

Frictional Labor Markets: Searching for Equilibrium

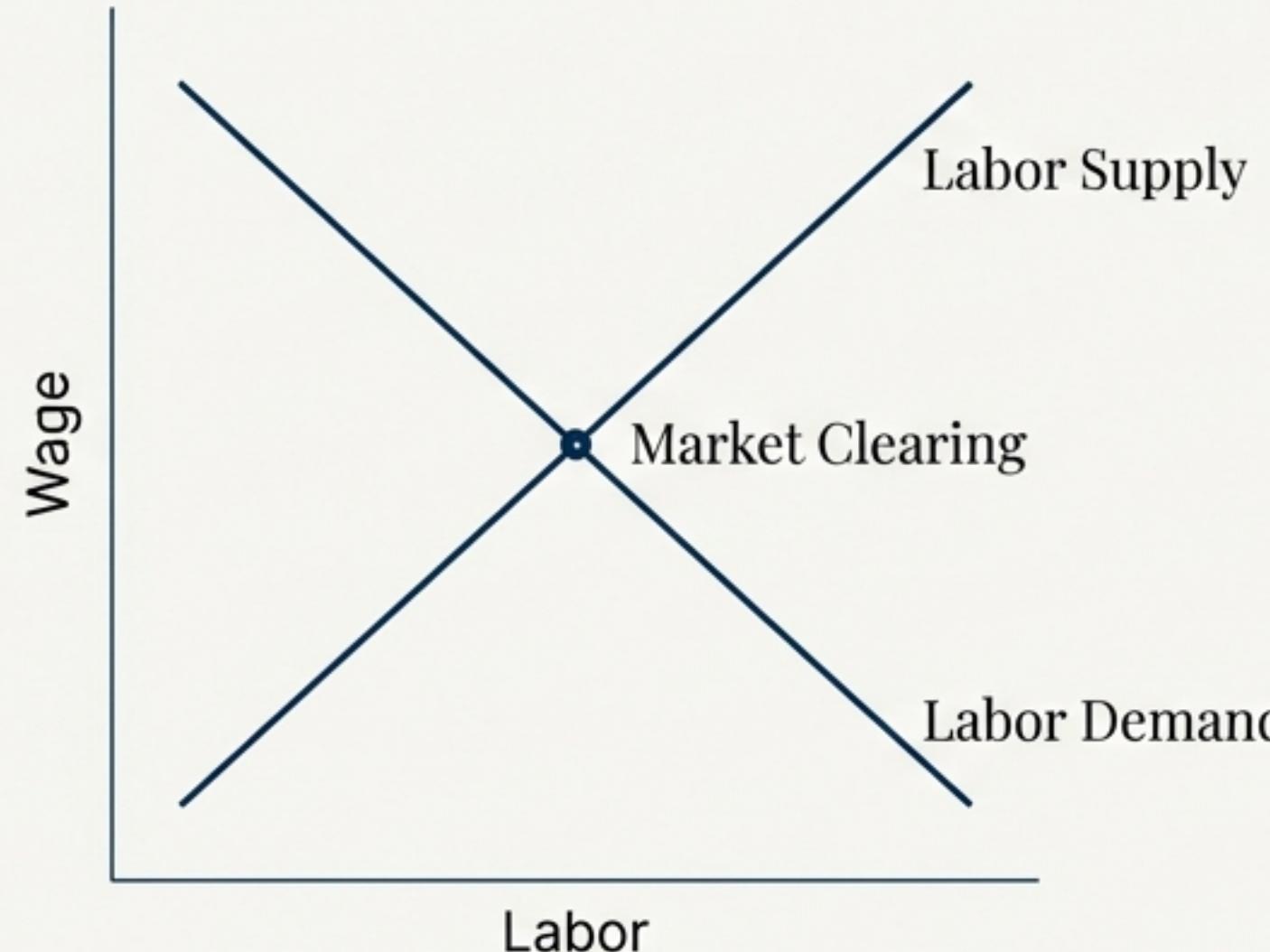
Unpacking the Diamond-Mortensen-Pissarides (DMP) Framework & The Volatility Puzzle

BASED ON CHAPTER 20 BY TOSHIHIKO MUKOYAMA AND AYŞEGÜL ŞAHİN



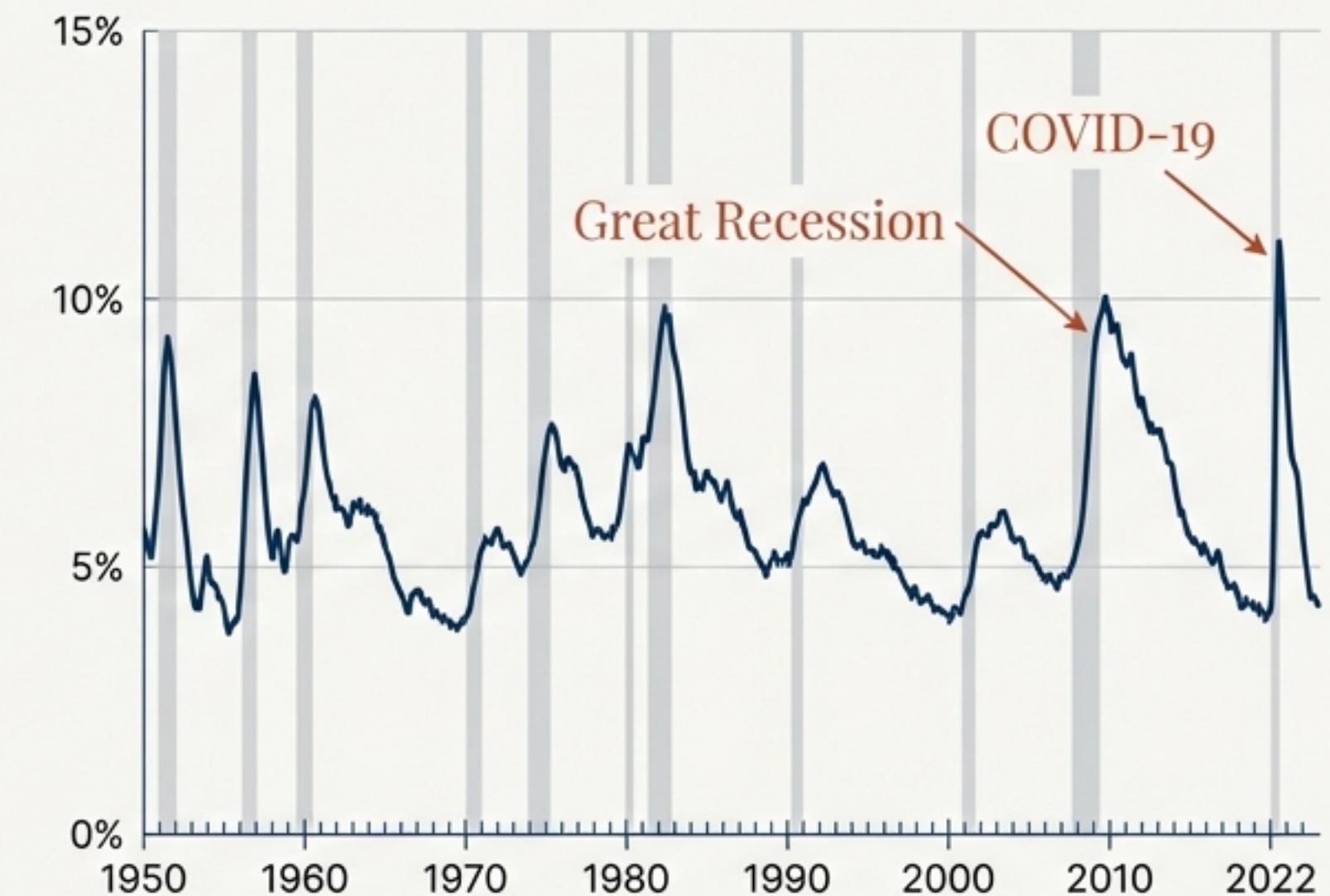
The Frictionless Myth vs. The Unemployment Reality

