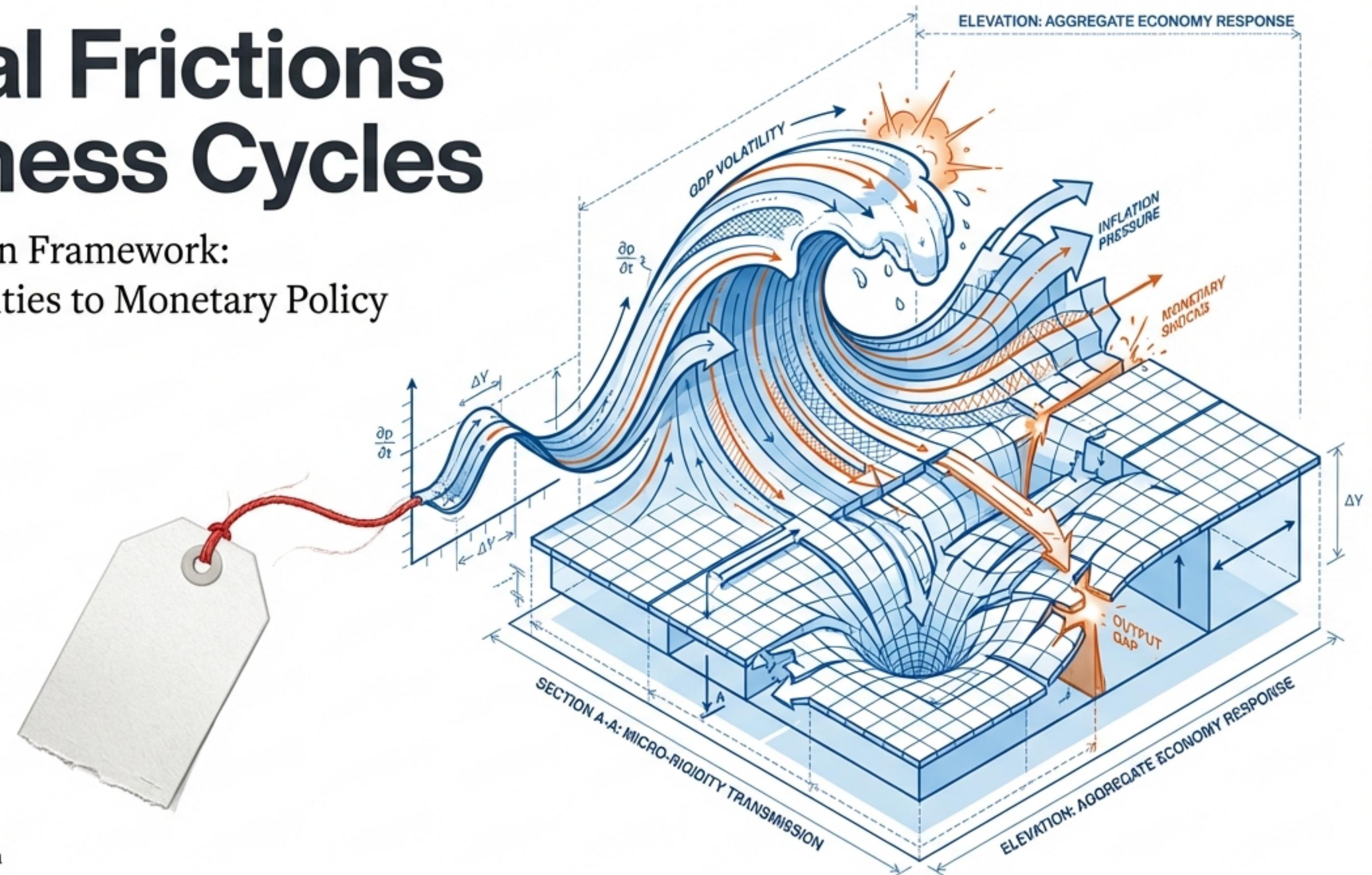


Nominal Frictions & Business Cycles

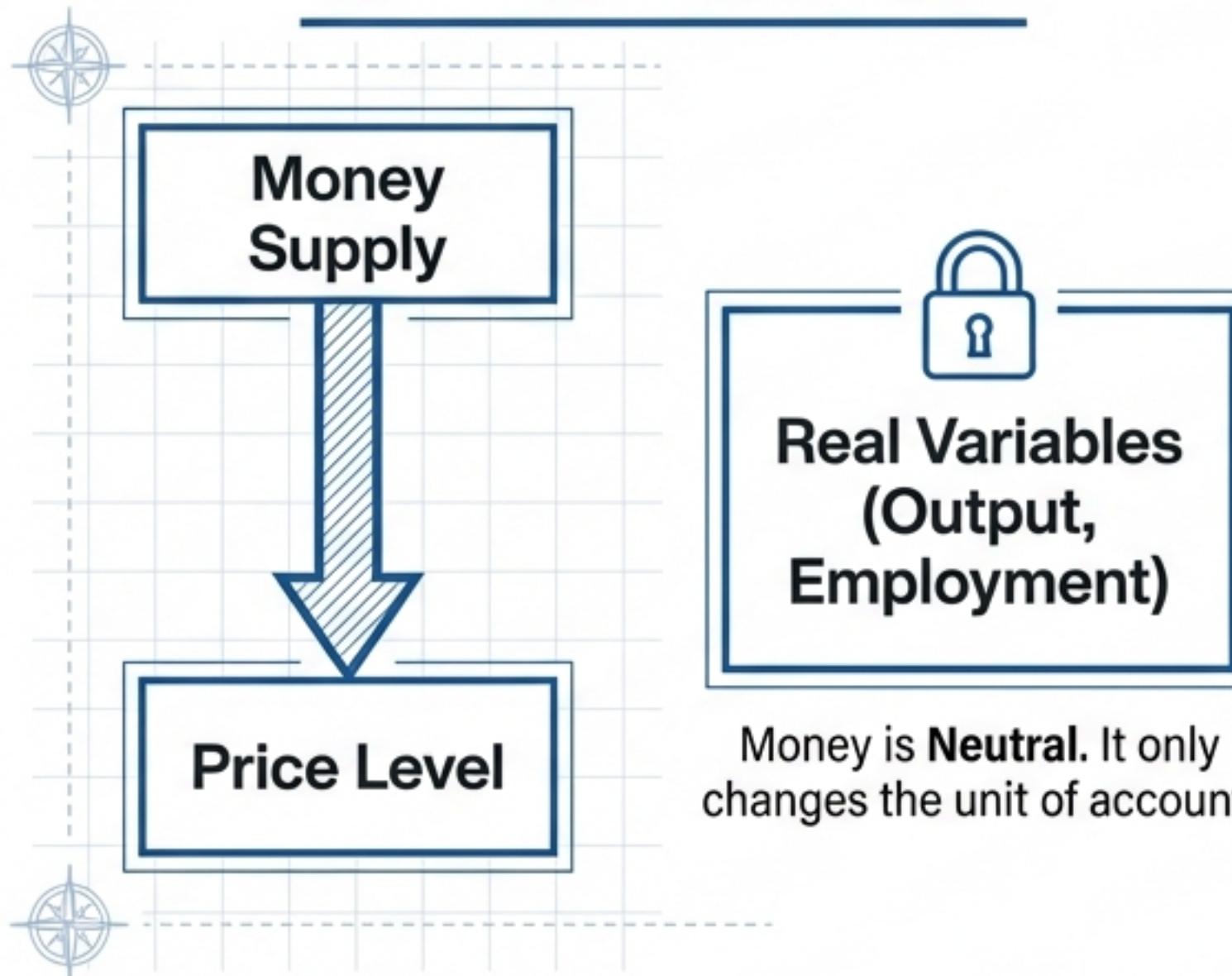
The New Keynesian Framework:
From Micro-Rigidities to Monetary Policy



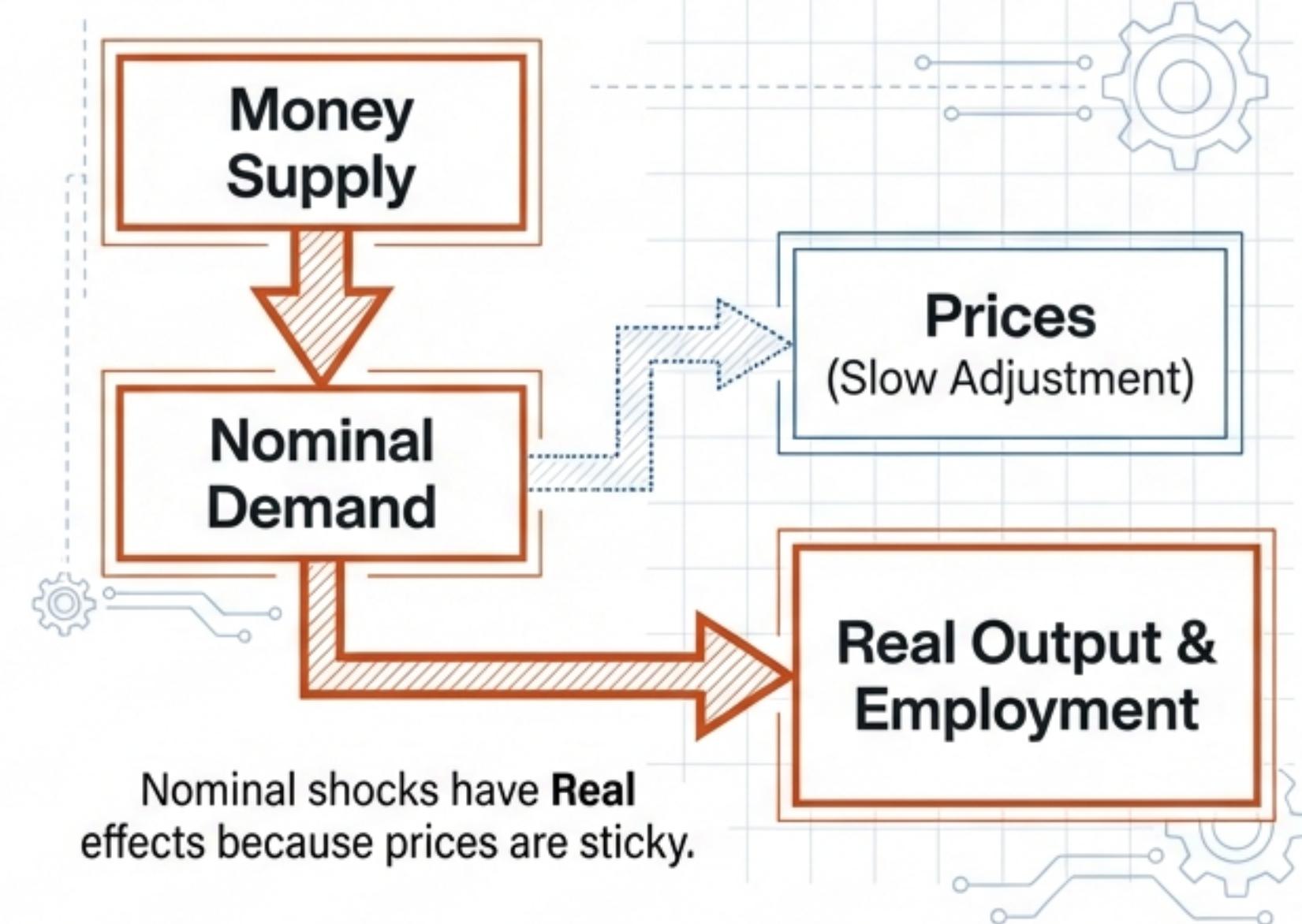
Based on the work of
Alisdair McKay and Morten Ravn

The Breakdown of the Classical Dichotomy

The Classical View



The Keynesian Reality



"The Great Depression proved that market economies can perform poorly with mass unemployment. The price adjustment mechanism is neither perfect nor immediate."

