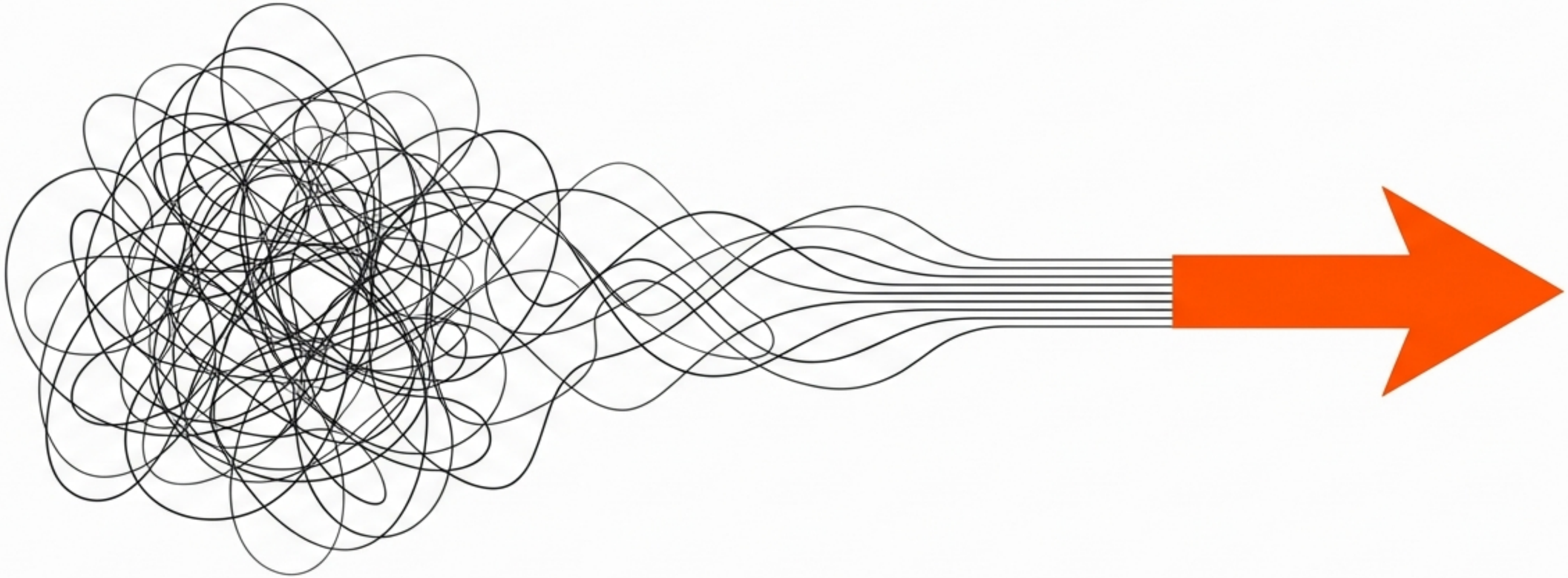
The Quest for Causality in Macroeconomics

Investigating the Fiscal Multiplier through Four Empirical Strategies



Based on Chapter 8: Empirical Strategies and Quantitative Macroeconomics

The Macroeconomist cannot use test tubes

The Hard Sciences (Controlled)

Macroeconomics (Equilibrium)

The Dilemma

Chemists can isolate variables in a lab. Macroeconomists observe equilibrium outcomes where every variable potentially affects every other variable simultaneously.

The Consequence

To answer policy questions—like "Will stimulus work?"—we need causal estimates, not just correlations.

The Goal

We must estimate the consequences of changing one aspect of the economy (e.g., spending) while holding economic fundamentals constant.

The Anchor Case: The Fiscal Multiplier

$$Multiplier = \frac{\Delta Y}{\Delta G}$$

1.0 (The Benchmark)

The Question

How does GDP (Y) respond to an exogenous increase in Government Spending (G)?

The Definition

The Fiscal Multiplier is the change in Output divided by the change in Spending.

