Disclaimer

• The views expressed in this talk are my own.

• They may not be shared by others in the Federal Reserve System ...

• Especially my colleagues on the Federal Open Market Committee (FOMC).
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Classic Question

Should the central bank (CB) be required to follow a pre-specified rule
Classic Question

Should the central bank (CB) be required to follow a pre-specified rule when setting the level of monetary accommodation?
Classic Question, cont’d

Or should the central bank (CB) have *discretion*
Classic Question, cont’d

Or should the central bank (CB) have **discretion**

to choose accommodation as it deems necessary to achieve its goals?
Motivation for the Question

- Many observers speak highly of interest rate targeting rules as a constraint on CB choices.

- In fact: Congress is considering legislation that would enshrine the Taylor Rule as a reference interest rate rule for the FOMC.
The Argument in This Talk

• Key trade-off:
  – a rule is good if CB has inflationary bias (from time consistency or other factors).
  – discretion is good if CB’s information and analysis are hard to quantify.

• In the US: little evidence of an inflationary bias by the CB.

• Also: FOMC relies, in a complex way, on many indicators of inflationary pressures.

Conclusion: In the US, discretion is better than any rule.
Formal Basis for My Analysis: Three Assumptions

**ASSUMPTION 1:** CBs may or may not have different objective from public.

**ASSUMPTION 2:** CBs may have relevant *non-ruleable* information.

**ASSUMPTION 3:** CB compensation does not vary with outcomes.
Assumption 1: Possibility of Different Objectives

- My analysis allows for the possibility that the CB has an inflationary bias.

- I allow for such bias for two reasons:
  - Oft-heard concerns that FOMC has a pro-inflation bias.
  - Relatedly: inflationary bias is the focus of academic literature on time consistency.

- BUT: I will argue that there is little evidence to support the existence of such bias.
Assumption 2: Non-Ruleable Information

- CBs use lots of information to forecast inflation and output.

- As well: CBs analyze that information in many ways.

- Both the information and its analysis are hard to quantify.

- Example: CB models of inflationary pressures include latent variables like:
  - potential output
  - natural real rate of interest
Assumption 3: Rigid Compensation

- (In US), CB real compensation is largely independent of outcomes.

- Implication: can’t use incentive compensation as a tool for CBs.
  - rules out elegant approach of Walsh (1993; AER).
Delegation Framework

Given the three assumptions:

- There is a tension between:
  - CB’s possible bias
  - CB’s non-ruleable information

- And compensation can’t be used to resolve this tension.
• This creates a *delegation problem* for society with CB.
  

• Rules versus discretion trade-off becomes:

  How much flexibility should society (delegator) give to CB (delegee)?
This Talk Is Not About Simple vs. Complex Rules

- Some observers argue that *simple* reaction functions will give rise to better outcomes.
  - Simple reaction functions may be near-optimal in many models.
  - Complicated reaction functions may be highly suboptimal for *some* model.

- Conclusion: simple rules are good because they protect against very bad outcomes.

- But I’m not talking about that.
Some Other References


- Svensson (2003, JEL).

- Canzoneri (1985, AER) - especially section III.
BASIC FRAMEWORK
Objectives

- Society has objective:
  
  \[-(\pi - \pi_{SOC})^2\]

- CB has objective:
  
  \[-(\pi - \pi_{CB})^2\]

- Possible CB bias: \(\pi_{CB} \geq \pi_{SOC}\).
Comment on Objectives

• Formally, I only model choice at a single date.
  – Political economy factors could generate possible bias.

• But this static choice can be embedded in a dynamic model.
  – Time inconsistency could generate possible bias.
Timing

• Stage 1: inflationary pressures $X$ are publicly observed.

• Stage 2: central bank (CB) observes inflationary pressures $\theta$.
  
  – $\theta$ may or may not be public.

  – Key: $\theta$ is not ruleable.

• Stage 3: CB chooses accommodation $\alpha$ from set $\Phi(X)$.
  
