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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.
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Monetary Policy and Financial Stability

- Major element of monetary policy conversation:

  Easy monetary policy could create risk of financial instability.

- My view: It is preferable to mitigate such risks using supervisory tools.

- But in reality: Supervision may leave residual systemic risk.

  How should this residual risk affect monetary policy?
This Talk

- A framework to incorporate systemic risk mitigation into monetary policymaking.
  - Theme: Systemic risk creates a mean-variance trade-off for policy.

- A suggestive calculation based on the framework.
Outline

1. A Mean-Variance Framework

2. Suggestive Calculation

3. Conclusion
A MEAN-VARIANCE FRAMEWORK
Simple Model

- Monetary policymaker (MP)’s goal is to set a gap \( X \) equal to zero.
  - \( X \) could equal inflation minus target.
  - \( X \) could equal natural unemployment rate (UR) minus actual UR.

- Note well: \( X \) is based on macroeconomic outcomes.

- MP can increase \( X \) by raising accommodation \( A \).

- After MP chooses \( A \), \( X \) is also affected by a number of shocks, including shocks to the financial system.
The Central Banker’s Problem

• MP’s loss is given by the square of the gap (that is, $X^2$).
  
  – Standard: MP wants gap to equal zero.
  
  – Equally bad to have positive or negative gaps.

• Recall: $X$ depends on shocks realized after $A$ is chosen.

• MP chooses $A$ so as to minimize the mean loss associated with $A$:

  $$\text{Mean}(X^2|A)$$
Usual Approach

• Mean loss equals squared mean gap + variance of gap:
  \[ Mean(X|A)^2 + Var(X|A) \]

• Typical assumption: MP can't influence variance of shocks.

• Then, minimizing expected loss is same as minimizing squared mean gap:
  \[ Mean(X|A)^2 \]

• Solution is to choose accommodation \( A^* \) that eliminates mean gap:
  \[ Mean(X|A^*) = 0 \]
Incorporating Financial Stability Risks

• Suppose higher $A$ increases the risk of financial instability that lowers $X$.

• Then, higher $A$ increases $\text{Var}(X|A)$.

• MP’s problem is to choose $A$ so as to minimize:

  $$[\text{Mean}(X|A)]^2 + \text{Var}(X|A)$$

• Now: MP’s choice of $A$ trades off mean versus variance.
Mean-Variance Trade-Off

- Trade-off means that MP’s appropriate choice $A^{**}$ will result in:

$$Mean(X|A^{**}) < 0$$

- That is, on average, the gap is negative under appropriate policy.

- MP gives up some mean $X$ in order to get less risk in $X$.

- But exactly how much mean $X$ should MP give up?
Comparing Two Monetary Policy Alternatives

• It is appropriate for MP to choose \( A \) over \( A^* \) if \( A \) reduces risk sufficiently relative to \( A^* \):

\[
Var(X|A^*) - Var(X|A) > Mean(X|A)^2
\]

• Central banks know a lot about assessing the RHS – that is, the mean of \( X \) given choice \( A \).

  – In my view: The RHS remains large for current choice of \( A \).

• Key question is about the LHS:

  How do we assess the difference in the risk implied by policy choices?
A Possibly Helpful Simplification

• Suppose that a crisis causes the gap $X$ to fall by $\Delta$.

• Suppose that monetary accommodation $A$ implies that the probability of a crisis is $p(A)$.

• Then (assuming statistical independence of the crisis from other shocks):

$$Var(X|A^*) - Var(X|A) \approx [p(A^*) - p(A)]\Delta^2$$

• Then: Given any policy choice $A$ or $A^*$, we need to assess:

The **implied probability** of a crisis and its **impact** $\Delta$ on $X$. 
SUGGESTIVE CALCULATION
Crisis Impact

• Assume: the natural UR is approx. 5% in 2017.

• Assume too that, under current policy $A^*$, projected 2017 UR is 5%.
  – That is, $E(X|A^*) = 0$ in 2017.

• Suppose too that a financial crisis would generate 2017 UR of 9%.

• In other words:

\[
\text{The impact } \Delta \text{ of a crisis is 4%}.
\]
According to the Survey of Professional Forecasters ...

• How likely is a crisis? As of 2014:Q1, the average SPF prediction is that:

\[ \Pr(UR \geq 9\% \text{ in } 2017) = 0.29\% \]

• So, if \( A^* \) is current monetary policy:

\[ p(A^*) \leq 0.0029 \]

– It’s an inequality because there are noncrisis sources of high UR.
(Implausibly) Highly Effective Monetary Policy

- Suppose monetary policy $A'$ eliminates any chance of a crisis.

- That is, $A'$ is a policy such that $p(A') = 0$.

- Then:

$$[p(A^*) - p(A')] \Delta^2 = (0.0029)(0.0016) 
\approx (0.0022)^2$$
• Should the FOMC be willing to adopt $A'$ over $A^*$ (when $E(X|A^*) = 0$)?

• Only if the (implausibly effective) policy $A'$ doesn’t increase projected gaps too much.

• Simple calculation: Only adopt tighter monetary policy $A'$ if:

$$A' \text{ raises UR to less than } 5.22\% (!!).$$

• Main take-away: Current SPF forecasts imply that

Little benefit to reducing or eliminating the probability of a crisis.
CONCLUSIONS
Financial Stability Framework: What We Need To Know

• Mean-variance framework implies that policymakers need to assess:

\[ Var(X|A) - Var(X|A') \]

• Possibly could simplify this problem to gauging:

\[ [p(A) - p(A')]\Delta^2 \]
Assessing Crisis Probabilities

- Key measurement questions: what is the probability of a crisis?

- Current SPF forecasts suggest that it is very low under current policy.

- Some might argue that professional forecasters tend to underestimate probabilities of tail events.

- It would be useful to develop other approaches:
  - **Model-based** probability assessments of tail events
  - And **market-based** probability assessments of tail events