Central Banking with Many Voices: The Communications Arms Race

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Around the world most central banks set policy by committee:

- □ Groups thought to reach better decisions than individuals
- □ Representation of different geographical areas and economic constituencies
- \square Median number of board members on monetary policy boards: 8 (BIS (2009).
- □ Fed: 19 members of FOMC (of which 12 vote at any given time)

Tension between decision making by committee and effective monetary policy communication:

- Most Fed policy makers give frequent public appearances or comments this is the Fed "cacophony".
- □ Faust (2016): Cacophony can be viewed as a tug-of-war over public sector expectations. Calls for game-theoretical work to understand this.

Tug-of-war over public sector expectations results not only in a public cacophony of Fed voices, but also in a "quiet cacophony" of Fed policy makers seeking to drive market expectations via informal channels such as the media and market newsletters.

1. Review recent work in asset pricing:

Large asset price movements at times of Federal Reserve debate and decision making that are not associated with public Fed communication.

- Lucca and Moench (2015):
 Pre-FOMC drift
- Cieslak, Morse and Vissing-Jorgensen (2019):
 Stock returns over the "FOMC cycle"
- Morse and Vissing-Jorgensen (2019):
 Governor-president interactions and stock returns

This paper: Cacophony is even worse than commonly appreciated

- 2. A history of leak discussions in FOMC documents, 1948-2013:
 - **FOMC itself expresses frequent concerns about leaks.**
 - □ Lessons about what motivates leaks:
 - Often motivated by disagreement
 - Used for tactical advantage: Disclosure about policy to some extent ties the hands of the committee, i.e. reduces flexibility by changing public expectations
 - □ Lessons about what the costs of leaks are:
 - Lost flexibility
 - Damage to the Fed's reputation
 - Damage to the Fed's decision making process

- 3. Game-theoretical model of the communications arms race:
 - Two policy makers decide what to communicate about policy preferences to the public at an intermediate date between policy meetings.
 - **Disagree** about the optimal policy rate.
 - Disclosure reduces flexibility: Loss from policy rate deviating from prior disclosure about preferred policy rate.
 - Spin is possible (to some extent) with selective disclosure of confidential information.
 - If disagreement is sufficiently strong and sufficent spin is possible the unique Nash equilibrium is that each policy maker communicates informally with his preferred spin but their advocacy cancels each other out.
 - All internal information comes out. Both are worse off than if they could commit to not using informal communication. Analogue to prisoners' dilemma.
 - □ Discuss what can be done to improve the situation.

PART 1. REVIEW OF ASSET PRICING EVIDENCE

Review of asset pricing evidence



Lucca and Moench (2015): Pre-FOMC drift

- □ Avg return on S&P500 about 50 bps in 24 hours before scheduled FOMC announcements (1994–2011). They argue this is puzzling:
 - No news appear to arrive during this period.
 - Leaks are "unrealistic from an institutional viewpoint" and monetary policy news coming out would have to be systematically positive.

Review of asset pricing evidence

Cieslak, Morse and Vissing-Jorgensen (2019): Stock returns over the FOMC cycle

Figure 1. Stock returns over the FOMC cycle, 1994-2016 g Avg. 5-day stock minus T-bill return, t to t+4 (pct) -.2 0 2 30 **\$28 617** 277 31 8.66-0 32 12 16 23 033 25 27 15 ĕ 26 10 $\dot{20}$ 30 -10 0 Days since FOMC meeting (weekends excluded)

Note. Based on 184 FOMC cycles (8 scheduled FOMC meetings per year). The numbers along the line indicate the value on the horizontal axis. If a given day is day -6 or closer to the next meeting, the 5-day (forward) return for this day is not used in the right part of the graph, so points to the right do not use any data for days -2 and later.

They argue that high even-week returns are in fact driven by monetary policy news which over post-1994 period has been **positive for the stock market on average** and has **reached markets via informal communications channels**:

- 1. Changes to the Fed funds target (rare post-1994 but common before that) tend to take place in even weeks in FOMC cycle time
- 2. Fed funds futures rates on average declined in even weeks
- 3. Even-week stock returns are higher following **board meetings of the Board of Governors** (with even-week meetings more important likely due to Board having a full fresh set of policy recommendations from Reserve Banks)
- 4. **"Fed put"** pattern: About half of even-week returns arise due to even-week mean-reversion in stock market following market declines
- 5. High even-week returns are **robust to controlling** for macroeconomic news releases, corporate earnings announcements and reserve maintenance periods.
- 6. No evidence that Fed **information releases or speeches** by Fed officials line up systematically with even weeks. Provide some examples of leaks.

