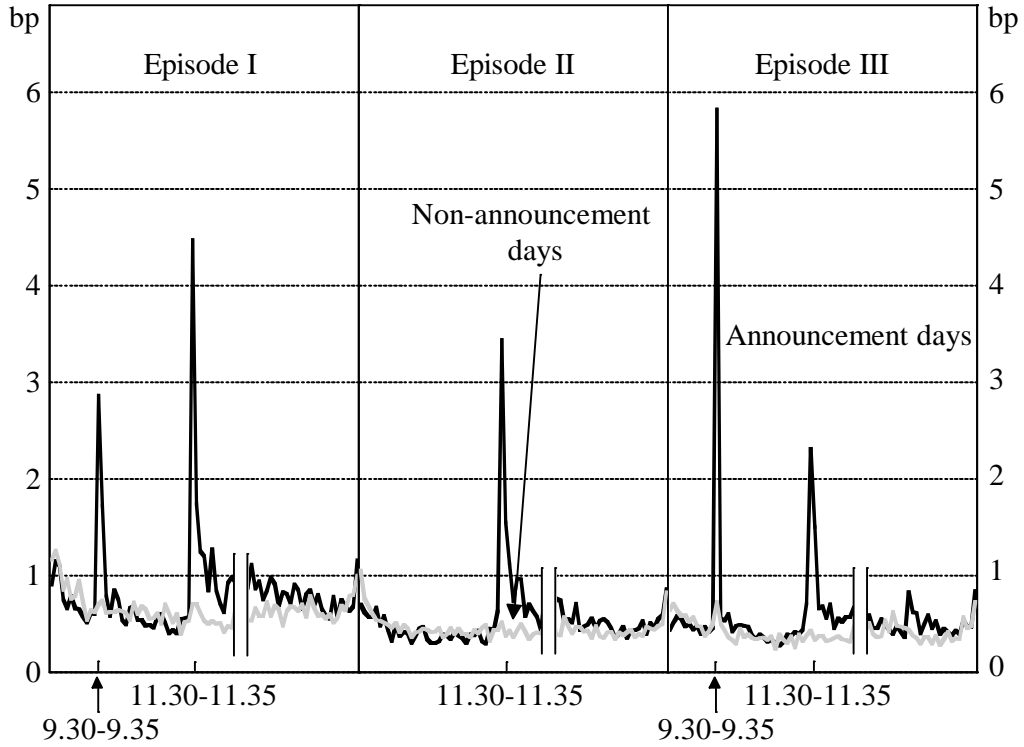
Figure B2: Bond Yield Volatility
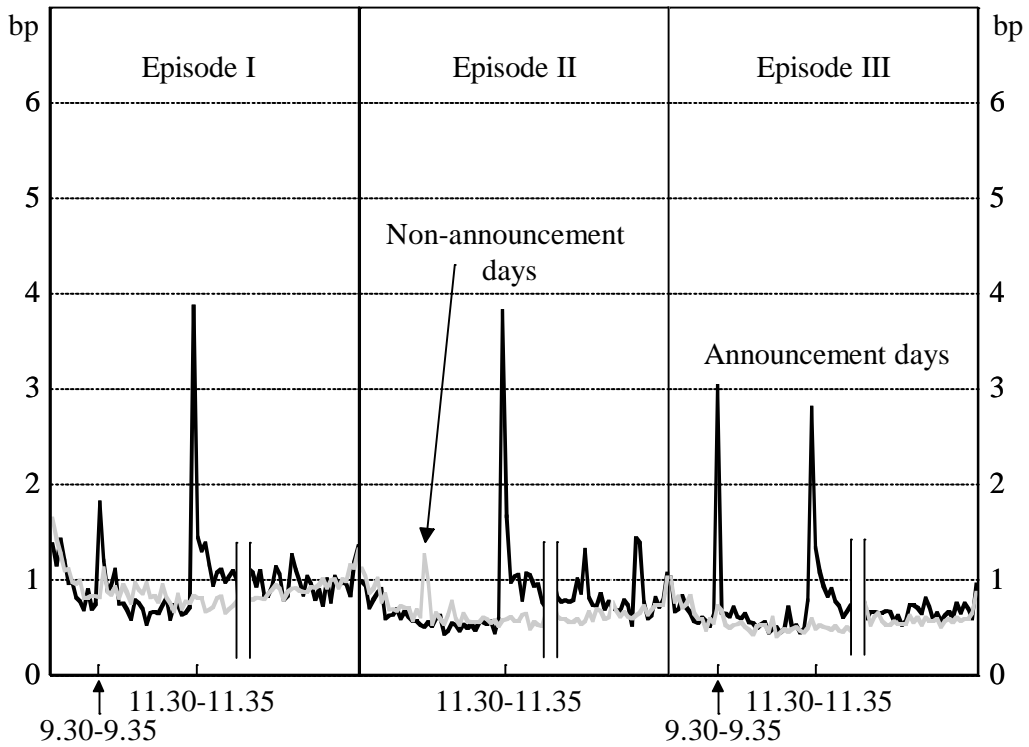
Appendix C: 25 Largest Movements in Yields During Five-minute Intervals[22]

