MONETARY POLICY BY COMMITTEE

HYOUNGSIK NOH

Abstract. We examine the minutes of monthly monetary policy meetings and found some supporting evidence to the recent studies with the data of the Bank of Finland and the Bank of England. Dissenting votes are indicative of future change in policy interest rate and insiders seldom dissent. However, the evidence provided here is anecdotal at best since we are at the preliminary stage of this research. We also consider optimal voting rule when the monetary policy is decided by individualistic votes by the committee members after the hearing of current economic condition reports and deliberation. Optimal voting quotient should rise when the social cost of wrongfully lowering interest rate becomes big. Since unanimity is different from consensus building, we need to carefully draw policy implication from this result. However, one message from this study is that the degree of aversion to inflation is preference and the institutional details should accommodate this difference to achieve optimal outcomes from the institution.

Key Words: Monetary Policy Committee, Dissenting opinions, Consensus, Voting rule

Date: February 18, 2008

Research Fellow, the Korea Institute of Finance, hsnoh@kif.re.kr

Very Preliminary. Please do not cite without author's consent.

1. Introduction

With a few known exceptions[1] all the monetary policies of modern central banks are conducted by a committee, generally called monetary policy committee.[2] According to Pollard (2004) 79 out of 88 countries monetary policy is determined by a committee. 36 countries use formal voting and 6 of them publish individual voting records. Revealed preference of nations around the globe tells us that monetary policy by a committee is thought to be superior to a decision by a sole governor of a central bank. However, little economic research has been accumulated about normative and positive features of a monetary policy by a committee. Among others Alan Blinder, Gerlach-Kristen and Anne Sibert actively write on various subjects regarding superiority of monetary policy by a committee, the relationship among independence, committee decision-making and transparency, and leadership in a committee.

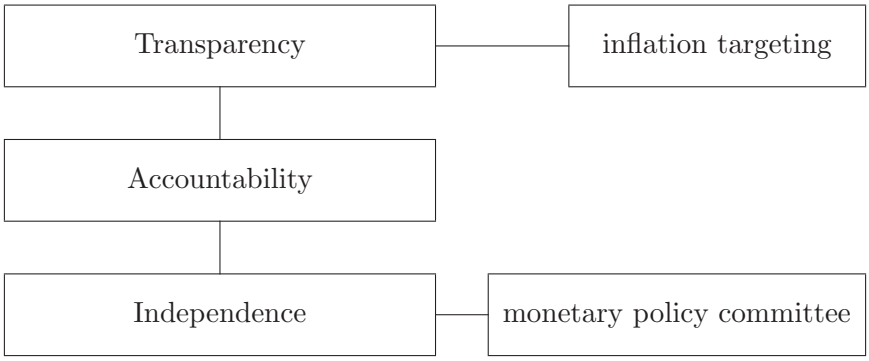
The monetary policy committee of the Bank of England was established in May 1997. The Bank of Japan's Policy Board became the highest decision-making body by an amendment of the Law of 1942. The Law of 1942 saw a complete revision in June 1997 with two principles "independence" and "transparency." The revision of Bank of Korea Act in 1998 changed the committee's name from "Monetary Policy Operation Committee" to "Monetary Policy Committee", which represents the role change in policy decision-making, at least legally. Inflation targeting has been widely adopted by many countries since its inception in New Zealand, Canada, the UK, Sweden, Finland and Australia in 1990 (see Svensson (2008)). These trends over about two decades are actually inter-related (see Blinder and Wyplosz (2004)). Independence entails accountability and transparency facilitates accountability. Interest rate targeting is easier to be perceived by the market and hence communication is in a more transparent way than other monetary aggregates.[3] And a committee is harder to be swayed by the finance minister, the authority of fiscal policy since a committee member's biased policy preference can be moderated by other committee member's voices and/or votes.

[1] New Zealand, Israel, and Canada to name a few

[2] For example, the committee of the Bank of England and that of the Bank of Korea are called Monetary Policy Committee

[3] Goodfriend (2007) puts "Today, central banks have an incentive to utilize transparency and communications to facilitate an understanding of their interest rate policy actions to strengthen the credibility of their commitment to low inflation."