Morse and Vissing-Jorgensen (2019): Governor-president interactions and stock returns

FOIA requests for calendars of Fed governors (incl. chair, vice chair)

- □ February 2007 to December 2017
- Calendars of Bernanke, Yellen, Powell, Fischer and Tarullo:
 28,818 calendar items
- Hypothesis: Informal communication results from interaction of policy makers.
 Each policy maker has incentive to affect market expectations using information acquired in interactions.
 - No board dissent over this period.
 - Focus on interactions between governors and Federal Reserve Bank presidents.
- □ **1,460 calendar items** are phone calls or meetings **between a governor and one or several Federal Reserve Bank presidents** (1,410 are one-on-one).

- D(FR Bank President item)=1 for days with one or more governor calendar items reflecting calls/meetings with a Federal Reserve Bank president.
- D(FOMC item)=1 for days (mainly day -1 and 0 in FOMC cycle) with one or more governor calendar items reflecting calls/meetings of FOMC.
- □ Both dummies capture **governor-president interactions**.

D(Week 0,2,4,6)=1 on 1,342 days. D(Week 0,2,4,6)*D(FR Bank President item)=1 on 312 days. D(Week 0,2,4,6)*D(FOMC item)=1 on 167 days. D(Week 0,2,4,6)*D(No FR Bank Pres item, No FOMC item)=1 on 936 days.

	Dependent variable: Daily excess return on US stock market	
	(1)	(2)
D(Week 0,2,4,6)	0.14***	
	[2.88]	
D(Week 0,2,4,6)*D(FR Bank President item)		0.19**
		[2.21]
D(Week 0,2,4,6)*D(FOMC item)		0.31**
		[2.18]
D(Week 0,2,4,6)*D(No FR Bank Pres item, No FOMC item)		0.057
		[1.14]
Constant	-0.027	-0.021
	[-0.89]	[-0.69]
N (days)	2,847	2,847

FOMC days are not special: Governor-president interactions more generally result in high stock returns!

- □ Findings not driven by Fed releases or speeches on days of governor-president interactions or by good news leading to calls/meetings being scheduled.
- Important information sharing between governors and presidents.
 One or both sides revealing information to someone in the press or the market.
- Does not reveal precisely how governors or presidents get information to markets.
 Perhaps they each have staff in charge of communications?

PART 2. A HISTORY OF LEAK DISCUSSIONS IN FOMC DOCUMENTS

I searched the Board of Governors website in "FOMC information" category:

- □ Words: "leak", "Washington Post", "Wall Street Journal", "New York Times".
- Dropped leaks not related to monetary policy (e.g., leaks about fiscal policy).

Leak discussions are quite frequent: 114 FOMC documents

- Typically, each FOMC document corresponds to one FOMC meeting or conference call (exceptions include leak mentions in the greenbook or in memos).
- \Box 64 documents: Recent leak(s) or possible leak(s)
- □ 44 documents: Risk of leaks (including 8 warnings not to leak)
- □ 4 are about congressional hearings into leaks. A few are jokes/comments.
- Unlikely to be comprehensive: Other words used. Only egregious leaks may be discussed at FOMC meetings.

A repeated theme: The difficulty of detecting leakers.

□ Richmond Fed President Lacker resigned in **2017** following admission of his involvement in leak to Medley Global Advisers in **2012**.

Figure 1. Number of FOMC documents with leak mentions, 1948-2013



The figure graphs the number of FOMC documents per year with leak discussions. The average number is 1.7 documents per year.