Bill Yields

Table C1: Episode I

	Movement (Basis points)	Date	Interval	News item
1.	-18.0	31 Mar 95	11.30 – 11.35 am	Retail sales & GDP
2.	16.0	14 Dec 94	9.30 – 9.35 am	Monetary policy announcement
3.	-15.0	25 Jan 95	11.30 – 11.35 am	CPI
4.	-15.0	1 Feb 95	11.30 – 11.35 am	Retail Sales, building approvals & balance of payments
5.	14.0	14 Dec 94	9.35 – 9.40 am	Monetary policy announcement
6.	13.0	11 Aug 94	11.30 – 11.35 am	Labour force
7.	-12.0	7 Dec 94	9.30 – 9.35 am	Post-Board dealing intentions
8.	11.0	24 Oct 94	9.30 – 9.35 am	Monetary policy announcement
9.	11.0	12 Jan 95	11.30 – 11.35 am	Labour force
10.	10.0	30 Nov 94	11.30 – 11.35 am	GDP
11.	9.0	30 Jun 94	11.30 – 11.35 am	Building approvals & balance of payments
12.	-9.0	17 Aug 94	9.30 – 9.35 am	Monetary policy announcement
13.	-9.0	30 Mar 95	11.30 – 11.35 am	Balance of payments
14.	-9.0	27 Jul 94	11.30 – 11.35 am	CPI
15.	8.0	28 Jun 94	9.05 – 9.10 am	–
16.	-8.0	12 Dec 94	9.30 – 9.35 am	–
17.	7.0	29 Sep 94	11.30 – 11.35 am	Building approvals & balance of payments
18.	7.0	15 Mar 95	3.25 – 3.30 pm	–
19.	7.0	28 Jun 94	8.40 – 8.45 am	–
20.	-6.0	5 Apr 94	8.35 – 8.40 am	–
21.	6.0	27 Jun 94	8.50 – 8.55 am	–
22.	-6.0	29 Jun 94	4.15 – 4.20 pm	–
23.	6.0	1 Dec 94	8.40 – 8.45 am	–
24.	-6.0	1 Mar 95	11.30 – 11.35 am	Building approvals & balance of payments
25.	6.0	9 Feb 95	11.30 – 11.35 am	Labour force & AWOTE

Table C2: Episode II

	Movement (Basis points)	Date	Interval	News item
1.	-18.0	27 Apr 95	11.30 – 11.35 am	CPI & AWOTE
2.	-13.0	4 May 95	11.30 – 11.35 am	Building approvals & balance of payments
3.	-11.0	27 Apr 95	11.35 – 11.40 am	CPI & AWOTE
4.	10.0	11 Jan 96	11.30 – 11.35 am	Labour force
5.	9.0	11 May 95	11.30 – 11.35 am	Labour force
6.	8.0	30 Jun 95	11.30 – 11.35 am	Building approvals & balance of payments
7.	7.0	25 Oct 95	11.30 – 11.35 am	CPI
8.	7.0	26 Jul 95	11.30 – 11.35 am	CPI
9.	-6.0	11 Mar 96	Open – 8.35 am	–
10.	-6.0	18 Apr 95	2.15 – 2.20 am	–
11.	6.0	21 Apr 95	11.30 – 11.35 am	Merchandise imports
12.	-5.0	7 Jul 95	Open – 8.35 am	–
13.	5.0	13 Jul 95	11.30 – 11.35 am	Labour force
14.	-5.0	19 Oct 95	11.30 – 11.35 am	Merchandise imports
15.	5.0	28 Mar 96	2.00 – 2.05 pm	Governor's speech to Australian Business Economists
16.	-5.0	11 Apr 96	11.30 – 11.35 am	Labour force
17.	-5.0	24 Apr 96	11.30 – 11.35 am	AWOTE
18.	-5.0	11 May 95	11.35 – 11.40 am	Labour force
19.	5.0	11 May 95	11.40 – 11.45 am	Labour force
20.	-5.0	9 May 95	7.30 – 7.35 pm	Federal Budget
21.	4.0	20 Apr 95	Open – 8.35 am	–
22.	4.0	24 Apr 95	11.05 – 11.10 am	–
23.	-4.0	29 Sep 95	11.30 – 11.35 am	Building approvals & balance of payments
24.	-4.0	29 May 95	11.30 – 11.35 am	Building approvals & balance of payments
25.	-4.0	19 Sep 95	11.30 – 11.35 am	Merchandise imports

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[22] When one of the 25 largest movements can not be attributed to a particular news item from Table 1, it is represented by '–'.

