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Managing expectations by words and deeds: monetary policy in Asia and the Pacific[1]

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Abstract

We examine some of the most basic devices that major central banks in Asia and the Pacific use to communicate with markets. First, we consider gradualism and reversal aversion in the setting of policy rates and argue that these patterns of behavior help market participants form expectations of future policy rates. Second, we analyse the statements released at the time of policy decisions and suggest that it is not so much the length of the statement that matters but the extent to which it focuses on forward-looking information. We then propose two tests for the effectiveness of central bank communication. The first is a version of the expectations hypothesis of the term structure of interest rates, which is a joint test of the effectiveness of communication and the informational efficiency of the domestic fixed-income market. The second is a surprises test, which compares the reaction of longer term interest rates to policy announcements with the reaction to macroeconomic news.

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Managing expectations by words and deeds: monetary policy in Asia and the Pacific

Alicia Garcia-Herrero and Eli M. Remolona

1. Introduction

In economies where financial markets play a significant role, expectations of market participants are naturally a significant channel for monetary policy. Indeed it is because such markets are forward-looking and expectations so important that the issues of transparency and communication come to the fore. As Svensson (2004) put it, "monetary policy is to a large extent the management of expectations."

In Asia and the Pacific, many central banks have chosen as their operating target an overnight interest rate, one Blinder (1998) has characterised as "an interest rate that is relevant to virtually no economically interesting transactions." This policy rate must somehow be connected to the interest rates that do matter, and the connection would often involve expectations about future policy rates. If such expectations were reflected in an effective yield curve, then the conduct of monetary policy would essentially be about managing market expectations so as to shape that yield curve.

In this paper, we argue that central banks in Asia and the Pacific have been learning to conduct monetary policy so as to take advantage of the market expectations channel. Their efforts to manage market expectations have led to certain patterns of behavior that seem to help market participants devise useful heuristics to form expectations about monetary policy. These patterns of behavior include gradualism and reversal aversion in setting policy rates. The central banks also now tend to release policy statements that vary widely in length across central banks but that are also somewhat shorter and contain somewhat more forward-looking information than before.

We propose two tests for the effectiveness of central bank communication in managing market expectations. The first is a version of the expectations hypothesis of the term structure of interest rates, which is a joint test of the effectiveness of communication and the informational efficiency of the domestic fixed-income market. The second is a surprises test, which compares the reaction of longer term interest rates to policy announcements with the reaction to macroeconomic news.

In what follows, we first briefly review the literature on monetary policy as management of market expectations. We then examine in section 3 how central banks in the region seem to

manage expectations in the way they adjust their operating targets. In section 4, we analyse the management of expectations through the statements that central banks typically release at the time of policy rate decisions. In section 5, we provide a preliminary investigation of the impact on markets of such management of expectations.

2. Monetary policy as management of market expectations

2.1 Channels of monetary policy and interest rates that matter

In the macroeconomics literature, the channel of choice for monetary policy initially focused on the money channel. In the 1960s, Patinkin (1965) and Friedman (1968) thought of the money channel in terms of a real balance effect and liquidity effect as the driving factors in the transmission mechanism. In the 1970s, Lucas (1972) and Sargent and Wallace (1975) introduced the notion of rational expectations even while continuing to assume that the transmission mechanism depended largely on the money channel.

It was in the 1990s that Taylor (1993) specified monetary policy rules in which the transmission mechanism worked mainly through interest rates. Also during this period, Bernanke and Gertler (1995) emphasized the credit channel, in which a risk premium for external finance played an important role. In the latter part of the 1990s, economists began to see monetary policy as working mainly through the expectations channel, although in the theoretical literature the object of expectations was inflation rather than interest rates. To Woodford (2005), for example, expectations matter and little else does. As Svensson (2005) put it, "monetary policy is to a large extent the management of expectations".

What exactly are the expectations to be managed? The theoretical literature has continued to emphasize inflationary expectations, and standard macroeconomic models continue to assume that the central bank already controls "the" interest rate. In practice, however, there are many interest rates and the one the central bank controls is not necessarily the one that has the greatest influence on real activity. In the recent empirical literature and in contrast to the theoretical literature, tests of transparency do tend to focus on interest rates as the object of expectations and thus implicitly rely on the expectations hypothesis of the term structure of interest rates. Kohn and Sack (2003), for example, look at movements in such interest rates to see whether "central bank talk" matters. Similarly, Fracasso, Genberg and Wyplosz (2003) measure surprises in terms of movements in one-month, three-month and 12-month interest rates to evaluate the quality of inflation reports.

In Asia and the Pacific, central banks have increasingly chosen an overnight or one-day interest rate as the operating objective of monetary policy. Table 1 lists for 12 central banks

in the region the choice of the specific policy rate target. For seven of the central banks, the policy rate is an overnight rate. This rate is either an interbank rate, such as in Australia, Japan, Korea, Malaysia and New Zealand, or a repo rate, such as in India and the Philippines. For an eighth central bank, the Bank of Thailand, the policy rate is the one-day repo rate. At the moment, Bank Indonesia targets the interest rate on its own one-month debt certificates (called SBI), which are auctioned weekly. The People's Bank of China targets a variety of interest rates, including one-year bank benchmark lending and deposit rates. The two remaining central banks, the Hong Kong Monetary Authority and the Monetary Authority of Singapore, have exchange rate targets; the former has a currency board that pegs to the US dollar, while the latter has a nominal effective exchange rate target.

The common use of an overnight or one-day interest rate as the operating target by central banks in the region was not always the case. Until 2004, the Bank Negara Malaysia still used a "three-month CB intervention rate" as its policy rate, and until 2006, the Bank of Thailand relied on the 14-day repo rate. There are also reports that Bank Indonesia will soon switch to an overnight interest rate for its operating target.

