Managing Expectations

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How to Manage Expectations?

- **Instruments**: “will maintain 0% interest rates for $\tau$ quarters”
- **Targets**: “will bring unemployment down to $Y\%$’
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**Instrument Communication**
August 2011: “The Committee [FOMC] currently anticipates ... exceptionally low levels for the federal funds rate at least through mid 2013.”
January 2012: horizon extended to “... at least through late 2014.”
September 2012: horizon extended to ” ... at least through mid 2015 .”

**Target Communication** (reserved?)
December 2012: “... as long as the unemployment rate remains above 6 1/2 percent, inflation between one and two years ahead is projected to be no more [than 2.5%], and longer-term inflation expectations continue to be well anchored.”
How to Manage Expectations?

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**Instrument Communication**

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December 2012: “... as long as the unemployment rate remains above 6 1/2 percent, inflation between one and two years ahead is projected to be no more [than 2.5%], and longer-term inflation expectations continue to be well anchored.

**Target Communication** (resolute?)

“do whatever it takes” (and perhaps won’t bother to tell you how)
Instrument vs Target Communication

- Reason to prefer one over the other?

- **NO** in benchmark with
  (i) Full credibility
  (ii) No future shocks (or policy contingent on them)
  (iii) Rational Expectations + Common Knowledge

“Ramsey world”
Instrument vs Target Communication

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“Ramsey world”

Our focus

Relax (iii) and explore role of bounded rationality
Main Lesson

<table>
<thead>
<tr>
<th>Optimal Forward Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>★ Instrument communication when GE feedback is weak</td>
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<tr>
<td>★ Target communication when GE feedback is strong</td>
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</tbody>
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Stop talking about $R$ and start talking about $u, Y$ when:

✓ long ZLB
✓ steep Keynesian cross
✓ strong financial accelerator

Rationale: help minimize

✓ agents’ need to “reason about the economy”
✓ distortion due to bounded rationality
✓ lack of confidence
Model

\[ C = \int c_i \, di = \text{average action today} \]
\[ Y = \text{outcome (target) in the future} \]
\[ \tau = \text{instrument in the future} \]

\[ c_i = (1 - \gamma) \mathbb{E}_i[\tau] + \gamma \mathbb{E}_i[Y] \]
\[ \gamma \in (0, 1) \text{ parameterizes GE feedback} \]
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Story (microfoundation in paper)

ZLB today, but not tomorrow
\[ C = \text{spending today}; \ Y = \text{income today plus tomorrow} \]
\[ \tau = \text{minus interest rate tomorrow (or for how long thereafter)} \]
\[ \gamma = \text{Keynesian multiplier} \]
Model

Final outcome depends on realized behavior and policy

\[ Y = (1 - \alpha)\tau + \alpha C \]

\[ \alpha \in (0, 1) \] parameterizes direct policy effect

Story (microfoundation in paper)

Loose policy tomorrow \( \rightarrow \) higher output tomorrow
The Model (just 2 equations!)

\[ c_i = (1 - \gamma)E_i[\tau] + \gamma E_i[Y] \]  
\[ Y = (1 - \alpha)\tau + \alpha C \]
The Model (just 2 equations!) and the Key Issue

\[ c_i = (1 - \gamma) \mathbb{E}_i[\tau] + \gamma \mathbb{E}_i[Y] \]  
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- **No guidance**: Agents have to forecast both \( \tau \) and \( Y \)
The Model (just 2 equations!) and the Key Issue

\[ c_i = (1 - \gamma)E_i[\tau] + \gamma E_i[Y] \] (1)

\[ Y = (1 - \alpha)\tau + \alpha C \] (2)

- No guidance: Agents have to forecast both \( \tau \) and \( Y \)
- **Instrument communication**: know \( \tau \), have to think about \( Y \)
The Model (just 2 equations!) and the Key Issue

\[ c_i = (1 - \gamma)E_i[\tau] + \gamma E_i[Y] \]  
\[ Y = (1 - \alpha)\tau + \alpha C \]  

- No guidance: Agents have to forecast both \( \tau \) and \( Y \)
- Instrument communication: know \( \tau \), have to think about \( Y \)
- Target communication: know \( Y \), have to think about \( \tau \)
Timing

\( t = 0 \) (FOMC meeting): PM sees \( \theta \) (ideal point) and announces

either \( \tau = \hat{\tau} \) (IC) or \( Y = \hat{Y} \) (TC)