Table C3: Episode III

	Movement (Basis points)	Date	Interval	News item
1.	-40.0	11 Dec 96	9.30 – 9.35 am	Monetary policy announcement
2.	-32.0	23 May 97	9.30 – 9.35 am	Monetary policy announcement
3.	-28.0	31 Jul 96	9.30 – 9.35 am	Monetary policy announcement
4.	-14.0	24 Oct 96	11.30 – 11.35 am	AWOTE
5.	-13.0	11 Sep 97	11.35 – 11.40 am	Labour force
6.	-10.0	30 Jul 97	9.30 – 9.35 am	Monetary policy announcement
7.	8.0	1 May 97	11.30 – 11.35 am	AWOTE & building approvals
8.	-8.0	11 Sep 97	11.30 – 11.35 am	Labour force
9.	7.0	20 Aug 96	7.30 – 7.35 pm	Federal Budget
10.	-6.0	7 Aug 96	2.00 – 2.05 pm	–
11.	6.0	4 Dec 96	9.30 – 9.35 am	Post-Board dealing intentions
12.	5.0	6 Feb 97	11.30 – 11.35 am	AWOTE
13.	-5.0	10 Jul 97	11.30 – 11.35 am	Labour force & financial aggregates
14.	5.0	4 Sep 96	9.30 – 9.35 am	Post-Board dealing intentions
15.	5.0	5 Sep 96	2.00 – 2.05 pm	Governor's BZW Australia Day Seminar in Tokyo
16.	-5.0	16 Oct 96	3.00 – 3.05 pm	RBA commentary (*Bulletin*)
17.	5.0	25 Jun 97	4.10 – 4.15 pm	–
18.	5.0	2 Jul 97	11.25 – 11.30 am	Building approvals & retail sales
19.	-5.0	24 Jul 97	11.30 – 11.35 am	AWOTE
20.	-5.0	19 Aug 97	3.00 – 3.05 pm	RBA commentary (*Bulletin*)
21.	4.0	17 Oct 96	8.40 – 8.45 am	–
22.	4.0	29 Jan 97	11.35 – 11.40 am	CPI
23.	-4.0	1 Apr 97	8.30 – 8.35 am	–
24.	4.0	23 Apr 97	11.30 – 11.35 am	CPI
25.	4.0	4 Jun 97	9.30 – 9.35 am	Post-Board dealing intentions

Bond yields

Table C4: Episode I

	Movement (Basis points)	Date	Interval	News item
1.	12.5	11 Aug 94	11.30 – 11.35 am	Labour force
2.	-11.0	25 Jan 94	11.30 – 11.35 am	CPI
3.	11.0	1 Jun 94	11.30 – 11.35 am	GDP
4.	-10.5	17 Aug 94	9.30 – 9.35 am	Monetary policy announcement
5.	-10.5	24 Oct 94	9.30 – 9.35 am	Monetary policy announcement
6.	-9.5	30 Jun 94	8.40 – 8.45 am	–
7.	-9.5	1 Feb 95	11.30 – 11.35 am	Retail sales, building approvals & balance of payments
8.	9.0	9 Mar 95	11.30 – 11.35 am	Labour force
9.	-9.0	31 Mar 95	11.30 – 11.35 am	Retail sales & GDP
10.	-8.5	27 Jul 94	11.30 – 11.35 am	CPI
11.	-8.5	25 Jan 95	11.30 – 11.35 am	CPI
12.	8.5	10 May 94	7.30 – 7.35 pm	Federal Budget
13.	8.0	30 Nov 94	11.30 – 11.35 am	GDP
14.	8.0	29 Sep 94	11.30 – 11.35 am	Building approvals & balance of payments
15.	8.0	7 Dec 94	2.00 – 2.05 pm	–
16.	-8.0	1 Jul 94	2.40 – 2.45 pm	–
17.	8.0	4 May 94	4.25 – 4.30 pm	–
18.	7.5	13 Oct 94	11.30 – 11.35 am	Labour force
19.	7.5	4 Mar 94	2.35 – 2.40 pm	–
20.	-7.5	10 May 94	10.15 – 10.20 am	–
21.	7.0	7 Dec 94	9.35 – 9.40 am	Post-Board dealing intentions
22.	-7.0	29 Jun 94	4.15 – 4.20 pm	–
23.	-7.0	5 May 94	3.40 – 3.45 pm	–
24.	6.5	17 Mar 94	2.00 – 2.05 pm	–
25.	-6.5	29 Nov 94	11.30 – 11.35 am	Building approvals & balance of payments

Table C5: Episode II

	Movement (Basis points)	Date	Interval	News Item
1.	16.0	18 May 95	9.50 – 9.55 am	–
2.	13.5	26 Jul 95	11.30 – 11.35 am	CPI
3.	12.0	9 May 96	3.45 – 3.50 pm	–
4.	-12.0	18 May 95	9.55 – 10.00 am	–
5.	11.5	11 May 95	11.30 – 11.35 am	Labour force
6.	10.5	31 May 95	2.40 – 2.45 pm	–
7.	10.5	30 Jun 95	11.30 – 11.35 am	Building approvals & balance of payments
8.	-10.5	24 Apr 96	11.30 – 11.35 am	AWOTE
9.	-10.0	9 May 96	3.50 – 3.55 pm	–
10.	-9.0	27 Apr 95	11.30 – 11.35 am	CPI & AWOTE
11.	8.5	13 Jul 95	11.30 – 11.35 am	Labour force
12.	8.5	11 Jan 96	11.30 – 11.35 am	Labour force
13.	-8.0	4 Mar 96	8.50 – 8.55 am	–
14.	8.0	29 May 96	11.30 – 11.35 am	GDP
15.	7.5	25 Oct 95	11.30 – 11.35 am	CPI
16.	7.0	21 Apr 95	11.30 – 11.35 am	Merchandise imports
17.	7.0	21 Feb 96	9.00 – 9.05 am	–
18.	-7.0	4 May 95	11.30 – 11.35 am	Building approvals & balance of payments
19.	-7.0	23 Apr 96	11.30 – 11.35 am	CPI
20.	6.5	25 Oct 95	11.35 – 11.40 am	CPI
21.	-6.5	9 May 95	7.35 – 7.40 pm	Federal Budget
22.	6.0	10 May 95	3.15 – 3.20 pm	–
23.	-6.0	21 Jun 95	10.25 – 10.30 am	–
24.	6.0	21 Feb 96	8.45 – 8.50 am	–
25.	-5.5	29 Sep 95	11.30 – 11.35 am	Building approvals & balance of payments