The interest rate targets identified above are seldom the rates that drive consumption or investment decisions in the economy at large. As emphasized by Shin (2008), short-term interbank rates are important because they reflect liquidity in the banking system, and the functioning of the whole financial system may depend on such liquidity. Nonetheless, for as long as the system functions well, the central bank will want to influence longer term interest rates for purposes of monetary policy. Table 2 lists for each of 12 economies the interest rates that evidently matter, that is, the interest rates that serve as a basis for pricing residential mortgages, bank business loans and medium or long-term financing. Bank loans extended to businesses tend to be priced in reference to interbank rates with a wide range of maturities but typically a 3-month rate. Residential mortgages come in two basic forms, variable-rate and fixed-rate. The variable rates appear to be commonly linked to short-term interbank rates and the fixed-rates to swap yields. Medium-term and long-term financing is typically available in maturities ranging from one year to five years and in some cases up to 10 years, with interest rates linked to yields taken from either a swaps curve or a government bond curve.

The question then is why not target directly the interest rates that matter? The most important reason is probably that short-term interest rates are what central banks can most effectively control. As shown in Table 1, most central banks do tend to operate in the money markets in conducting liquidity operations. Hence, the operating target tends to be set either in the same market in which the central banks operate or in a closely related market where tie interest rates together. Woodford (2005a) also suggests that a central bank can hardly

have a view about the appropriate level of bond prices at each point in time. In addition, under the expectations hypothesis, a consequence of targeting long-term rates would be the spikes in volatility that a change in such target would cause in short-term rates. This last consideration appears to be the reason for the planned switch by Bank Indonesia from the one-month SBI to an overnight rate for its operating target.

2.2 Expectations and the yield curve

To influence the interest rates that matter, central banks must somehow rely on market expectations. These expectations would determine the yield curve, which then provides the reference points for the interest rates do that matter. The importance of the yield curve, however, tends to be neglected in discussions of the expectations channel. Indeed in the macroeconomics of rational expectations, the yield curve is redundant. Economic agents would use all available information to calculate all prices and interest rates in the future and make their consumption and investment decisions accordingly. The central bank's communication policy in this case is simply to be as transparent as possible. The appropriate policy could then well be described as a "data dump" in which market participants are left to process the information on their own and figure out what the central bank is likely to do in the future.

One possible reason for the reluctance in the macroeconomics literature to take yield curves more seriously is the apparent empirical rejection of the expectations hypothesis, in which implied forward rates seem to be systematically biased predictors of future short-term interest rates. Indeed Blinder (2006) has pointed to the failure of this hypothesis as one of the two most important research issues in monetary economics. In fact, however, there has been a breakthrough in the asset pricing literature that allows one to demonstrate that expectations do drive yield curves, at least in the United States. In particular, Duffee (2002) and Dai and Singleton (2002) have used affine-yield models to analyze the behavior of term premia. They show that once term premia are properly accounted for, forward rates extracted from yield curves do reflect closely expectations of future short-term interest rates.

One reason to take yield curves seriously is that these are what market participants now rely on to reconcile varying views on what future short-term interest rates are likely to be. In a world where cognitive resources of time, memory and analytical capacity are limited, Tversky and Kahneman (1974) have shown that "people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simpler judgmental operations. In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors." Gabaix and Laibson (2000) have modeled such

heuristics in terms of proxy value functions. In market economies, yield curves are likely to play important roles in the heuristics about future interest rates.

We argue in this paper that in general experience teaches central banks to understand this behavior in markets, so that they will try to conduct monetary policy in ways that allow for heuristics that will not lead market participants to serious errors in judgment. In market-oriented economies, these heuristics often place the yield curve at center stage, and monetary policy becomes effective to the extent that the authorities can influence the shape of this curve.

3. Managing expectations by deeds: gradualism and reversal aversion

In this section, we analyze two important features of the conduct of monetary policy by central banks in Asia and the Pacific: (a) the size of policy rate adjustments; and (b) how often they make consecutive policy changes in the same direction. The first feature we call gradualism, the second reversal aversion. Together these two devices seem to lead to heuristics that simplify the way market participants think about monetary policy and allow the central bank to more effectively manage market expectations and influence the yield curve.

3.1 Gradualism

Not only have central banks in Asia and the Pacific chosen as their target policy rates "interest rates that do not matter", they have also increasingly been adjusting these policy rates in increments so small that Willem Buiter once characterized the changes as "chicken feed".

Between 2000 and 2007, the ten central banks in our sample that have interest rates as their operating targets have shown an increased tendency to move these policy rates by only 25 basis points at a time. For our purposes, we characterize policy rate moves of 25 basis points or less as "gradual". As shown in Graph 1, in 2000 and 2001, the ten central banks moved their policy rates a total of about 70 times. Of these moves, about half were by 50 basis points of more and half by 25 basis points or less.[2] In 2006 and 2007, the same central banks changed their policy rates 54 times. This time, 46 of the changes were by 25 basis points or less.

[2] The People's Bank of China has tended to move its one-year benchmark lending and deposit rates by 18 or 27 basis points. For purposes of this analysis, we "round off" 27 basis points to 25 basis points.

There is a slight asymmetry in the way central banks make these adjustments in policy rates. It does matter whether the central banks are reducing policy rates or raising them. As shown in Table 3, 77 out of 98 policy rate hikes were by 25 basis points, while only 52 of 92 rate declines were by 25 basis points. In 2007, there were 14 hikes in policy rates and 14 reductions. All the hikes were by 25 basis points or less, while three of the reductions were by 50 basis points or more. In other words, central banks are a bit more likely to make a relatively large move when they are easing monetary policy than when they are tightening.

Some central banks have been more likely to make small policy rate moves than others. As shown in Table 4, 129 out of a total of 190 policy rate moves during the period were by 25 basis points (27 basis points in the case of the People's Bank of China). At the level of the individual central bank, this strong preference for 25-basis-point moves holds for nine of the ten monetary authorities. The sole exception is the Bangko Sentral ng Pilipinas, which made a total of 31 policy rate moves during the period, 42% of them by 25 basis points and 48% by 50 basis points. At the opposite extreme are two central banks, the Bank of Korea, for which 94% of policy rate moves were by 25 basis points, and the Reserve Bank of New Zealand, for which 86% of moves were by 25 basis points.

3.2 Reversal aversion

While central banks in the Asia-Pacific region make only small changes in their policy rates, they also make several of them consecutively in the same direction. This tendency to make several adjustments in the same direction is what we call "reversal aversion". Hence, over time, these gradual moves would cumulate to more than "chicken feed". More importantly, once such monetary policy behavior is established, a single small policy rate move could telegraph further such moves in the future and generate a significant shift in the yield curve.