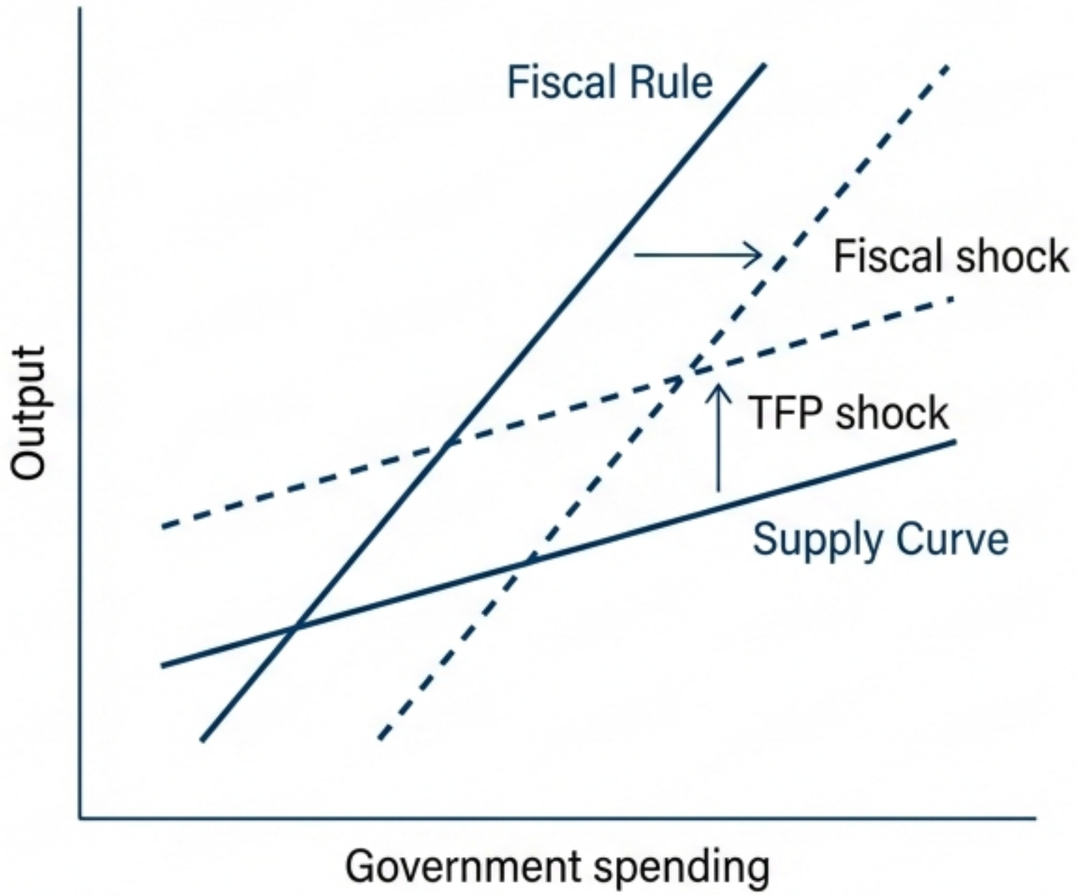
The Benchmark

A multiplier of **1.0** means one dollar of spending raises GDP by exactly one dollar.

The Condition

We must identify a change in G that happens independently of other forces affecting the economy (**Ceteris Paribus**).

Why correlation is not causation



The Simultaneity Problem

In the real world, G and Y are jointly determined.

Reverse Causality

A booming economy (Y) creates tax revenue, lowering the opportunity cost for the government to spend (G). This creates an upward-sloping Fiscal Rule.

