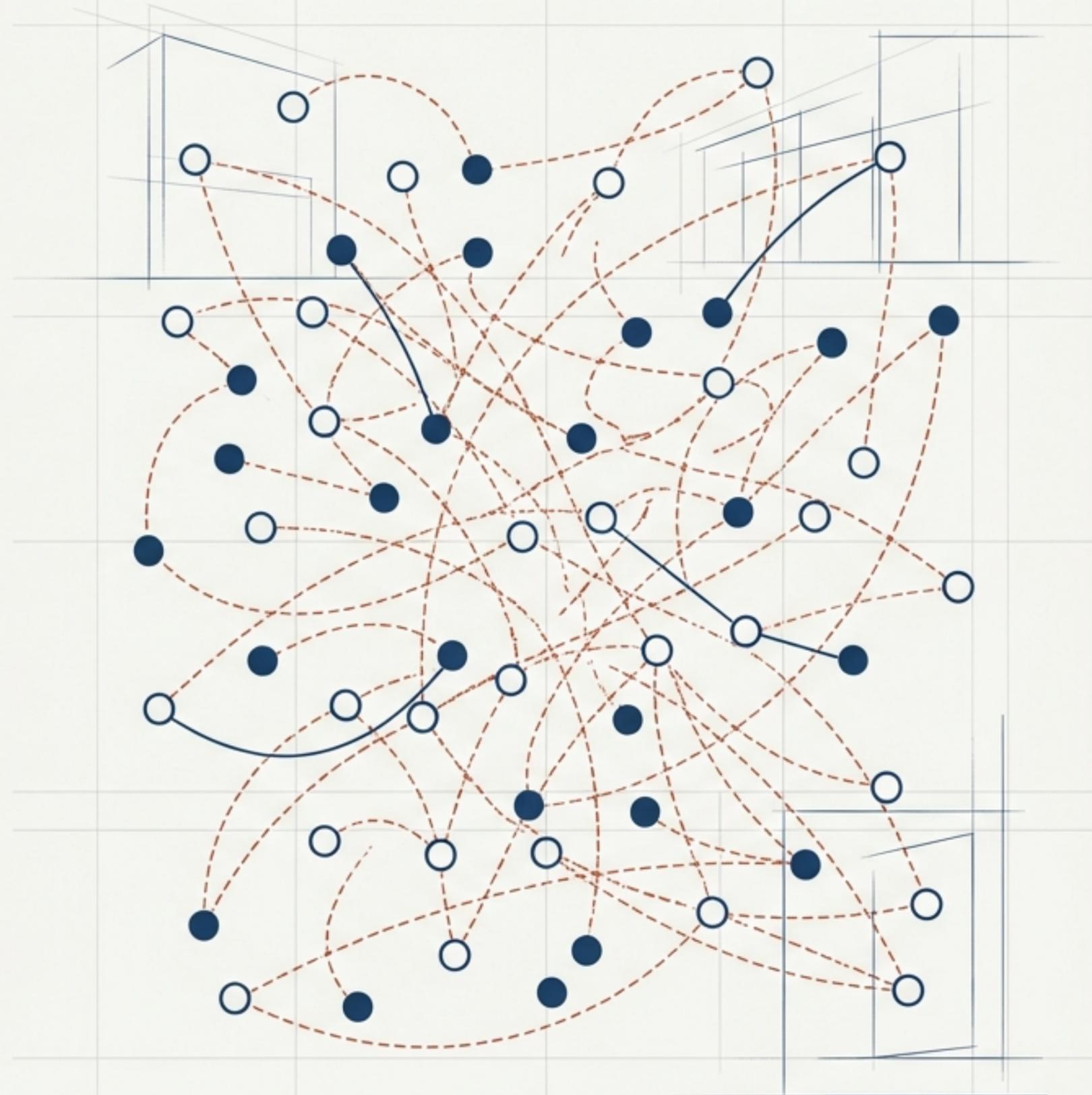


Frictional Labor Markets: Searching for Equilibrium

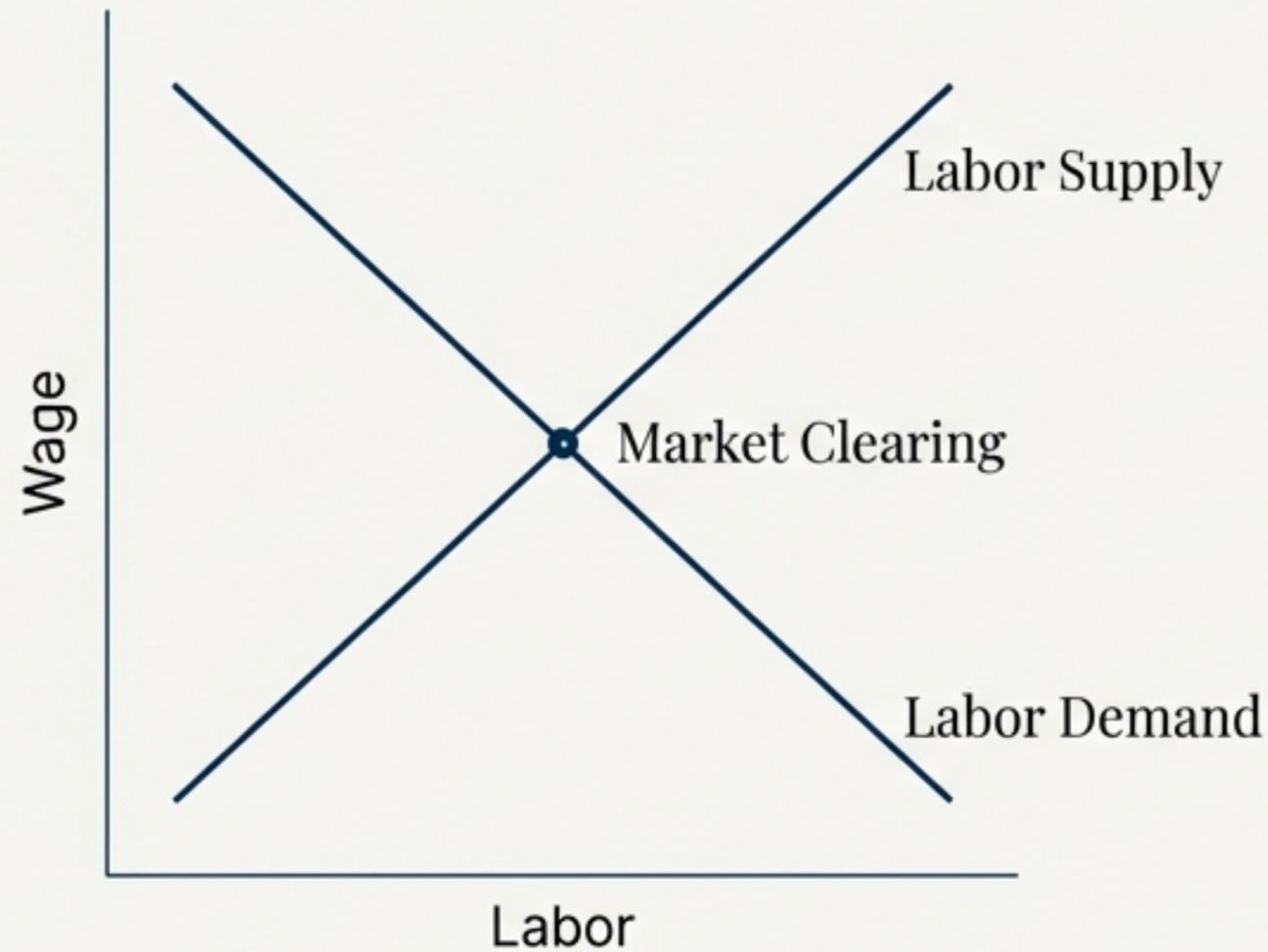
Unpacking the Diamond-Mortensen-Pissarides (DMP) Framework & The Volatility Puzzle