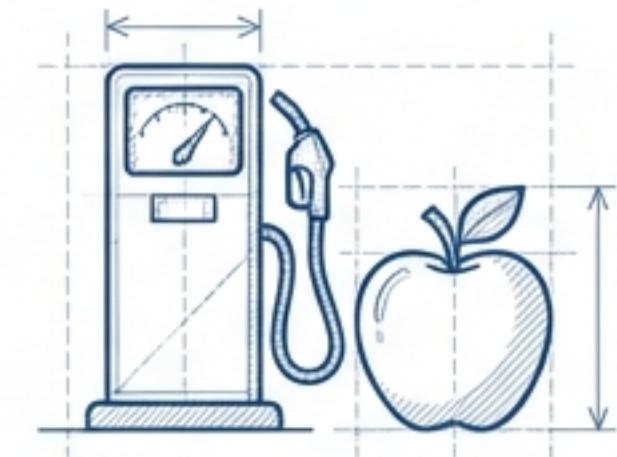
The Micro-Evidence: Do Prices Actually Change?



Magazines / Services

According to BLS CPI Data:

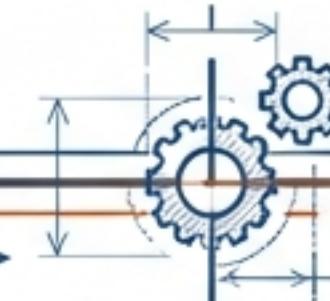
Median Price Duration: ~3.4 to 6.2 months
Excluding Sales: ~6.9 to 11 months



Energy / Unprocessed Food



Sticky
(Rare Changes)



Median Good

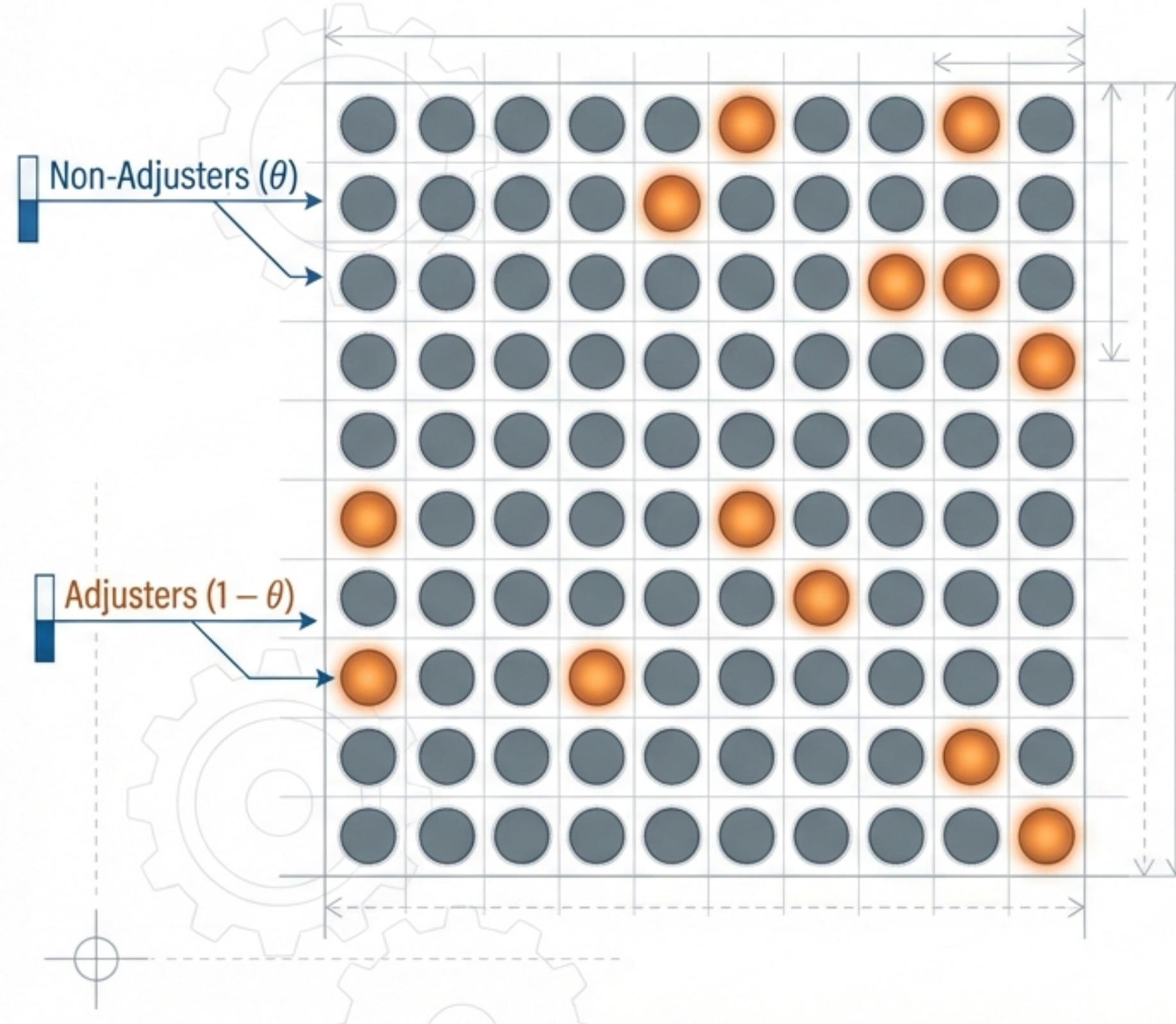


Flexible
(Frequent Changes)

Frequency of Price Adjustment

Prices do not fluidly track market conditions. Significant heterogeneity exists, but the consensus is clear: **Rigidities are a feature, not a bug.**

Modeling the Friction: The Calvo Mechanism



The Calvo (1983) Probability Model

- To model stickiness mathematically, we assume a “memoryless” process.

