

*“Forward Guidance without Common Knowledge”*  
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# Expectations, Coordination and Forward Guidance

## Motivation:

- *Forward Guidance Puzzle: the further a promise of  $R_t$  is into the future, the larger is its effect on output and inflation*
- But, in reality, the effectiveness of prospective policy depends on *agents' expectations about each others responses*

**Question:** *What if we break the common knowledge assumption?  
Would the Forward Guidance Puzzle remain?*

**This paper:** Proposes a novel theoretical resolution

Shows how the lack of *CK* resolves the *Forward Guidance Puzzle*

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# Big Picture: Common Knowledge *Should* Matter

## Macroeconomic Puzzles:

- Benchmark macroeconomic models exhibit many puzzles
- *Ricardian Equivalence, Paradox of Toil, Forward Guidance Puzzle...*
- *PE vs. GE: Incredible General Equilibrium multipliers*

But *what determines the strength of GE?*

⇒ people's ability to anticipate each others choices

**Marios and Chen** show how *imperfect common knowledge anchors higher-order beliefs*

⇒ *dampens general equilibrium multipliers*

⇒ *resolves macroeconomic puzzles*

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# A Simple Example

## Basic Setup:

- Simplified three-period version of *dispersed information NK model*
- Uncertainty over *future* policy rate: (a)  $R_t = 0$  when  $t = \{0, 1\}$ ;  
(b) Then,  $R_2 \sim N(0, 1/\tau_R)$  for  $t = 2$ . Flex-price outcome for  $t \geq 3$ .
- *Stark* information structure:  $x_{i0} = R_2 + \varepsilon_x^i$ ,  $\varepsilon_x^i \sim N(0, 1/\tau_x)$

## Equilibrium Conditions:

1. *Demand Block*:  $y_t = \bar{\mathbb{E}}_t [y_{t+1}] - R_t + \bar{\mathbb{E}}_t [\pi_{t+1}]$
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# Equilibrium Characterization

## Forward Solution:

$$\begin{aligned}y_0 &= -R_0 - \bar{\mathbb{E}}_0[R_1] - \bar{\mathbb{E}}_0\bar{\mathbb{E}}_1[R_2] + \bar{\mathbb{E}}_0[\pi_1] + \bar{\mathbb{E}}_0\bar{\mathbb{E}}_1[\pi_2] \\ &= -R_0 - (1 + \kappa)\bar{\mathbb{E}}_0[R_1] - \left[(1 + \kappa)^2 + \kappa\beta\right]\bar{\mathbb{E}}_0\bar{\mathbb{E}}_0[R_2]\end{aligned}$$

## Forward Guidance Puzzle:

Assume *Common Knowledge*

$$y_0 = -\phi_0 R_0 - \phi_1 \mathbb{E}_0[R_1] - \phi_2 \mathbb{E}_0[R_2]$$

**The Puzzle:**  $\phi_0 < \phi_1 < \phi_2$

*The further a promise of  $R_t$  is into the future, the larger is the effect!*

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## Partial vs. General Equilibrium

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- “*Partial Equilibrium*”:  $-1$
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### **Without Common Knowledge:**

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- “*Partial Equilibrium*”:  $-1 \times \lambda$ ,  $\bar{\mathbb{E}}_0 \bar{\mathbb{E}}_0 [R_2] = \lambda \bar{\mathbb{E}}_0 [R_2]$
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**Imperfect Common Knowledge Dampens *Forward Guidance!***

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# Common Knowledge, Coordination and Forward Guidance

## Infinite Horizon Extension:

- *General Equilibrium Effect:*  $-\phi_T \times \lambda^T \rightarrow 0$
- A resolution of *the Forward Guidance Puzzle*

## General Equilibrium Dampening:

$$\bar{\mathbb{E}}_0[\pi_t] = \delta_t \lambda \times \bar{\mathbb{E}}_0[R_2]$$

- *ICK decreases the responsiveness of endogenous expectations*
- *Higher-order beliefs  $\rightarrow$  dampen str. compl  $\rightarrow$  dampen GE multipliers*

Operationalizes: Central bank can steer  $\bar{\mathbb{E}}[R] \rightsquigarrow \bar{\mathbb{E}}[\pi] \ \& \ \bar{\mathbb{E}}[y]$

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# A Bird's Eye View

## The Paper is Overall:

- *Excellent, creative and consequential*
- *Creates a fundamental insight about GE*
- *About much more than a macroeconomic puzzle:*  
*How all markets adjust? Formalized level-k? Overturn HAM results?*

## Comments:

1. *Elements of Odyssean Forward Guidance*
2. *Extrapolative Expectations: Another Candidate?*
3. *Microfoundations vs Rationality vs Beliefs?*