The Frictionless Model (Classic RBC)



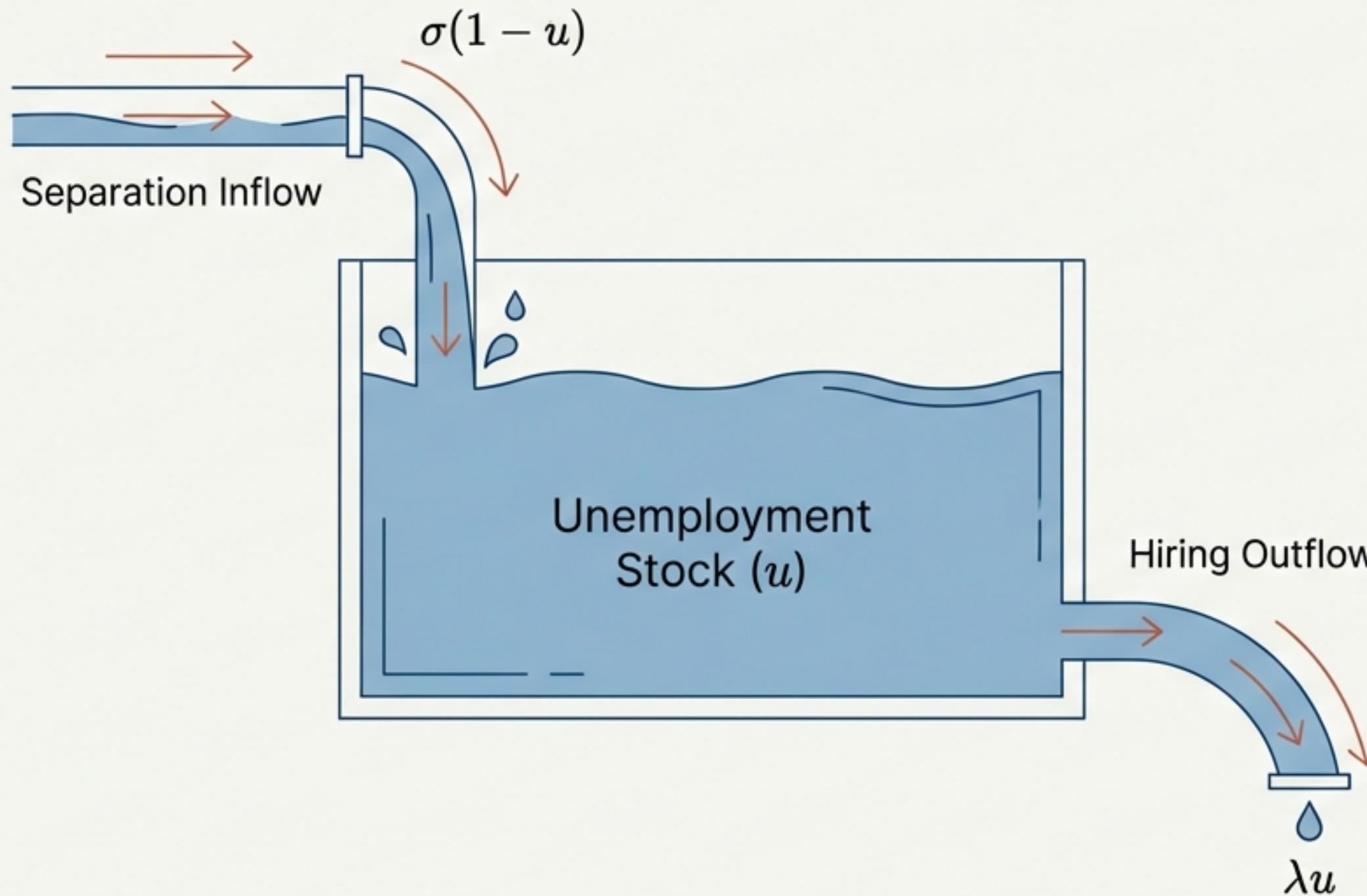
Assumption: Instant matching.
Voluntary unemployment only.

The Reality (US Data 1950–2022)



Reality: Persistent, involuntary
unemployment driven by search frictions.

The Mechanics of the Bathtub Model



The Law of Motion:

$$u_{t+1} = (1 - \lambda)u_t + \sigma(1 - u_t)$$

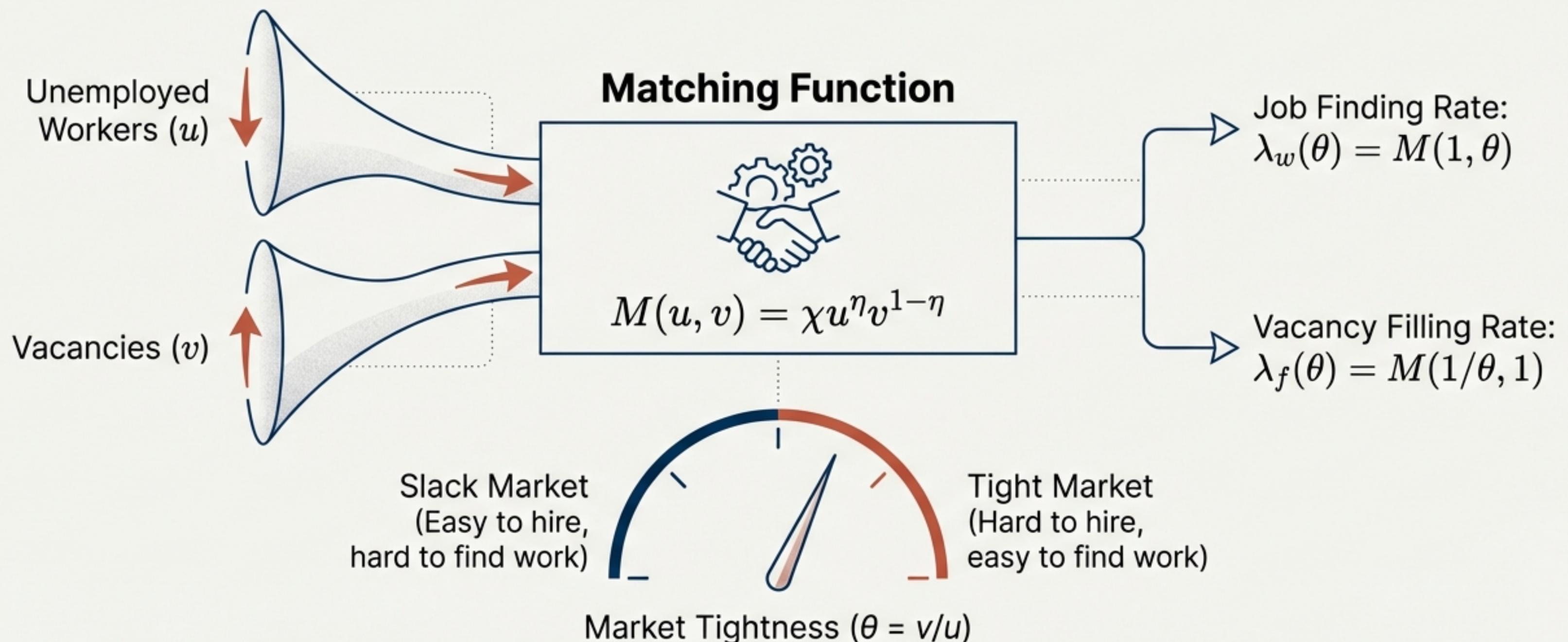
The Steady State:

$$\bar{u} = \frac{\sigma}{\lambda + \sigma}$$

Key Parameters (Monthly US Data):

- Job Finding Rate (λ) ≈ 0.45
- Separation Rate (σ) ≈ 0.034
- Steady State Unemployment $\approx 7.0\%$

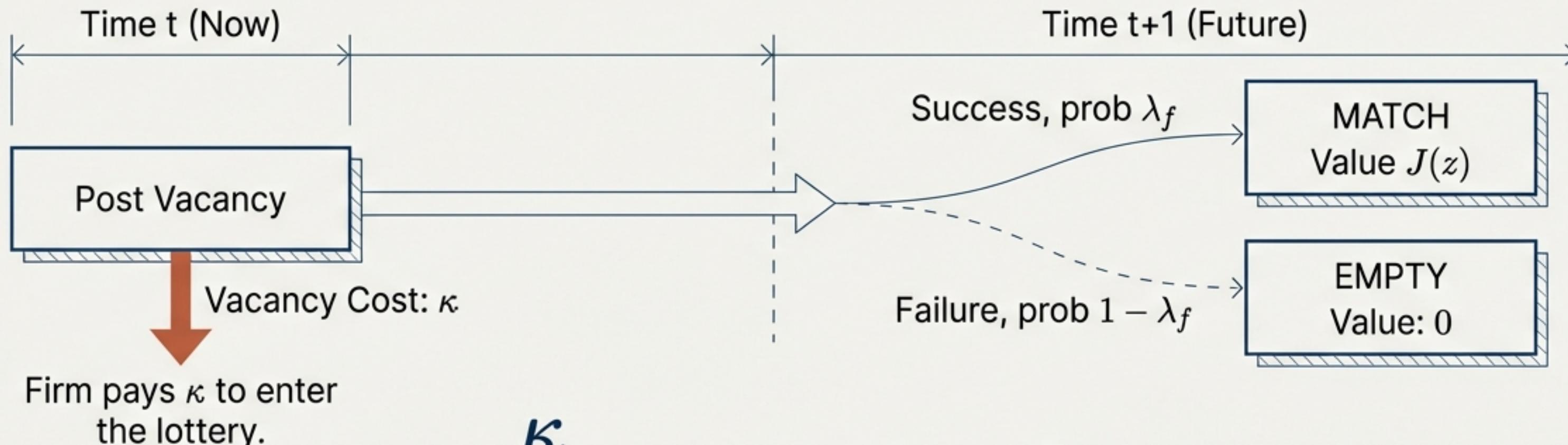
Inside the Black Box: The Matching Function