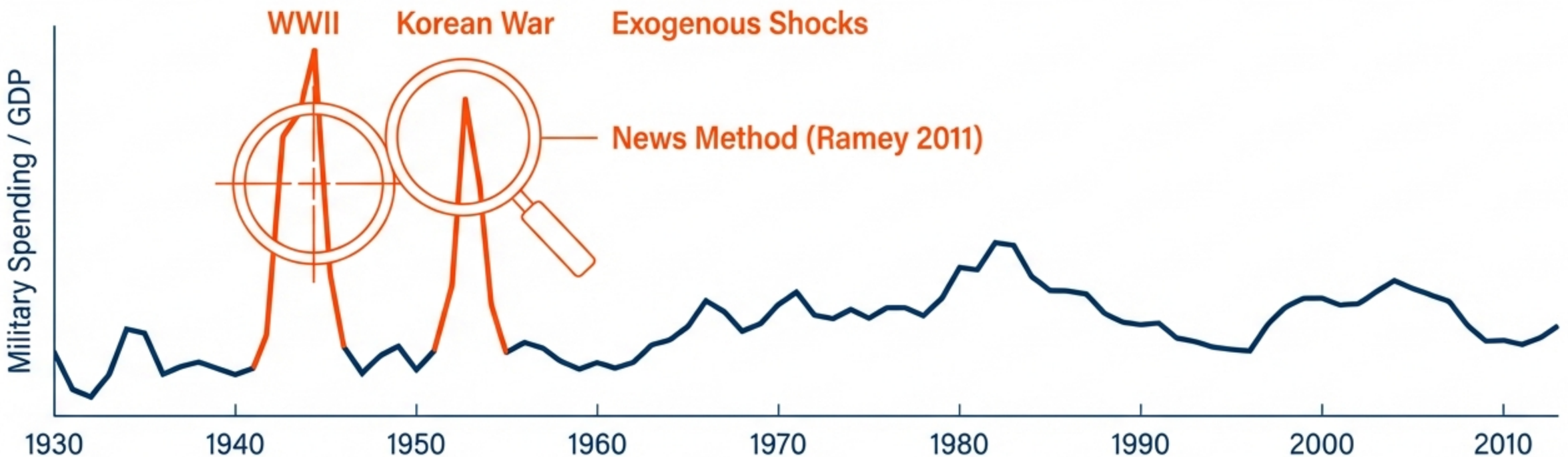
The Data Cloud

Observed data reflects shifts in BOTH the Supply Curve (via TFP shocks) and the Fiscal Rule (via fiscal shocks). Simply plotting G against Y reveals neither slope.

Key Insight

We need a tool to isolate the shifts in the Fiscal Rule to trace out the Supply Curve.

Strategy I: Natural Experiments (Time Series)



The Logic

Wars are arguably exogenous to the economic cycle. They shift the Fiscal Rule without shifting the Supply Curve.