\( t = 1 \) (liquidity trap): Agents form beliefs and choose \( c_i \)

\( t = 2 \) (exit): \( C, \tau \) and \( Y \) are realized
Timing

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The Policy Problem

$$\min_{\theta \mapsto \{\text{message},(\tau,Y)\}} \mathbb{E}[(1 - \chi)(\tau - \theta)^2 + \chi(Y - \theta)^2]$$

s.t. $(\tau, Y)$ is implementable in equil given

eq. (1)-(2) and message $\tau = \hat{\tau}$ or $Y = \hat{Y}$
Frictionless, REE Benchmark

Benchmark \equiv \text{representative, rational and attentive agent} (\text{CK of both announcement and rationality})

\implies \text{no error in predicting behavior of others:}

\[ \mathbb{E}_i[C] = C \]

\implies \text{any equilibrium satisfies}

\[ c_i = C = Y = \tau \]

\implies \text{irrelevant whether PM announces } \tau \text{ or } Y

(\text{equivalence of primal and dual problems})
Friction: Lack of CK / Anchored Beliefs

Assumption: Lack of CK of announcement

Let $X \in \{\tau, Y\}$ be the announcement. Agents are rational and attentive but think only fraction $\lambda \in [0, 1]$ of others is attentive:

$$E_i[X] = X \quad E_i[E[X]] = \lambda E_i[X]$$
Friction: Lack of CK / Anchored Beliefs

- **Assumption:** Lack of CK of announcement
  Let $X \in \{\tau, Y\}$ be the announcement. Agents are rational and attentive but think only fraction $\lambda \in [0, 1]$ of others is attentive:

\[
E_i[X] = X \\ E_i[\bar{E}[X]] = \lambda E_i[X]
\]

- Convenient proxy for
  - HOB in incomplete-info settings
  - **Level-K Thinking:** same essence, but a small “bug”
  - **Cognitive discounting:** same for GE, but adds PE distortion
Friction: Lack of CK / Anchored Beliefs

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- **Convenient proxy for**
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- **Key shared implication:** Anchored Beliefs

  $$\bar{E}[[C]] = \lambda C$$
Preview of Argument

1. Friction attenuates power of FG under IC
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2. Friction amplifies power of FG under TC
Preview of Argument

1. Friction attenuates power of FG under IC

2. Friction amplifies power of FG under TC

3. Role of GE: As $\gamma \uparrow$, first distortion $\uparrow$ and second $\downarrow$
1. Friction attenuates power of FG under IC

2. Friction amplifies power of FG under TC

3. Role of GE: As $\gamma \uparrow$, first distortion $\uparrow$ and second $\downarrow$

4. **Optimality:** TC $\succ$ IC if and only if $\gamma$ large enough
IC: Game after Announcing $\tau$

$$C = (1 - \gamma)\bar{E}[\tau] + \gamma\bar{E}[Y]$$
IC: Game after Announcing $\tau$

C = (1 − $\gamma$)$\bar{E}[\tau]$ + $\gamma\bar{E}[Y]$  

= $\tau$ (fixed by FG)  

(reasoned by agents)

= (1 − $\alpha$)$\bar{E}[\tau]$ + $\alpha\bar{E}[C]$
IC: Game after Announcing $\tau$

$C = (1 - \gamma)\bar{E}[\tau] + \gamma\bar{E}[Y]$

$C = (1 - \delta_\tau)\tau + \delta_\tau \bar{E}[C]$ (reasoned by agents)

$= (1 - \alpha)\bar{E}[\tau] + \alpha\bar{E}[C]$ (fixed by FG)

$\alpha \gamma \in (0, 1)$

> Game of complements

"I expect less spending and income, so I spend less"

> Friction reduces effectiveness of FG

IC: Game after Announcing $\tau$

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- **Game of complements**
  “I expect less spending and income, so I spend less”

- **Friction reduces** effectiveness of FG
TC: Game after Announcing $Y$

$$C = (1 - \gamma) \bar{E}[\tau] + \gamma \bar{E}[Y]$$
TC: Game after Announcing $Y$

\[ C = (1 - \gamma)\bar{E}[\tau] + \gamma\bar{E}[Y] \]

(reasoned by agents)

\[ = \frac{1}{1-\alpha}\bar{E}[Y] - \frac{\alpha}{1-\alpha}\bar{E}[C] \]

\[ = Y \text{ (fixed by FG)} \]
TC: Game after Announcing $Y$

C = (1 − $\gamma$) $\bar{E}[$τ$] + $\gamma$ $\bar{E}[$Y$]