The Beveridge Curve: Evidence of Friction



The Firm's Decision: Vacancy as Investment



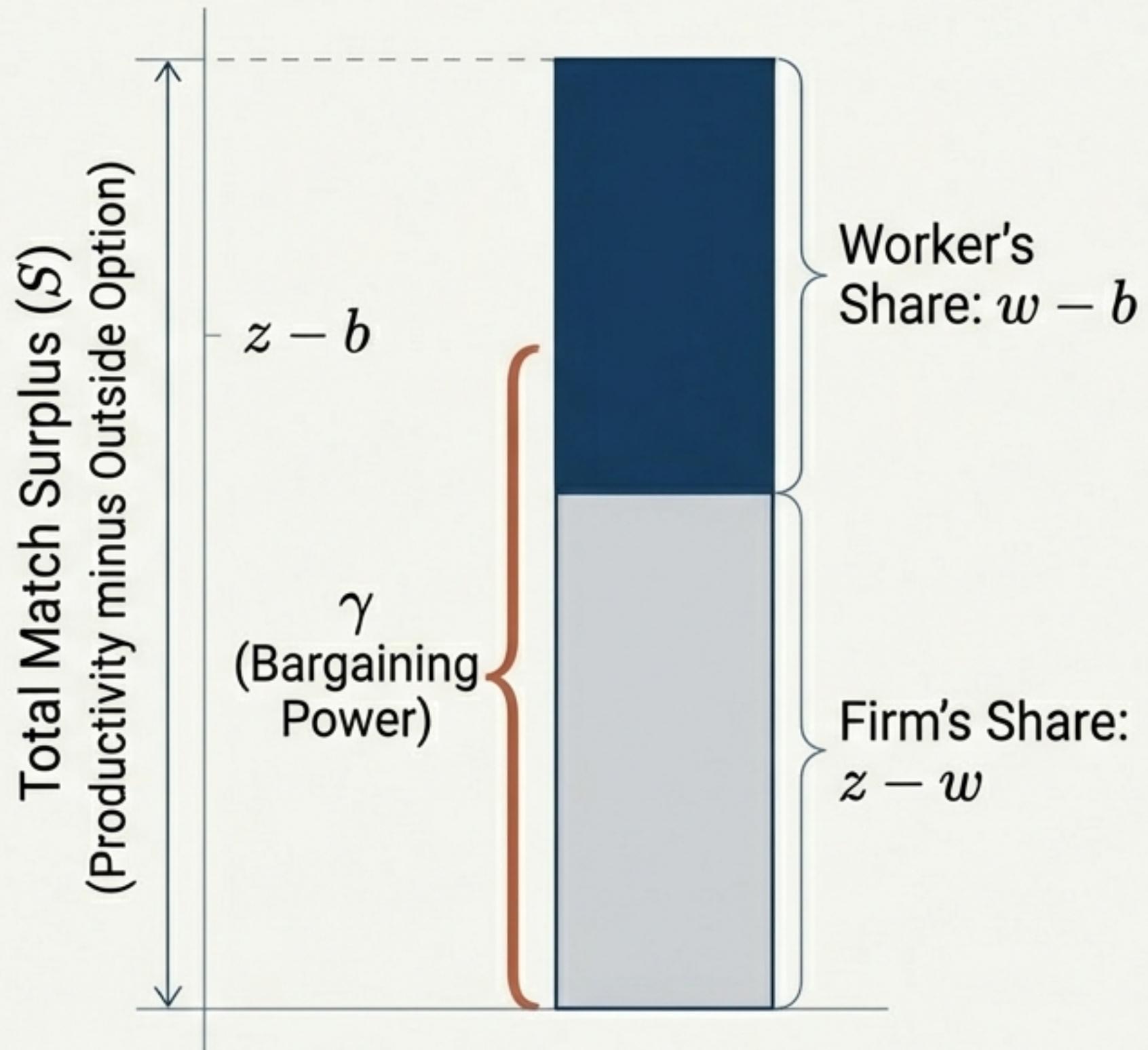
$$\frac{\kappa}{\lambda f(\theta)} = \beta E[J(z')]$$

Expected Cost of Hiring

Expected Future Profit

Firms post vacancies until the expected cost equals the expected benefit (Free Entry).

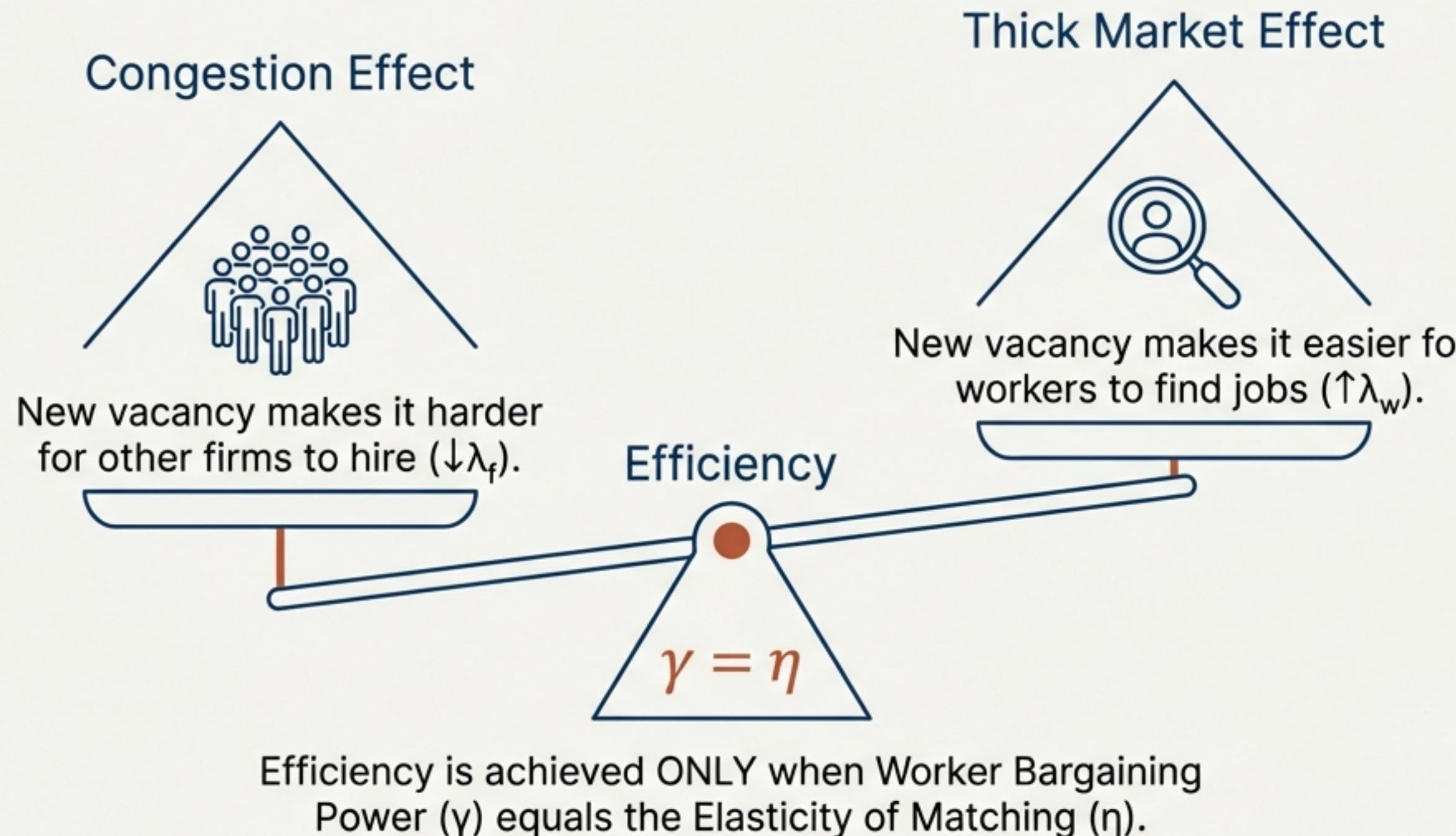
Splitting the Surplus: Nash Bargaining



- **The Mechanism:** Generalized Nash Bargaining
$$(1 - \gamma)(W - U) = \gamma(J - V)$$
- **Consequence:**
 1. Productivity (z) rises.
 2. Total Surplus rises.
 3. Worker uses bargaining power γ to demand higher wage (w).
- 4. **Result:** Wages absorb the productivity shock, dampening the firm's profit incentive.

Is the Search Equilibrium Efficient?