FIGURE 1. Relations in governance structures



Economists like to specify loss function in a quadratic form,

$$L = \text{inflation gap}^2 + \lambda_0 * \text{output gap}^2 \tag{1}$$

which is also related to a Phillips curve and a Taylor rule, where a nominal interest rate is specified as below

$$i = r + \pi^e + \lambda_1 * \text{inflation gap} + \lambda_2 * \text{output gap} \tag{2}$$

where i is nominal interest rate, r is neutral real interest rate (NRIR) and π^e is expected inflation rate.[4]

In Korea λ_1 and λ_2 cannot be revealed to the public for the reason that they reveal the Bank of Korea's stance to a degree more than necessary.[5] A more important point about λ_1 and λ_2 is that individual committee members have different values for them and committee members do not agree on them. This difference may come from different assessment of state of the economy or from different preference borne by their different experience in their careers.

Often a Monetary Policy Committee uses a de facto consensus (unanimity) notwithstanding de jure majority voting rule. In Korea, the simple majority (4 votes out of 7) is required to decide on a given matter. Consensus is argued to give credibility, legitimacy, power and policy effectiveness (Yellen (2005) and Chappell, McGregor and Vermilyea (2004)). We try to provide some implications with a canonical model of economic analysis of

[4]Svensson (1997) showed that the mapping from λ_0 to λ_1 and λ_2 is not straightforward.
[5]According to the Head of Monetary Policy Analysis Team, the Bank of Korea

jury decision making. Linkage is still weak, which we hope to overcome by developing the model further. We introduce where the model stands.

1.1. **Information aggregation through voting.** Recently there has been a renewed interest in information aggregation through voting. Information aggregation means that the voting result is the same as in the case where private information is common knowledge. Guarnaschelli et al. (2000) supports this result with an experiment. Coughlan (2000) refutes the result with a more realistic model with the possibility of mistrial and communication among jurors. The idea of information aggregation through voting dates back to Condorcet (1785). Condorcet (1785) shows that when private information is independent conditional on the true state, majority voting aggregates information in the sense that the probability of a correct decision approaches one as number of voters grows large. Ladha (1992) and Berg (1993) extend the result by relaxing the independence assumption.

1.2. **Preference aggregation through voting.** We depart from these law of large number type results by not considering information aggregation. Instead, we consider a preference aggregation problem. In return for forsaking information aggregation we can allow for perfect correlation of private information and for ex ante heterogeneity among voters. In our model, voters are ignorant except for the public signal that they receive. In the existing literature, the source of interim heterogeneity among voters is their private signals. If we exclude private signals, then the common public signal generates the same informativeness of the true state of nature through the deliberation phase.

Blinder (2007) states that

> In the case of monetary policy virtually all the data that matter are common knowledge, making differential information a weak foundation on which to build a theory.

In a similar vein we assume that committee members agree on the interpretation of signals after going through committee deliberation. Then, in our model, the factor that affects different votes is each individual's heterogeneous threshold of reasonable doubt. With the same signal and different thresholds of reasonable doubt our problem is an optimization problem rather than strategic one and preference aggregation rather than information aggregation. Given that all voters share the same posterior probability of the true state, pivotality does not determine voting behavior. Rather, a

voter votes for lowering interest rate if the posterior probability of the state of the economy needs an interest rate cut is higher than his threshold of reasonable doubt (i.e., a parameter in the voter's utility function)

We consider the social planner's ex ante choice problem in the case of committee decision making. The social planner is assumed to have control over the voting rule ex ante. We find that the optimal voting rule is a weakly increasing function of the societal threshold of reasonable doubt. With simple but reasonable distributional assumptions, we identify various thresholds of reasonable doubt that can justify unanimity and other majority voting rules.

We structure the paper as follows. Section 2 introduces a classification of monetary policy decision-making system. Section 3 considers some evidence from the Bank of Korea's minutes that confirms recent studies about monetary policy committee decision-making. Section 4 introduces the model and considers optimal voting rules. Section 5 provides conclusion and Appendix provides data and a derivation.

2. Classification of monetary policy decision making system

Blinder and Wyplosz (2004) classify monetary policy decision-making bodies into four types.