The Parameters:

θ = Probability a firm *cannot* update (Stuck).

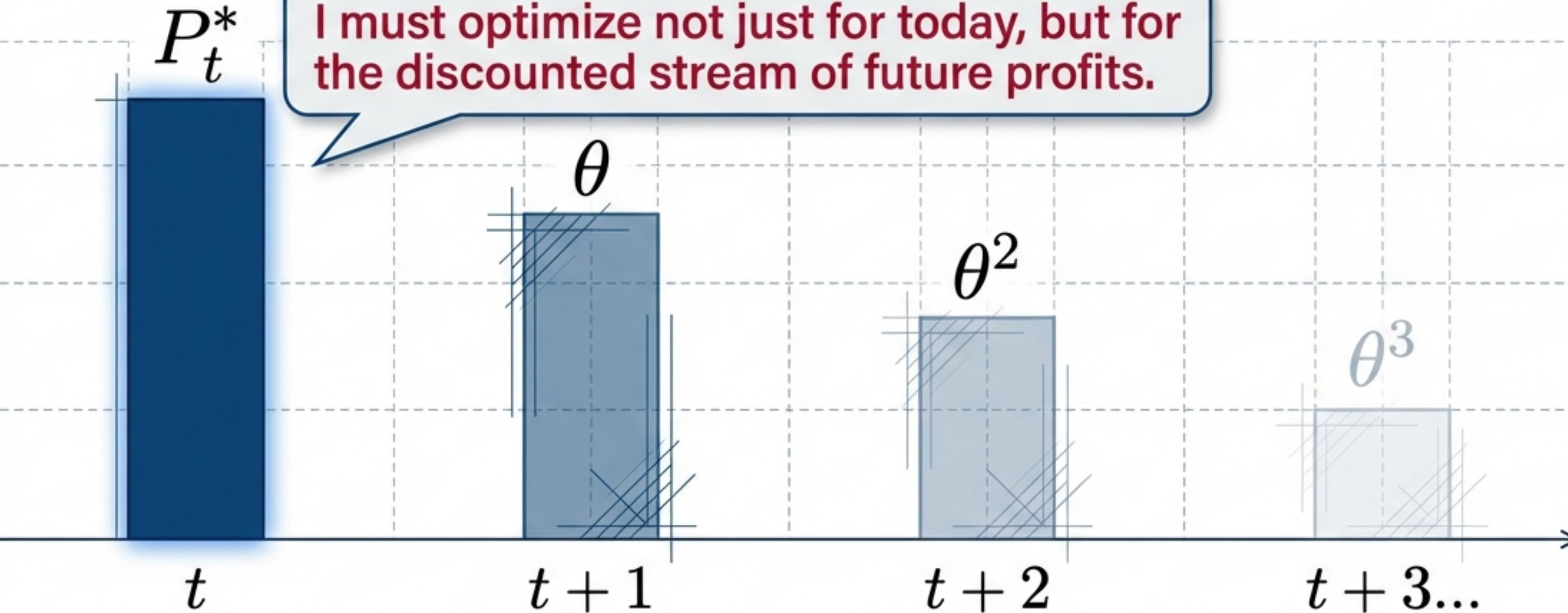
$1 - \theta$ = Probability a firm *can* update.

Average Price Duration = $\frac{1}{1-\theta}$

Implication:

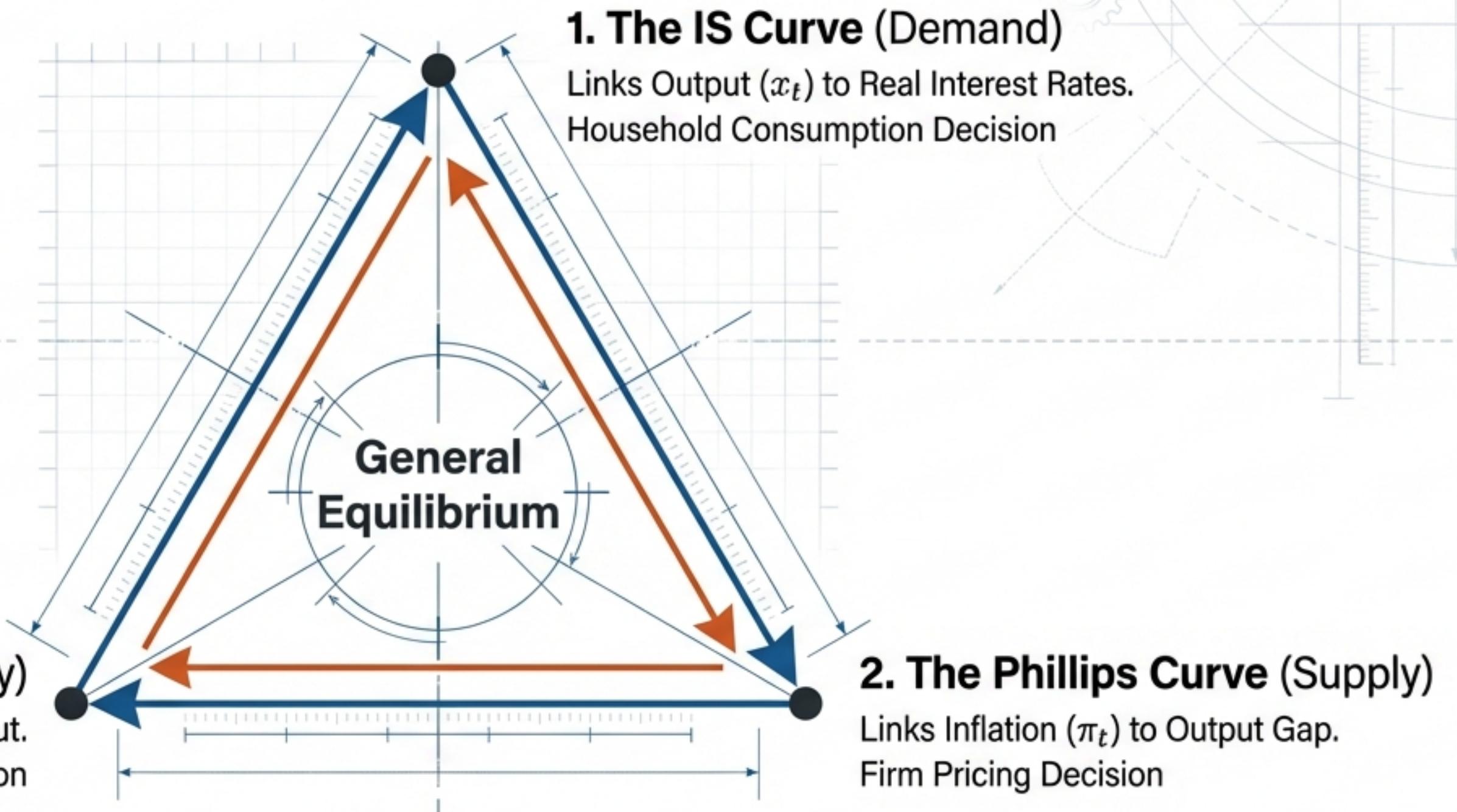
In the short run, output is **demand determined**. Firms must satisfy whatever demand exists at their posted, sticky prices.