Balancing Externalities via the Hosios Condition

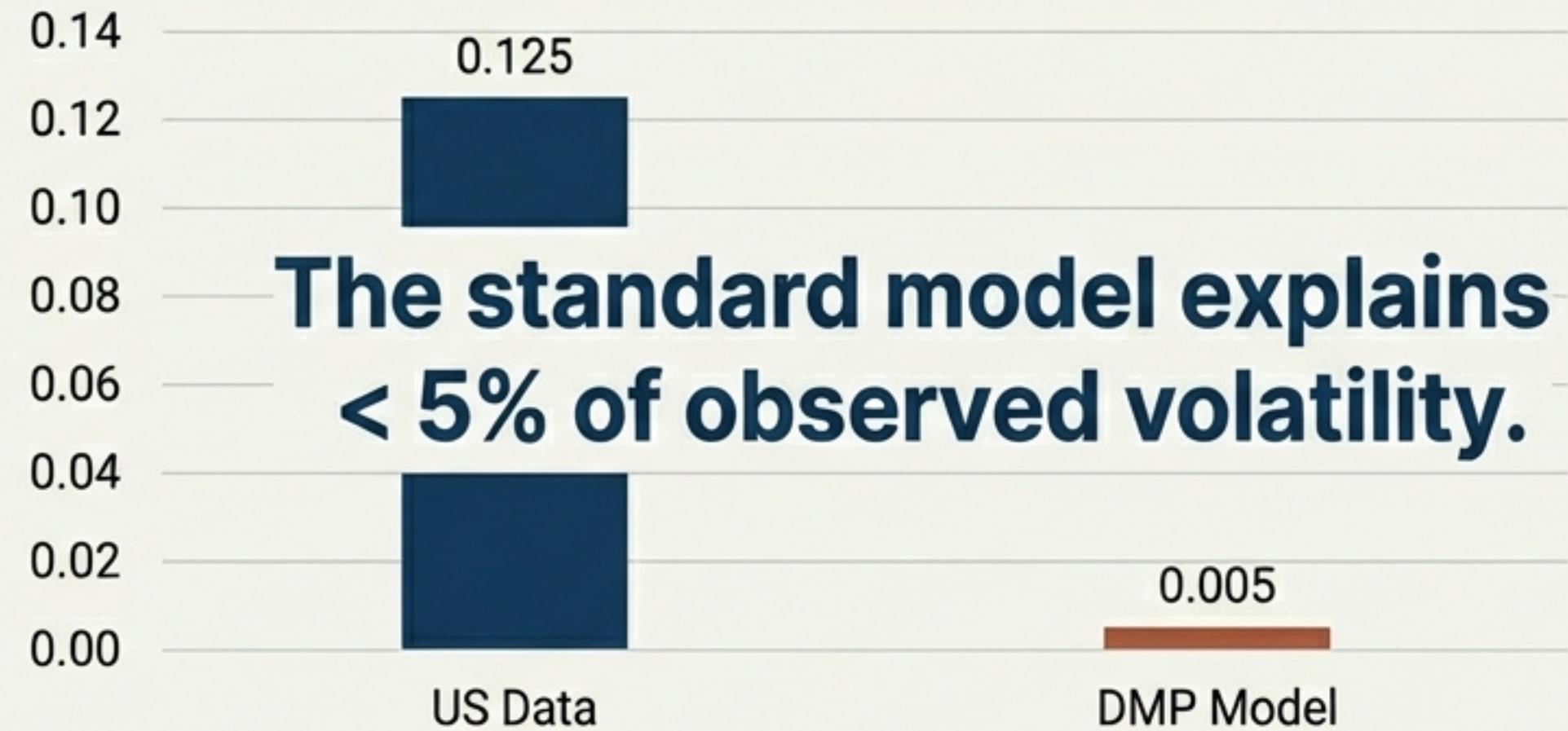


The Shimer Puzzle: Theory Crashes into Data

Calibration Inputs

- Discount factor
 $\beta = 0.996$
- Separation rate
 $\sigma = 0.034$
- Productivity shocks z :
Calibrated to US Output

Volatility of Unemployment (Standard Deviation)

