



**Australian
National
University**

CENTRE FOR APPLIED MACROECONOMIC ANALYSIS

The Australian National University

CAMA Working Paper Series

November, 2011

**PROBABILISTIC INTEREST RATE SETTING WITH A SHADOW
BOARD: A DESCRIPTION OF THE PILOT PROJECT**

TIMO HENCKEL

Centre for Applied Macroeconomics (CAMA), ANU

SHAUN VAHEY

Centre for Applied Macroeconomics (CAMA), ANU

LIZ WAKERLY

Centre for Applied Macroeconomics (CAMA), ANU

CAMA Working Paper 27/2011
<http://cama.anu.edu.au>

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TIMO HENCKEL (CAMA), SHAUN VAHEY (CAMA) AND LIZ WAKERLY (CAMA)

1. INTRODUCTION

This study aims to assess the scope for monetary policymakers to aggregate probabilistic interest rate advice. The members of a Shadow Board give probabilistic assessments of the appropriate (target) interest rate for Australia in real time. The pilot project will be running each month from August to December (inclusive) 2011, with the Shadow Board giving advice shortly before each decision by the Reserve Bank of Australia (RBA) Board.

The remainder of this brief note outlines the procedure followed in the interest rate setting pilot project. Section 3 outlines some of the related literature. Section 4 presents the pilot project results, and Section 5 concludes with some thoughts on the shape of the project beyond the pilot phase.

2. A PROBABILISTIC POLICY (PRO-POL) INTEREST RATE SETTING PROJECT

This section outlines the procedure adopted for the PRO-POL interest rate setting pilot project. The voting procedure differs from the RBA approach insofar as there is no meeting among members.¹ Rather, individuals submit their own preferred choice for the target interest rate, with accompanying probabilities. There is no requirement for voting to be independent. Shadow Board members are not provided with common background information. Once their votes have been submitted, the advice from each Shadow Board member will be available on the Centre for Applied Macroeconomic Analysis (CAMA) webpages at the Australian National University.²

The nine members of the Shadow Board, and their affiliations, are given in Table 1 below.

Date: 7 November 2011. This note replaces an earlier version dated 10 August 2011.

¹See the Appendix for institutional details on the RBA Board.

²<http://cama.anu.edu.au/ShadowRBAboard.asp>

TABLE 1. Shadow Board Members as at 26 October 2011

Paul Bloxham	Chief Economist (Australia & New Zealand), HSBC Bank Australia Ltd
Mark Crosby	Dean, Global MBA Program Acting Dean, Global BBA Program Professor of Economics, SP Jain Center of Management
Mardi Dungey	Professor, University of Tasmania CFAP University of Cambridge CAMA
Saul Eslake	Program Director, Productivity Growth, Grattan Institute
Bob Gregory	Professor Emeritus, RSE, ANU Professorial Fellow, Centre for Strategic Economic Studies, Victoria University Adjunct Professor, School of Economics & Finance, Queensland University of Technology
James Morley	Professor, University of New South Wales CAMA
Jeffrey Sheen	Professor & Head, Department of Economics, Macquarie University Editor, The Economic Record CAMA
Mark Thirlwell	Director, International Economy Program, Lowy Institute for International Policy
Shaun Vahey	Professor, RSE, The Australian National University Director CAMA, Director PRO-POL

2.1. **The process.** The pilot project will run for five consecutive months: August, September, October, November and December 2011. Each round will occur the Thursday before the Tuesday decision by the RBA Board.³ Each Shadow Board member votes for an interest rate setting (electronically) using probabilities in appropriate interest rate bins.⁴ Beliefs are aggregated using the complete densities via the linear opinion pool. The members are not forecasting actual RBA Board behaviour.

³The RBA Board meets eleven times a year, on the first Tuesday of each month, excluding January.

⁴An alternative approach would be to use distributions over continuous-valued interest rates. However, belief elicitation problems can arise with non-statistician members.

Each member submits their probabilistic interest rate setting by sending a single email (by 11am on Thursday) responding to the following request (also sent by email).