The Firm's Dilemma: Pricing for the Future



Current Inflation is **Forward-Looking**. A firm raising prices today is reacting to expectations of Marginal Costs (MC) in the future.

The Engine: The Three-Equation New Keynesian Model



The Demand Side: The IS Curve

$$x_t = E_t x_{t+1} - \frac{1}{\sigma} (\hat{i}_t - E_t \pi_{t+1} - r_t^n)$$

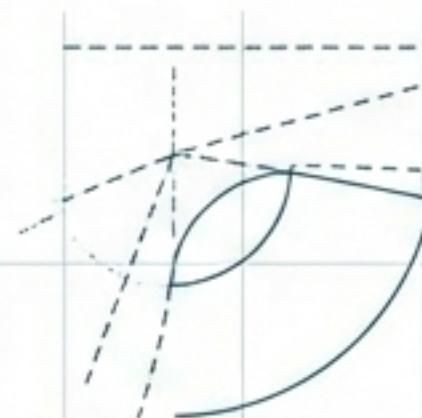
Current Output Gap:
Determined by future
expectations and interest rates.

Forward Looking: Anticipated
recession tomorrow causes
recession today.

Real Interest Rate: The true cost of
borrowing. Higher real rates
incentivize saving over consumption.

The Mechanism: High real rates → Save more, Consume less → Output Falls.

The Supply Side: The New Keynesian Phillips Curve

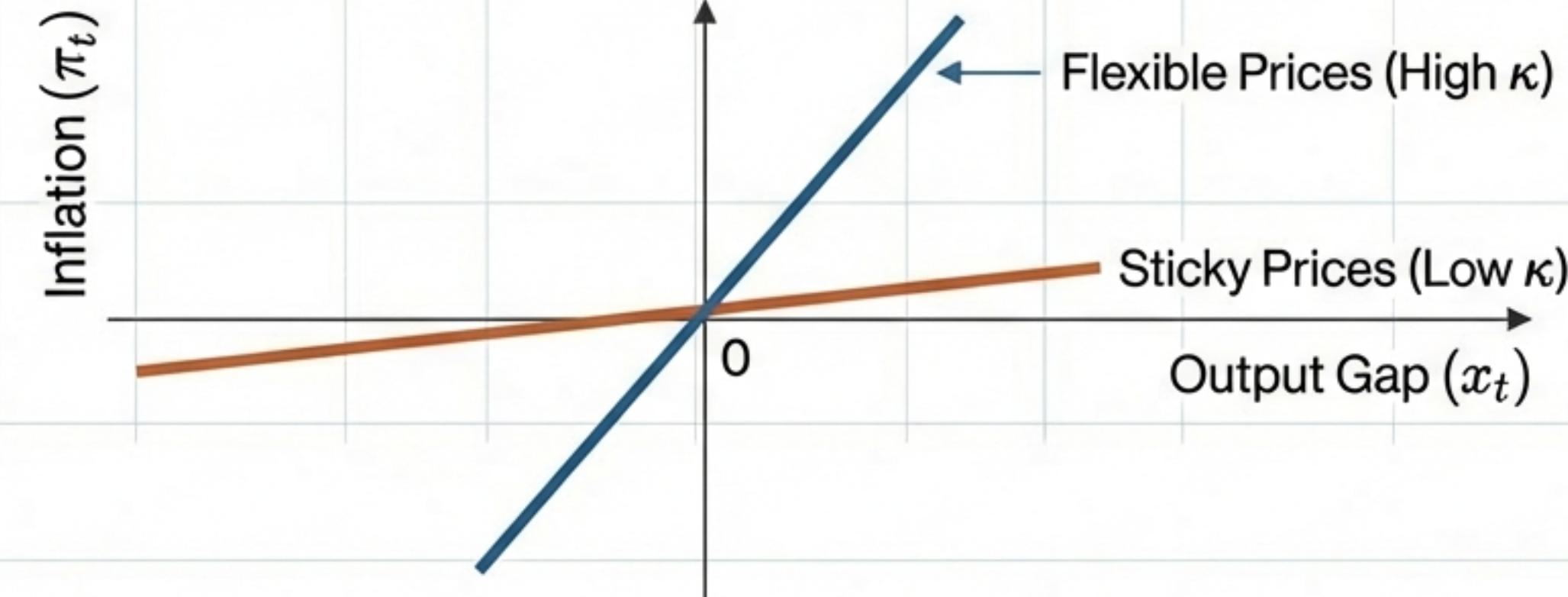


$$\pi_t = \kappa x_t + \beta E_t[\pi_{t+1}]$$

Current Inflation

• **Kappa (Slope):** The link between the real economy and prices.