The Complication

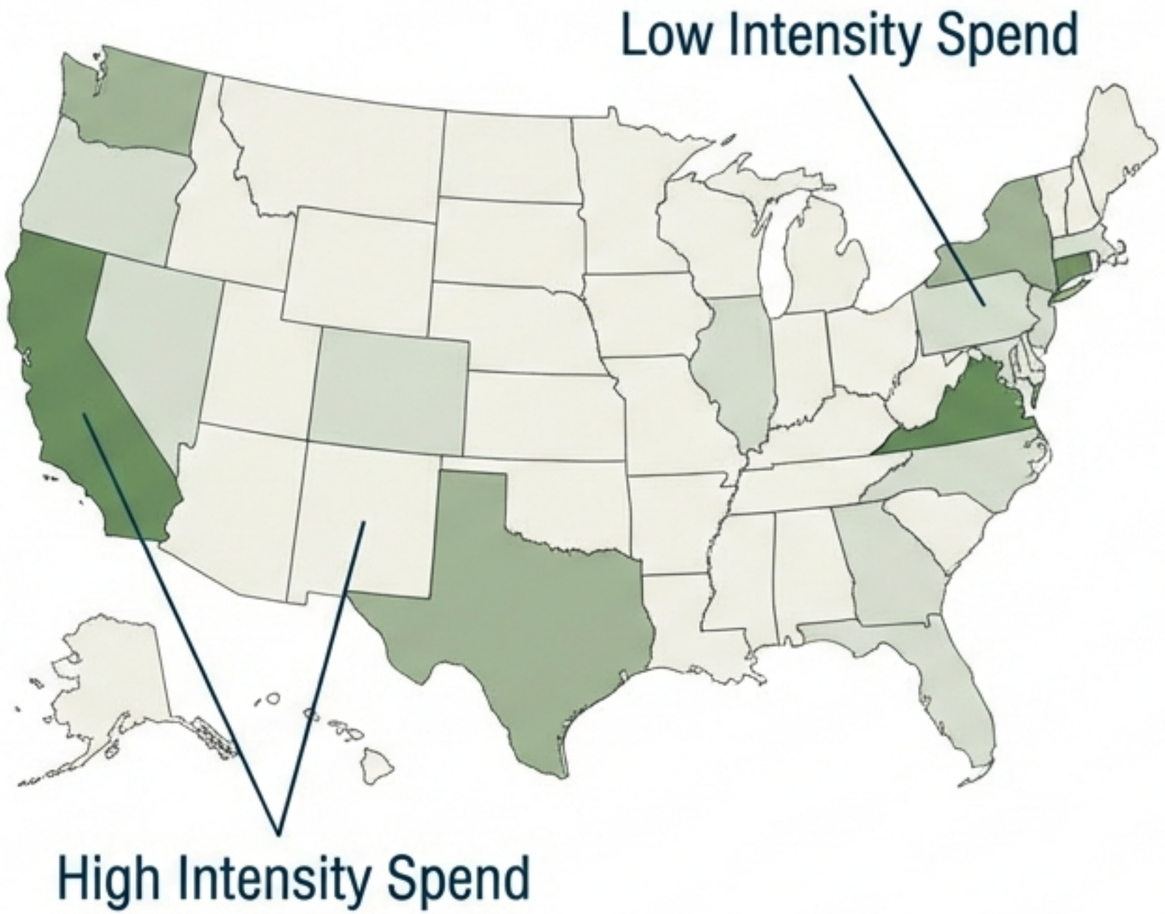
Spending changes are often known before they happen. Wealth effects occur when the "News" arrives, not when the check is written.

The Verdict

Multiplier ≈ 1.0 (with WWII included).

Multiplier ≈ 0.7 (without WWII).

Strategy I: Natural Experiments (Cross-Sectional)



The Method

Nakamura & Steinsson (2014) compare output changes in “High Spend” states vs. “Low Spend” states.

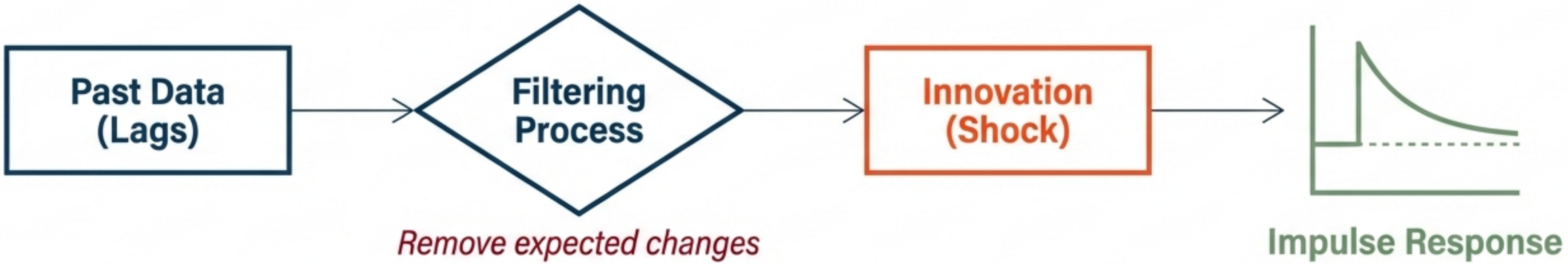
The Verdict

Estimated Multiplier ≈ 1.5.

The Crucial Caveat

This is a “relative" multiplier, not an aggregate one. It strips out General Equilibrium effects like national tax hikes or interest rate changes which affect all states equally.