2.2. The question. “The current RBA target for the cash rate is $X\%$ (in July, 4.75%). Please supply a probabilistic distribution for the interest rate at the next RBA Board meeting. This should reflect your views on the appropriate setting for interest rates. It is not a prediction of RBA Board behaviour. Please respond by filling in the following table (only).

TABLE 2. Probabilistic distribution

Name and affiliation:	
Target rate	Probability (0-100)
X+75bp	
X+50 bp	
X+25bp	
X	
X-25bp	
X-50bp	
X-75bp	

Your response should give only the table with your name (plus affiliation, optional) and probabilities in each row. All probabilities must be written as whole numbers between zero and 100. The probabilities will typically sum to 100. If the probabilities do not sum to 100, the remaining probability mass will be assumed to be uniformly distributed across those interest rates receiving non-zero probabilities. If you think interest rates should be outside these bounds, simply add additional rows to your table as required.

Each vote will be published on the CAMA website as a distribution. An aggregate distribution will also be published, constructed using the linear opinion pool. This information will appear on the CAMA website by 3pm on each Thursday.”

2.3. Example responses. Some example responses are shown below. These examples were sent to the Shadow Board members prior to the first vote.

2.3.1. Example 1. An example from someone who is quite confident that the current setting is correct is shown in Table 3.

TABLE 3. Probabilistic distribution: belief that current setting correct

Name and affiliation: A. N. Other (Belconnen Institute)	
Target rate	Probability (0-100)
X+75bp	0
X+50 bp	0
X+25bp	10
X	80
X-25bp	10
X-50bp	0
X-75bp	0

2.3.2. *Example 2.* Table 4 shows probabilities that reflect more uncertainty, and the belief that rates should go up. (Note these do not sum to 100, but the remaining probability mass, 1 percent, is allocated uniformly so that this vote is recorded as an additional one third of a percentage point in X, X+25bp, X+50bp.)

TABLE 4. Probabilistic distribution: belief that rates should rise

Name and affiliation: A. N. Other (Belconnen Institute)	
Target rate	Probability (0-100)
X+75bp	0
X+50 bp	33
X+25bp	33
X	33
X-25bp	0
X-50bp	0
X-75bp	0

2.3.3. *Example 3.* The numbers in Table 5 envisage asymmetric risks, but encompass the belief that rates should fall.

2.4. **The resulting distributions.** The data submitted by the Shadow Board are compiled, and charts showing the individual and aggregate probabilistic distributions are published on the CAMA website by 3pm on the relevant Thursday. An

TABLE 5. Probabilistic distribution: belief that rates should fall

Name and affiliation: A. N. Other (Belconnen Institute)	
Target rate	Probability (0-100)
X+75bp	0
X+50 bp	0
X+25bp	0
X	10
X-25bp	70
X-50bp	20
X-75bp	0

example of a (synthetic) round is given below. Figure 1 ((A) to (I)) shows the individual preferences of nine fictional Shadow Board members, with each member's vote identified.

Along with the individual preferences, the aggregate is also presented (Figure 1 (J)). This is constructed using the linear opinion pool. This approach takes a convex combination of the individual densities. The approach is common in applied statistics fields and is described by (among others) Stone (1961), Winkler (1968), Wallis (2005), Mitchell and Hall (2005), Jore, Mitchell and Vahey (2010) and Ranjan and Gneiting (2010). Beyond the pilot phase, the project will explore alternative methods of aggregating individual preferences. See, for example, the discussions in Kascha and Ravazzolo (2010).

To see how the linear opinion pool works in our context, consider the aggregation of our synthetic votes from a fictional Shadow Board. For each interest rate bin, for example, X+25bp, we sum the probability mass across individual Board members, and then we divide by the number of individuals in the Shadow Board. That is, we fix the weights on the individual densities to $1/9$, so that each individual receives the same weight in the aggregate.