During the 2000-2007 period, the ten central banks in the region that have chosen interest rates as their operating objectives showed a rather strong tendency to move those rates in the same direction as the last move. As shown in Table 5, 87% of all the policy rate moves were moves in the same direction as the previous one. This tendency was strongest for the Reserve Bank of India, which followed a policy rate move by one in the same direction 90% of the time. In most cases, the frequency was at least 86%. There are only two exceptions here. One is the Bank of Korea, which made consecutive moves in the same direction only 76% of time. The other is the Bank of Japan, which did so only 50% of the time, albeit out of only a total of only five policy rate moves during the period.

The pattern of reversal aversion seems roughly symmetric with respect to rate increases and rate decreases. As shown in Table 6, on average, 87% of policy rate increases were followed

by another rate increase and 86% of policy rate declines by another rate decline. Among the central banks that made at least 20 policy rate moves during the period, the most pronounced asymmetries were those of the Reserve Bank of New Zealand and Bangko Sentral ng Pilipinas. In the case of the former 90% of rate increases were followed by another rate increase, while only 75% of rate decreases were followed by a rate decrease. In the case of the latter, it was 90% for rate increases and 75% for rate decreases.

3.3 The "cat's tail" heuristic

All in all, the way in which central banks in Asia and the Pacific conduct monetary policy seems to have become gradual and reversal averse. This behaviour is sometimes described as "interest-rate smoothing" and is often justified as a way to avoid undue volatility in interest rates. Sack and Wieland (2000) show that such smoothing is optimal in the face of forward-looking behaviour by market participants and uncertainty regarding structural parameters. Rudebusch (2002) argues that such smoothing merely reflects the dynamics in the underlying economy. Nonetheless, it is clear that no amount of macroeconomic modelling can explain the fact that central banks tend to move the overnight rate by exactly 25 basis points and do so in the same direction at regular intervals many times in a row.

In practice, central banks and market participants seem to have developed codes and heuristics to facilitate communication with one another. Before 1994, for example, the US Federal Open Market Committee (FOMC) did not release a policy statement. Instead market participants inferred from the operations of the Federal Reserve Bank of New York what the monetary stance was. As described by Meulendyke (1989), every day after 11:30 a.m., the "desk" of the New York Fed would notify primary dealers of the amount of repo transactions it would like to do and whether the transactions were for foreign official customers or the Federal Reserve system. The code words then were "customer" versus "system", where the former had no implications for monetary stance while the latter did. With the advent of policy announcements, the code words have changed to such terms such as "upside risks" and "downside risks".

Conversations with market participants suggest one possible heuristic that is now used to assess monetary policy in the context of gradualism and reversal aversion. According to this heuristic, central banks move policy rates as if they were trying to cut a cat's tail. They don't know how much to cut and so they cut a little at a time. For market participants, this heuristic seems to simplify enormously the complex task of assessing the likelihoods of the many different paths the policy rate could take. If the central bank can be expected to move the policy rate by only 25 basis points at a time, an investor deciding on a position in two-year government bonds, for example, need only decide how many rate moves the central bank is

likely to make in the same direction over the next two years. It does not matter what the precise policy rates are at each point in time in the future. It matters only what the rate is likely to be two years hence.

By practicing monetary policy with gradualism and reversal aversion, a central bank need only communicate how long into the future it is likely to maintain a stance of easing or tightening to manage market expectations and exert a strong influence on a yield curve. To the extent that signals from the central bank lead market participants to hold different expectations, trading in financial markets will produce a yield curve that reconciles the different expectations.

Note that gradualism here is not the same as interest rate smoothing. Gradualism reflects the central bank's own uncertainty about how much to ease or tighten rather than simply an effort to avoid volatility. The small size of the policy rate moves is a measure of the uncertainty confronting the central bank. This may be one reason the rate declines have a slight tendency to be larger than rate increases: there tends to be less uncertainty about an economy that needs more stimulus than one that needs to be dampened.

4. Managing expectations by words: an analysis of monetary policy statements

We have argued that gradualism and reversal aversion in adjusting the central bank's operating target are devices to communicate monetary policy by deeds. Central banks also communicate by words. Woodford (2005b) has proposed four broad issues about which central banks may communicate: (a) the central bank's interpretation of economic conditions; (b) the policy decision about the operating target; (c) the strategy that guides policy decisions in general; and (d) the outlook for future policy. Gradualism and reversal aversion with regard to the operating target would help to communicate on the last broad issue, the outlook for policy, but communicating the other three would likely require the use of words.

To communicate by words, central bank officials may give speeches, press conference may be held to explain recent policy decisions and minutes of monetary policy committee meetings may be released to the public. One thing that all central banks seem to do these days is to issue a monetary policy statement to accompany a policy rate decision.

Releasing a policy statement is such a standard practice these days that we often forget that this was not the case until fairly recently. The US Federal Open Market Committee did not release a policy statement until February 1994. The first central bank in the region to publish such a statement seems to have been the Reserve Bank Australia, which did so starting in February 1997. The Bank of Korea and the Reserve Bank New Zealand followed in 1999.

The most recent to join the club has been Bank Indonesia, which issued its first monetary policy statement in July 2005.

A monetary policy statement is typically released soon after a monetary policy meeting. Hence, the frequency of statement releases depends on the frequency of meetings. As shown in Table 7, this varies from as much as twice a month in the case of the Bank of Japan to eight times a year in the case of Bank Negara Malaysia and the Reserve Bank of New Zealand. The Reserve Bank of Australia was an exception in this regard. It released a statement every quarter and whenever a change was made in the target cash rate. Until recently, no statement was released when no policy rate change was made. This has now changed, with the bank now releasing a statement after every meeting even when there is no change in the policy rate.

The nature of the statement that is released varies widely across the region and in each case has evolved over time. In the rest of this section, we dig more deeply into the nature of these statements by focusing on their length and on their forward-looking content.

4.1 How long are monetary policy statements?

It is tempting to think that increased transparency in monetary policy would be associated with longer monetary policy statements. After all, the more central banks try to explain, the more market participants would understand monetary policy. In fact, however, once central banks started to publish policy statements, there seems to have been no clear trend to try to "explain more" when we measure "explaining more" in terms of the number of words in a statement. Indeed, if there is a trend among central banks in the Asia-Pacific region, it is to release somewhat shorter statements. It might seem silly to measure transparency or communication in terms of word count alone, but Blinder (2006) has sharply criticized the FOMC because in 1996-1998 the committee issued statements with an average of only 58 words per statement – "thus *under 100 words per year!*" (p 13, emphasis is Blinder's).