Strategy II: Structural Vector Autoregressions (SVARs)



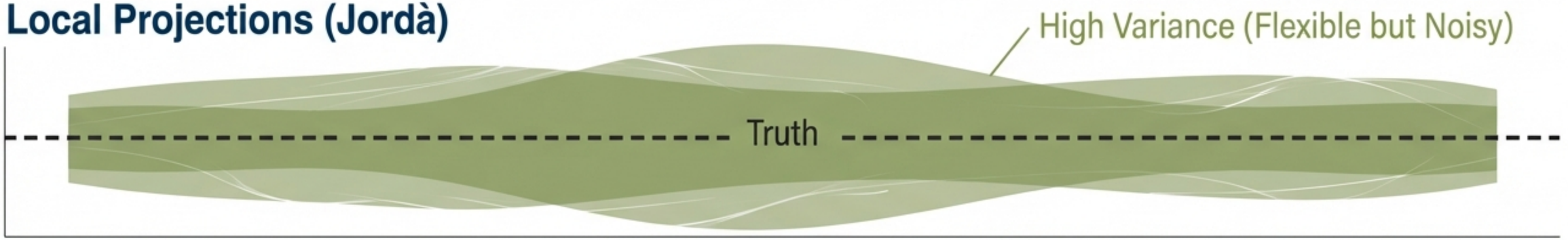
Recursive Identification (Blanchard & Perotti)

Crimson Pro Regular

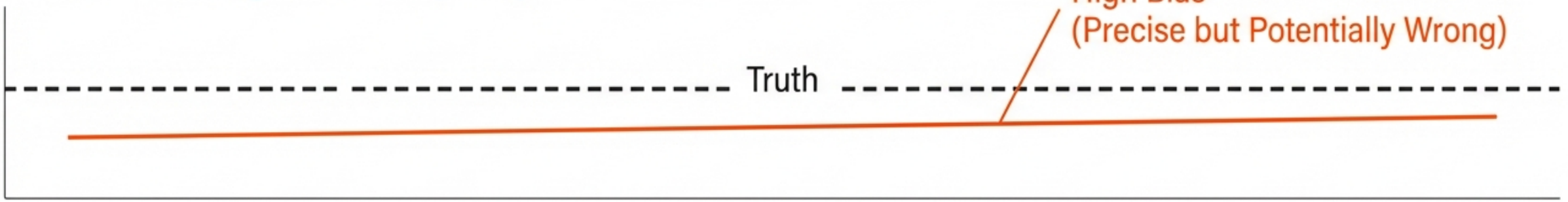
- **The Assumption**
  Policy takes time. It takes more than one quarter for the government to observe GDP data and pass legislation.
- **The Restriction**
  Therefore, the *contemporaneous response of Government Spending to GDP* is restricted to zero.
- **The Verdict**
  Multiplier ≈ 1.0.

The Bias-Variance Trade-off: VARs vs. Local Projections

Local Projections (Jordà)



Vector Autoregressions (VAR)