3. RELATED LITERATURE

Until the beginning of the 1990s, central banks were seen as secretive institutions, deliberately keeping the public guessing about their objectives and intentions. (See Mishkin (2007, Chapter 5) for a discussion.) During the past two decades, coinciding with the widespread adoption of inflation targeting, a new consensus has emerged in which transparency of central bank policy and its clear communication is seen as

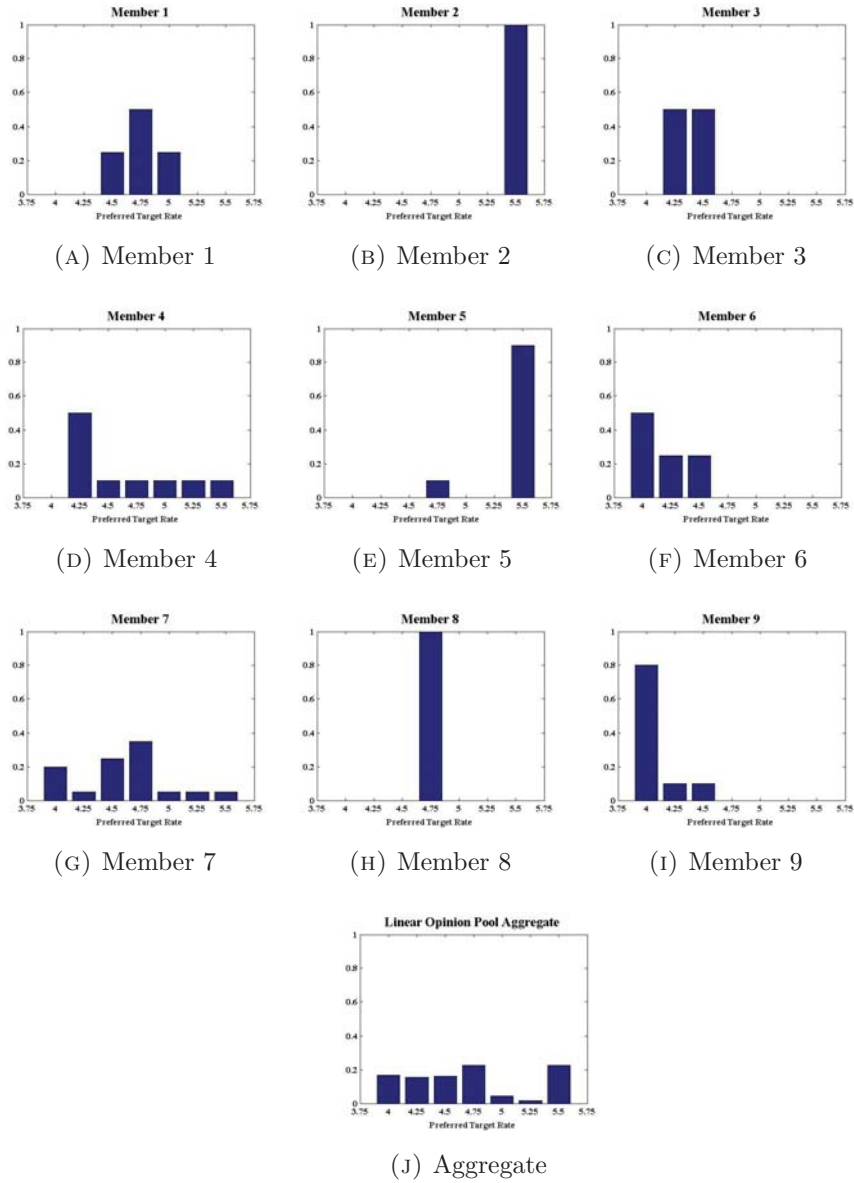


FIGURE 1. Synthetic Voting with a Fictional Shadow Board

beneficial. Increasingly, central banks publish regular “inflation reports” (or monetary policy statements), disclose the minutes of policy meetings, and communicate forecasts of future policy to the public.⁵

However, two major questions remain unanswered. First, what is the optimal degree of transparency, or, is there such a thing as too much transparency? And second, how should policymakers’ intentions and forecasts be optimally aggregated and communicated?