Table C6: Episode III

	Movement (Basis points)	Date	Interval	News item
1.	-26.5	11 Dec 96	9.30 – 9.35 am	Monetary policy announcement
2.	-13.0	11 Sep 97	11.30 – 11.35 am	Labour force
3.	-12.5	31 Jul 96	9.30 – 9.35 am	Monetary policy announcement
4.	-12.0	12 Jun 97	11.30 – 11.35 am	Labour force & financial aggregates
5.	9.0	13 May 97	7.30 – 7.35 pm	Federal Budget
6.	8.0	3 Sep 96	11.30 – 11.35 am	Retail sales
7.	-8.0	24 Oct 96	11.30 – 11.35 am	AWOTE
8.	7.0	24 Jul 96	11.30 – 11.35 am	CPI
9.	-7.0	23 May 97	9.30 – 9.35 am	Monetary policy announcement
10.	-6.5	10 Apr 97	11.30 – 11.35 am	Labour force & financial aggregates
11.	6.0	2 Jul 97	11.25 – 11.30 am	Building approvals and retail sales
12.	-6.0	30 Jul 97	9.30 – 9.35 am	Monetary policy announcement
13.	6.0	4 Sep 97	11.30 – 11.35 am	Retail sales
14.	5.5	8 May 97	11.40 – 11.45 am	Governor's Semi Annual Statement & labour force
15.	5.5	26 Aug 96	4.25 – 4.00 pm	–
16.	-5.0	21 Aug 96	2.05 – 2.10 pm	–
17.	-5.0	30 May 97	11.30 – 11.35 am	Retail sales
18.	5.0	20 Aug 96	7.30 – 7.35 pm	Federal Budget
19.	4.5	29 Nov 96	8.45 – 8.50 am	Comments by the Governor at the CEDA AGM dinner
20.	4.5	6 Feb 97	11.30 – 11.35 am	AWOTE
21.	-4.5	10 Jul 97	11.30 – 11.35 am	Labour force & financial aggregates
22.	-4.0	25 Jul 96	11.30 – 11.35 am	AWOTE
23.	4.0	30 Jan 97	9.30 – 9.35 am	–
24.	-4.0	13 Mar 97	11.30 – 11.35 am	Labour force
25.	4.0	23 Apr 97	11.30 – 11.35 am	CPI

Appendix D: 25 Largest Movements in Yields During 15-minute Intervals[23]

Bill Yields

Table D1: Episode I

	Movement (Basis points)	Date	Interval	News item
1.	26.0	14 Dec 94	9.30 – 9.45 am	Monetary policy announcement
2.	-26.0	31 Mar 95	11.30 – 11.45 am	Retail sales & GDP
3.	-16.0	1 Feb 95	11.30 – 11.45 am	Retail sales, building approvals & balance of payments
4.	16.0	11 Aug 94	11.30 – 11.45 am	Labour force
5.	-14.0	25 Jan 95	11.30 – 11.45 am	CPI
6.	12.0	30 Nov 94	11.30 – 11.45 am	GDP
7.	11.0	28 Jun 94	Open – 8.45 am	–
8.	10.0	30 Jun 94	11.30 – 11.45 am	Building approvals & balance of payments
9.	10.0	27 Jun 94	Open – 8.45 am	–
10.	10.0	1 Dec 94	Open – 8.45 am	–
11.	10.0	14 Dec 94	2.30 – 2.45 pm	–
12.	-9.0	5 Jul 94	2.45 – 3.00 pm	–
13.	-9.0	27 Jul 94	2.00 – 2.15 pm	–
14.	-9.0	16 Jan 95	Open – 8.45 am	–
15.	-9.0	30 Mar 95	11.30 – 11.45 am	Balance of payments
16.	-9.0	31 Mar 95	11.45 – 12.00 pm	Retail sales & GDP
17.	-8.0	7 Dec 94	9.30 – 9.45 am	Post-Board dealing intentions
18.	-8.0	12 Dec 94	9.30 – 9.45 am	–
19.	8.0	15 Mar 95	3.15 – 3.30 pm	–
20.	8.0	31 Mar 95	2.00 – 2.15 pm	–
21.	8.0	28 Jun 94	8.45 – 9.00 am	–
22.	7.0	12 Sep 94	Open – 8.45 am	–
23.	-7.0	27 Jul 94	11.30 – 11.45 am	CPI
24.	7.0	7 Nov 94	Open – 8.45 am	–
25.	7.0	3 Jan 95	Open – 8.45 am	–