BASED ON CHAPTER 20 BY TOSHIHIKO MUKOYAMA AND AYŞEGÜL ŞAHİN



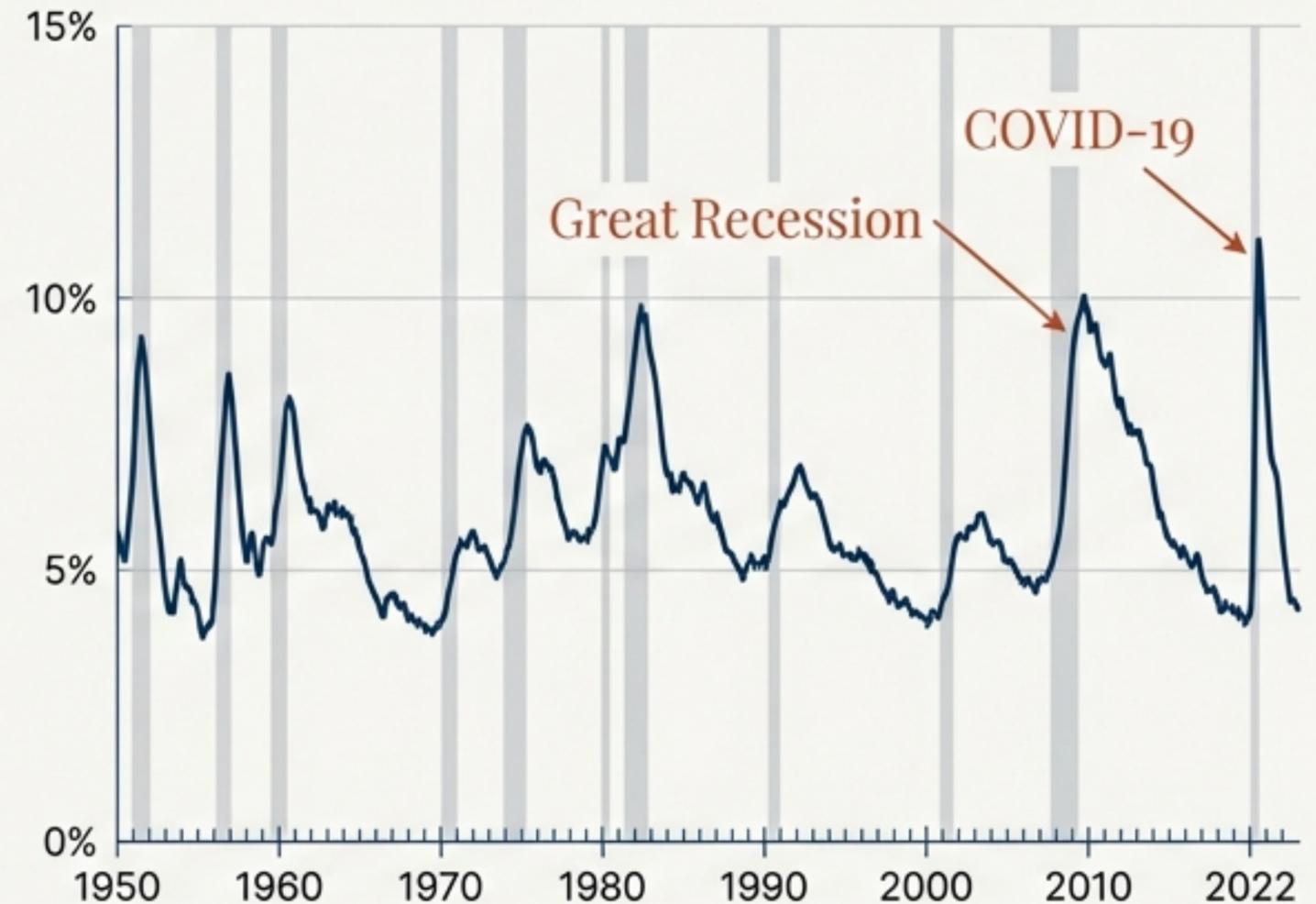
The Frictionless Myth vs. The Unemployment Reality

The Frictionless Model (Classic RBC)