Some authors argue that current central bank policy remains too opaque. For example, with reference to the European Central Bank, Geraats, Giavazzi and Wyplosz (2008) advocate publishing (unattributed) voting records. They claim that knowing the balance of votes would enable the public to better understand how the Governing Council responds to economic information. They also recommend publishing the anticipated interest rate path. Other papers in a similar vein include Geraats (2008) and van der Crujsen et al. (2010).⁶

The debate about how monetary policy makers’ intentions and forecasts should be aggregated and communicated has focused on the optimal structure and composition of monetary policy committees (Sibert, 2003, 2006, Weber, 2010) and on the clarity of central bank communication (Geraats, 2007, Berger et al., 2006, Fracasso et al., 2003).

In contrast, our work focuses on two questions that have hitherto received very limited attention: how can members of a monetary policy committee effectively communicate the risks and uncertainty associated with their individual beliefs about the interest rate; and how can these beliefs be aggregated?

4. THE PILOT STUDY RESULTS

The pilot study results for August are shown in Figure 2. On 2 August 2011, the RBA Board left interest rates unchanged at 4.75%.

Figure 3 gives the September Shadow Board results, published on 1 September 2011. The RBA Board again left interest rates at 4.75% on 6 September 2011.

⁵See, for example, the Reserve Bank of New Zealand Monetary Policy Statement at <http://www.rbnz.govt.nz/monpol/statements/>, Norges Bank Monetary Policy Report at <http://www.norges-bank.no/en/about/published/publications/monetary-policy-report/> and the RBA Statement on Monetary Policy at <http://www.rba.gov.au/publications/smp/index.html>.

⁶On the other hand, excessive transparency might amplify private sector uncertainty. (See Mishkin (2007, Chapter 5).)