Table D2: Episode II

	Movement (Basis points)	Date	Interval	News item
1.	-23.0	27 Apr 95	11.30 – 11.45 am	CPI & AWOTE
2.	-12.0	4 May 95	11.30 – 1.45 am	Building approvals & balance of payments
3	11.0	21 Apr 95	11.30 – 11.45 am	Merchandise imports
4.	11.0	25 Oct 95	11.30 – 11.45 am	CPI
5.	-10.0	11 Mar 96	Open – 8.45 am	–
6.	10.0	21 Apr 95	11.45 – 12.00 pm	Merchandise imports
7.	9.0	11 May 95	11.30 – 11.45 am	Labour force
8.	9.0	11 Jan 96	11.30 – 11.45 am	Labour force
9.	-8.0	27 Apr 95	11.45 – 12.00 pm	CPI & AWOTE
10.	6.0	26 Apr 95	Open – 8.45 am	–
11.	6.0	13 Jul 95	11.30 – 11.45 am	Labour force
12.	6.0	26 Jul 95	11.30 – 11.45 am	CPI
13.	6.0	4 Mar 96	Open – 8.45 am	–
14.	6.0	28 Mar 96	2.00 – 2.15 pm	Governor's speech to Australian Business Economists
15.	6.0	30 Jun 95	11.30 – 11.45 am	Building approvals & balance of payments
16.	5.0	24 Apr 95	11.00 – 11.15 am	–
17.	5.0	20 Apr 95	Open – 8.45 am	–
18.	-5.0	21 Jun 95	10.45 – 11.00 am	–
19.	-5.0	29 Sep 95	11.30 – 11.45 am	Building approvals & balance of payments
20.	5.0	20 Jun 95	11.30 – 11.45 am	Merchandise imports
21.	-5.0	7 Jul 95	2.15 – 2.30 pm	–
22.	-5.0	13 Sep 95	2.30 – 2.45 pm	–
23.	-5.0	11 Apr 96	11.30 – 11.45 am	Labour force
24.	5.0	30 Jun 95	11.45 – 12.00 pm	Building approvals & balance of payments
25.	-4.0	19 Sep 95	11.30 – 11.45 am	Merchandise imports

[23] When one of the 25 largest movements cannot be attributed to a particular news item from Table 1, it is represented by '–'.

Table D3: Episode III

	Movement (Basis points)	Date	Interval	News Item
1.	-44.0	11 Dec 96	9.30 – 9.45 am	Monetary policy announcement
2.	-32.0	23 May 97	9.30 – 9.45 am	Monetary policy announcement
3	-28.0	31 Jul 96	9.30 – 9.45 am	Monetary policy announcement
4.	-21.0	11 Sep 97	11.30 – 11.45 am	Labour force
5.	-15.0	24 Oct 96	11.30 – 11.45 am	AWOTE
6.	-10.0	10 Jul 97	11.30 – 11.45 am	Labour force & financial aggregates
7.	9.0	1 May 97	11.30 – 11.45 am	AWOTE & building approvals
8.	8.0	17 Oct 96	Open – 8.45 am	–
9.	-8.0	30 Jul 97	9.30 – 9.45 am	Monetary policy announcement
10.	7.0	6 Feb 97	11.30 – 11.45 am	AWOTE
11.	7.0	25 Jun 97	4.00 – 4.15 pm	–
12.	7.0	20 Aug 96	7.30 – 7.45 pm	Federal budget
13.	-6.0	7 Aug 96	2.00 – 2.15 pm	–
14.	6.0	3 Sep 96	11.30 – 11.45 am	Retail sales
15.	6.0	5 Sep 96	2.00 – 2.15 pm	Governor's BZW Australia Day Seminar in Tokyo
16.	6.0	29 Jan 97	11.30 – 11.45 am	CPI
17.	5.0	30 Sep 97	11.30 – 11.45 am	Building approvals & retail sales
18.	5.0	16 Oct 96	3.00 – 3.15 pm	RBA commentary (*Bulletin*)
19.	5.0	4 Dec 96	9.30 – 9.45 am	Post-Board dealing intentions
20.	-5.0	10 Apr 97	11.30 – 11.45 am	Labour force & financial aggregates
21.	5.0	2 Jul 97	11.15 – 11.30 am	Building approvals & retail sales
22.	5.0	16 Jul 97	8.45 – 9.00 am	–
23.	-5.0	24 Jul 97	11.30 – 11.45 am	AWOTE
24.	4.0	23 Apr 97	11.30 – 11.45 am	CPI
25.	4.0	4 Sep 96	9.30 – 9.45 am	Post-Board dealing intentions

Bond yields

Table D4: Episode I

	Movement (Basis points)	Date	Interval	News item
1.	16.5	11 Aug 94	11.30 – 11.45 am	Labour force
2.	-16.5	24 Oct 94	9.30 – 9.45 am	Monetary policy announcement
3	-15.0	16 Sep 94	Open – 8.45 am	–
4.	13.0	30 Nov 94	11.30 – 11.45 am	GDP
5.	-13.0	25 Jan 95	11.30 – 11.45 am	CPI
6.	-11.5	23 Nov 94	9.30 – 9.45 am	–
7.	-11.0	25 Jan 95	11.30 – 11.45 am	CPI
8.	-10.5	22 Jun 94	Open – 8.45 am	–
9.	-10.5	14 Dec 94	9.30 – 9.45 am	Monetary policy announcement
10.	10.0	26 Oct 94	11.30 – 11.45 am	CPI
11.	-9.5	4 Aug 94	3.45 – 4.00 pm	–
12.	-9.5	17 Aug 94	9.30 – 9.45 am	Monetary policy announcement
13.	9.5	13 Oct 94	11.30 – 11.45 am	Labour force
14.	-9.5	1 Feb 95	11.30 – 11.45 am	Retail sales, building approvals & balance of payments
15.	9.5	9 Mar 95	11.30 – 11.45 am	Labour force
16.	-9.0	10 May 94	10.00 – 10.15 am	–
17.	9.0	18 May 94	8.45 – 9.00 am	–
18.	-9.0	29 Jun 94	4.00 – 4.15 pm	–
19.	-9.0	30 Jun 94	Open – 8.45 am	–
20.	9.0	30 Jun 94	8.45 – 9.00 am	–
21.	-9.0	28 Feb 95	Open – 8.45 am	–
22.	-9.0	31 Mar 95	11.30 – 11.45 am	Retail sales & GDP
23.	8.5	31 Mar 95	2.00 – 2.15 pm	–
24.	-8.5	12 Jul 94	9.30 – 9.45 am	–
25.	8.5	16 Sep 94	8.45 – 9.00 am	–