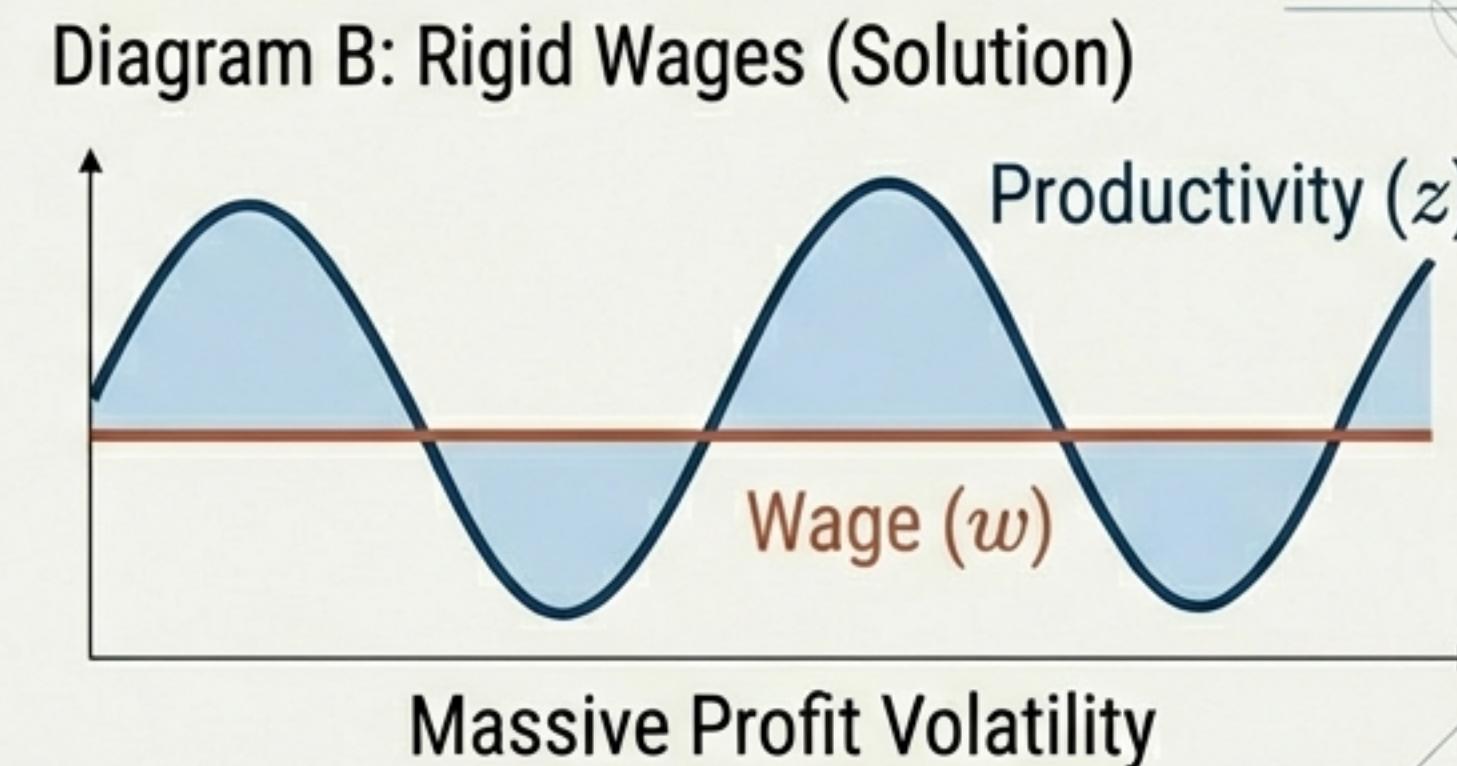
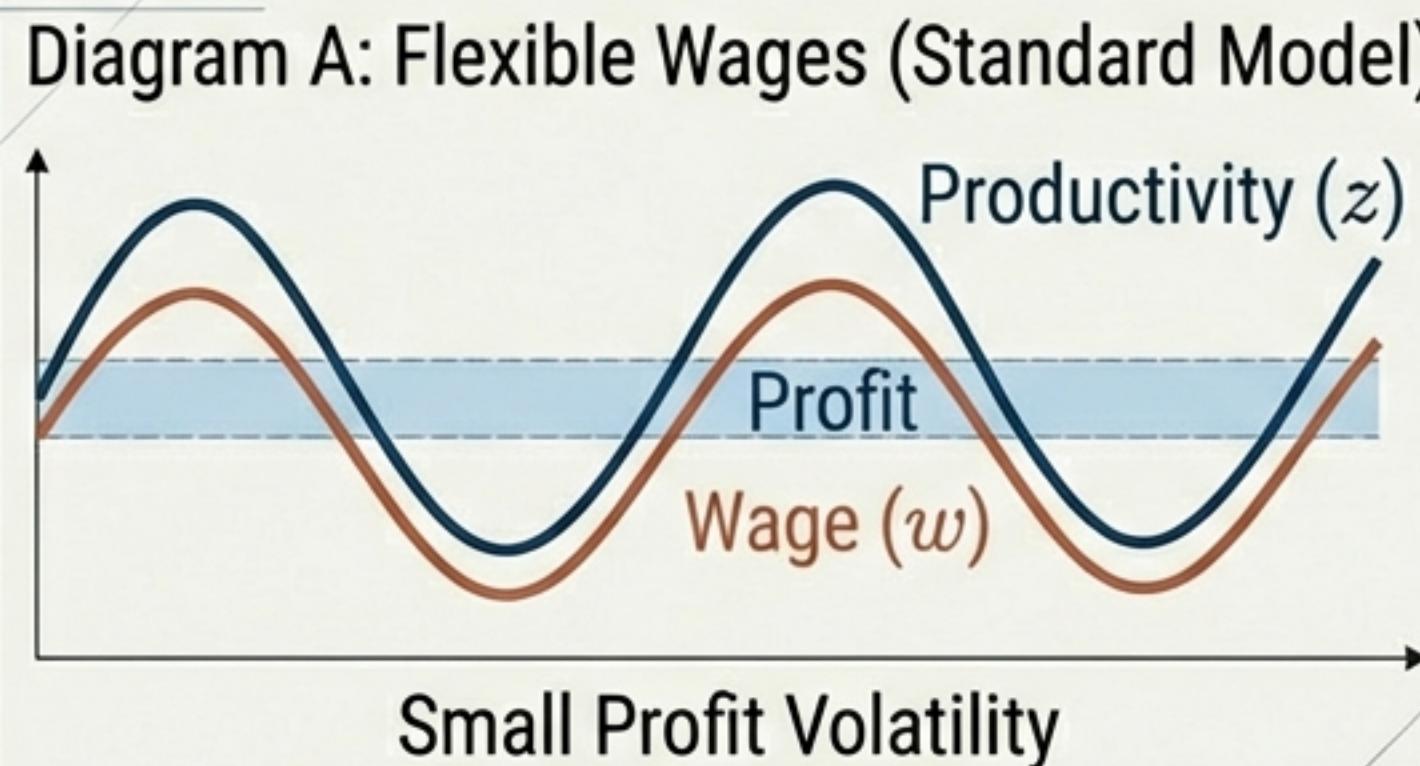


**The standard model explains
< 5% of observed volatility.**

Wages are too flexible. They rise with productivity, eating up profits and killing the incentive to post vacancies.

Solution 1: Rigid Wages

The Profit Wedge



The Fix

Assumption: $w = \bar{w}$ (Fixed)

Resulting Volatility (Std Dev):

- Data: 0.125
- Model with Rigid Wages: 0.115

Verdict: Matches reality.