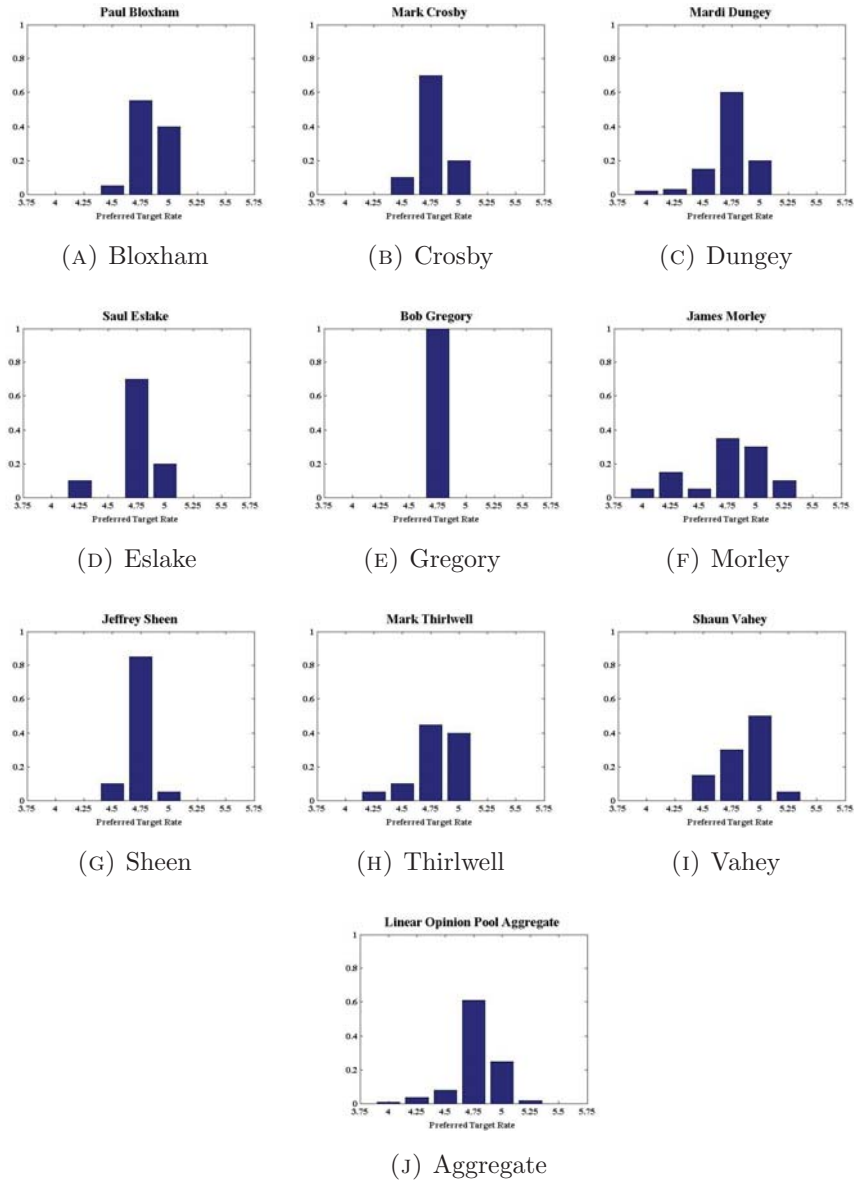


FIGURE 2. August Pilot Study

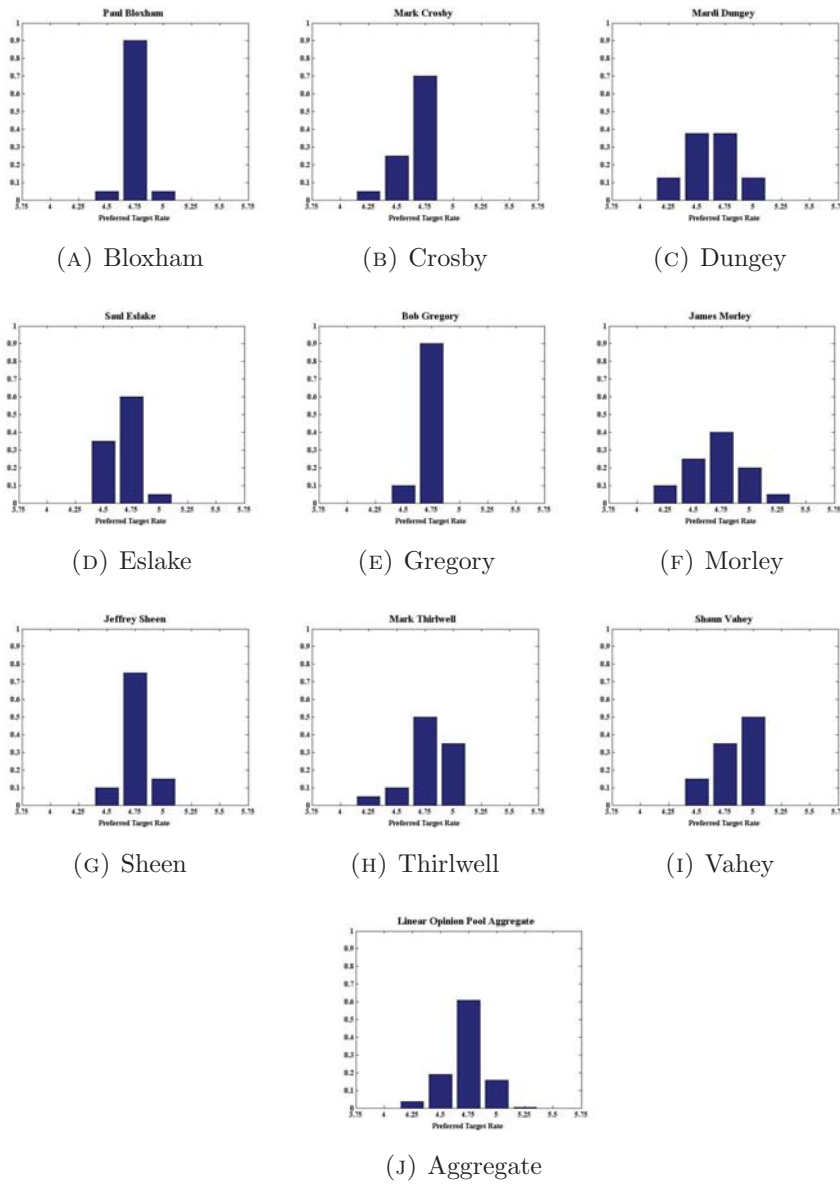


FIGURE 3. September Pilot Study

October results for the Shadow Board were published on 29 September and are shown in Figure 4. Once again, the RBA Board kept interest rates unchanged at 4.75% at its meeting on 4 October 2011.

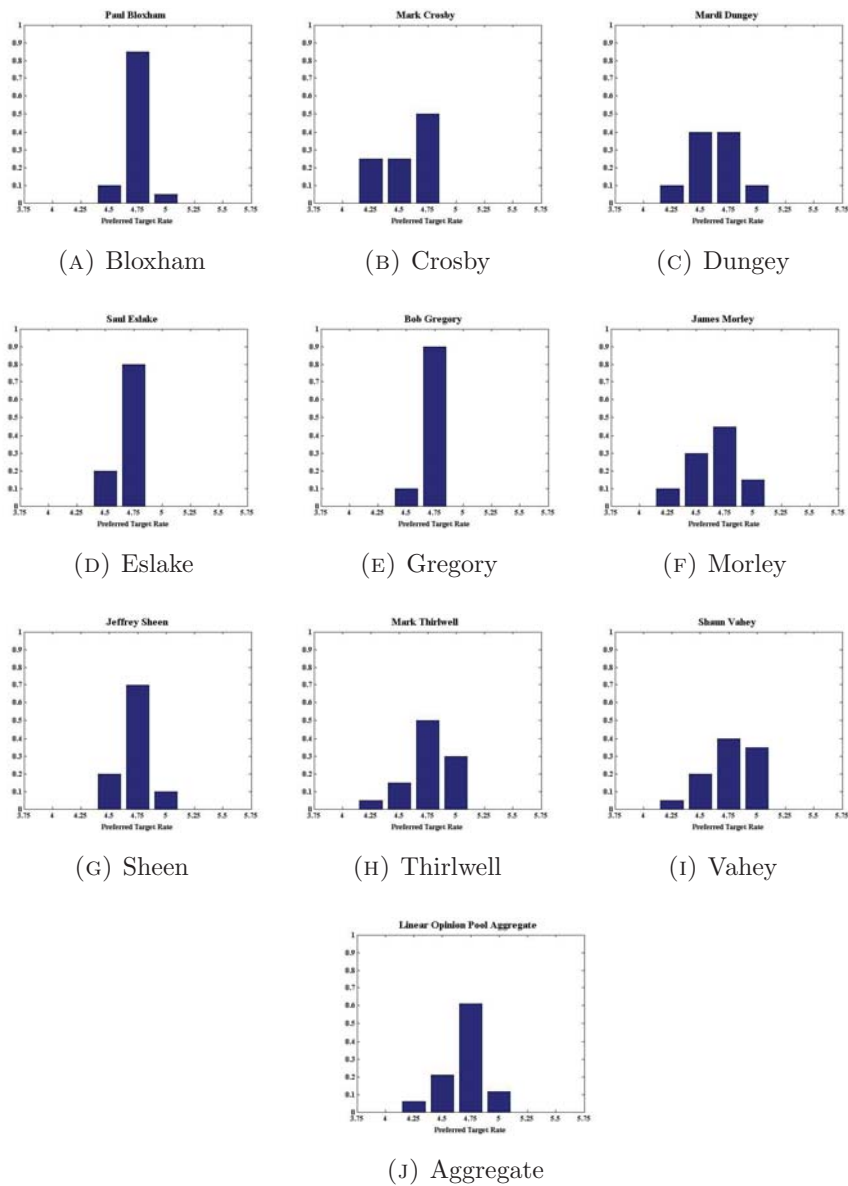


FIGURE 4. October Pilot Study

In all three early pilots (August, September and October), the aggregate has the highest probability mass (approximately 61%) at maintaining interest rates at 4.75%. But there has been a shift in the expected probability of a rise in interest rates from nearly 27% in August down to less than 12% in October. Conversely, the probability of a cut in rates has risen from 12% in August to more than 27% in October.