Table D5: Episode II

	Movement (Basis points)	Date	Interval	News item
1.	16.5	25 Oct 95	11.30 – 11.45 am	CPI
2.	15.5	26 Jul 95	11.30 – 11.45 am	CPI
3	15.0	31 May 95	2.30 – 2.45 pm	–
4.	-12.5	24 Apr 96	11.30 – 11.45 am	AWOTE
5.	12.0	29 May 96	11.30 – 11.45 am	GDP
6.	-10.5	27 Apr 95	11.30 – 11.45 am	CPI & AWOTE
7.	10.0	11 May 95	11.30 – 11.45 am	Labour force
8.	10.0	21 Feb 96	8.45 – 9.00 am	–
9.	9.5	30 Jun 95	11.30 – 11.45 am	Building approvals & balance of payments
10.	-9.0	4 Mar 96	8.45 – 9.00 am	–
11.	8.5	21 Apr 95	11.30 – 11.45 am	Merchandise imports
12.	-8.5	10 May 95	Open – 8.45 am	–
13.	-8.0	2 Aug 95	12.00 – 12.15 pm	–
14.	8.0	30 Jun 95	11.45 – 12.00 pm	Building approvals & balance of payments
15.	7.5	13 Jul 95	11.30 – 11.45 am	Labour force
16.	-7.5	26 Oct 95	11.30 – 11.45 am	AWOTE
17.	-7.5	23 Apr 96	11.30 – 11.45 am	CPI
18.	-7.0	4 May 95	11.30 – 11.45 am	Building approvals & balance of payments
19.	-7.0	19 Sep 95	11.30 – 11.45 am	Merchandise imports
20.	7.0	11 Jan 96	11.30 – 11.45 am	Labour force
21.	7.0	10 May 95	4.00 – 4.15 pm	–
22.	-6.5	10 May 95	8.45 – 9.00 am	After Federal Budget
23.	-6.0	11 Apr 96	11.30 – 11.45 am	Labour force
24.	-6.0	21 Jun 95	10.15 – 10.30 am	–
25.	-5.5	31 Jul 95	11.30 – 11.45 am	Building approvals & balance of payments

Table D6: Episode III

	Movement (Basis points)	Date	Interval	News Item
1.	-30.0	11 Dec 96	9.30 – 9.45 am	Monetary policy announcement
2.	-14.5	11 Sep 97	11.30 – 11.45 am	Labour force
3	-11.5	10 Apr 97	11.30 – 11.45 am	Labour force & financial aggregates
4.	-11.5	12 Jun 97	11.30 – 11.45 am	Labour force & financial aggregates
5.	10.5	3 Sep 96	11.30 – 11.45 am	Retail sales
6.	-10.5	31 Jul 96	9.30 – 9.45 am	Monetary policy announcement
7.	-10.0	30 May 97	11.30 – 11.45 am	Retail sales
8.	9.0	13 May 97	7.30 – 7.45 pm	Federal Budget
9.	9.0	24 Jul 96	11.30 – 11.45 am	CPI
10.	-9.0	24 Oct 96	11.30 – 11.45 am	AWOTE
11.	-8.0	23 May 97	9.30 – 9.45 am	Monetary policy announcement
12.	-8.0	10 Jul 97	11.30 – 11.45 am	Labour force & financial aggregates
13.	-7.5	21 Aug 96	2.00 – 2.15 pm	–
14.	7.5	6 Feb 97	11.30 – 11.45 am	AWOTE
15.	7.5	2 Jul 97	11.15 – 11.30 am	Retail sales & building approvals
16.	7.5	11 Aug 97	2.15 – 2.30 pm	–
17.	7.0	23 Apr 97	11.30 – 11.45 am	CPI
18.	-6.5	12 Dec 96	11.45 – 12.00 pm	Labour force
19.	6.5	1 May 97	11.30 – 11.45 am	AWOTE
20.	6.0	27 Aug 96	8.45 – 9.00 am	–
21.	6.0	29 Jan 97	11.30 – 11.45 am	CPI
22.	-6.0	31 Jul 97	11.30 – 11.45 am	Retail sales
23.	6.0	7 Aug 97	11.30 – 11.45 am	Labour force
24.	-5.5	19 Aug 97	3.15 – 3.30 pm	RBA commentary (*Bulletin*)
25.	-5.0	30 Jul 97	9.30 – 9.45 am	Monetary policy announcement

Table D7: Number of Times Each News Item Contributes to the 25 Largest Movements in Bill and Bond Yields (15-minute Intervals)