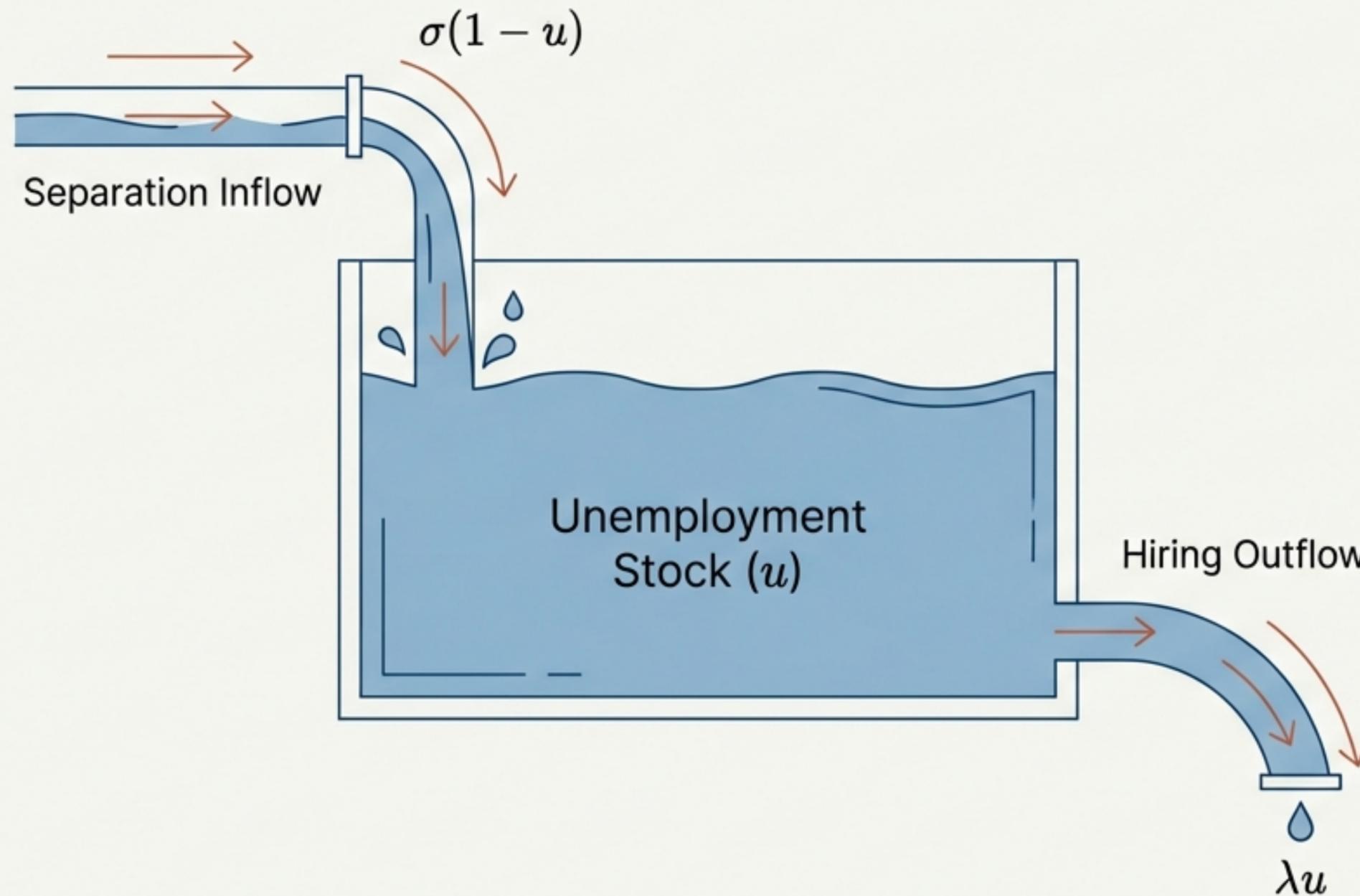
Assumption: Instant matching.
Voluntary unemployment only.

The Reality (US Data 1950–2022)



Reality: Persistent, involuntary
unemployment driven by search frictions.

The Mechanics of the Bathtub Model



The Law of Motion:

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

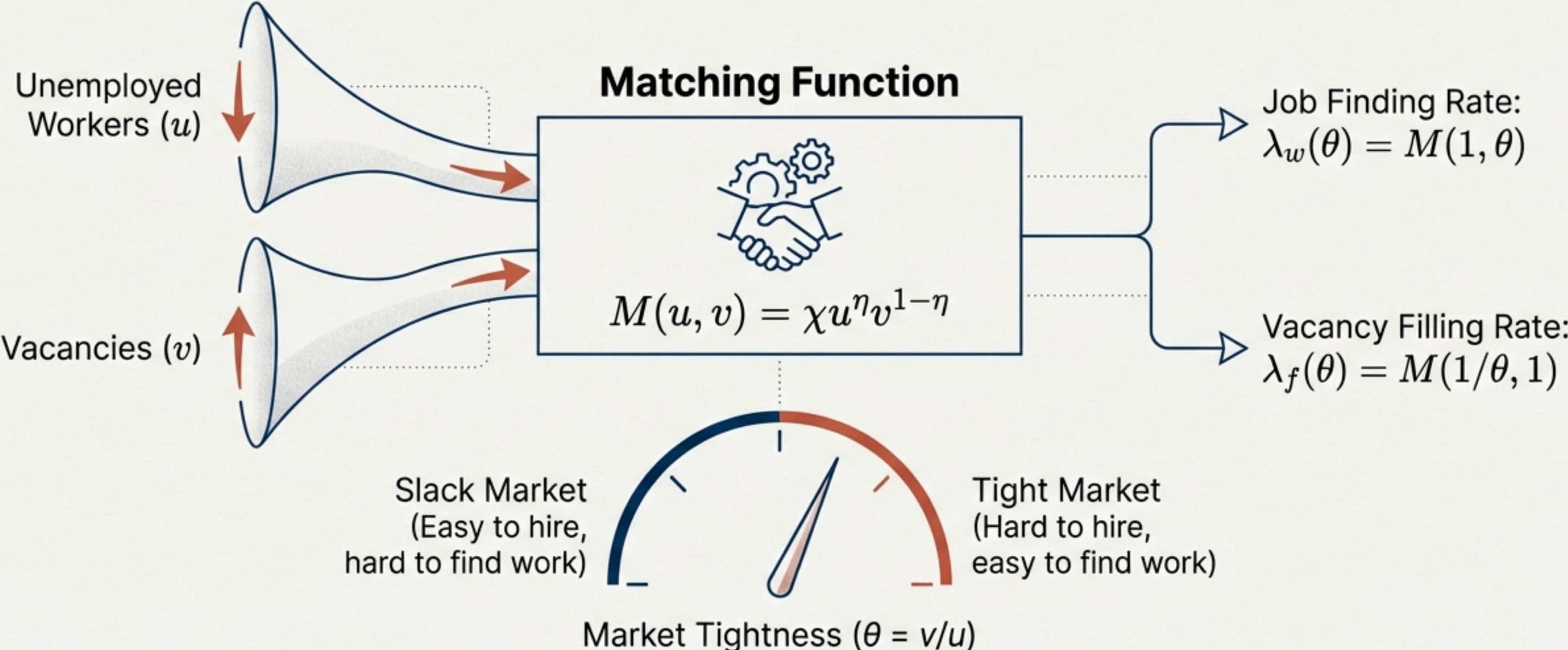
The Steady State:

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

Key Parameters (Monthly US Data):

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

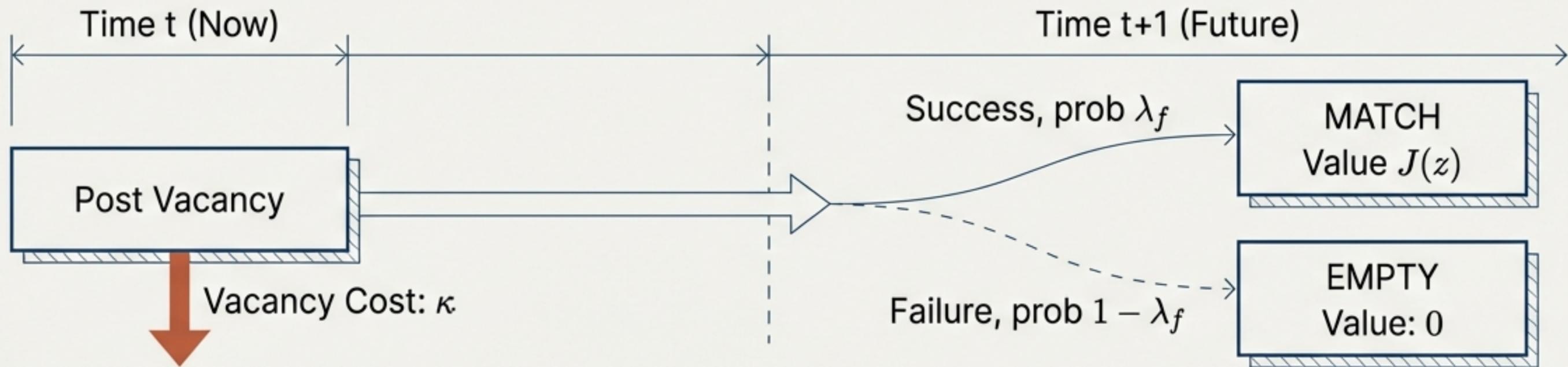
Inside the Black Box: The Matching Function



The Beveridge Curve: Evidence of Friction



The Firm's Decision: Vacancy as Investment



Firm pays κ to enter the lottery.

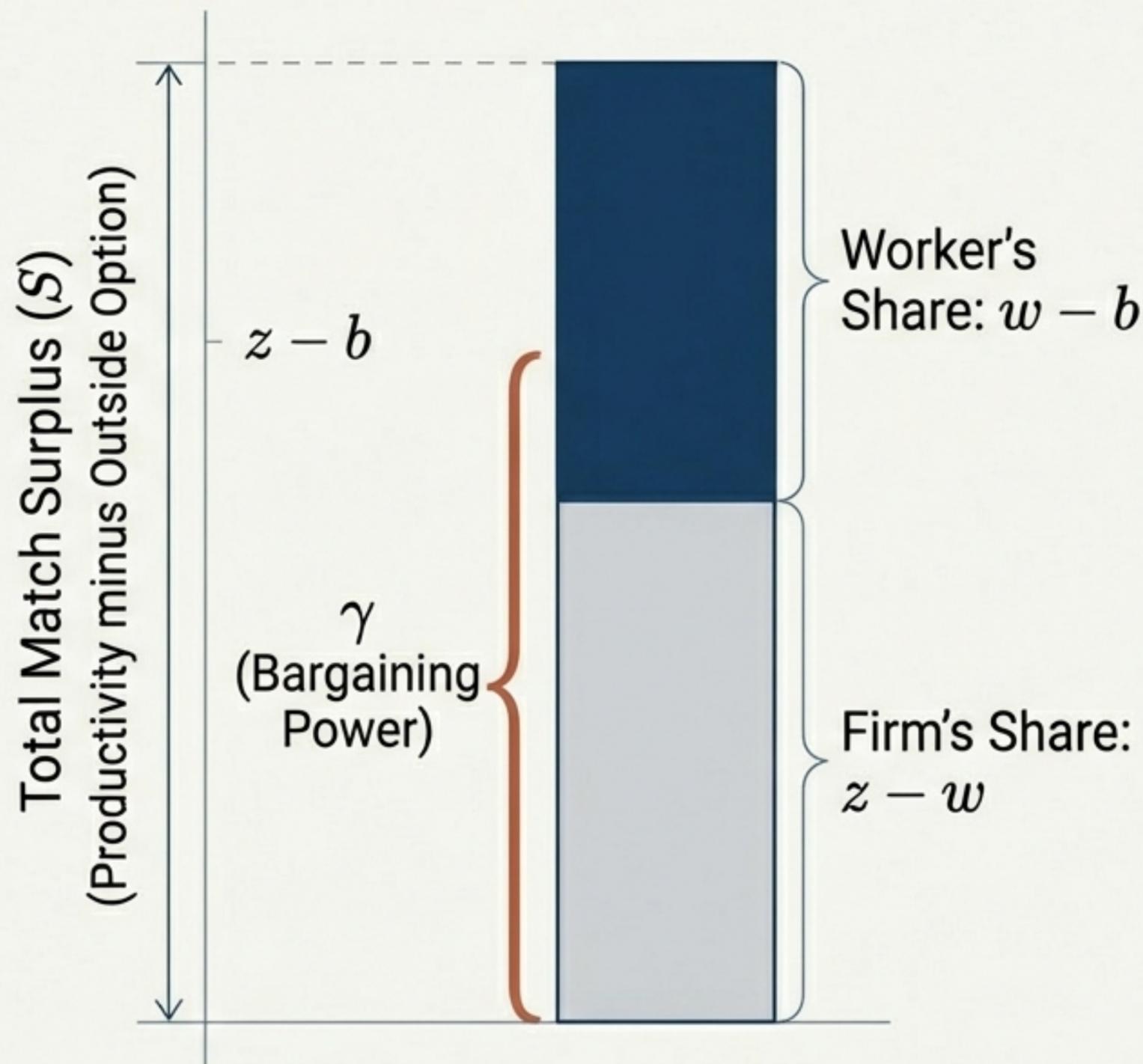
$$\frac{\kappa}{\lambda f(\theta)} = \beta E[J(z')]$$

