RULES VERSUS DISCRETION: A RECONSIDERATION

BOSTON, MASSACHUSETTS
JANUARY 4, 2015

NARAYANA KOCHERLAKOTA

PRESIDENT
FEDERAL RESERVE BANK OF MINNEAPOLIS

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).

Acknowledgements

I thank Manuel Amador, Cristina Arellano, Kei-Mu Yi, and Samuel Schulhofer-Wohl for helpful comments.

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.
  - See Holmstrom (1984; volume).

- 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

- Amador and Bagwell (2011, Econometrica).
- Athey, Atkeson, and Kehoe (2005, Econometrica).
- 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 θ.
  - θ may or may not be public.
  - Key: θ is not ruleable.
- Stage 3: CB chooses accommodation α from set $\Phi(X)$.
  - $\Phi(X)$ is *endogenous* - described later.

Comment on θ

- It may seem to be easy to encode (scalar) θ into a rule.
- But I think about θ as being the dot product of ω, β:

$$\theta = \omega' \beta$$

  where ω and β are both random vectors.

- May be hard to describe ω.
- As well, β may be the product of complicated analysis.

Inflation

- Inflation is determined by:

$$\pi = \alpha + X + \theta + u$$

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

- θ has unbounded support.

Institutional Design

- Before stage 1, society chooses a *correspondence* Φ.
- The correspondence maps X to an action set $\Phi(X)$ for the CB.
- Society chooses Φ 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 Φ 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 θ shocks.

- Discretion therefore reduces variance of π.

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:** $Var(\theta) < (\pi_{CB} - \pi_{SOC})^2$
- **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 θ 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 (π_{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 α and X.
- In the model, the public can then *infer* θ via:

$$\theta = \pi_{CB} - X - \alpha$$

- In reality: public is typically uncertain about π_{CB}.
- Then, the CB's choice of α does not imply θ.
- CB should reveal its information θ.
- Equivalently: it should **explain** the choice of α, given π_{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.