	Bill yields			
	Episode I	Episode II	Episode III	Total
RBA policy announcements	1	–	4	5
RBA commentary	0	1	2	3
Post-Board dealing intentions	1	0	2	3
CPI	2	3	2	7
AWOTE	0	1	$3^1/_2$	$4^1/_2$
Labour force	1	4	2	7
Retail sales	$1^1/_3$	0	2	$3^1/_3$
GDP	2	0	0	2
Imports	0	4	0	4
Building approvals	$^5/_6$	2	$1^1/_2$	$4^1/_3$
Balance of payments	$1^5/_6$	2	0	$3^5/_6$
Financial aggregates	0	0	1	1
Fiscal policy statements	0	0	1	1
Unidentified	14	8	4	26
	25	25	25	75

	Bond yields			
	Episode I	Episode II	Episode III	Total
RBA policy announcements	3	–	4	7
RBA commentary	0	0	1	1
Post-Board dealing intentions	0	0	0	0
CPI	3	$3^1/_2$	3	$9^1/_2$
AWOTE	0	$2^1/_2$	3	$5^1/_2$
Labour force	3	4	$4^1/_2$	$11^1/_2$
Retail sales	$^5/_6$	0	$3^1/_2$	$4^1/_3$
GDP	$1^1/_2$	1	0	$2^1/_2$
Imports	0	2	0	2
Building approvals	$^1/_3$	2	$^1/_2$	$2^5/_6$
Balance of payments	$^1/_3$	2	0	$2^1/_3$
Financial aggregates	0	0	$1^1/_2$	$1^1/_2$
Fiscal policy statements	0	1	1	2
Unidentified	13	7	3	23
	25	25	25	75

Appendix E: Empirical Results

Table E1: Impact of Announcements

	Bill yields							
	Episode I		Episode II		Episode III		Whole period	
Constant	0.3	(9.62)	0.2	(7.59)	0.2	(7.38)	0.2	(14.18)
RBA policy announcements	11.7	(6.81)	–	–	21.9	(3.35)	18.1	(4.06)
RBA commentary	0.9	(1.23)	0.8	(2.93)	2.2	(2.29)	1.3	(2.98)
Post-Board market operations	1.0	(1.13)	0.1	(0.91)	2.0	(3.54)	1.0	(2.70)
CPI	5.3	(2.09)	6.1	(3.03)	1.4	(2.35)	4.3	(3.48)
AWOTE	-0.6	(-0.56)	3.5	(1.84)	6.6	(3.57)	3.4	(2.73)
Labour force	2.9	(2.37)	2.4	(2.77)	2.1	(3.91)	2.2	(4.13)
Retail trade	2.2	(2.38)	0.0	(-0.09)	1.2	(3.23)	1.1	(2.40)
GDP	5.5	(2.02)	0.8	(2.01)	0.6	(1.89)	2.3	(2.02)
Imports	0.7	(1.73)	1.8	(3.34)	0.1	(0.57)	1.1	(3.38)
Building approvals	0.1	(0.08)	1.4	(2.00)	0.0	(0.02)	1.1	(2.76)
Balance of payments	3.4	(2.56)	1.8	(2.61)	0.2	(1.26)	1.6	(3.62)
Financial aggregates	0.4	(0.75)[a]	0.0	(-0.06)[a]	-0.3	(-0.60)[a]	0.1	(0.42)[a]
	–	–	–	–	0.8	(2.39)[b]	0.7	(2.19)[b]
Adjusted R^2	0.42		0.44		0.64		0.46	
DW statistic	1.89		1.92		1.99		1.95	
S E of regression	1.26		0.86		1.28		1.24	
Number of observations	936		927		942		2 805	

	Bond yields							
	Episode I		Episode II		Episode III		Whole period	
Constant	0.6	(15.23)	0.5	(15.06)	0.4	(15.15)	0.5	(25.80)
RBA policy announcements	7.4	(3.62)	–	–	10.2	(2.62)	9.2	(3.56)
RBA commentary	2.0	(2.21)	0.6	(1.86)	1.0	(2.51)	1.2	(3.13)
Post-Board market operations	0.4	(1.68)	-0.1	(-1.38)	0.3	(3.09)	0.2	(1.93)
CPI	6.9	(5.63)	6.7	(3.66)	2.6	(2.47)	5.5	(5.76)
AWOTE	-1.8	(-1.60)	2.8	(1.45)	4.3	(5.16)	1.9	(1.96)
Labour force	3.6	(4.02)	3.0	(3.30)	3.3	(3.75)	3.1	(5.88)
Retail trade	1.0	(2.40)	0.1	(0.24)	2.5	(3.91)	1.0	(3.10)
GDP	5.7	(3.47)	1.6	(1.13)	0.5	(1.43)	2.5	(2.69)
Imports	0.7	(2.34)	2.5	(5.49)	0.1	(0.89)	1.5	(4.65)
Building approvals	0.6	(0.91)	1.2	(2.03)	-0.9	(-1.02)	0.9	(2.87)
Balance of payments	2.3	(3.06)	1.9	(3.18)	0.2	(1.10)	1.4	(4.63)
Financial aggregates	0.1	(0.29)[a]	0.0	(0.21)[a]	-0.1	(-0.49)[a]	0.0	(0.31)[a]
	–	–	–	–	1.5	(2.01)[b]	1.5	(1.94)[b]
Adjusted R^2	0.51		0.45		0.49		0.41	
DW statistic	1.95		1.86		1.97		1.90	
S E of regression	0.93		0.92		0.99		1.01	
Number of observations	936		927		942		2 805	

Notes: (a) Announced at 9.30 am.

(b) Announced at 11.30 am.

T-ratios are in parentheses.

When heteroskedasticity is present, White's heteroskedasticity-consistent standard errors are used to calculate t-ratios.