• **Expected Inflation:** Inflation is self-fulfilling.

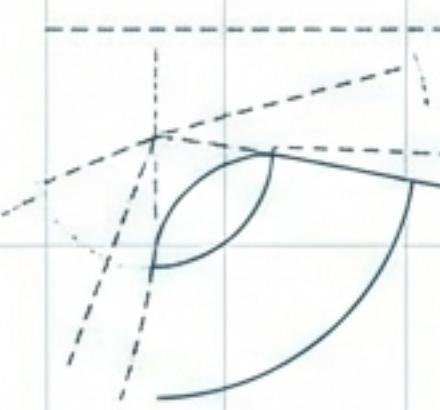


κ depends on price rigidity (θ).

The stickier the prices (high θ), the flatter the curve (low κ).

Inflation becomes less sensitive to current output.

Closing the System: The Monetary Policy Rule


$$\hat{i}_t = \phi_\pi(\pi_t - \pi^*) + \phi_x x_t$$

The Taylor Principle: $\phi_\pi > 1$

The Central Bank must raise nominal rates
more than one-for-one with inflation.

Stability vs. Instability

- **Scenario A** (Active Policy $\phi_\pi > 1$)

Inflation rises → Nominal Rate
rises **MORE** →
Real Rate rises → Economy cools.



STABLE

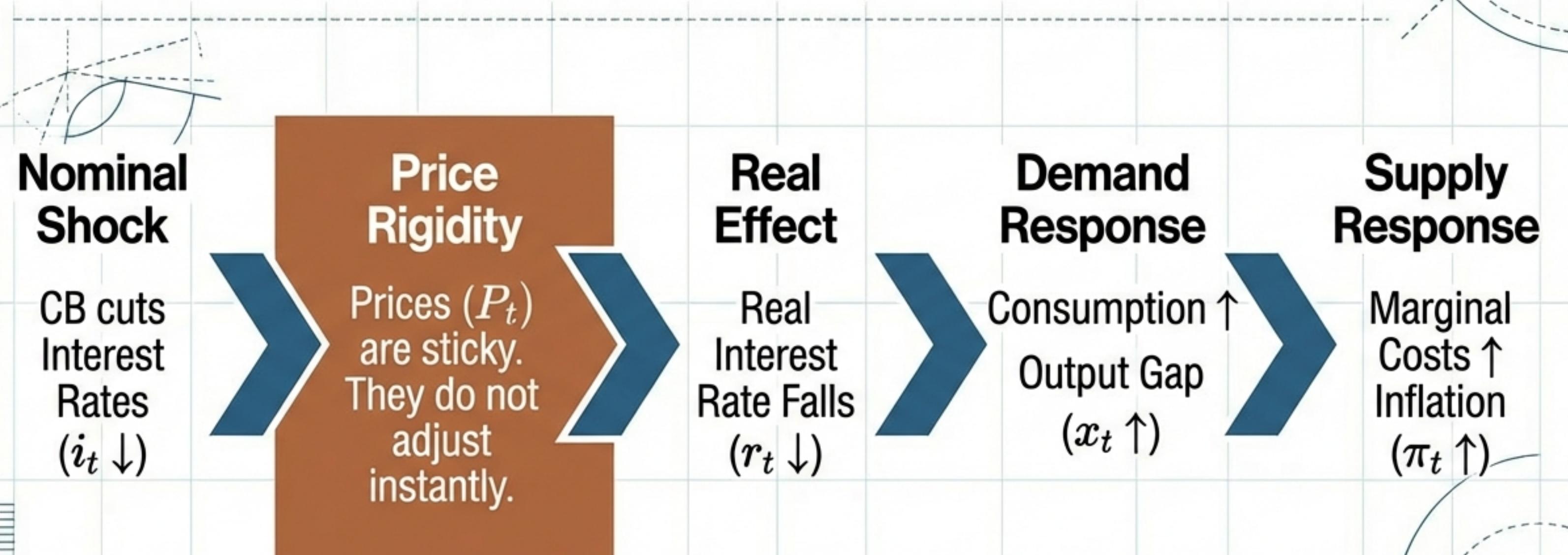
- **Scenario B** (Passive Policy $\phi_\pi < 1$)

Inflation rises → Nominal Rate
rises **LESS** → Real Rate falls →
Demand booms →
→ More Inflation.



**SPIRAL /
INDETERMINACY**

The Transmission Mechanism: From Rates to Reality



In a Classical (Flexible) world, Step 2 fails. Prices would jump instantly, leaving Real Rates and Output unchanged.

Policy Strategy & The Divine Coincidence

The Divine Coincidence (Baseline Model)



Stabilizing Inflation = Stabilizing Output.
No trade-off exists.

The Breakdown (Cost-Push Shocks)