- individual central bank governor (Reserve Bank of New Zealand)
- autocratically-collegial MPC (Federal Reserve System)
- genuinely-collegial MPC (European Central Bank)
- individualistic MPC (Bank of England)

Autocratically-collegial committee is precise description of Greenspan Fed but Bernanke Fed is not so sure if it is autocratically-collegial. Anyhow, 'autocratically-collegial' means that "the chairman came close to dictating the committee's decision." And individualistic means majority voting in a strict sense, which sometimes means Mervin King is in minority. ECB takes decision by consensus, which puts ECB in an intermediate position. (See Wolfers (2008))

Blinder (2006) who first introduced this typology with co-authors explains:

> Committees can either be individualistic, meaning that they make decisions by true majority rule with each member voting for his or her own preferred policy-as at the Bank of

> England, for example; or they can be collegial, meaning that they agree in advance to submerge individual differences in order to reach a group consensus-as at the Fed or the ECB. Collegial committees can be further divided into those that are genuinely collegial, meaning that the chairman seeks the committees consensus and then persuades recalcitrant members to go along (e.g., the ECB Governing Council), or autocratically collegial, meaning that the chairman more or less dictates the consensus to the other members (e.g., the FOMC under Alan Greenspan).

Before the revision of the Bank of Korea Act in 1998 the Bank of Korea's MPC is considered to be an autocratically-collegial committee that is somewhat dictated by the finance minister rather than a governor. After the revision of the Act the MPC of Korea passed through a transition period during which the committee itself and the administration of the BOK still thought the committee as an rubber stamp. Over the four years from 1999 through 2002, there were only 4 dissenting opinions over the statement pre-made before the monetary policy meetings held once a month. We think that the style change in the minutes of committee meetings applied from the February 2003 meeting reflects the change of Korea's MPC into an individualistic committee like the MPC of the Bank of England. To judge whether it really falls on individualistic committee category some further research should be conducted.

3. Some evidence

Anderson, Dillen and Sillen (2006) find that dissenting votes are indicative of future change in policy interest rate. Anecdotal evidence of Korean data shows the same phenomenon. Tae Dong Kim had been a lone dissenter from February 2003 meeting through April 2003 meetings objecting maintaining overnight call rate by calling for a lowering by 25 basis points. And the MPC finally agreed upon a 25 bps lowering on May 13, 2003. He also played a role as an indicator by dissenting on keeping the then current rate and calling for a raise by 25 basis points from July through September in 2005 before the committee decided on a 25 bps raise on October 11, 2005

Gerlach-Kristen (2007) finds, with the Bank of England's voting records, that insider rarely dissent and typically vote for higher rates and the opposite pattern is found with outsiders.

We collect data from February 2003, when the minutes changed its style. Before then, committee meetings deliberated on the pre-written decision statements and a decision was made by passing the original statement as it was or passing it with minor changes. We found three dissenting opinions before the style change. However, it is very unclear whether the dissenting opinion is about the overnight call rate or the other expressions in the statements. The table in the Appendix shows identity and the organization that recommended the person as a committee member. In only one occasion an insider showed a dissenting opinion. And some committee members consistently favored lower interest rates, for example, Moon Soo Kang and the others consistently favored higher rates Goong Hoon Nam. It will be a hasty conclusion that a committee member's preference is predictable by examining who recommended him or her for the position. Actually, Sung Nam Lee and Tae Dong Kim showed their preference in both ways depending on the situation. The minutes provide somewhat detailed opinions exchanged during deliberation. However, the identity only appears at the end of the transcript and this makes tracking down and coding the preference difficult. We postpone this job for a later supporting research.

4. Optimal voting rule

There are two alternatives in the decision problem, a (maintain) or o (lowering). The state of nature, the state of the economy is either g (going to contract) or i (immune to current condition). The decision can be made by a governor or committee. The governor can be the social planner herself or the sole decision maker who minimizes the loss of central bank. There is a signal s which is viewed by both the committee members. Because everyone observes s, there is no information aggregation problem in the process of a committee decision. We assume the population is distributed over a continuum of measure one. Each person has a different threshold of reasonable doubt which we denote q_j. The distribution function is $H(q)$. When the public signal is realized in the briefing before the meeting and the deliberation process in the meeting, the posterior probability of the economy is still good is $\pi(s) := \Pr(g|s)$. When a person is selected as a committee member, he compares π and q_j and votes for lowering interest rate if π