Solution 2: Endogenous Separations

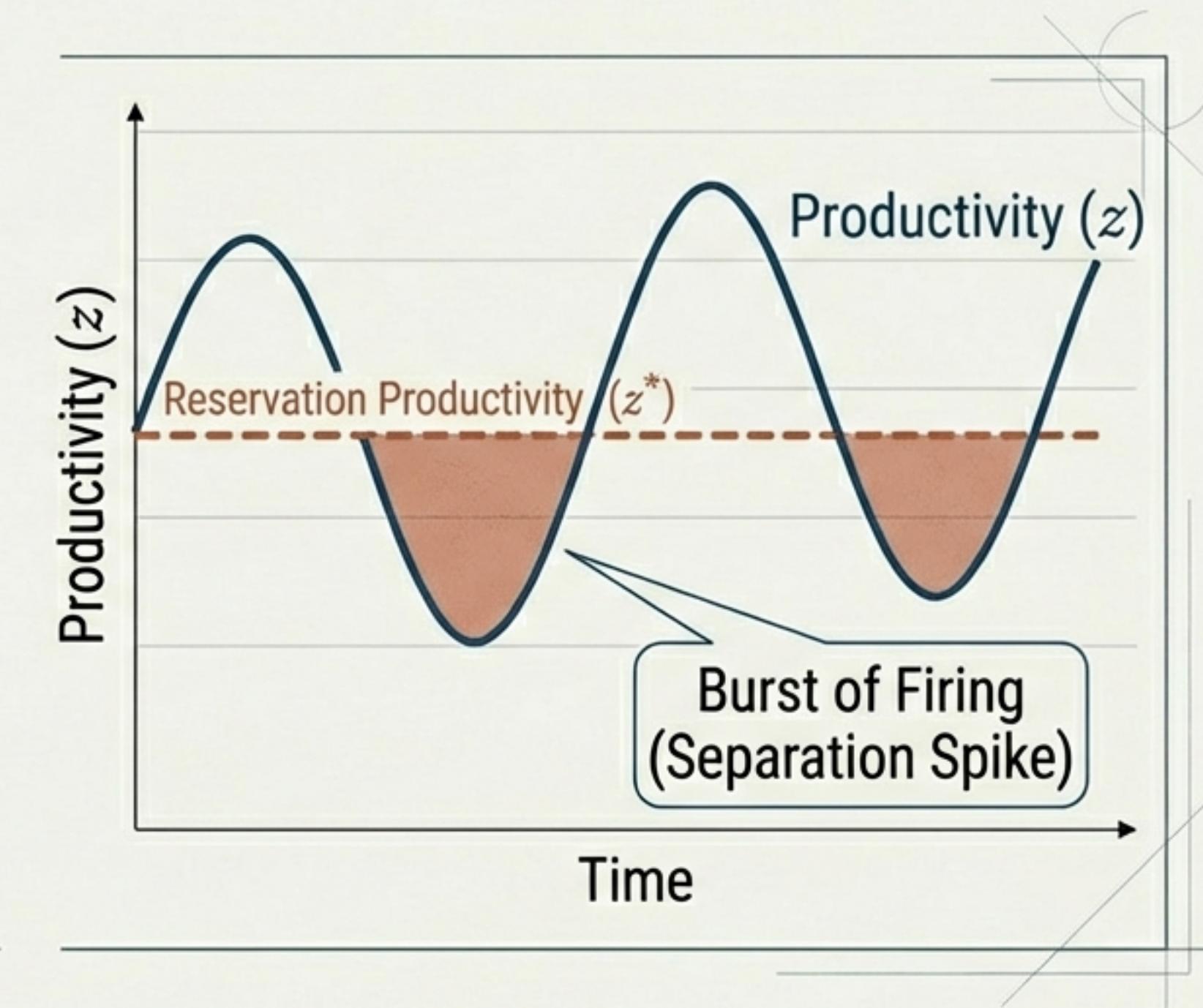
The Mechanism

Firms choose separation rate σ based on productivity.

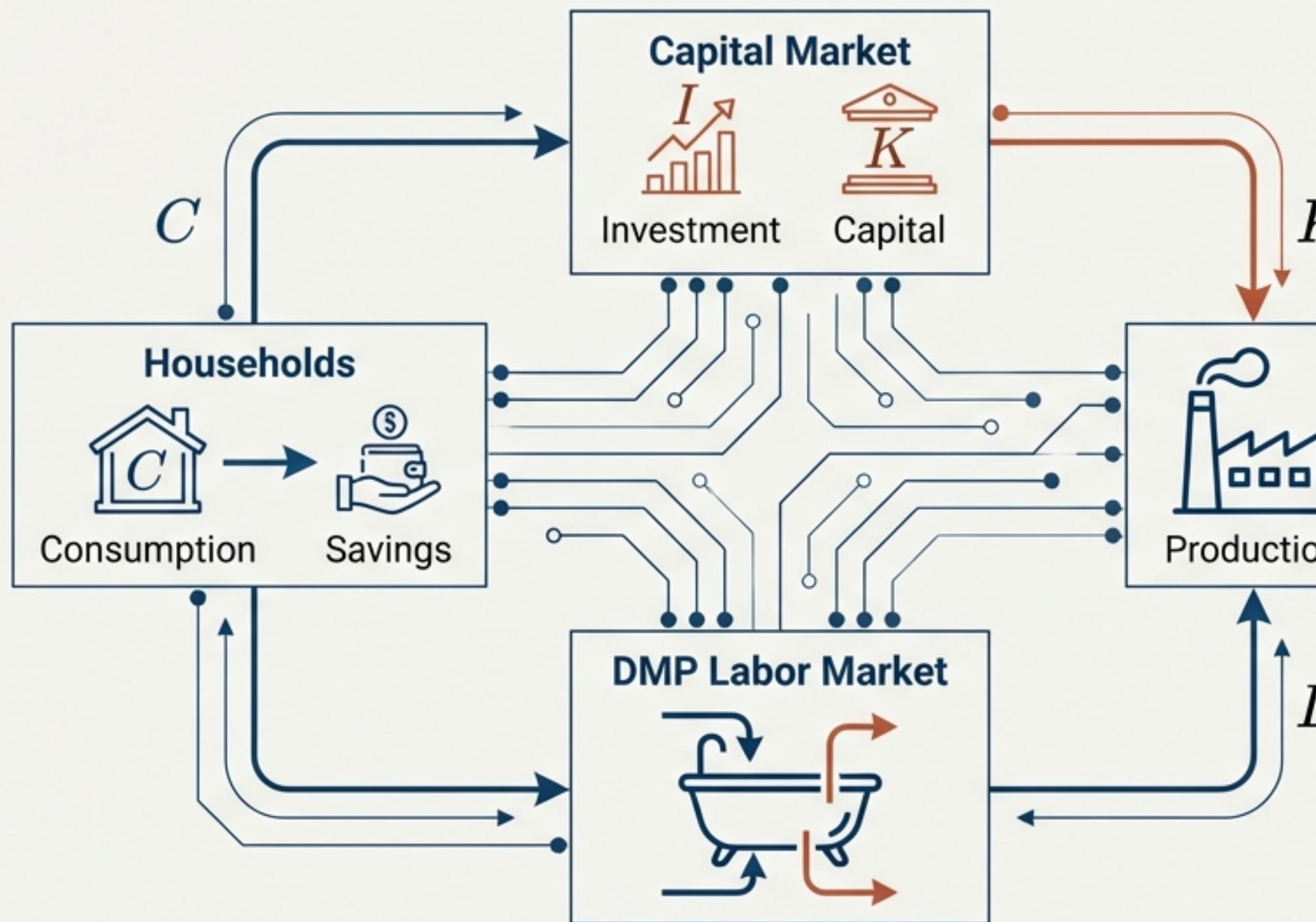
Condition: $-c'(\sigma) = \kappa/\lambda f(\theta)$

Findings:

1. Improves fit for flow rates ($E \rightarrow U$).
2. Alone, it does not solve the volatility puzzle.
3. Combined with Rigid Wages:
Generates volatility exceeding the data
(Std Dev 0.217).