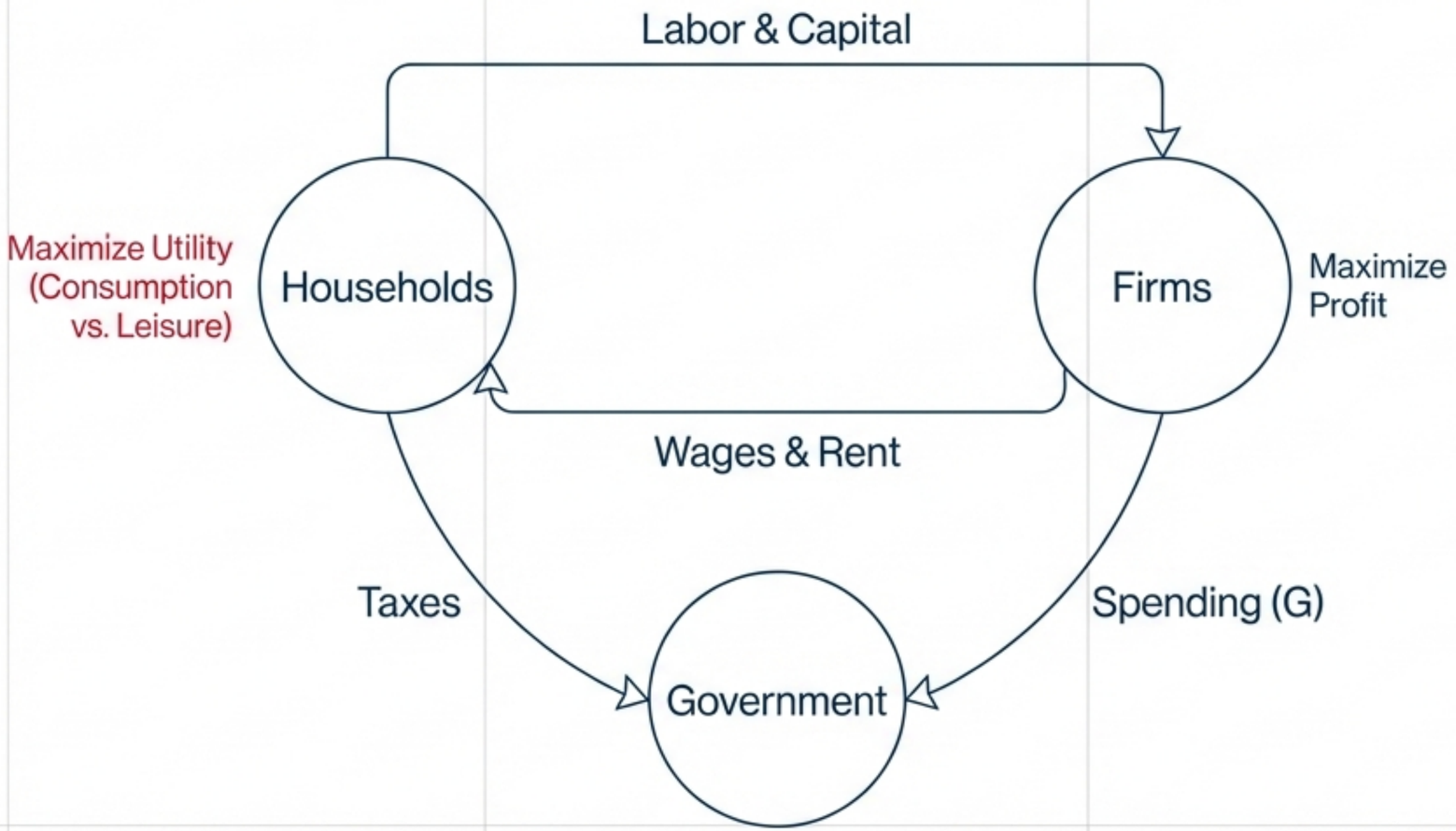
Local Projections

Regress outcome directly on the shock. Flexible, but signal-to-noise ratio drops as horizon grows.

VARs

Extrapolate dynamics from one period to the next. Precise, but if the model is too simple (misspecified), errors compound.

The Pivot to Theory: Building an Economic Laboratory



Why Models?