Fernandez (2007) analyses over 500 monetary policy statements by seven central banks in the region plus the US Federal Reserve. The central banks in the Fernandez study include Bank Indonesia, Bank of Japan, Bank of Korea, Bank Negara Malaysia, Reserve Bank of New Zealand, Bangko Sentral ng Pilipinas and Bank of Thailand. Fernandez has shared his data with us. To add to his list, we have conducted the same analysis for the Reserve Bank of Australia.

The data show that the length of monetary policy statements has varied widely across central banks and in some cases has evolved over time. As shown in Table 7, the most terse of statements has been that of the US Federal Reserve, with an average of 133 words, a count

has not changed very much over the years. Among the central banks in the region, the Bank of Korea (average 151 words), Bank Negara Malaysia (average 188 words) and Bank of Thailand (average 216 words) have released relatively short statements. The longest statements have been from the Bank of Japan (average 775 words) and Bank Indonesia (average 620 words). In the middle in terms of word count are the Reserve Bank of New Zealand (average 265 words) and Bangko Sentral ng Pilipinas (average 294 words). In the case of the Reserve Bank of Australia, we report a count of 332 words based on the 5 December 2007 "Statement by Glenn Stevens, Governor: Monetary Policy". However, if we based our count on the quarterly "Statement on Monetary Policy", the central bank would have the longest policy statements in the region. In 2007, for example, just the introduction to these statements contained an average of 1,808 words.

Note that more frequent monetary policy meetings do not necessarily lead to shorter statements. The policy committees of the Bank of Japan and Bank of Indonesia meet relatively more frequently than those of the others but they also have among the longest policy statements in the region. It also does not seem to make a difference whether the central bank formally targets inflation. Among the inflation-targeting central banks, the Bank of Korea issues a relatively short statement, while Bank Indonesia issues a relatively long one. Among the non-inflation-targeting central banks, Bank Negara Malaysia releases a relatively short statement, while the Bank of Japan releases a relatively long one.

To the extent that there is a trend in the length of monetary policy statements, it seems to have been towards shorter statements. The word counts for the Bank of Japan, Bank of Korea and Bank of Thailand in earlier periods were significantly higher than they are at present. In the case of the Reserve Bank of Australia, the recent publication of the 332-word "Statement by Glenn Stevens, Governor: Monetary Policy" seems to be consistent with this trend. The monetary policy committee of the Bangko Sentral ng Pilipinas now meets only every six weeks instead of every month but its policy statement has not gotten longer, implying a total yearly word count that is now lower than before.

Is a trend towards shorter statements an indication of less transparency? When one looks deeper into the content of monetary policy statements, the number of words does not seem to be a good measure of transparency. According to Fernández (2007), the relation between the length of monetary policy statements and their information content is rather weak in Asia and the Pacific. In other words, the transparency of central banks – at least when narrowly measured in terms of the forward-looking content of monetary policy statements -- is independent of the length of statements.

4.2 How forward-looking are monetary policy statements?

To better understand the use by central banks of monetary policy statements to communicate with the markets, we look at the information content in those statements. In fact, such statements are often written so that they maintain a certain structure (e.g, a discussion of the domestic growth followed by one on the global economy), so that market participants can skip to the specific section of interest. Even the shortest of all statements, the FOMC statement, is seldom read in its entirety, and typically only one or two sentences will change from one statement to the next. To market participants, the most important information in these statements seems to be the outlook for future policy. Hence, in this section, we focus on the forward-looking content of the statements. For this purpose we rely to a large extent on the assessments of a market participant and watcher of central banks in Asia, namely David Fernandez, Head of Emerging Asia Research of JP Morgan.

To analyse monetary policy statements in Asia, Fernandez (2007) follows the spirit of Romer and Romer (1989) and Friedman and Schwartz (1963). He divides the information provided in monetary policy statements into two main categories: backward-looking and forward-looking information and constructs an index for each of these categories. Backward-looking information is about how the economy has performed in recent periods, while forward-looking information is about an assessment of how the economy is likely to perform going forward. For purposes of the present paper, we concentrate on the latter for our analysis since the question we would like to answer is whether and how central banks guide market expectations.

To measure the forward-looking content of monetary policy statements, Fernandez considers two components, one related to the economic outlook and one to future monetary policy action. The former is divided into four subcomponents: the growth outlook, growth risks, the inflation outlook and inflation risks. For each subcomponent, Fernandez assigns the value of one when some information is provided in the monetary policy statement about it and zero otherwise. The component on future monetary policy actions is measured in the following way. If there is no mention at all about future monetary policy actions is given, the component is assigned a value of zero. If vague guidance is provided, it takes the value of two. If some guidance appears in the statement, the score is four. Finally, if there is explicit guidance, the component takes the maximum value of six.

According to this scoring system, the statements released by the US Federal Open Market Committee are the gold standard in terms of forward-looking information. As shown in Table 7, in the Asia-Pacific region, the statements published by Reserve Bank of New Zealand and Reserve Bank of Australia contain the most forward-looking information. The Bank of

Thailand, Bank Indonesia and Bangko Sentral ng Pilipinas also issue relatively informative forward-looking statements. While the Bank of Japan releases relatively long policy statements, the Fernandez metric suggests that the content of these statements tends to be largely backward-looking rather than forward-looking. The Bank of Korea and Bank Negara Malaysia also seem to put more emphasis on backward-looking rather than forward-looking information.

There seems to be no direct relationship between the length of a monetary policy statement and its forward-looking content. The statements with the most forward-looking content seem to be those with only moderate length, such as those by the Reserve Bank of New Zealand, Reserve Bank of Australia, Bank of Thailand and Bangko Sentral ng Pilipinas. The statements with the least forward-looking content include both the relatively long ones from the Bank of Japan and the relatively short ones from the Bank of Korea.