exceeds q_j and votes for maintaining, otherwise.[6] Each committee member shares the same utility function but had different value depending on his type, q_j: $U(i,a) = U(g,o) = 0, U(i,o) = -q_j$, and $U(g,a) = -(1-q_j)$. A voter votes for lowering as long as $\pi(s) \geq q_j$. Therefore, a voter's vote is like choosing the minimum of two expected utilities (loss) of wrongful decisions,

$$min\{(1-\pi(s))q_j, \pi(s)(1-q_j)\} \tag{3}$$

In other words, a committee member votes as if she votes alone. One can easily infer that a lower q corresponds to being more prone to lowering interest rate.

Let α denote the probability of lowering interest rate if the case is tried by committee. α can be written as

$$\begin{aligned} \alpha(s;R,H) =& \sum_{i \geq R} \binom{n}{i} H(\pi(s))^i (1-H(\pi(s)))^{(n-i)} \\ =& \frac{n!}{(R-1)!(n-R)!} \int_0^{H(\pi(s))} \tau^{(R-1)}(1-\tau)^{(n-R)} d\tau \end{aligned} \tag{4}$$

where H is the distribution of individual preferences, R is the voting rule, n is the size of the committee.

Then, the expected social cost of wrongful monetary policy decision by committee is

$$\alpha(s)(1-\pi(s))q_{sp} + (1-\alpha(s))\pi(s)(1-q_{sp}), \tag{5}$$

a convex combination of two costs from wrongful verdicts.

4.1. **Performance of Voting Rules at Various Levels of q_{sp}.** By varying q_{sp} we calculate

$$\int_0^1 (\alpha(s)(1-\pi(s))q_{sp} + (1-\alpha(s))\pi(s)(1-q_{sp}))dF(s) \tag{6}$$

where $\pi(s)$ is assumed to be s and $F(s)$ is assumed to be $U[0,1]$.

Then, we obtain following graph showing relative performance of various voting rules at each q_{sp}.

When $q_{sp} \geq 0.86$, unanimity dominates all other (super)majority rules, when q_{sp} is 0.80 or 0.85, the voting rule, $R = 11$ performs the best, and, etc. The result is summarized by a table below.

[6] As noted in Gerardi (2000), Che and Severinov (2006) and Costinot and Kartik (2006), this decision is consistent with cost minimizing behavior when a voter acts as a 'sincere' voter.