Table E2: Average Absolute Surprises

	Episode I	Episode II	Episode III	Whole period
RBA policy announcements (basis points)	41	–	38	40
Underlying inflation (%)	0.1	0.3	0.1	0.2
AWOTE (%)	0.4	0.3	0.3	0.3
Employment ('000)	21.2	33.2	21.5	25.3
Retail trade (%)	1.6	0.9	1.2	1.2
GDP (%)	0.5	0.5	0.2	0.4
Imports (%)	1.3	4.0	2.1	2.5
Building approvals (%)	4.7	3.7	4.0	4.1
Balance of payments ($b)	0.157	0.171	0.258	0.196

Table E3: Reactions to Average Surprises

Bill yields

	Episode I		Episode II		Episode III		Whole period	
Constant	-0.1	(-2.11)	0.0	(-0.46)	0.1	(3.62)	0.0	(-1.12)
Policy announcements	8.8	(7.60)	–	–	23.3	(8.97)	17.4	(4.33)
Underlying inflation	5.3	(2.43)	7.8	(3.46)	0.6	(9.64)	4.6	(3.83)
AWOTE	0.8	(0.96)	1.4	(2.51)	6.1	(4.19)	2.4	(2.23)
Employment	3.1	(5.39)	2.7	(3.62)	2.0	(5.55)	2.5	(5.84)
Retail trade	1.7	(2.06)	0.3	(1.59)	0.9	(3.84)	1.0	(3.10)
GDP	5.2	(1.48)	0.7	(2.30)	0.0	(-0.04)	1.9	(1.60)
Imports	-0.1	(-0.11)	1.7	(3.59)	0.3	(2.53)	0.9	(3.52)
Building approvals	0.8	(0.88)	1.7	(3.13)	0.5	(2.29)	1.0	(2.13)
Balance of payments	2.6	(5.76)	2.1	(2.43)	0.1	(0.62)	1.5	(2.02)
Adjusted R^2	0.44		0.56		0.82		0.53	
DW statistic	2.10		1.90		2.08		2.07	
S E of regression	1.31		0.79		0.93		1.21	
Number of observations	936		927		942		2 805	

Bond yields

	Episode I		Episode II		Episode III		Whole period	
Constant	0.0	(0.09)	0.0	(-0.29)	0.0	(0.89)	0.0	(-0.95)
Policy announcements	-2.1	(-0.62)	–	–	10.6	(3.12)	5.3	(1.62)
Underlying inflation	5.7	(5.75)	7.9	(7.10)	2.0	(5.03)	5.0	(8.16)
AWOTE	0.2	(0.54)	3.3	(2.66)	3.5	(3.61)	2.0	(2.20)
Emplyment	3.3	(20.96)	3.2	(4.31)	3.6	(6.30)	3.2	(7.03)
Retail trade	1.2	(2.16)	0.9	(3.62)	1.8	(3.24)	1.3	(4.24)
GDP	6.1	(11.44)	2.2	(1.83)	-0.1	(-0.13)	2.7	(3.59)
Imports	0.0	(0.05)	2.3	(5.77)	0.2	(1.64)	1.2	(4.97)
Building approvals	0.7	(1.49)	1.5	(2.12)	0.5	(3.49)	0.9	(2.15)
Balance of payments	2.3	(7.51)	2.1	(2.81)	0.3	(1.95)	1.5	(2.68)
Adjusted R^2	0.45		0.54		0.56		0.39	
DW statistic	2.02		1.98		2.07		2.02	
S E of regression	1.14		0.94		1.00		1.16	
Number of observations	936		927		942		2 805	

Notes: T-ratios are in parentheses.

When heteroskedasticity is present, White's heteroskedasticity-consistent standard errors are used to calculate t-ratios.

Table E4: Does the Market Respond Only to Unexpected News?

	Bill yields				Bond yields			
Constant		0.3	(18.30)			0.5	(40.79)	
	Dummy for Announcement		Absolute Surprise		Dummy for Announcement		Absolute Surprise	
Policy announcements	2.8	(0.55)	15.6	(2.28)	7.0	(1.71)	2.2	(0.49)
Underlying inflation	0.7	(0.56)	3.5	(2.77)	2.2	(1.98)	3.2	(3.33)
AWOTE	3.6	(2.21)	-0.1	(-0.12)	1.8	(1.74)	0.2	(0.15)
Employment	-0.4	(-0.65)	2.5	(4.07)	0.2	(0.42)	2.9	(4.57)
Retail trade	0.6	(0.79)	0.4	(0.79)	0.0	(0.09)	0.9	(2.41)
GDP	0.9	(1.14)	1.3	(1.08)	-0.8	(-1.24)	3.2	(4.25)
Imports	-0.2	(-0.42)	1.0	(2.85)	0.2	(0.44)	1.1	(3.09)
Building approvals	0.2	(0.32)	0.8	(1.62)	0.2	(0.40)	0.7	(2.00)
Balance of payments	1.4	(1.93)	0.1	(0.16)	0.6	(1.07)	0.7	(1.33)
Adjusted R^2		0.57				0.52		
DW statistic		1.93				1.90		
S E of regression		1.11				0.91		
Number of observations		2 805				2 805		

Notes: T-ratios are in parentheses.

When heteroskedasticity is present, White's heteroskedasticity-consistent standard errors are used to calculate t-ratios.

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