The forward-looking content of some of the monetary policy statements in Asia and the Pacific has improved over time. As shown in the different panels of Graph 3, the Fernandez metric suggests that the statements published by Bank Negara Malaysia, the Reserve Bank of Australia and the Reserve Bank of New Zealand have become somewhat more forward-looking. Statements by other central banks – including that of the Federal Reserve –- seem to have remained the same.

5. Effectiveness of communication policy

How well have central banks communicated with market participants in fostering a market expectations channel? In this section, we propose two tests and report very preliminary results for central banks in the region. One is a test of the expectations hypothesis, which is a test on whether yield curves reflect expectations of future policy rates. The other is a surprises test, which is a test of whether policy rate decisions and the statement released on the same day catch market participants by surprise to a greater extent than do macroeconomic data releases. Needless to say, the reliability of either test will depend on how liquid and developed the domestic fixed-income markets are.

5.1 How well do yield curves predict policy rates?

Our test of the expectations hypothesis is a joint test of how well the central bank has communicated its strategy and policy outlook and of the informational efficiency of the markets. To test the expectations hypothesis for US interest rates, Shiller et al (1983) derived the hypothetical spread for a zero-coupon bond of duration *N* months as

$$S_{Nt}^{H} \equiv \sum_{m=1}^{N-1}\left(1-\frac{m}{N}\right)\Delta y_{1,t+m} \ ,$$

which is a weighted average of changes in the short-term interest rate. The weights decline as the changes go further out in the future. Under the expectations hypothesis, the regression of this spread on the actual spread S_{Nt} :

$$S_{Nt}^{H} = a_N + b_N S_{Nt} + e_{Nt}$$

would result in a coefficient b_N that is not significantly different from unity. More recent work on affine-yield models (eg, Dai and Singleton (2002) and Duffee (2002)) suggest that the importance of a term premium would in fact lead to a coefficient that is less than unity even when the yield curve properly reflects expectations of future short rates.

For the present analysis, we run the Shiller et al regressions using as short rates the policy rates of central banks in the region. These central banks include the Reserve Bank of Australia, Bank Indonesia, Bank of Korea, Bank Negara Malaysia, Reserve Bank of New Zealand, Bangko Sentral ng Pilipinas and Bank of Thailand. We conduct the analysis for horizons and maturities ranging from six months to 10 years.

Our analysis suggests that in varying degrees yield curves in five of the economies we consider reflect expectations of future policy rates. Graph 4 shows the estimated coefficients for the cases in which the estimates are statistically significant. Consistent with previous results for the United States and Europe, the estimated coefficients are all less than unity, reflecting the importance of term premia. The regressions show that even in the presence of term premia yield curves in Australia and New Zealand contain significant information about future policy rates at a wide range of horizons but especially at the five-year and 10-year horizons. Korea's yield curve predicts the policy rate at the six month horizon, Thailand's curve at the two-year and three-year horizons and the Philippines' curve at the five-year horizon. These results suggest that at least for these five countries, there is potentially an expectations channel operating through the yield curve.

5.2 A surprises test: policy rate decisions versus macroeconomic news

In their evaluation of inflation reports by inflation-targeting central banks, Fracasso, Genberg and Wyplosz (2003) propose a surprises test. They measure surprises in terms of the size of the responses of one-month, three-month and 12-month interest rates to policy rate decisions. They then find that in a cross-section of inflation-targeting economies, the surprise measure tends to be inversely correlated with the quality of the inflation report. In this paper,

we employ a similar idea by measuring surprises in terms of movements in interest rates in reaction to information events. Instead of comparing surprises across countries, however, we compare surprises arising from policy rate decisions with those arising from the arrival of macroeconomic news.

A central bank that communicates effectively would find its policy rate decisions as well as its statement about the policy outlook to be well anticipated by market participants. In other words, if the central bank has already explained well its reaction function, that is, it has communicated fully the strategy that guides policy decisions in general (Woodford's (2005b) broad issue (c), then communicating the policy outlook becomes redundant. Any such information would already be incorporated in the longer maturities of the yield curve and the policy announcement would no longer contain a surprise to move yields. On the other hand, the arrival of macroeconomic news would convey new information to both the central bank and market participants, and the latter would then try to infer the implications of the news for monetary policy. In a world of perfect central bank communication, macroeconomic news would contain the only true surprises. This surprise component would then what would move yields at longer maturities to reflect revisions of market expectations of policy rates down the road. In practice, communication is never perfect and we would expect both policy statements and macroeconomic news to contain surprises. The question here is one of the relatively degree of surprise.

In the case of the United States, policy rate announcements by the FOMC since 1994 have typically been well anticipated by market participants and have thus caused relatively little movement in the yield curve beyond the short end. By contrast, macroeconomic announcements, such as those of the non-farm payroll number, PPI and CPI, cause relatively large movements in the yield curve. Fleming and Remolona (1999a), for example, use tick-by-tick data for the five-year on-the-run US Treasury note and find that most of the price impact happens within five minutes of an announcement. At this frequency, they find that the average price impact of a non-farm payroll announcement is about five times that of a Fed funds target rate announcement. Indeed they find that five other announcements – the PPI, 10-year note auction results, 30-year bond auction results, CPI and new home sales – exert a stronger impact on the market than does the FOMC announcement. More recent estimates by Ehrmann and Fratzscher (2007b) suggest that the pattern has remained largely the same.

Similar results have been found for other developed markets. Connolly and Kohler (2007) look at Australia, Canada, the euro area, New Zealand and the United Kingdom and find that central bank communication contains relatively little surprise in comparison to macroeconomic news. Among the different modes of communication, they find that the most

informative ones in terms of surprises are the policy statements and the monetary policy reports.

For Asia and the Pacific, we obtain data from Bloomberg on yields for various maturities and the dates of policy decisions and macroeconomic releases. The yield data we have been able to obtain consist only of data at the daily frequency. This means our results would often be clouded by other developments that take place on the day of the announcements we look at. In the absence of higher frequency data, these results will necessarily be very preliminary. Moreover, the fixed-income markets in the region tend to be less liquid than the US market, making market reactions more difficult to detect. In the regressions we report below, we use dummy variables for event dates, in which the events include the dates of policy decisions and statements and the dates of macroeconomic data releases.