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



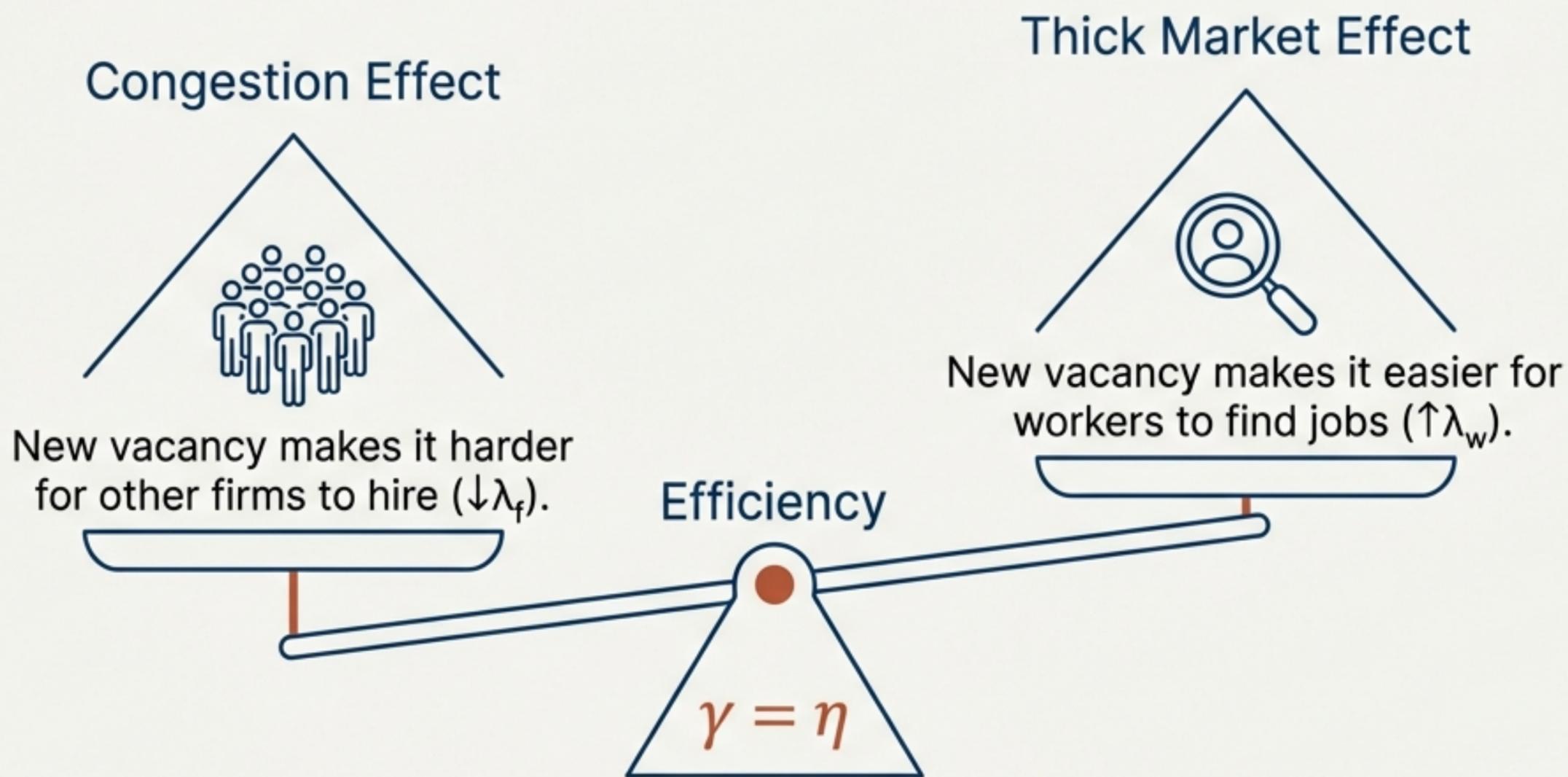
- **The Mechanism:** Generalized Nash Bargaining

$$(1 - \gamma)(W - U) = \gamma(J - V)$$

- **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



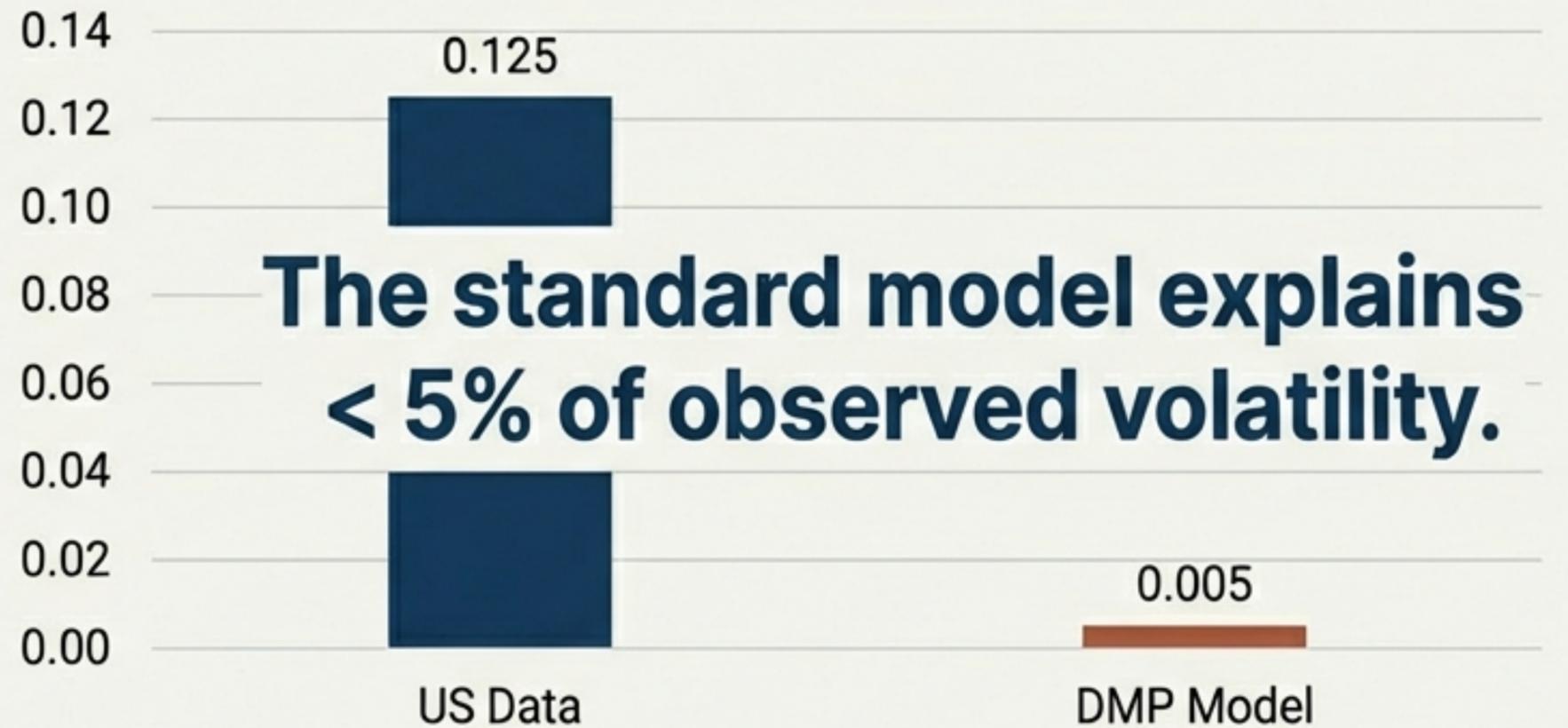
Efficiency is achieved ONLY when Worker Bargaining Power (γ) equals the Elasticity of Matching (η).