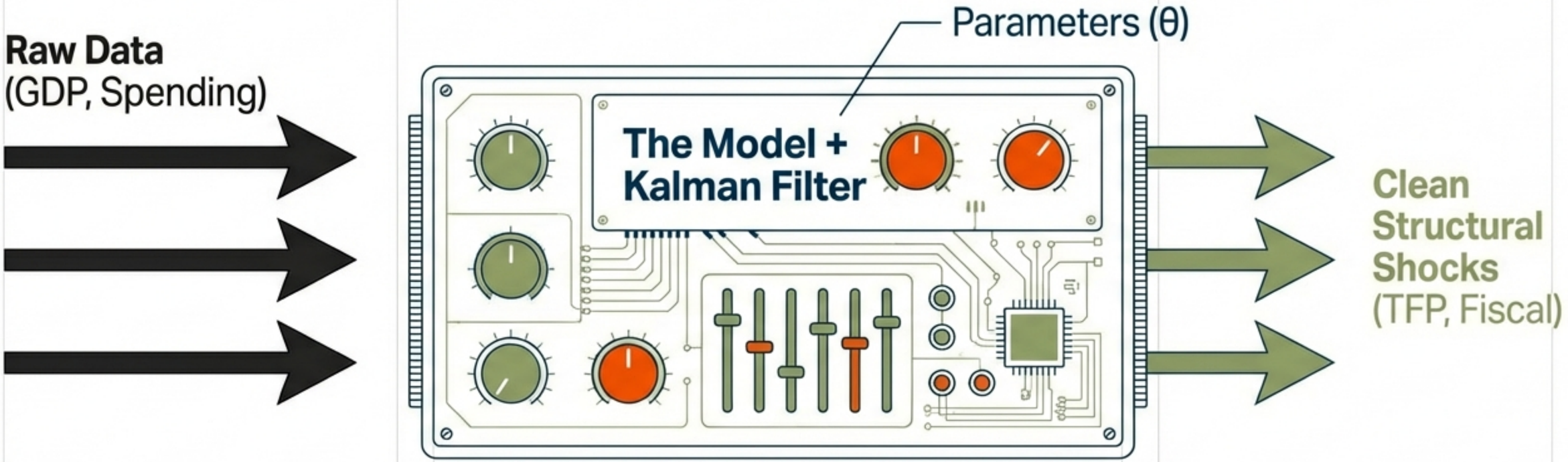
When data is silent or we need to understand mechanisms, we build a structural model.

The Mechanism

Households react to taxes (wealth effect) and interest rates (intertemporal substitution).

Strategy III: Structural Estimation

Raw Data
(GDP, Spending)



The Logic

Treat the economic model as a statistical model (Data Generating Process).

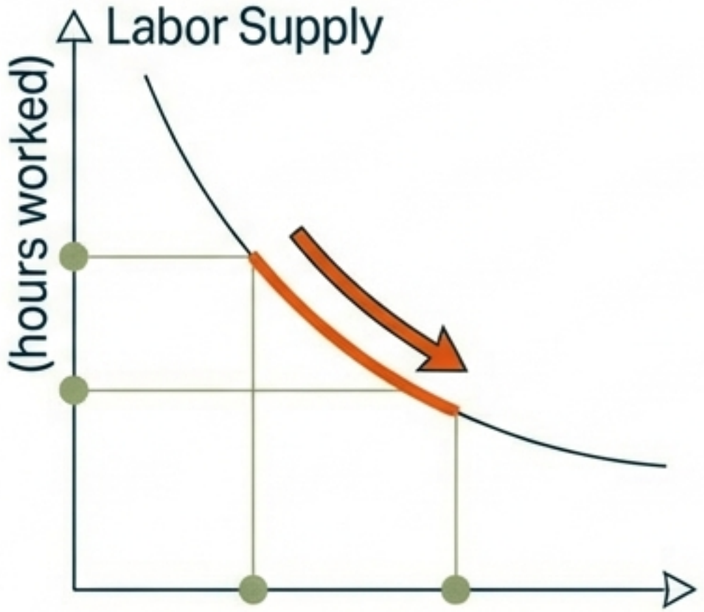
The Method

Maximum Likelihood Estimation. We tune the parameters (θ) until the model's probability of producing the observed history is maximized.

Identification

Rigid functional forms allow us to mathematically separate shocks.

Strategy IV: Calibration from Micro-Evidence



The Logic

Don't ask the macro data to explain everything. Use external "micro" evidence to fix key parameters.

The Key Parameter

Labor Supply Elasticity (ψ). This determines the wealth effect—how much people work when they get poorer.

The Key Parameter

Studied Lottery Winners. Do people quit when they win?

The Evidence

(Golosov et al.)