For five of the markets in the region, we find a significant impact on one-year and two-year yields by either the policy announcement or the CPI announcement. These markets are those of Australia, Japan, Korea, New Zealand and Thailand. The fact that we find significant effects in these markets is partly a function of the fact that these markets are also among the more liquid ones in the region. No other domestic macroeconomic announcement is detected to be important in these markets while in some cases the US non-farm payroll has a significant impact.

The policy rate announcement has a significant impact in four of the markets and the CPI in three. As shown in Graph 5, the policy rate announcement seems to move markets in Australia, Japan, Korea and New Zealand, while the CPI seems to do so in Australia, Korea and Thailand. These results places the Bank of Thailand at one extreme, suggesting that the central bank has been so effective in communication that its policy rate decisions are well anticipated even while CPI announcements tend to contain big surprises. By this measure, the Reserve Bank of New Zealand appears somewhat less effective, its policy announcements appearing to contain a larger element of surprise than do CPI announcements. Similarly, albeit to a lesser degree, the Bank of Korea's policy announcements seem to bring more surprises than the CPI news. In the case of the Reserve Bank of Australia, the element of surprise appears to roughly the same between policy announcements and CPI announcements. It is important to note that these results are based only on daily data, and estimates based higher frequency data may alter these conclusions.

6. Conclusions

In this paper, we argue that central banks in Asia and the Pacific have been learning to conduct monetary policy so as to take advantage of the market expectations channel. Their

efforts to manage market expectations have led them to adjust policy rates in increments as small as 25 basis points at a time and to do so in the same direction for extended periods of time, patterns of behavior we call gradualism and reversal aversion. We argue that these patterns of behavior help central banks communicate effectively with market participants by allowing them to form useful heuristics for evaluating monetary policy. The central banks also now tend to release policy statements that vary widely in length across central banks but that nonetheless seem to be slowly converging towards statements that are relatively short and focus on conveying forward-looking information. Woodford has suggested that central banks should also communicate the strategy that guides their policy decisions. This issue now appears to be more suited for other modes of communication, such as speeches by officials or articles in the central bank's bulletin.

We explain two possible tests for the effectiveness of central bank communication in managing market expectations and report preliminary results of these tests. The first is a test of the expectations hypothesis of the term structure of interest rates. Here we find that already in five of the markets we look at there is evidence that the yield curve reflects expectations of future policy rates and that hence there is a potential for central banks to exploit the market expectations channel. The second test is based on a comparison of surprises in policy statements with surprises in macroeconomic news. Surprises are measured in terms of the reaction of longer term yields to the arrival of information. We find that in Asia and the Pacific, policy statements still appear to contain a larger element of surprise than do macroeconomic news, suggesting that there is still scope for central banks in the region to communicate more effectively the way they interpret economic data and the strategies that guide their decisions.

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Table 1: Policy rate targets and markets for monetary operations

Selected countries in Asia and the Pacific

	Policy rate target	Market for operations
Australia	Cash rate (overnight)	Repo
China	One-year benchmark lending and deposit rates	
Hong Kong	Spot exchange rate	
India	Repo (overnight)	Repo
Indonesia	One-month SBI ("BI rate")	Weekly SBI auction
Japan	Overnight call rate	Repo
Korea	Overnight call rate	MSB/repo
Malaysia	Overnight policy rate	Tender/repo
New Zealand	Official cash rate	FX swaps
Philippines	Overnight repo	Repo
Singapore	Nominal effective exchange rate	
Thailand	One-day repo	Repo

Sources: central banks

Table 2: Interest rates that matter

	Central bank policy rate target	Mortgages	Bank business loans	Medium and long term financing
Australia	Cash rate	3Y swap yield	3M bank bill swap rate	5Y swap yield
China	One-year benchmark lending and deposit rates	Based on one-year benchmark lending rate	1. 7-day repo 2. CHIBOR: O/N – 4M 3. SHIBOR: O/N – 12M	
Hong Kong	Spot exchange rate	Best lending rate	HIBOR one-month	Exchange Fund Notes: 2Y – 15Y
India	Repo and reverse repo rates		Prime lending rate	
Indonesia	One-month SBI ("BI rate")	3M interbank lending rate	JIBOR: O/N – 12M	
Japan	O/N call rate	Government Housing Loan Corporation rate	TIBOR: O/N – 12M	10Y Japanese government bonds (JGBs)-zaito
Korea	O/N call rate	91-day CD yields	1. 3M CDs 2. KORIBOR: one-week – 12M	1Y Monetary Stabilization Bonds (MSBs), 3Y treasury bonds
Malaysia	O/N policy rate	Base lending rate	KLIBOR: O/N – 12M	1. 3, 5,10Y Malaysian Government Securities (MGS); 2. 3, 5,10Y Government Investment Issues-Islamic
New Zealand	Official cash rate	90-day swap rates	3M Bank Bill swap rate	Government bond yields – 1, 2, 5, 10Y
Philippines	Repo and reverse repo rates	364-day Treasury bill rate	1. The Interbank Call Loan rate 2. The Treasury bill (T-bill) rate 91-day 3. The Manila Reference Rate (MRR) 4. PHIBOR	MART1 Rates by The Money Market Association of the Philippines
Singapore	NEER band	Prime lending rate	3M USD SIBOR	Singapore Government Securities: 2, 5, 7, 10, 15, 20Y bonds
Thailand	One-day repo	Minimum loan rate (Siam Commercial Bank)	BIBOR: O/N – 12M	1.Government bonds; 2. State agency: Financial Institution Development Fund bonds

Sources: AsiaBondsOnline; national data.

Table 3: Frequency distribution of the size of policy rate changes by sign of change[1]

Absolute value of target change							
Changes	**<20bps**	**25bps[2]**	**50bps[3]**	**75-100bps**	**125-150bps**	**>150bps**	**Total[4]**
All changes	4	129	44	6	3	4	190
Positive	2	77	10	5	2	2	98
Negative	2	52	34	1	1	2	92

[1] Each entry shows the number of changes of a given size. [2] For China, 27bps. [3] For China, 54bps. [4] Australia, China, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, and Thailand.

Sources: Bloomberg; BIS calculations.