FIGURE 2. Performance of Voting Rule at Different Levels of q_{sp}

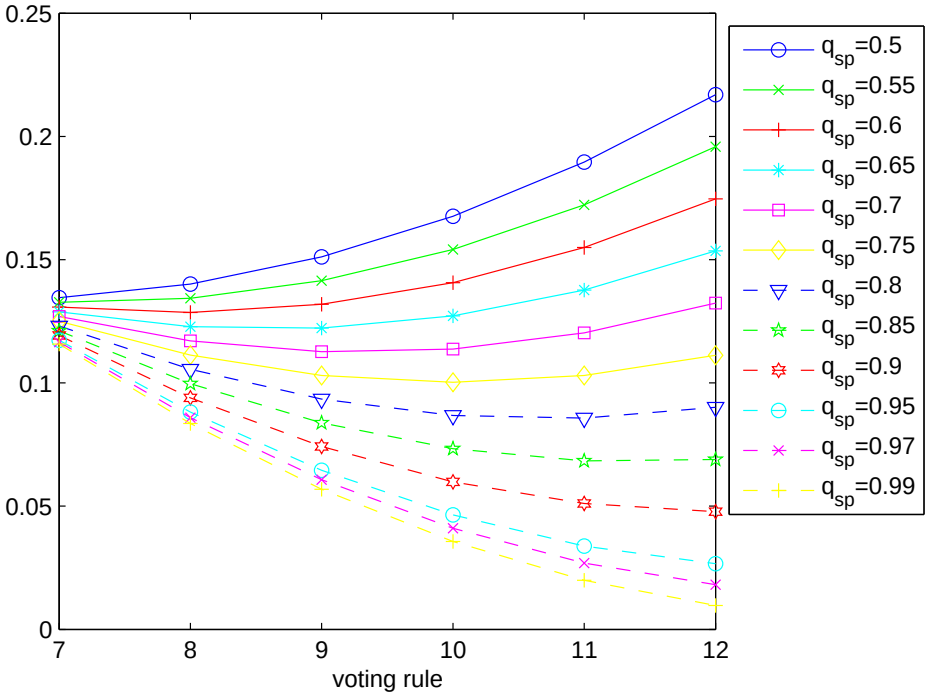


TABLE 1. Optimal Voting Rule at Different Levels of q_{sp}

q_{sp}	0.5	0.55	0.6	0.65	0.70	0.75	0.80	0.85	≥ 0.86
best rule (R^*)	7	7	8	9	9	10	11	11	12

4.1.1. *Voting rule choice as a function of q_{sp}.* One implication of the above result is that the optimal voting rule is a nondecreasing function of q_{sp}. In order to verify the generality of this result, we check whether the condition of increasing differences holds, which is a sufficient condition for single crossing.

Definition 1. The function v has increasing differences if the incremental return, $v(R', q_{sp}) - v(R, q_{sp})$, is weakly increasing in the parameter, q_{sp}.

In order to use the monotone comparative statics result readily, we convert our minimization problem to a maximization problem. Define

(7)

$$v(R, q_{sp}) = -\int_0^1 (\alpha(s; R, H)(1-\pi(s))q_{sp} + (1-\alpha(s; R, H))\pi(s)(1-q_{sp}))dF(s)$$

Then, the ex ante social planner's problem is

$$\max_R v(R, q_{sp}) \tag{8}$$

Note that

$$v(R+1, q_{sp}) - v(R, q_{sp}) = \int_0^1 (\alpha(s; R, H) - \alpha(s; R+1, H))(q_{sp} - \pi(s))dF(s) \tag{9}$$

If we differentiate above difference with respect to q_{sp},

$$\frac{\partial}{\partial q_{sp}} [v(R+1, q_{sp}) - v(R, q_{sp})] = \int_0^1 (\alpha(s; R, H) - \alpha(s; R+1, H))dF(s) \tag{10}$$

$$= \binom{n}{R} \int_0^1 (H(\pi(s))^R (1 - H(\pi(s)))^{(n-R)})dF(s) \tag{11}$$

$$\geq 0 \tag{12}$$

The last inequality comes from the fact that the integrand is nonnegative regardless of signal s. Therefore, $v(R, q_{sp})$ satisfies the increasing difference condition and, in turn, the single-crossing property. Invoking the theorem from Milgrom and Shannon (1994) we conclude that the optimal voting rule, R^* is weakly increasing in q_{sp}.

Proposition 1. *The optimal voting rule R is weakly increasing in the social planner's threshold of reasonable doubt, q_{sp}.*

This result is dependent on neither the committee member distribution, $H(q)$ nor the functional form of $\pi(s)$.

5. Discussion and Conclusion

We examine the minutes of monthly monetary policy meetings and found some supporting evidence to the recent studies with the data of the Bank of Finland and the Bank of England. Dissenting votes are indicative of future change in policy interest rate and insiders seldom dissent. However, the evidence provided here is anecdotal at best since we are at the preliminary stage of this research. Further research will be added. We also consider optimal voting rule when the monetary policy is decided by individualistic votes by the committee members after the hearing of current economic condition reports and deliberation. Optimal voting quotient should rise when the social cost of wrongfully lowering interest rate becomes big. Since unanimity is different from consensus building, we need to carefully draw policy

implication from this result. However, one message from this study is that the degree of aversion to inflation is preference and the institutional details should accommodate this difference to achieve optimal outcomes from the institution. One drawback of this model is that it has a weak link to loss function specified in the economics literature. Further research should fill this gap shortly.