On 27 October, the Shadow Board published its results for November. They are shown in Figure 5. The aggregate probability of a rate cut rose to more than 37%. At its meeting on 1 November, the RBA Board reduced interest rates by 25 basis points to 4.50%.

Results for December 2011 will be added as they become available.

5. CONCLUSIONS

At the end of the pilot, the Shadow Board members will meet to discuss the findings and the scope for further collaboration to continue the study for a number of years. The members will consider (among other issues) funding, the costs and benefits of verbal communication, and alternative methods of constructing the aggregate Shadow Board view.

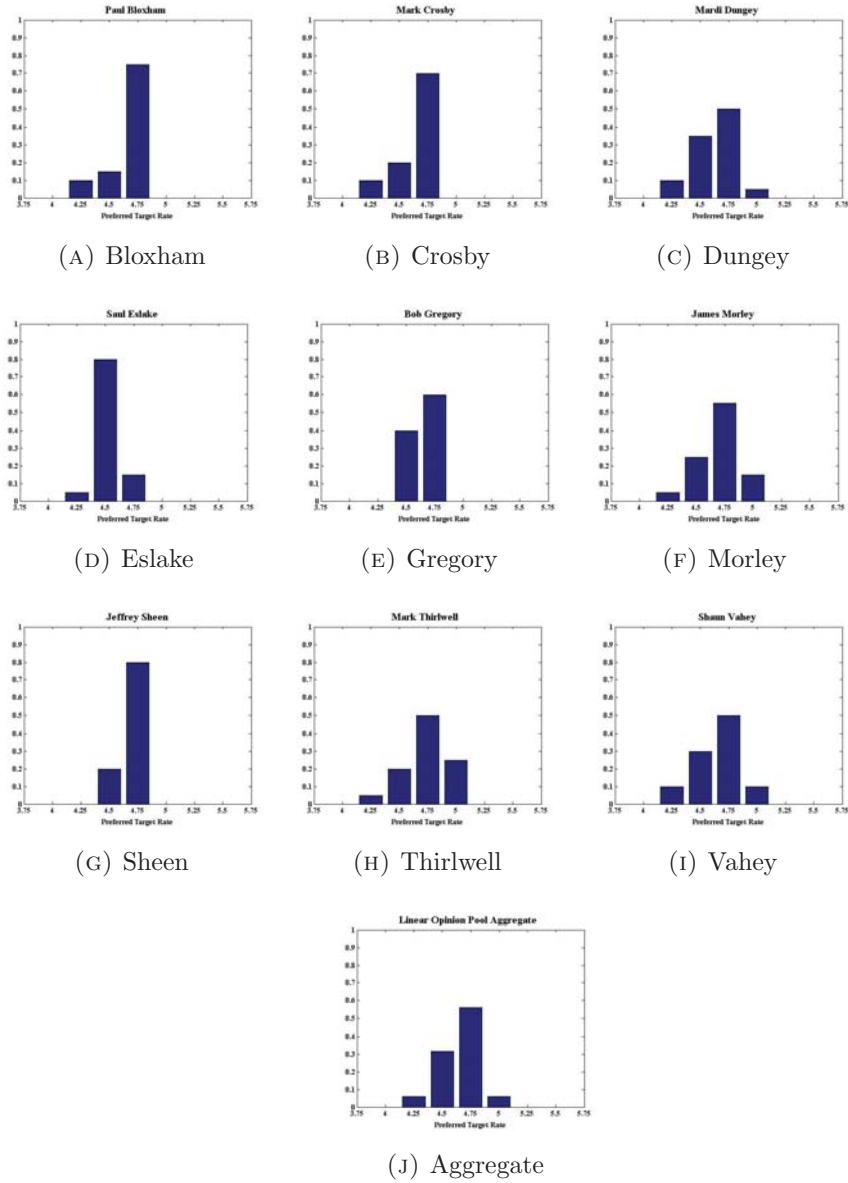


FIGURE 5. November Pilot Study

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7. APPENDIX: THE RESERVE BANK OF AUSTRALIA BOARD

Much of the material in this appendix has been sourced from the webpage of the Reserve Bank of Australia: www.rba.gov.au/.

The Reserve Bank is a statutory authority, established by an Act of Parliament, the Reserve Bank Act 1959. The Reserve Bank Board's obligations with respect to monetary policy are laid out in Sections 10(2) and 11(1) of the Act. Section 10(2) of the Act says: "It is the duty of the Reserve Bank Board, within the limits of its powers, to ensure that the monetary and banking policy of the Bank is directed to the greatest advantage of the people of Australia and that the powers of the Bank ... are exercised in such a manner as, in the opinion of the Reserve Bank Board, will best contribute to: the stability of the currency of Australia; the maintenance of full employment in Australia; and the economic prosperity and welfare of the people of Australia." Section 11(1) of the Act covers the need to consult with Government: "the Reserve Bank Board is to inform the Government, from time to time, of the Bank's monetary and banking policy."

The Reserve Bank Board consists of nine members in total. These members include the three ex officio members of the Board, consisting of the Governor of the Reserve Bank, who is Chairman of the Board, the Deputy Governor of the Reserve Bank, who is the Deputy Chairman of the Board, and the Secretary to the Treasury. There are six external members who are appointed by the Treasurer for a period of five years. According to section 17(1) of the Reserve Bank Act, members of the Board are not allowed to be a director, officer, or employee of an institution that is authorised to take in deposits. Excluding changes in the number of directors, the structure of the board of directors has remained unchanged since 1951.