Table 4: Frequency distribution of the size of policy rate changes by central bank

Absolute value of target change							
Changes[1]	**<20bps**	**25bps[2]**	**50bps[3]**	**75-100bps**	**125-150bps**	**>150bps**	**Total[4]**
Australia		85	15				20
China	22.2	66.7	11.1				9
India		59.4	25	6.2	3.1	6.2	32
Indonesia		45	35	10	5	5	20
Japan	40	60					5
Korea		94.4	5.6				18
Malaysia		100					3
New Zealand		86.2	13.8				29
Philippines		41.9	48.4	3.2	3.2	3.2	31
Thailand		73.9	21.7	4.3			23
All changes[4]	*4*	*129*	*44*	*6*	*3*	*4*	*190*

[1] Each entry shows the percentage of the total change of a given size. [2] For China, 27bps. [3] For China, 54bps. [4] Sum of all absolute changes for Australia, China, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines, and Thailand.

Sources: Bloomberg; BIS calculations.

Table 5: Policy rate changes and probability of change in the same direction

Policy rate changes since 2000

Countries	Number of policy changes	Probability of 2 consecutive changes in the same direction
Australia	20	0.89
China	9	0.87
India	32	0.94
Indonesia	20	0.89
Japan	5	0.50
Korea	18	0.76
Malaysia	3	1.00
New Zealand	29	0.86
Philippines	31	0.90
Thailand	23	0.86
Total	*190*	*0.87*

Sources: Bloomberg; BIS calculations.

Table 6: Policy rate changes since 2000 by sign of change

Policy rate changes since 2000

Countries	Number of policy changes	Probability of increase given a previous increase in policy rate	Probability of decrease given a previous decrease in policy rate
Australia	20	0.92	0.83
China	9	1.00	0.00
India	32	0.90	0.95
Indonesia	20	0.83	0.92
Japan	5	0.50	0.50
Korea	18	0.78	0.75
Malaysia	3	1.00	N/A
New Zealand	29	0.90	0.75
Philippines	31	0.75	0.95
Thailand	23	0.86	0.87
Total	*190*	*0.87*	*0.88*

Sources: Bloomberg; BIS calculations.

Table 7: Summary characteristics of monetary policy statements

Monetary authority	Starting date	Frequency of publication *	Average word count	Average forward-looking content score
Australia	February 1997	4 times a year and whenever rate changes	332[1]	5.56
Indonesia	July 2005	Monthly	620	4.42
Japan	January 1998	Up to twice a month	775	2.83
Korea	October 1999	Monthly	151	1.02
Malaysia	August 2003	8 times a year	188	3.61
New Zealand	November 1999	8 times a year	265	5.84
Philippines	January 2002	Every 6 weeks	294	4.39
Thailand	October 2003	Every 6 weeks	216	4.69
Memo: United States	February 1994	8 times a year	133	6.13

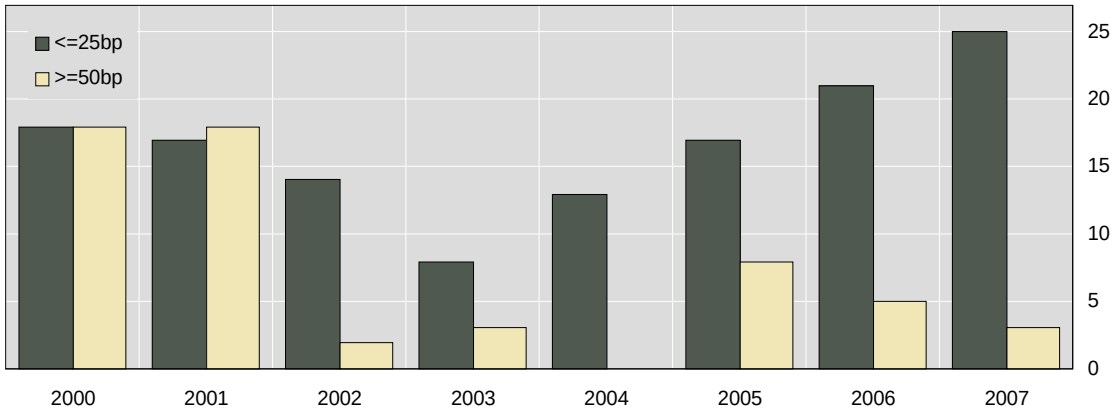
Note: For Japan, Korea, New Zealand, and US, sample period is from starting date to September 2007. For Australia, Indonesia, Malaysia, Philippines, and Thailand, sample period is from starting date to August 2007. [1] August 2007.

* The publication of monetary policy statements coincides with monetary policy meetings, except for Australia.

Sources: central banks; JPMorgan

Graph 1 – Evolution of the absolute value of policy rate changes[1]

Total number of policy rate moves by size of move, 2000-2007

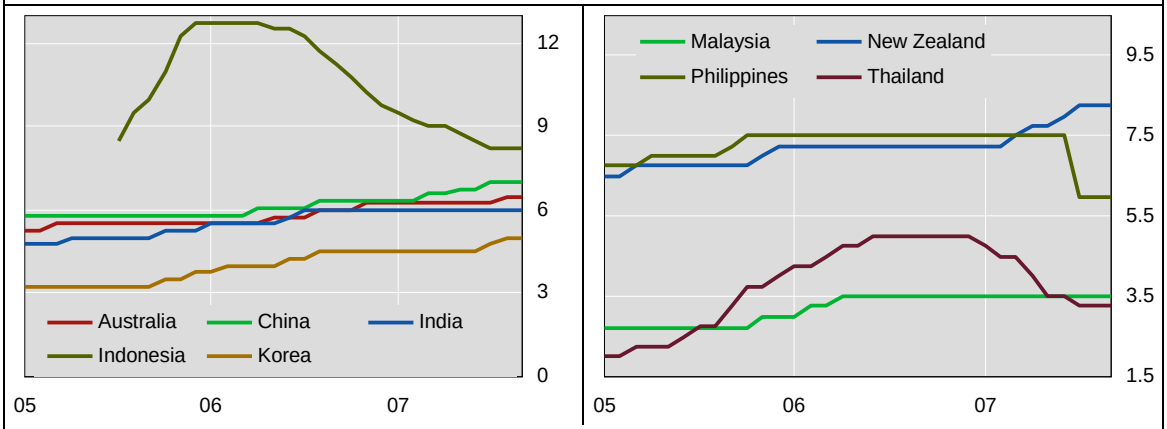


[1] Total number of absolute changes in policy rate in Australia, China, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Philippines and Thailand.