# Elements of Odyssean Forward Guidance

## Forward Guidance:

- *Delphic*: Information about fundamentals (*Wiederholt, 2016*)
- *Odyssean*: Conditional information about  $R$  (*Marios and Chen, 2017*)

**Odyssean Objective:** *Reduce uncertainty about future policy rates, conditional on economic developments (ECB, Monthly Bulletin 2014)*

## Forward Guidance Creates Common Knowledge

$$y_0 = -\phi_2 \bar{\mathbb{E}}_0 \bar{\mathbb{E}}_0 [R_2] \approx -\phi_2 \mathbb{E}_0 [R_2]$$

- *Additional public signal  $\rightarrow$  dampens higher-order uncertainty*
- *Forward Guidance amplifies dampened multiplier?*

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# Elements of Odyssean Forward Guidance

Table 2: Labor futures: volatility reaction to monetary policy announcements

Event	Date	1m	3m	6m	12m	24m	36m
FLS – Mansion house speech	14/06/2012		21.40%	3.16%	-28.74%***	-7.29%**	-9.98%***
Forward Guidance – IR Publication	07/08/2013	-16.25%	-29.52%***	-22.61%***	-6.61%	-1.68%	-1.27%

Significant at \*\*\*1%, \*\*5%, \*10%. Percentiles of the empirical distribution.

Table 1: Labor futures: level reaction to monetary policy announcements (percentage points)

Event	Date	1m	3m	6m	12m	24m	36m
FLS – Mansion house speech	14/06/2012		-0.31***	-0.31***	-0.28***	-0.35***	-0.33***
Forward Guidance – IR Publication	07/08/2013	0.01	0.01	-0.02	-0.02	0.00	0.02

Significant at \*\*\*1%, \*\*5%, \*10%. Percentiles of the empirical distribution.

**BoE (2013): This reduction in uncertainty suggests that the policy achieved its aim of reducing uncertainty**

# Micro-Consistent Expectations

**Empirical Evidence:** *Coibion and Gorodnichenko (2012, 2015)*

*Inflation expectations appear consistent with noisy information models*

**Evidence in favor of ICK Dampening of GE?**

But...

- Expectations also seem extrapolative (Gennaioli et al, 2016)
- Revisions to fixed-term forecasts are *serially correlated*
- Inconsistent with standard dispersed information models

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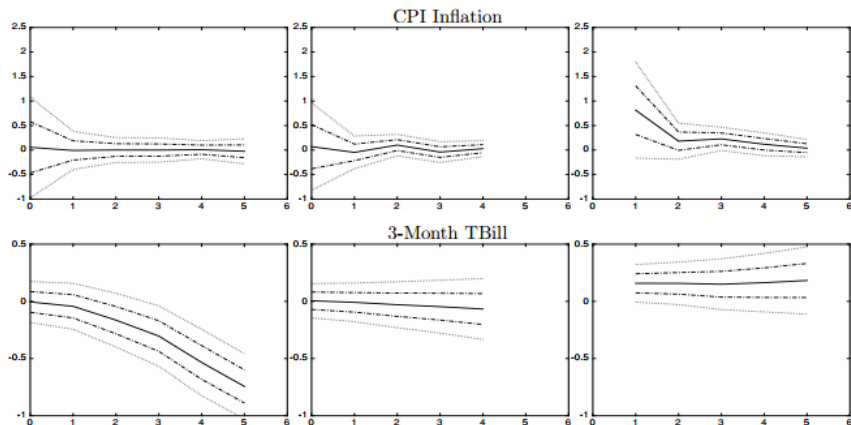
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# Micro-Consistent Explanation?

Figure 2: The Effect of Forward Guidance Announcements on Expectations  
August 2011                      January 2012                      September 2012



*Del Negro et al (2015): The Forward Guidance Puzzle*

# Microfoundations vs. Beliefs vs. Rationality

## A Plethora of Explanations:

- Incomplete markets, death, adj. phillips curve, commitment...
- Sparsity, level- $k$ ,  $\beta/\delta$ , imperfect common knowledge

## Microfoundations vs. Beliefs vs. Rationality?

### A Quantitative Exercise?

- Examine transmission mechanism
- Study magnitude: persistence vs initial response

### Maybe There Is No Puzzles In the End?

# Final Remarks

## Conclusion:

- Since **Morris and Shin (2002)** focus on **public information's** ability to **coordinate** people's actions by creating more **common knowledge**
- Yet the mere presence of **imperfect common knowledge** creates an **imperfection** in people's ability to coordinate their choices
- **Marios and Chen** turn our attention to the **critical role played** by this **imperfection** for *realistic GE effects in macroeconomics*
- .... **enormous upside potential**

**Rubenstein (1989):** *Almost common knowledge  $\neq$  common knowledge*



Thank you for your time and attention!