The current members (at 25 October 2011) of the RBA board of directors are given in the table below.

The board normally meets eleven times each year, on the first Tuesday of each month, with the exception of January which has no meeting. Five members of the Board must meet in order to form a meeting of the Board, which must be chaired by the Governor, or the Deputy Governor in his absence. It is reported that the Board usually forms a consensus without a need for structured voting, although it is not apparent how the Board deals with disagreements among members should it arise in practice.⁷ Minutes of the monetary policy Board meetings are published two weeks after the meeting is held.

RBA staff prepare data on Australian and international economies; and on domestic and international financial markets for the Board meetings. (These data are released to the public the day after the interest rate decision.) The papers contain

⁷There is a formal procedure in place if the Reserve Bank Board and the Treasury disagree.

TABLE 6. RBA Board Members as at 26 October 2011

Glenn Stevens	Governor, RBA, Chair of the Board
Ric Battellino	Deputy Governor, RBA, Deputy Chair of the Board
Martin Parkinson	Treasury, Secretary to the Treasury
Jillian Broadbent	Director, Australian Securities Exchange Director, Special Broadcasting Service Director, Woolworths Ltd
Catherine Tanna	Ex VP, BG Group
John Edwards	Adjunct Professor, John Curtin Institute of Public Policy, Curtin University
Roger Corbett	Chairman, ALH Group Ltd Chairman, Fairfax Media Ltd Deputy Chairman, PrimeAg Australia Ltd Director, Wal-Mart Stores Inc
Graham Kraehe	Chairman, BlueScope Steel Ltd Chairman, Brambles Ltd Director, Djerriwarrh Investments Ltd
John Akehurst	Director, CSL Ltd Director, Origin Energy Ltd Director, Securency International Pty Ltd Director, University of Western Australia Business School

recommendations for a policy decision. The RBA produces a formal statement on monetary policy four times a year.