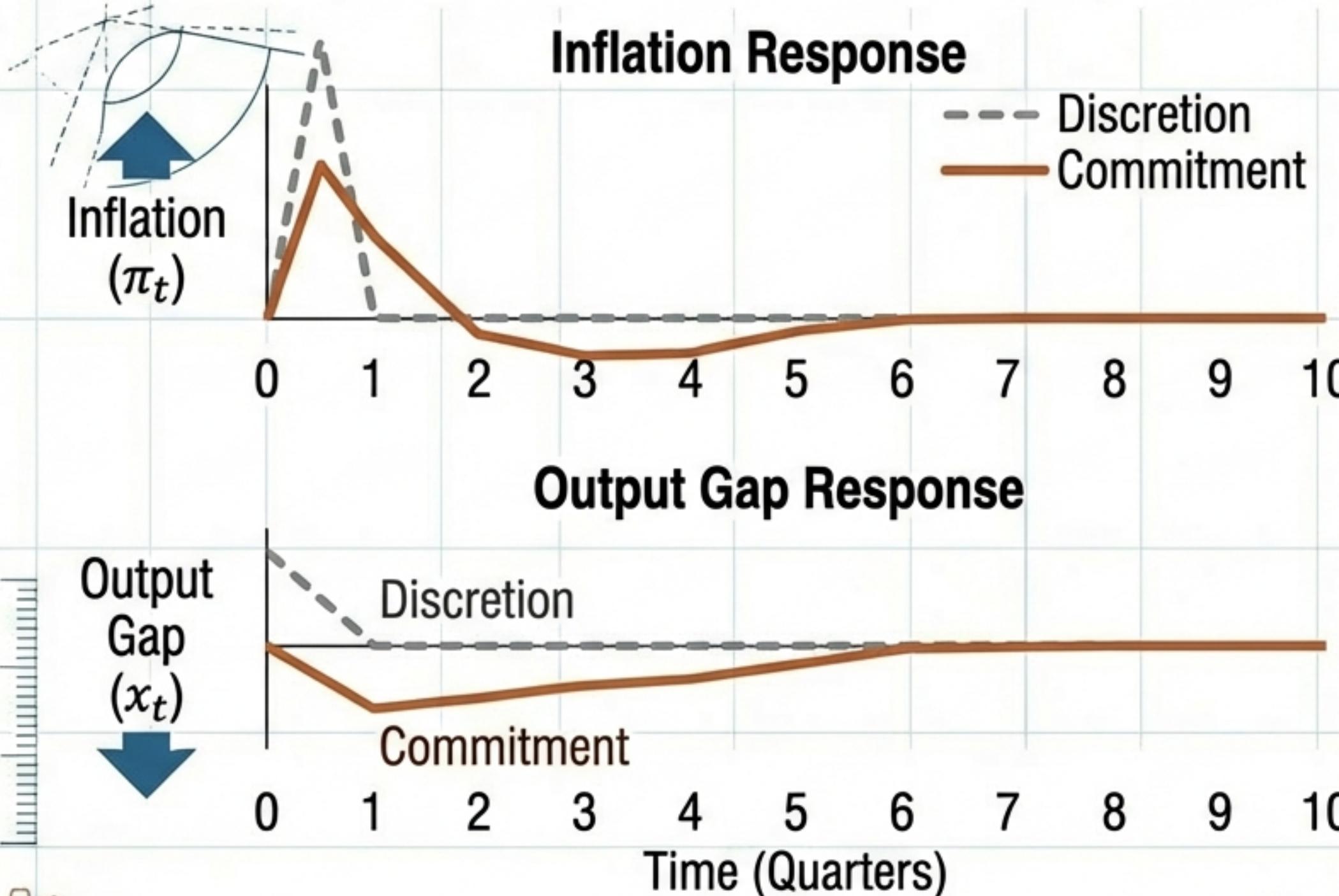


The Dilemma: To fight inflation, the CB must
create a recession (negative output gap).

$$\pi_t = \kappa x_t + \beta E_t[\pi_{t+1}] + \eta_t$$

The Time Consistency Problem

Commitment vs. Discretion in response to a Cost-Push Shock

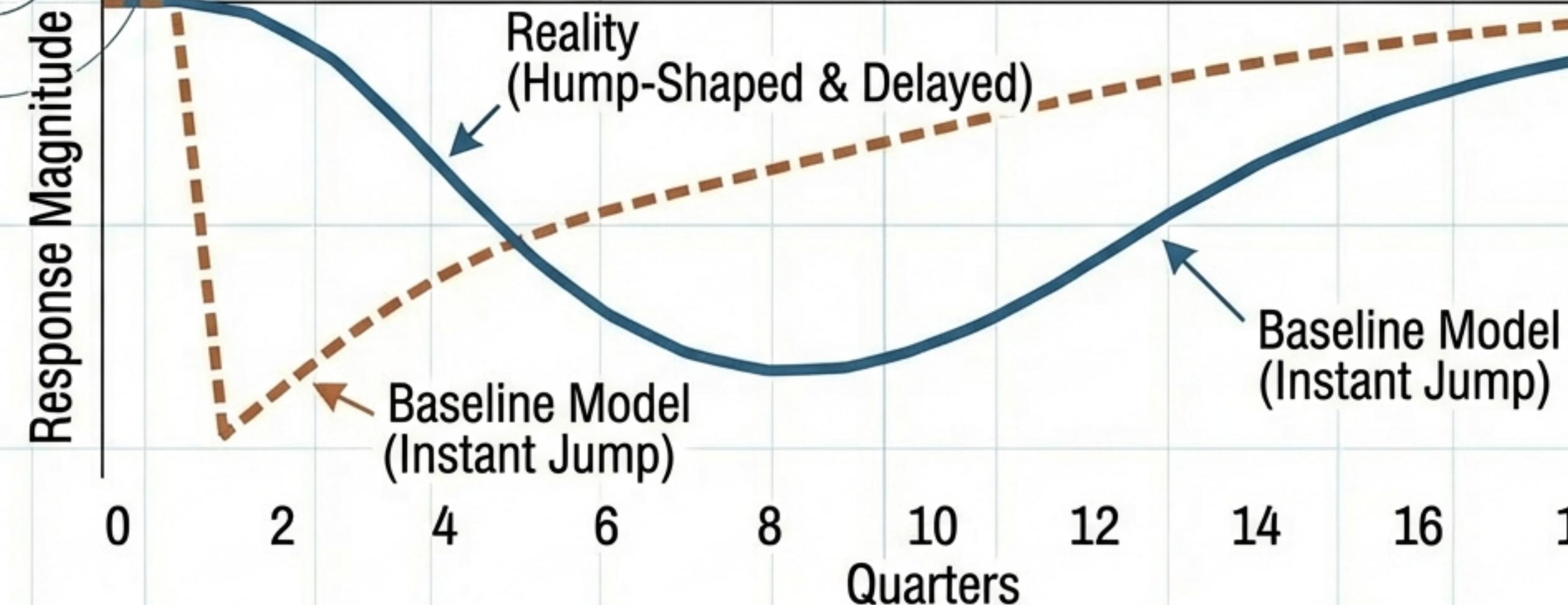


Commitment Strategy: The CB promises a future recession (lower output tomorrow). This lowers inflation expectations *today*, dampening the initial shock.