  – $\Phi(X)$ is *endogenous* - described later.
Comment on $\theta$

- It may seem to be easy to encode (scalar) $\theta$ into a rule.

- But I think about $\theta$ as being the dot product of $\omega, \beta$:

  $\theta = \omega' \beta$

  where $\omega$ and $\beta$ are both random vectors.

- May be hard to describe $\omega$.

- As well, $\beta$ may be the product of complicated analysis.
Inflation

- Inflation is determined by:

\[ \pi = \alpha + X + \theta + u \]

- \((X, \theta, u)\) are all mean zero and mutually independent.

- \(\theta\) has unbounded support.
Institutional Design

- Before stage 1, society chooses a correspondence $\Phi$.

- The correspondence maps $X$ to an action set $\Phi(X)$ for the CB.

- Society chooses $\Phi$ so as to maximize expectation of its objective.
Some Terminology

- CB has a **rule** if $\Phi(X)$ is a singleton for all $X$.

- CB has **discretion** if $\Phi(X)$ is the entire real line for all $X$.

- CB has **constrained discretion** if $\Phi$ has any other form.
FIVE CASES
Five Cases

1. Unbiased CB and no non-ruleable information.

2. Biased CB and no non-ruleable information.

3. Unbiased CB with non-ruleable information.

4. Slightly biased CB with non-ruleable information.

5. Highly biased CB with non-ruleable information.
Case 1: Unbiased CB and No Non-Ruleable Information

- **Case 1:** $Var(\theta) = (\pi_{CB} - \pi_{SOC}) = 0$

- Both (good!) rules and discretion are optimal.

- If $\Phi(X) = \{\pi_{SOC} - X\}$ for all $X$, then $\pi = \pi_{SOC} + u$.

- If $\Phi(X) = (-\infty, \infty)$ for all $X$, then $\pi = \pi_{CB} + u$.
  - CB offsets inflationary pressures $X$ ($\alpha = \pi_{CB} - X$).
Case 2: Biased CB with No Non-Ruleable Information

- **Case 2:** $\pi_{CB} \neq \pi_{SOC}$ and $Var(\theta) = 0$

- **In this case:** a good rule dominates discretion.

- If $\Phi(X) = \{\pi_{SOC} - X\}$ for all $X$, then $\pi = \pi_{SOC} + u$.
  - this rule forces CB to choose socially optimal accommodation.

- If, for some $X$, $(\pi_{CB} - X) \in \Phi(X)$, then $\pi = \pi_{CB} + u$.
  - discretion allows CB to choose suboptimal accommodation.
Case 3: Unbiased CB Has Non-Ruleable Information

• **Case 3:** $\pi_{CB} = \pi_{SOC}$ and $Var(\theta) > 0$

• In this case: discretion dominates any rule.

• The best rule is $\Phi(X) = \{\pi_{SOC} - X\}$ for all $X$.

• Under this rule, $\pi = \pi_{SOC} + u + \theta$. 
• If $\Phi(X) = (-\infty, \infty)$ for all $X$, then $\pi = \pi_{SOC} + u$.

• Discretion allows CB to offset $\theta$ shocks.

• Discretion therefore reduces variance of $\pi$. 
Case 4: Slightly Biased CB with Non-Ruleable Information.

• Case 4: $Var(\theta) > (\pi_{CB} - \pi_{SOC})^2$

• Again, discretion dominates any rule.

• The best rule is $\Phi(X) = \{\pi_{SOC} - X\}$ for all $X$.

• Under this rule, $\pi = \pi_{SOC} + u + \theta$. 
• If $\Phi(X) = (-\infty, \infty)$ for all $X$, then $\pi = \pi_{CB} + u$.

• Discretion reduces variance and increases bias.

• Overall, discretion reduces $E(\pi - \pi_{SOC})^2$ by:

$$Var(\theta) - (\pi_{CB} - \pi_{SOC})^2$$
Intuition for Case 4

- A rule is good because it eliminates any bias in CB’s choices.

- Discretion is good because it allows CB to offset non-ruleable inflationary pressures.