Table 2. FOMC documents with leak mentions

Date	Category	Topic	
12/17-12/18/2013	Risk of leaks	FOMC information security at the Reserve Banks.	
3/19-3/20/2013	Recent leaks	Lack of results from investigation of prior leaks. Governor Tarullo concerned about risk of divided loyalty of board staff serving multiple governors.	
1/29-1/30, 2013	Recent leaks	Leaks to New York Times and Medley Global Advisors	
12/11-12/12, 2012	Recent leaks	Investigation into leaks to New York Times and Medley Global Advisors	
10/23-10/24/2012	Recent leaks	Investigation into leaks to New York Times and Medley Global Advisors. Separately, concern about leaks if SEP forecasts by name are circulated internally within the Fed.	
7/31-8/1, 2012	Risk of leaks	Risk of leaks if Summary of Economic Projections includes names	
6/20/2012	Possible leak	Possible leaks about plans for the maturity extension program (MEP)	
12/13/2011	Recent leaks	Leaks of the FOMC agenda ahead of the meeting	
11/28/2011	Recent leak	WSJ article on leak to newsletter writer	
9/20-9/21, 2011	Risk of leaks	Fisher pushing back against more information sharing with reserve banks due to risk of leaks	
1/25-1/26, 2011	Recent leaks	Long discussion to formulate policy to prevent leaks from FOMC participants	
11/3/2010	Recent leaks	Recent leaks to the press	
10/15/2010	Recent leaks	Chairman disappointed with recent leaks of FOMC information	
9/21/2010	Recent leaks	Leaks from August 10, 2010 FOMC meeting	
8/24/2010	Recent leaks	Recent leaks of FOMC information to the press	
5/9/2010	Risk of leaks	Risk of leaks via Congress	
1/26-1/27, 2010	Risk of leaks	Leaking to Larry Meyer of Macroeconomic Advisers	
4/28-4/29, 2009	Recent leak	Leaked stress-test results	
2/7/2009	Warning not to leak	Chairman reminder to avoid leaks	
10/31/2007	Possible leak	WSJ obtaining confidential information	

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Steps taken to reduce leaks: Further evidence that the Fed is concerned with leaks.

- 1. **The FOMC statement:** Emerged after pressure from Congress in the early 1990s following a series of leaks.
- 2. Press conferences: Leaks may have contributed to introduction and timing.
 - □ First press conference was in April 2011, just two meetings after the most extensive discussion of leaks in FOMC transcripts.
 - □ This discussion led to the FOMC's first "Policy on External Communications of Committee Participants". The first principle states:

"Committee participants will endeavor to enhance the public's understanding of monetary policy. They are free to explain their individual views but are expected to do so in a spirit of collegiality and to refrain from characterizing the views of other individuals on the Committee. In explaining the rationale for announced Committee decisions, participants will draw on Committee communications and the Chairman's press conference remarks as appropriate." Initially: Statement out at 12:30 p.m. Press conference at 2:15 p.m.
 Since March 2013: Statement out 2 p.m. Press conference at 2:30 p.m.
 Bloomberg:

"Ben S. Bernanke is tightening his control of Federal Reserve communications to ensure investors hear his pro-stimulus message over the cacophony of more hawkish views from regional bank presidents. The Fed chairman, starting tomorrow, will cut the time between the release of post-meeting statements by the Federal Open Market Committee and his news briefings, giving investors less opportunity to misperceive the Fed's intent." 3. Withholding information from other policy makers:

The **board withholds the identity of which Reserve Bank made a given discount rate request** from the other Reserve Banks (until minutes are made public).

□ May help explain why Morse and Vissing-Jorgensen (2019) find important role for calls/meetings between governors and presidents.

4. Limit attendance:

After years of leaks, in July 1983 Chairman Volcker limited policy making discussion at FOMC meetings to committee members.

□ Perhaps recognizing that reduced attendance would not solve the problem if leaks were from committee members, he noted in the June 1982 meeting:

CHAIRMAN VOLCKER. "There's only one recourse, which is obvious, if we have some sense of lack of confidentiality. There are a lot of people in this room and we could make it quite a few fewer; we can't make it less than the Committee members."