The Risk: The temptation to renege once the shock has passed.

Aggregate Evidence: Model vs. Reality

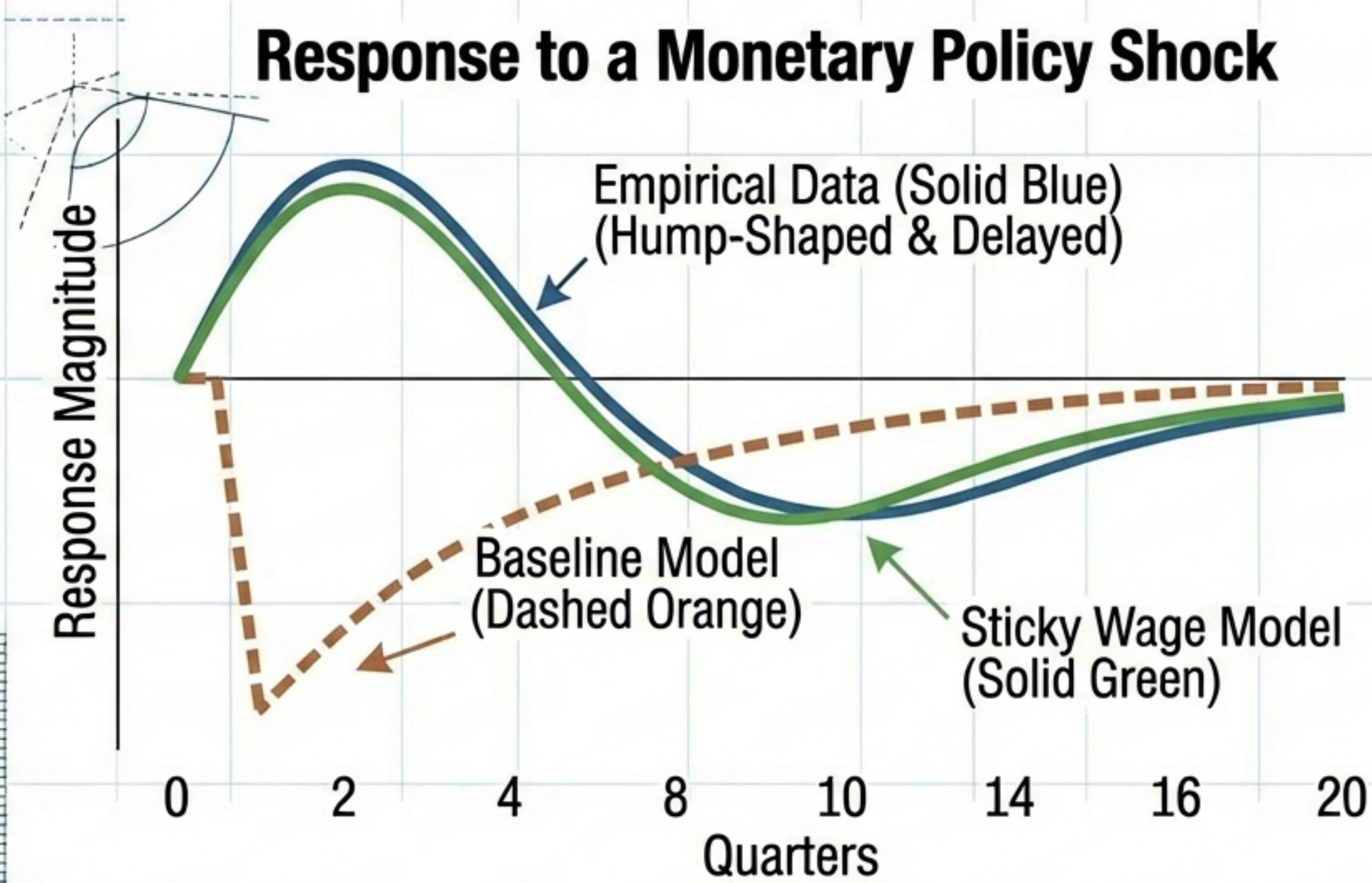
Response to a Monetary Policy Shock



The Baseline Sticky-Price Model captures the direction (non-neutrality) but fails the timing (persistence). The model is too fast.

Improving the Fit: Adding Sticky Wages

Response to a Monetary Policy Shock



The Missing Friction:

Labor markets are rigid too.

Sticky Wages → Real Wages adjust slowly → Marginal Costs adjust slowly → Inflation has persistence.

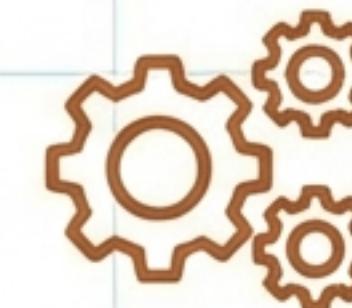
Combining Price and Wage rigidity aligns the model with empirical reality.

Conclusion: The Non-Neutral Economy

Micro-Foundations



Prices are Sticky. Micro-data confirms that price adjustment is infrequent (Calvo).



Transmission

Money is Non-Neutral. Frictions allow nominal rates to drive real consumption (IS Curve).

Expectations



Forward-Looking. Current inflation depends on expectations of the future (Phillips Curve).



Policy

Active Policy Required. Central banks face trade-offs (Cost-Push) and must manage commitments to stabilize the economy.

The New Keynesian framework provides the rigorous mechanism to explain why monetary policy matters.