Appendix A. Dissenting Opinions

TABLE 2. Dissenting Opinions

Month	Outcome	Dissenters	Dissenting opinion
February 2003	Maintain	Tae Dong Kim (KORCHAM)	Lower
March 2003	Maintain	Tae Dong Kim	Lower
April 2003	Maintain	Tae Dong Kim	Lower
May 2003	Lower	Goong Hoon Nam (FSC)	Maintain
June 2003	Maintain	Tae Dong Kim, Woon Yeol Choi (KSDA)	Lower
July 2003	Lower	Goong Hoon Nam	Maintain
August 2004	Lower	Deok Hoon Lee (BOK), Sung Nam Lee (FSC)	50 bps, Maintain
October 2004	Maintain	Jong Chang Kim (KFB), Deok Hoon Lee (BOK)	Lower
November 2004	Lower	Sung Tae Lee (BOK-Deputy Governor)	Maintain
July 2005	Maintain	Tae Dong Kim	Raise
August 2005	Maintain	Tae Dong Kim	Raise
September 2005	Maintain	Tae Dong Kim	Raise
December 2005	Raise	Moon Soo Kang (MOFE), Jong Chang Kim	Maintain
February 2006	Raise	Moon Soo Kang	Maintain
August 2006	Raise	Moon Soo Kang, Sung Nam Lee, Bong Heum Park (KORCHAM)	Maintain
June 2007	Maintain	Hoon Shim (KFB-BOK career)	Raise
August 2007	Raise	Moon Soo Kang	Maintain

Appendix B. Constructing $\pi(s)$

We adopt the following assumptions from Meirowitz (2002).

A 1. Monotone density property: $f(s|g)$ is strictly increasing and $f(s|i)$ is strictly decreasing.

This monotone density property implies a strict monotone likelihood ratio property (MLRP), which means $\frac{f(s|g)}{f(s|i)}$ is strictly increasing in s. This assumption is not used in the main result. However, it is useful in the construction of $\pi(s)$. The monotone density property has a meaning that higher (lower) signal is more likely to result when the state is g (i). The monotone likelihood ratio property means that higher s is a stronger indication of guilt.

A 2. The conditional densities are continuous on the support, $[0, 1]$

This continuity assumption makes social planner's ex ante objective function continuous and whether an increasing difference condition holds becomes simpler.

A 3. Boundary condition is as follows: $f(0|g) = 0, f(0|i) > 0, f(1|g) > 0, f(1|i) = 0$

This assumption guarantees that the unconditional density is nonzero on the entire support, which makes $\pi(s)$ well-defined. Also, it gives us two perfectly informative signals, $s = 0$ and $s = 1$. Denote the conditional probability density function (pdf) of signal s, conditional on the state G (guilty) with $f(s|g)$ and conditional on the state I (innocent) with $f(s|i)$. The simplest candidates for conditional density functions that satisfy the assumptions of our information environment are as follows:

$$f(s|g) = 2s \tag{13}$$

$$f(s|i) = -2s + 2 \tag{14}$$

Then,

$$\pi(s) = \Pr(g|s) = \frac{f(s|g)\Pr(g)}{f(s|g)\Pr(g) + f(s|i)\Pr(i)} \tag{15}$$

With equal priors, $\Pr(i) = \Pr(g) = \frac{1}{2}$

$$\pi(s) = s \tag{16}$$

This $\pi(s)$ is used in an example of thresholds of reasonable doubt that justify various voting rules.

Without the equal prior assumption,

$$\pi(s) = \frac{s \Pr(g)}{s \Pr(g) + (1-s) \Pr(i)} \tag{17}$$

In this case, Bayesian updating of the prior is done in the simplest way using s for the weight of $\Pr(g)$ and $(1-s)$ for the weight of $\Pr(i)$.

References

Andersson, Malin, Dillen, Hans, and Sellin, Peter (2006): "Monetary policy signaling and movements in the term structure of interest rates," *Journal of Monetary Economics*, 53, 1815–1855.

Ashworth, Scott, and Bueno de Mesquita, Ethan (2006): "Monotone Comparative Statics for Models of Politics," *American Journal of Political Science*, 50(1), 214–231.

Athey, Susan (2002): "Monotone Comparative Statics Under Uncertainty," *Quarterly Journal of Economics*, CXVII(1), 187–223.

Austen-Smith, David, and Banks, Jeffrey S. (1996): "Information Aggregation, Rationality, and the Condorcet Jury Theorem," *The American Political Science Review*, 90(1), 34–45.