Political science classification of leaks (Pozen (2013)):

□ **Policy leak:** Intended to help, hurt, or alter a plan or policy. Subtypes:

Internecine leak, "through which competing agencies or factions within the executive branch strive to strengthen their relative positions"

Counter-leak (or record-correction leak), "intended to neutralize or dispute prior disclosures";

- □ **Trial-balloon leak:** Used to test the response of key constituencies, members of Congress, or the general public;
- □ Whistleblower leak: Meant to reveal a perceived abuse;
- **Ego leak:** Used to satisfy the leaker's sense of self-importance;
- □ **Goodwill leak:** Meant to curry favor with a reporter;
- □ Animus leak: Meant to settle grudges or embarrass others;
- □ **Inadvertent or lazy leak:** Leak by accident or ignorance.

Linsky survey implies a central role for internecine leaks and counter-leaks in US government policy making:

- □ 42% answered yes to the question "Did you ever feel it appropriate to leak information to the press?"
- Most commonly cited reasons for leaking:
 "to counter false or misleading information": 78%
 "to gain attention for an issue or policy option": 73%
 "to consolidate support from the public or a constituency outside govt.": 64%.

FOMC documents suggest that internecine leaks and counter-leaks are also important in the Fed context

They matter because they affect public perceptions:
 The Fed is reluctant to not deliver on expectations.

Bernanke Aug 2010 memo to FOMC about recent stories in the press: Internecine leaks motivated by disagreement within the FOMC.

CHAIRMAN BERNANKE. "[...] it damages the reputation and credibility of the institution if the outside world perceives us as using leaks and other back channels to signal to markets, to disseminate points of view, or to advance particular agendas"

CHAIRMAN BERNANKE. "It is my hope that FOMC participants or observers are not intentionally or tactically conveying confidential information to the public."

CHAIRMAN BERNANKE. "It is particularly important not to characterize the views of another participant at the meeting."

Chairman Volcker more colorfully expresses the same sentiment of internecine leaks driven by policy disagreement in the November 1982 transcript:

CHAIRMAN VOLCKER. "I think there is a tendency on the part of any organization, for people to say "Damn it! If somebody else is leaking, I'm going to talk to a reporter, too, and get my story out." Unless this is stopped, it's just going to cut us up."

Leaks affect policy by driving market expectations.

Direct evidence that Federal Reserve policy makers care about market expectations:

- Survey of Primary Dealers, Survey of Market Participants surveys policy expectations prior to each FOMC meeting.
- □ Attesting to the impact of these market expectations on policy:

A private company (Macropolicy Perspectives) in 2017 launched a **Shadow Survey of Market Participants** in order to "collect information about consensus expectations that the FOMC uses as an input into its policy decisions" and sell this information to interested buyers prior to the FOMC meeting.

Direct evidence that disclosure reduces policy flexibility: Fewer inter-meeting rate changes after 1994 (CMVJ)

- □ Feb 1994: Fed started issuing statements following changes to policy rate
- □ 1982:9-1993: 62 of 93 target changes between scheduled meetings.
- □ 1994-2016: 7 of 62 target changes between scheduled meetings.
- □ From 1994 on, the Fed has generally waited to the next meeting, presumably to retain flexibility.

Examples from FOMC documents provide evidence of the importance of market expectations for policy via reduced flexibility.

June 2012 FOMC meeting:

MR. FISHER. "I'm just saying that if we can—in every way possible, however we do it—we should try to preserve the options to be debated at this table, and then not use the argument that markets expect us to do X or Y. What is leading the markets to expect that? I haven't seen this broad-based discussion that we are having in the speeches."

December 2011 FOMC meeting:

CHAIRMAN BERNANKE. "I also wanted, though, to mention today some press reports on the timing of our communications initiatives. [...] it does complicate the work of the subcommittee and of this Committee if the expectations of the public are for delivery of certain outcomes at certain dates."

1989 FOMC meeting:

CHAIRMAN GREENSPAN. "Secondly, let me just indicate to those to whom I haven't spoken that those articles in The Washington Post and The New York Times yesterday were not authorized releases. They were not done by myself nor anyone I'm aware of. I'm not sure at this stage particularly what damage was done, but it clearly has very severely restricted our options, or it could. I hope that during this period everyone will endeavor to stay away from the press."