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)



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

Diagram A: Flexible Wages (Standard Model)

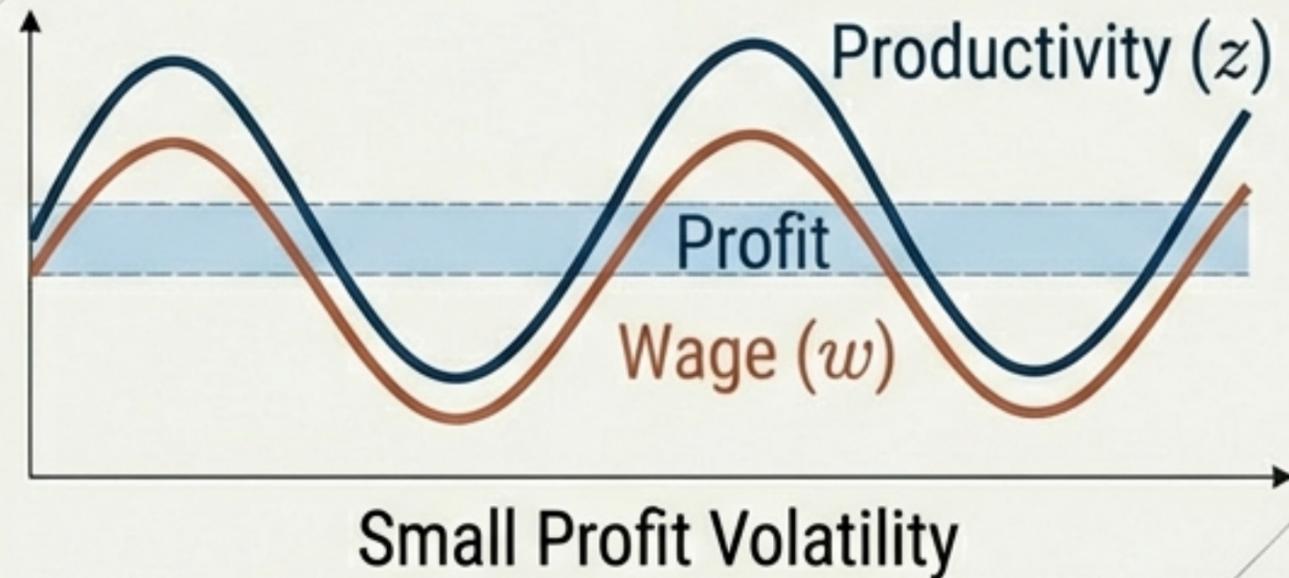
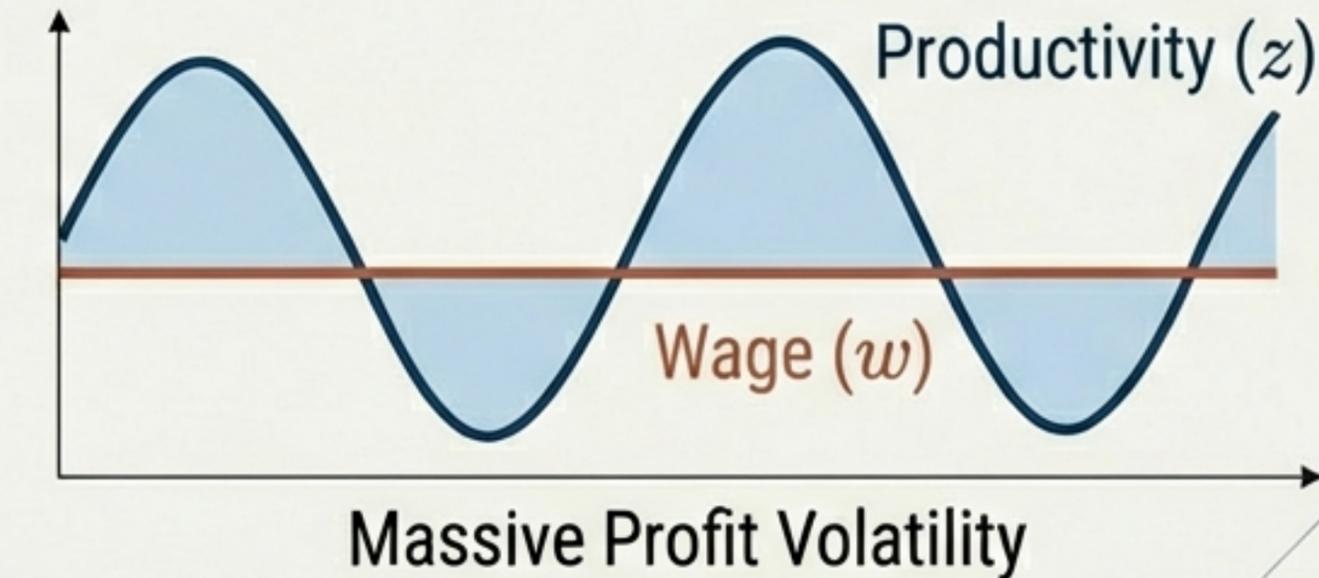


Diagram B: Rigid Wages (Solution)