Berg, S. (1993): "Condorcet's Jury Theorem, Dependency among Jurors," *Social Choice and Welfare*, 10(1), 87–95.

Blinder, Alan (2007): "Monetary policy by committee: Why and how?," *European Journal of Political Economy*, 23, 106–123.

Blinder, Alan, and Wyplosz, Charles (2004): "Central Bank Talk: Committee Structure and Communication Policy," *manuscript*.

Chappell, Henry W. Jr., McGregor, Rob Roy, and Vermilyea, Todd (2004): "Majority Rule, Consensus Building, and the Power of the Chairman: Arthur Burns and the FOMC," *Journal of Money, Credit and Banking*, 36(3), 407–422.

Che, Yeon Koo, and Severinov, Sergei (2006): "Lawyer Advising in Evidence Disclosure," *manuscript*.

Condorcet, M. de (1785): *Essai sur l'Application de l'Analyse à la Probabilité des Décisions Rendues à la Pluralité des Voix*. Imprimerie Royale, Paris.

Costinot, Arnaud, and Kartik, Navin (2006): "Information Aggregation, Strategic Voting, and Institutional Design," *manuscript*.

Coughlan, Peter J. (2000): "In Defense of Unanimous Jury Verdicts: Mistrials, Communication, and Strategic Voting," *The American Political Science Review*, 94(2), 375–393.

Duggan, John, and Martinelli, Cesar (2001): "A Bayesian Model of Voting in Juries," *Games and Economic Behavior*, 37(2), 259–294.

Feddersen, Timothy, and Pesendorfer, Wolfgang (1998): "Convicting the Innocent: The Inferiority of Unanimous Jury Verdicts under Strategic Voting," *The American Political Science Review*, 92(1), 23–35.

——— (1999): "Elections, Information Aggregation, and Strategic Voting," *PNAS*, 96(19), 10572–10574.

Gerardi, Dino (2000): "Jury Verdicts and Preference Diversity," *The American Political Science Review*, 94(2), 395–406.

Gerardi, Dino, McLean, Richard, and Postlewaite, Andrew (2005): "Aggregation of Expert Opinions," *manuscript*.

Gerardi, Dino, and Yariv, Leeat (2007): "Deliberative Voting," *Journal of Economic Theory*, 134, 317–338.

Gerlach-Kristen, Petra (2007): "Outsiders at the Bank of England's MPC," *manuscript*.

Goodfriend, Marvin (2007): "How the World Achieved Consensus on Monetary Policy," *Journal of Economic Perspectives*, 21(4), 47–68.

Guarnaschelli, Serena, McKelvey, Richard D., and Palfrey, Thomas R. (2000): "An Experimental Study of Jury Decision Rules," *The American Political Science Review*, 94(2), 407–423.

Ladha, Krishna K. (1992): "The Condorcet Jury Theorem, Free Speech, and Correlated Votes," *American Journal of Political Science*, 36(3), 617–634.

Meirowitz, Adam (2002): "Informative Voting and Condorcet Jury Theorems with a Continuum of Types," *Social Choice and Welfare*, 19, 219–236.

Milgrom, Paul, and Shannon, Chris (1994): "Monotone Comparative Statics," *Econometrica*, 62(1), 157–180.

Pollard, Patricia (2004): "Monetary Policy-Making Around the World: Different Approaches from Different Central Banks," *manuscript*.

Prat, Andrea (2002): "Should a Team Be Homogeneous?," *European Economic Review*, 46(7), 1187–1207.

Rogoff, K. (1985): "The Optimal Degree of Commitment to an Intermediate Monetary Target," *The Quarterly Journal of Economics*, 100(4), 1169–1189.

Svensson, Lars E. O. (1997): "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets," *European Economic Review*, 41(6), 1111–1146.

——— (2008): "What Have Economists Learned about Monetary Policy over the past 50 Years?," *manuscript*.

Wolfers, Justin (2008): "Comments on Alan Blinder and John Morgan's 'Do Monetary Policy Committees Need Leaders? A Report on an Experiment'," *manuscript*.

Yellen, Janet (2005): "Policymaking in the FOMC: Transparency and continuity," *Federal Reserve Bank of San Francisco Economic Letter*, 2005-22.