VICE CHAIRMAN CORRIGAN. "Mr. Chairman, if I could, I'd like to add a point on those unfortunate press articles. It is clear to me that they have already done some damage in terms of reducing [our] flexibility and undermining discipline in the marketplace. It is absolutely essential, regardless of what the motivation for those particular articles may have been, that there is only one person who speaks for the Federal Reserve in these circumstances and that is you."

What reduces the flexibility of policy makers going forward, appears to be what has been disclosed (not market expectations in general).

□ Why? Difficult to explain the state-contingent nature of optimal policy ⇒ Fed looks less competent (flip-flopping) if it does not deliver a policy consistent with what it earlier had lead the market to believe

Importantly, to the extent advocacy relies on the disclosure of internal confidential information it can't be done publicly.

Selective reporting of facts via leaks is a standard issue in political science.

- □ Pozen (2013): "plants must be watered by leaks"
- Abel (1987): "In the jaundiced but not unfounded view of some veteran reporters, "[t]he guiding principle, then and now, is that when it suits an administration's purpose to leak secret information to the press, it simply ignores or temporarily overrides a document's classification.""

Three costs mentioned repeatedly in FOMC documents:

- 1. Reduced policy flexibility
- 2. Damage to the central bank's reputation

CHAIRMAN GREENSPAN. "[...] Jerry Corrigan, as you may recall, said at the luncheon that we gave him on his farewell immediately following the last meeting of the FOMC that the one thing that could do this institution in is the leak question and the whole issue of the credibility of our operations. And I must tell you that Jerry is almost surely right on this." (July 1993 FOMC meeting) **One specific channel for reputational damage:** The (correct) perception that some in private sector/press have access to confidential information.

Long discussion at Jan 2011 FOMC meeting.

VICE CHAIR YELLEN. "[...] As you may recall, the Chairman gave our subcommittee a three-part charge.[...]; second, we were to develop policies to avoid the perception that individuals outside of the Federal Reserve System are able to gain inappropriate access to FOMC information that could be valuable in forecasting monetary policy"

MR TARULLO. "[...] This is not limited to one person, and **this is not just Macroeconomic Advisers**, although they have been mentioned. [...] I think this problem is more serious than most of the people around the table think it is, and I have believed since I've been here that there was a real problem waiting to explode."

3. Damage to decision making process: Quality of policy deliberations

CHAIRMAN BERNANKE "And such leaks threaten the free give and take of ideas and collegiality of the FOMC as we grapple with the difficult issues we face." (Aug 2010 memo)

CHAIRMAN GREENSPAN. "We have had two extraordinary leaks, and perhaps more, in recent days [...]. If [our discussions] start to be subject to selective leaks on content, I think we're all going to start to shut down. [...]If we cannot be free and forward with our colleagues, then I think the effectiveness of this organization begins to deteriorate to a point where we will not have the ability to do what is required of us to do." (Dec 1989 FOMC meeting)

CHAIRMAN VOLCKER. "[...] We had a leak about the aggregates [...]. Wherever it came from, there is nothing more corroding of the confidence with which we sit around the table or in a telephone conference and discuss [policy] than the fear that somehow there is going to be a leak of what is discussed. " (Aug 1980 FOMC meeting)

PART 3. THE GAME THEORY OF THE QUIET CACOPHONY

Two policy makers D and H decide on interest rate at each policy meeting.

□ They **disagree** on the appropriate policy rate, given economic conditions.

□ Policy makers' views of the **appropriate interest rate** evolve as:

Date 0:	Date 1:	Date 2:
Last policy meeting	Intermediate date	Current policy meeting
r_0^D	$r_1^D = r_0^D + e_1^D$	$r_2^D = r_0^D + e_2^D$
r_0^H	$r_1^H = r_0^H + e_1^H$	$r_2^H = r_0^H + e_2^H$

The e's are **shocks to policy preferences** and

$$e_2^D = e_1^D + v_2^D$$

 $e_2^H = e_1^H + v_2^H$

$$\begin{array}{lll} \operatorname{cov}\left(e_{1}^{D}, v_{2}^{D}\right) & = & \operatorname{cov}\left(e_{1}^{H}, v_{2}^{H}\right) = 0 \\ \operatorname{cov}\left(e_{1}^{D}, e_{1}^{H}\right) & = & \operatorname{cov}\left(e_{2}^{D}, e_{2}^{H}\right) = \operatorname{cov}\left(e_{1}^{D}, e_{2}^{H}\right) = \operatorname{cov}\left(e_{2}^{D}, e_{1}^{H}\right) = 0 \end{array}$$

The policy rate r is set at date 2 just after the realization of e_2^D and e_2^H .