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

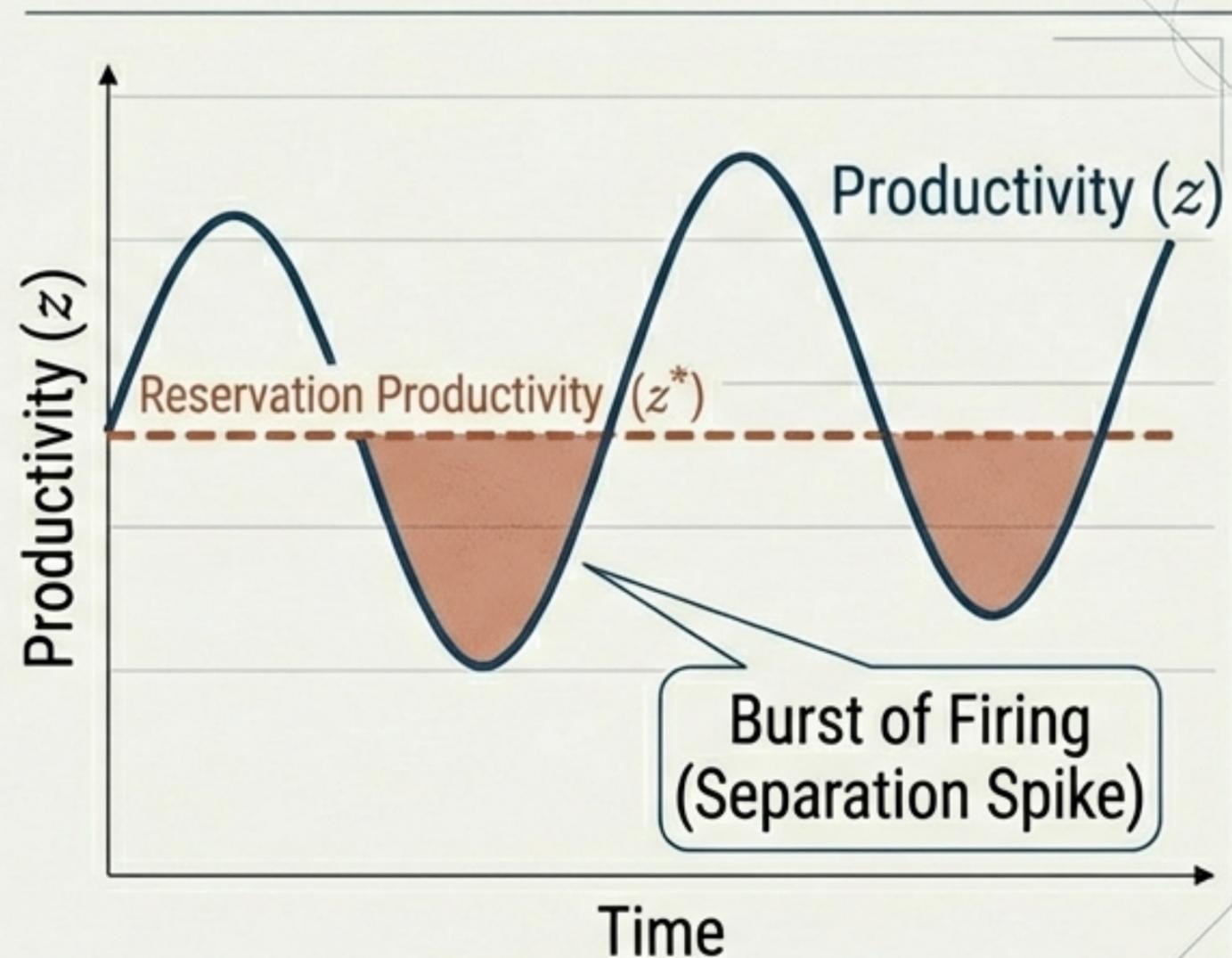
The Mechanism

Firms choose separation rate σ based on productivity.

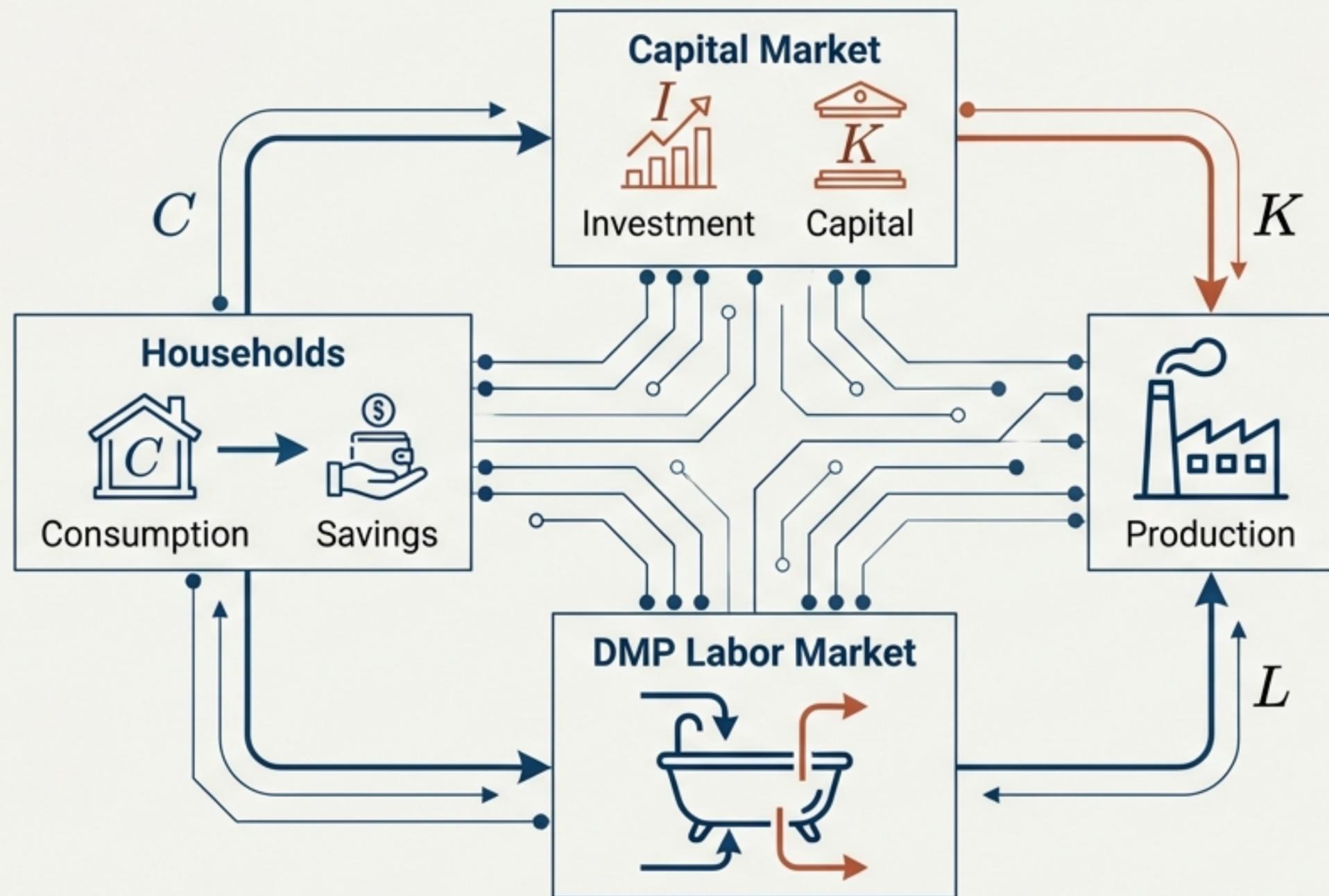
$$\text{Condition: } -c'(\sigma) = \kappa/\lambda f(\theta)$$