- If $Var(\theta) > (\pi_{CB} - \pi_{SOC})^2$, then the second force dominates the first.

**Discretion wins.**
Case 5: Highly Biased CB

- **Case 5:** \( \text{Var}(\theta) < (\pi_{CB} - \pi_{SOC})^2 \)

- Now, a (good) rule dominates discretion.

- The best rule is \( \Phi(X) = \{\pi_{SOC} - X\} \) for all \( X \).

- Under this rule, \( \pi = \pi_{SOC} + u + \theta \).
• If $\Phi(X) = (-\infty, \infty)$ for all $X$, then $\pi = \pi_{CB} + u$.

• Compared to the best rule, discretion increases $E(\pi - \pi_{SOC})^2$ by:

$$(\pi_{CB} - \pi_{SOC})^2 - Var(\theta)$$

• But rules are still not best ...
Case 5, Continued: Optimality of Constrained Discretion

- Suppose $\pi_{CB} > \pi_{SOC}$ (biased central bank).

- Then: incentives are aligned if $\theta$ is sufficiently positive.

- So: let $\Phi(X) = -X + (-\infty, \pi_{SOC}]$.

- This constrained discretion is better than the best rule.

- It allows CB to offset sufficiently inflationary shocks.
Summary of Results

1. Unbiased CB and no non-ruleable information: Rule OR Discretion.

2. Biased CB and no non-ruleable information: Rule.

3. Unbiased CB with non-ruleable information: Discretion.

4. Slightly biased CB with non-ruleable information: Discretion.

5. Highly biased CB with non-ruleable information: Constrained Discretion.
COMMENTS
Comment 1: Optimality of Discretion

- Most macroeconomic models assume no non-ruleable information.

- CB typically has inflationary bias (for time consistency reasons).

- As in cases 1 and 2: rules are at least weakly optimal, if not strictly so.
• Empirically: **little recent evidence to suggest an inflationary bias.**

• Optimal inflation \((\pi_{SOC})\) is 2% per year.
  
  – It is the long-run target in the reference policy rule before Congress.
  
  – FOMC has adopted 2% as its long-run target.

• PCE inflation has averaged:
  
  – 1.9% over past 20 years.
  
  – 1.9% over past 10 years.
  
  – 1.6% over past five years.
• At the same time, FOMC relies on many indicators of inflationary pressures.

• Hence, in the US:
  – Little, if any, CB inflationary bias.
  – CB has a lot of non-ruleable information.

• The relevant cases are case 3 (maybe 4), not cases 1, 2, or 5.

• (Unconstrained) discretion dominates rules.
Comment 2: Discretion Always Beats Many Rules

- In cases 1 and 2, a given rule dominates discretion.

- But discretion still dominates many rules (all but one in case 1).

- Key: rule has to exactly offset undue and public inflationary pressures ($X$).
Comment 3: Communication

- Suppose that the CB has discretion.

- The public observes $\alpha$ and $X$.

- In the model, the public can then infer $\theta$ via:

$$
\theta = \pi_{CB} - X - \alpha
$$
• In reality: public is typically uncertain about $\pi_{CB}$.

• Then, the CB’s choice of $\alpha$ does not imply $\theta$.

• CB should reveal its information $\theta$.

• Equivalently: it should explain the choice of $\alpha$, given $\pi_{CB}$ and $X$. 
CONCLUSION
Classic Argument

- Central bank is tempted to over-inflate relative to long-run societal goal.

- Best to eliminate central banks and replace them with computers.
In This Talk ...

• I argue that:
  
  – the inflationary bias of the FOMC is negligible.
  
  – the FOMC has many non-quantifiable sources of information.
  
  – FOMC compensation is ineffective at providing incentives.

  **Conclusion: discretion is better than any rule.**
Preferences Are Key (Rogoff Redux)

- Appointed central bankers must have little inflationary bias.

- It takes the right organizational culture and appointment procedures to deliver this outcome.

- In my view, we have achieved this desirable goal in the US.