- \Box r_0^D and r_0^H are observable by policy makers and markets at date 0 after the last policy meeting.
- Delicy makers observe e_1^D , e_1^H at time 1 and e_2^D , e_2^H at time 2 (via internal communication at the central bank).
- □ They have a choice of whether to reveal information about e_1^D or e_1^H to markets at date 1.

If information about e_1^D or e_1^H is disclosed:

 \Box Policy makers incur a loss if the chosen policy rate r differs from the market's perception of average policy preferences as of date 1.

Loss functions as a function of the policy outcome, r:

$$L^{D} = \alpha \left(r - r_{2}^{D}\right)^{2} + I^{disc} \beta \left(r - E_{1}^{market} \left(\frac{1}{2} \left(r_{2}^{D} + r_{2}^{H}\right)\right)\right)^{2}$$
$$L^{H} = \alpha \left(r - r_{2}^{H}\right)^{2} + I^{disc} \beta \left(r - E_{1}^{market} \left(\frac{1}{2} \left(r_{2}^{D} + r_{2}^{H}\right)\right)\right)^{2}$$

- $\Box \quad \alpha > 0, \ \beta > 0.$
- \Box $I^{disc} = 1$ if D or H has made a date 1 disclosure about average policy preferences
- $\Box \quad E_1^{market} \left(\frac{1}{2} \left(r_2^D + r_2^H \right) \right): \text{ Market's expectation of average preferred policy rate given all disclosure.}$
- □ Both policy makers look equally bad if the Fed appears to be flip-flopping.

r at date 2 chosen to minimize total policy maker loss, given date 1 disclosure:

$$\min_{r} L\left(r|r_{2}^{D}, r_{2}^{H}, I^{disc}, E_{1}^{market}\left(\frac{1}{2}\left(r_{2}^{D} + r_{2}^{H}\right)\right)\right)$$

$$= L^{D} + L^{H}$$

$$= \alpha \left(r - r_{2}^{D}\right)^{2} + \alpha \left(r - r_{2}^{H}\right)^{2} + 2I^{disc}\beta \left(r - E_{1}^{market}\left(\frac{1}{2}\left(r_{2}^{D} + r_{2}^{H}\right)\right)\right)^{2}$$

Disclosure reduces the flexibility of policy makers to react to news arriving between date 1 and 2.

The game theory of the quiet cacophony. Policy outcome given disclosure

Lemma 1 (Policy outcome at date 2 given disclosure). The policy outcome without disclosure is

$$r = \frac{1}{2} \left(r_2^D + r_2^H \right)$$

and the policy outcome with disclosure is

$$r = \frac{\alpha}{\alpha + \beta} \frac{1}{2} \left(r_2^D + r_2^H \right) + \frac{\beta}{\alpha + \beta} E_1^{market} \left(\frac{1}{2} \left(r_2^D + r_2^H \right) \right).$$

The game theory of the quiet cacophony. Advocacy (spin)

Conditional on knowing e_1^D and e_1^H :

$$E_1\left(\frac{1}{2}\left(r_2^D + r_2^H\right)|e_1^D, e_1^H\right) = \frac{1}{2}\left(r_0^D + r_0^H\right) + \frac{1}{2}\left(e_1^D + e_1^H\right)$$

Assumption (spin): Policy makers can selectively reveal information

For a given value of $E_1\left(\frac{1}{2}\left(r_2^D + r_2^H\right)|e_1^D, e_1^H\right)$ a policy maker could, if he was the only one disclosing, make the market expect any value for the average policy preference within S^* of the truth:

$$E_{1}\left(\frac{1}{2}\left(r_{2}^{D}+r_{2}^{H}\right)|e_{1}^{D},e_{1}^{H}\right)-S^{*}$$

$$\leq E_{1}^{market}\left(\frac{1}{2}\left(r_{2}^{D}+r_{2}^{H}\right)|\text{disclosure by one}\right)$$

$$\leq E_{1}\left(\frac{1}{2}\left(r_{2}^{D}+r_{2}^{H}\right)|e_{1}^{D},e_{1}^{H}\right)+S^{*}.$$