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



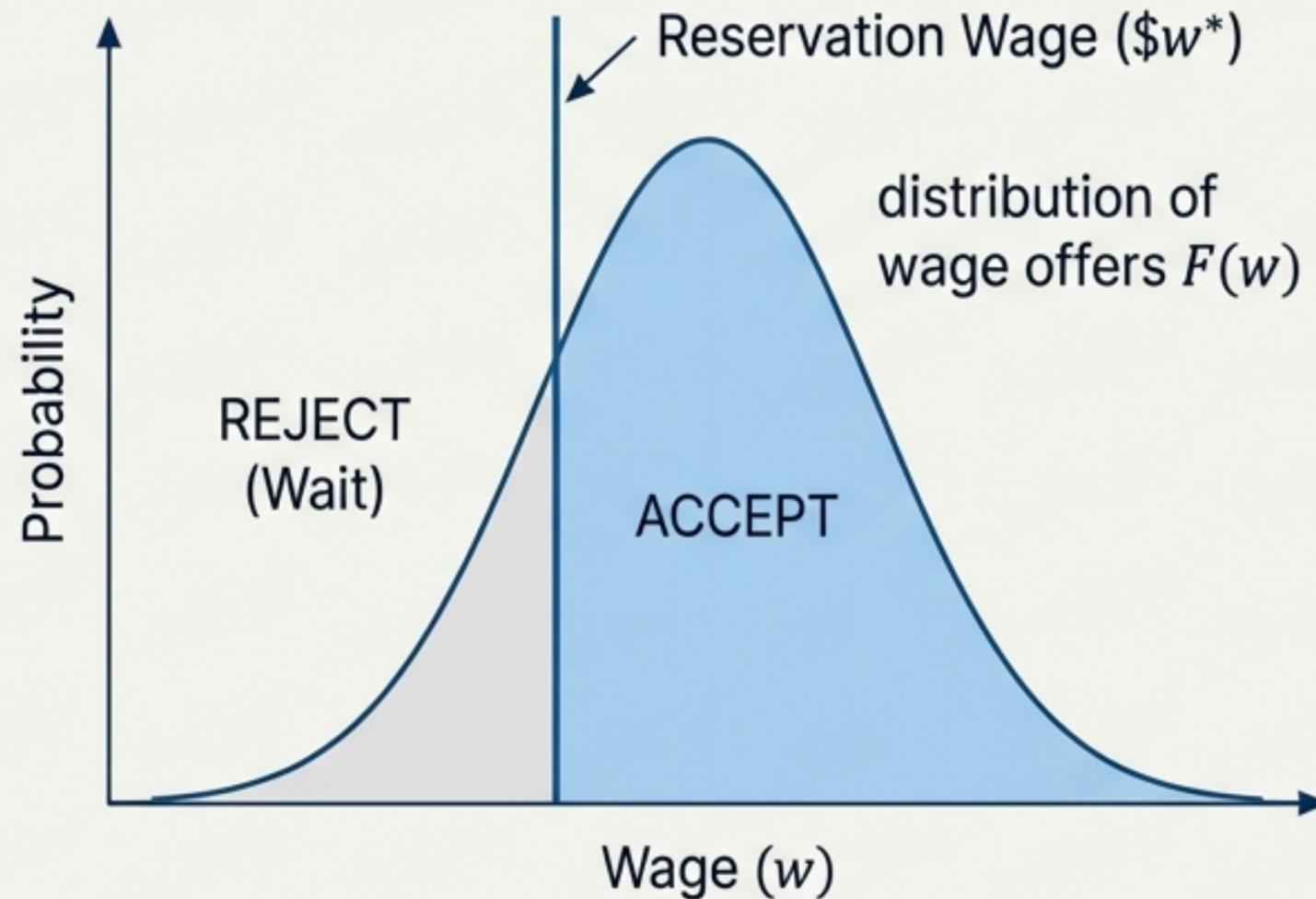
Key Findings Box:

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

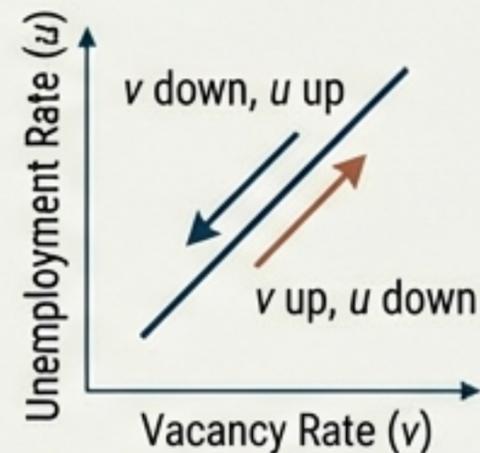
1. Friction is Real

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



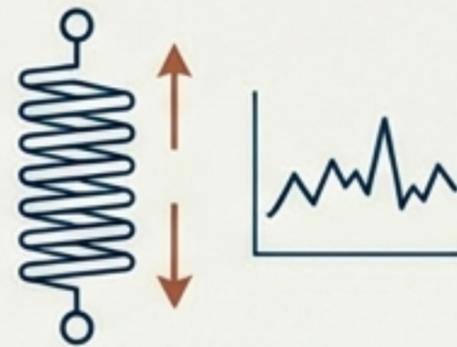
2. The Cycle

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

Frictional Labor Markets: Searching for Equilibrium