( reasoning by agents )

= $\frac{1}{1-\alpha}$ $\bar{E}[$Y$] − $\frac{\alpha}{1-\alpha}$ $\bar{E}[$C$]

= $Y$ (fixed by FG)

C = (1 − $\delta_Y$) $Y$ + $\delta_Y$ $\bar{E}[$C$]

− $\frac{(1-\gamma)\alpha}{1-\alpha}$ ≤ 0

- Game of substitutes
  “I expect less spending, so I expect looser policy and spend more”

- Friction increases effectiveness of FG
  Turns FG literature upside down
Implementability

Proposition: implementable sets

\[ \{(\tau, Y) : \tau = \mu_\tau(\gamma, \lambda) Y\} \quad \text{Instrument communication} \]

\[ \{(\tau, Y) : \tau = \mu_Y(\gamma, \lambda) Y\} \quad \text{Target communication} \]

- Friction \(\neq\) “everything is dampened”
- TC keeps powder dry
The Role of the GE Feedback

**Proposition**

\[
\partial \mu \tau / \partial \gamma > 0 \\
\partial \mu Y / \partial \gamma > 0
\]

Can prove these slope up, *and* never cross

Recall: \( \mu = \partial \tau / \partial Y \)
The Role of the GE Feedback

**Proposition**

\[
\frac{\partial \mu_T}{\partial \gamma} > 0 \\
\frac{\partial \mu_Y}{\partial \gamma} > 0
\]

**Quick intuition**

Distortion from reasoning about what is not announced.

High \( \gamma \) \( \rightarrow \) very important to figure out \( Y \), not so much \( \tau \).

Can prove these slope up, *and* never cross.

Recall: \( \mu = \frac{\partial \tau}{\partial Y} \)

As \( \gamma \) (GE) increases, \(\{\) distortion under IC increases, distortion under TC decreases\(\} \)
Main Result

Theorem: optimal communication

There exists a $\hat{\gamma} \in (0, 1)$ ("critical GE feedback") such that

- $\gamma < \hat{\gamma}$: optimal to communicate instrument
- $\gamma \geq \hat{\gamma}$: optimal to communicate target

Additional results in paper:
- Precise values of optimal message and attained $(\tau, Y)$
- Level-k Thinking
Main Result

Theorem: optimal communication

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variant with Level-k Thinking
Generalized Departure from RE

- Misspecified beliefs:

\[ \bar{E}[C] = \lambda C + \sigma \epsilon \]

where \( \lambda, \sigma > 0 \) and \( \epsilon \) is orthogonal to \( \theta \)

- Nests:
  - under-reaction (\( \lambda < 1 \)): FG literature
  - over-reaction (\( \lambda > 1 \)): Shleifer et al
  - noise or animal spirits (\( \sigma > 0 \))
Generalized Departure from RE

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- Optimal policy result goes through
  - intuition: all about limiting the role of \( \bar{E}[C] \)
  - i.e., “more thinking = more distortion” result extends
Take-Home Lessons

How to communicate / manage expectations?

- Tilt focus from $R$ path to $u, Y$ targets when feedback loops are strong

New perspective on Taylor rules

- Traditional: demand vs supply shocks
- Here: arrest bounded rationality or nearly self-fulfilling traps

Extend logic from multiple equil (Mario Draghi) to unique equil

- large multipliers $\rightarrow$ HOB critical $\rightarrow$ “nearly” self-fulfilling $\rightarrow$
Level-\(k\): Similar but Less Sharp

- **Instrument comm** (games of complements): the same
  - others are less rational \(\approx\) others are less attentive

- **Target comm** (games of substitutes): a bug
  - distortion changes sign between even and odd \(k\)

- Our preferred formulation avoids the bug

- Cognitive discounting avoids it too (but confounds PE-GE)
FG: Three GE Feedbacks

1. Within Dynamic IS: Keynesian cross
2. Within NKPC: dynamic pricing complementarity
3. Across: inflation-spending feedback

▶ All three: intensify with length of ZLB / horizon of FG
FG: Numerical Illustration

- Textbook NK model, with modest friction ($\lambda = .75$)

- Attenuation by 90% when ZLB last 5 years
- Plus, discontinuity at infinite horizons