□ If competing policy makers each advocate in opposite directions, then market expectations are the truth plus the sum of the spin:

$$E_1^{market}\left(\frac{1}{2}\left(r_2^D+r_2^H\right)|\text{disclosure by both}\right) = E_1\left(\frac{1}{2}\left(r_2^D+r_2^H\right)|e_1^D,e_1^H\right) + S^D + S^H.39$$

A disclosure strategy (for a given policy maker):

 $\hfill\square$ A decision of whether to disclose and, if yes, what value of spin to use.

A Nash equilibrium consists of:

- 1. A disclosure strategy for D that is optimal given the disclosure strategy of H and market expectations.
- 2. A disclosure strategy for H that is optimal given the disclosure strategy of D and market expectations.

If advocacy (spin) was not feasible, neither would have an incentive to disclose.

The full value of $\frac{1}{2} \left(e_1^D + e_1^H \right)$ will (in expectation) be incorporated in policy even without disclosure so truthful disclosure would only serve to reduce policy flexibility.

Theorem 1 (Prisoners' dilemma, for sufficient disagreement and feasible spin). Consider the situation where $E_1(r_2^H - r_2^D) > 0$, i.e., H is hawkish relative to D. Let E_1 denote expectations at time 1 conditional on e_1^D, e_1^H . If

$$\sqrt{2}\sigma_v < |\frac{1}{2}E_1(r_2^H - r_2^D)| \le S^*$$

then:

- (a) D prefers disclosure to non-disclosure regardless of H's choice (disclosure is a strictly dominant strategy for D).
- (b) H prefers disclosure to non-disclosure regardless of D's choice (disclosure is a strictly dominant strategy for H).
- (c) Given (a)-(b), the unique Nash equilibrium outcome is that both disclose with $S^D = -S^*$ and $S^H = S^*$. Both policy makers are worse off in this equilibrium than if neither disclosed.

Spin reaction functions: Tug of war!

D's spin reaction function: D's optimal spin (given disclosure) is negative

 \Box If *H* does not disclose:

 \Longrightarrow

$$S^{D} = -\frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right)$$

$$E_{1}(r) = E_{1}\left(\frac{1}{2}\left(r_{2}^{D} + r_{2}^{H}\right)\right) - \frac{\beta}{\alpha + \beta}\frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) < E_{1}\left(\frac{1}{2}\left(r_{2}^{D} + r_{2}^{H}\right)\right)$$

 $\hfill \hfill \hfill$

$$S^{D} + S^{H} = -\frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) \Longrightarrow S^{D} = -\frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) - S^{H}$$

unless this is below the limit of $-S^*$.

$$S^{D} = \max\left(-\frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) - S^{H}, -S^{*}\right)$$

H's spin reaction function: H's optimal spin (given disclosure) is positive

 \Box If *D* does not disclose:

 \implies

$$S^{H} = \frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right)$$

$$E_{1}(r) = E_{1}\left(\frac{1}{2}\left(r_{2}^{D} + r_{2}^{H}\right)\right) + \frac{\beta}{\alpha + \beta}\frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) > E_{1}\left(\frac{1}{2}\left(r_{2}^{D} + r_{2}^{H}\right)\right)$$

 $\hfill\square$ If D discloses, H is trying to reach a total spin of

$$S^{D} + S^{H} = \frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) \Longrightarrow S^{H} = \frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) - S^{D}$$

unless this is above the limit of S^* .

$$S^{H} = \min\left(\frac{1}{2}E_{1}\left(r_{2}^{H} - r_{2}^{D}\right) - S^{D}, S^{*}\right)$$



□ The two spin reaction functions intersect at $S^D = -S^*$, $S^H = S^*$. Each side discloses all the information that supports their case.

Theorem 2 (If disagreement is low, or not much spin is feasible, then non-disclosure is possible).