The Big Picture: Integrating with RBC



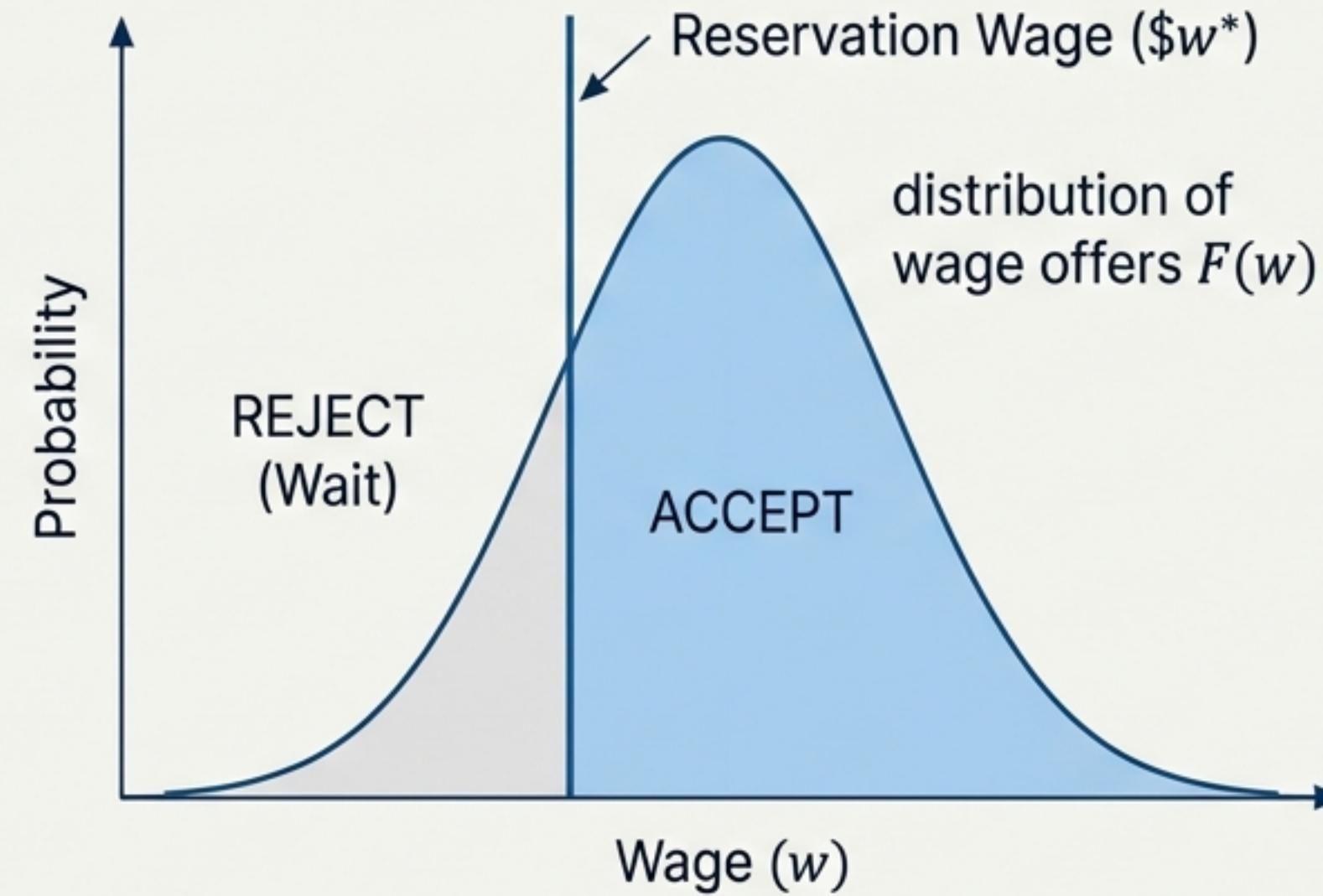
Key Findings Box:

Model Performance:

- Consumption (C) & Investment (I): Matches standard Business Cycle correlations.
- Labor (L): Still requires **Rigid Wages** to match macro volatility.

Wage Dispersion: The McCall Search Model

Why do similar workers earn different wages?



Decision Rule: Accept if $w \geq w^*$.

The Frictional Wage Dispersion Puzzle:

- Model prediction: Mean wage is only **3.1%** higher than lowest wage.
- Insight: Search friction alone cannot explain large inequality. We need '**On-the-job search**' or **high unemployment costs** to explain the full gap.

Summary: The Architecture of Unemployment

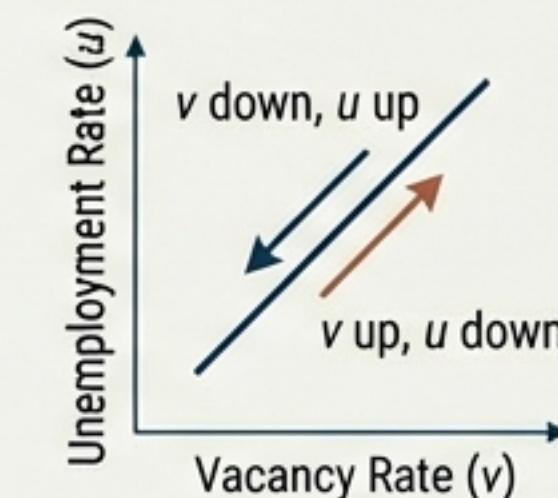
1. Friction is Real

Unemployment is an equilibrium outcome of search costs ($u > 0$).



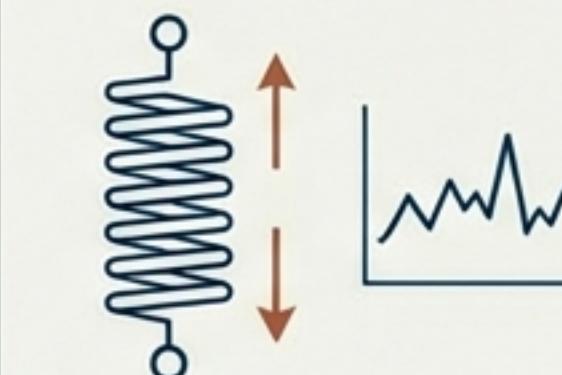
2. The Cycle

Vacancies and Unemployment move inversely (The Beveridge Curve).



3. The Puzzle

Standard bargaining creates wages that are too flexible, failing to generate realistic volatility.

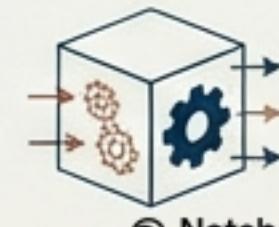


4. The Solution

Real-world rigidities (**Fixed Wages**) and Firing Decisions (**Endogenous Separation**) are required to match the data.



Understanding the macroeconomy requires peering inside the 'black box' of the matching function.



Thank You

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