Sources: Bloomberg, BIS calculations.

Graph 2 – Policy rates in Asia and the Pacific

In per cent

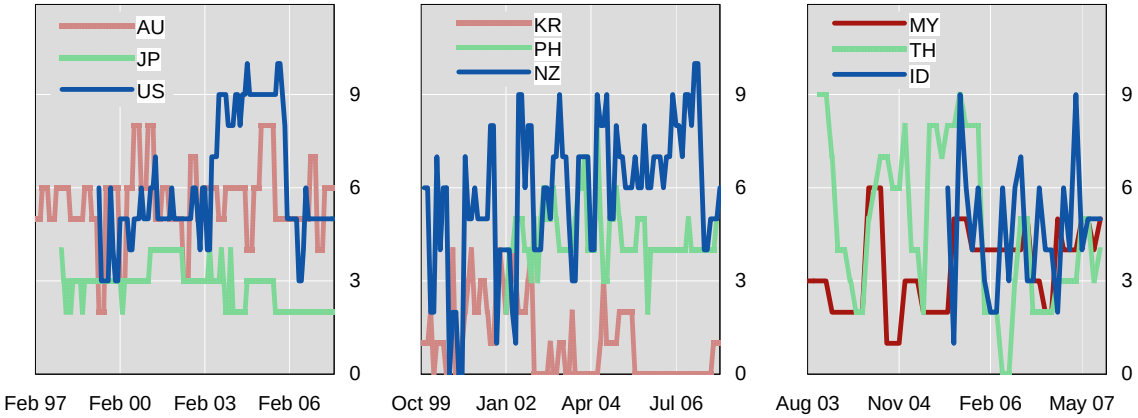


[1] For Australia, cash rate; for China, 1-year lending rate; for India, reverse repo rate; for Indonesia, BI rate; for Korea, overnight call rate; for Malaysia, 3-month intervention rate (until end-April 2004), overnight call rate since May 2004; for New Zealand, cash rate; for Philippines, reverse repo rate; for Singapore, 1-month SIBOR; for Thailand, 14-day repo rate (until 17 January 2007), 1-day repo rate since then on.

Source: CEIC, national data.

Graph 3 – Forward-looking content of monetary policy statements

Selected central banks



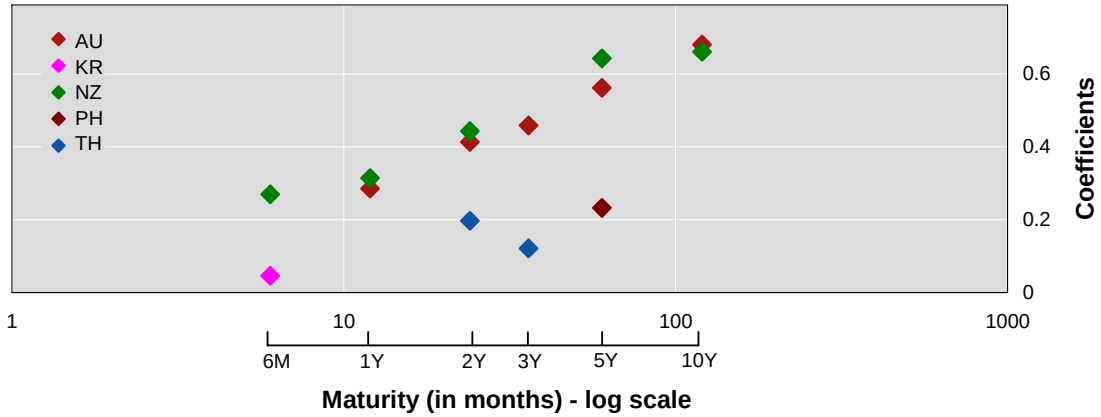
Note: A larger number means that monetary policy statements are more forward-looking.

Source: JPMorgan.

Graph 4 – Policy rate expectations in yield curves

Slope coefficients from regression of term spread on hypothetical spread:

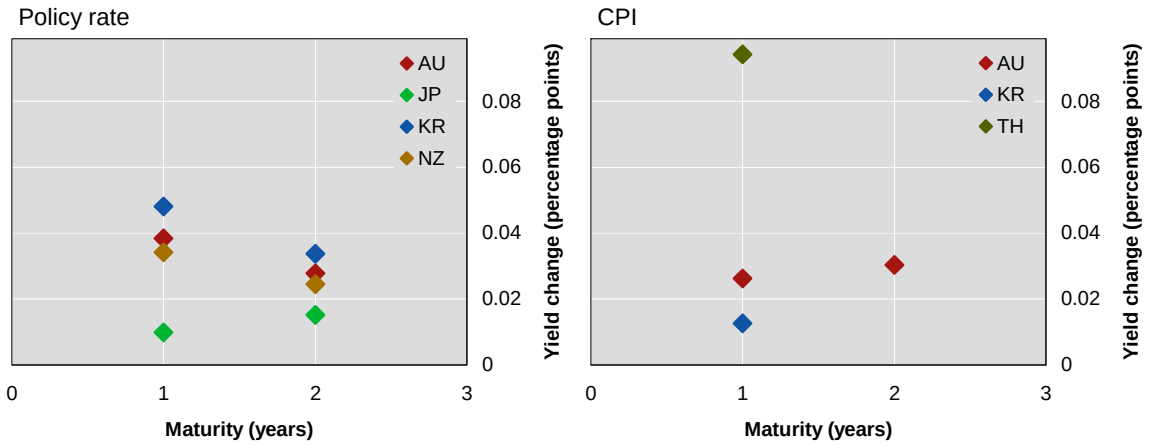
$$S_{Nt}^{H} = a_N + b_N S_{Nt} + e_{Nt} \text{ where } S_{Nt}^{H} = \sum_{m=1}^{N-1}\left(1-\frac{m}{N}\right)\Delta y_{1,t+m}$$



Source of basic data: Bloomberg

Graph 5 – Policy surprises versus macro news surprises

Regression coefficients of changes in one-year and two-year yields as explained by dummy variables for event days



Sources: Bloomberg; BIS calculations.