Consider the situation where $E_1(r_2^H - r_2^D) > 0$, i.e., H is hawkish relative to D. Condition 1: $\sqrt{2}\sigma_v \ge |\frac{1}{2}E_1(r_2^H - r_2^D)|$. Condition 2: S^* is sufficiently small.

If either of the above two conditions hold, then:

- (a) D's spin reaction function: If H does not disclose, disclosure is not worthwhile for D. If H discloses, and picks spin of S^H , D prefers a spin of $S^D = \max\left(-\frac{1}{2}E_1\left(r_2^H - r_2^D\right) - S^H, -S^*\right)$.
- (b) *H*'s spin reaction function: If *D* does not disclose, disclosure is not worthwhile for *H*. If *D* discloses, and picks spin of S^D , *H* prefers a spin of $S^H = \min\left(\frac{1}{2}E_1\left(r_2^H - r_2^D\right) - S^D, S^*\right)$.
- (c) Given (a) and (b) there are two Nash equilibria. In one neither discloses. In the other both disclose with $S^D = -S^*$ and $S^H = S^*$. Both D and H prefer the non-disclosure equilibrium.

In this case, I'd expect D and H to coordinate on the non-disclosure equilibrium. ⁴⁵

The game theory of the quiet cacophony. Can leaking never work in equilibrium?

In equilibrium of Theorem 1 no one even gains from leaking (just like the prisoners do not gain from confessing in equilibrium).

Possible variations of the model in which leaking may benefit a leaker in equilibrium:

- 1. One side may be better informed or better at spinning than the other. Then the less informed party would not fully be able to counter the effects of leaks by the more informed party on market expectations.
- 2. Perhaps record-corrections do not work fully in that once markets have been influenced by the first leaker it is difficult to fully undo this.
 - □ Recall how Bernanke moved up his press conference in 2013

Induces an incentive to leak fast and may provide a mechanism for leaking to benefit the first leaker in equilibrium.

There are obvious but unattractive solutions:

- Avoid disagreement by appointing similar-thinking policy makers.
 Runs counter to why we have group-decision making in the first place.
- Publicly disclose policy preferences in real time so there is less to leak.
 Would likely lead to even more loss in policy flexibility than current framework:
 - No disclosure: Full flexibility
 - Informal disclosure: Some loss of flexibility
 - Public disclosure: Even more loss of flexibility

Parallels to the time inconsistency literature don't seem promising:

- To overcome the standard time-inconsistency problem (surprise inflation to increase employment):
 - Rogoff (1985) argues for appointing a central banker with a "too large" weight on inflation relative to employment.
- □ To avoid excessive gradualism in monetary policy:
 - Stein and Sunderam (2018) argue that society would be better off with a central banker who cared less about market volatility.
- Here, we need central bankers who care "too little" about delivering on policy expectations driven by Fed disclosure, relative to the representative household.
 - But why would potential candidates inherently have different β preferences?
 - And incentivizing them to act as if they have low β would involve rewarding what looks like erratic policy making.

Instead, think about what drives β : Imperfect understanding of Fed's policy framework.

□ If the public fully understood how the Fed would optimally react to each type of incoming data, disclosure would serve only to communicate the framework and not lead to lost flexibility.

Currently, the market needs to understand 19 economic frameworks (7 governors, 12 presidents)

- □ Governors plus NY Fed president always vote.
- □ Of remaining 11, 4 vote in a given year. 4 new ones rotate on each year.

This is hard: 2016 Brookings survey of private sector Fed watchers and academics:

- Only 34% state that they have a very clear or mostly clear understanding of the Fed's policy reaction function.
- 64% want the presidents to speak less.
 Instead, 51% want the chair to speak more.

Suggestion: Avoid FOMC rotation. Have only X of the Reserve Banks vote, but the same ones all the time, "Super Reserve Banks"

- \Box X could be chosen to maintain the balance of power between the board and the Reserve Banks.
- The chair would have an easier time communicating the consensus with a stable set of people voting.
- □ The market would have fewer Reserve Bank presidents to understand.

β would likely fall as the public understands policy framework better:

- □ The quiet cacophony would be a weaker driver of policy.
- □ Policy flexibility would increase.
- Other costs of quiet cacophony would also diminish: Damage to Fed reputation and decision making process.