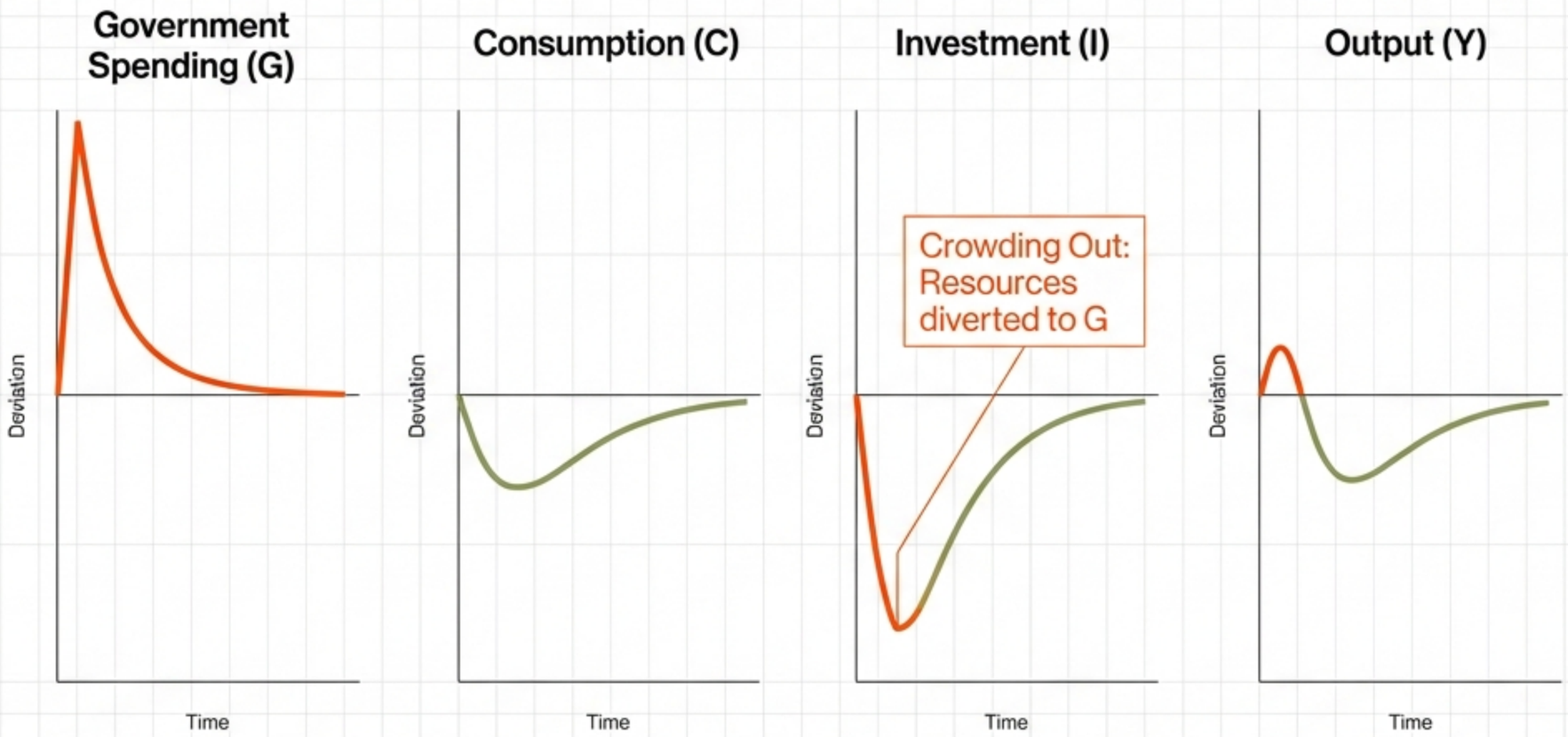
The Finding

Winning **$100** leads to a **$2.30 drop** in annual earnings.

The Calibration

Implies **ψ ≈ 2.1** (a low elasticity).

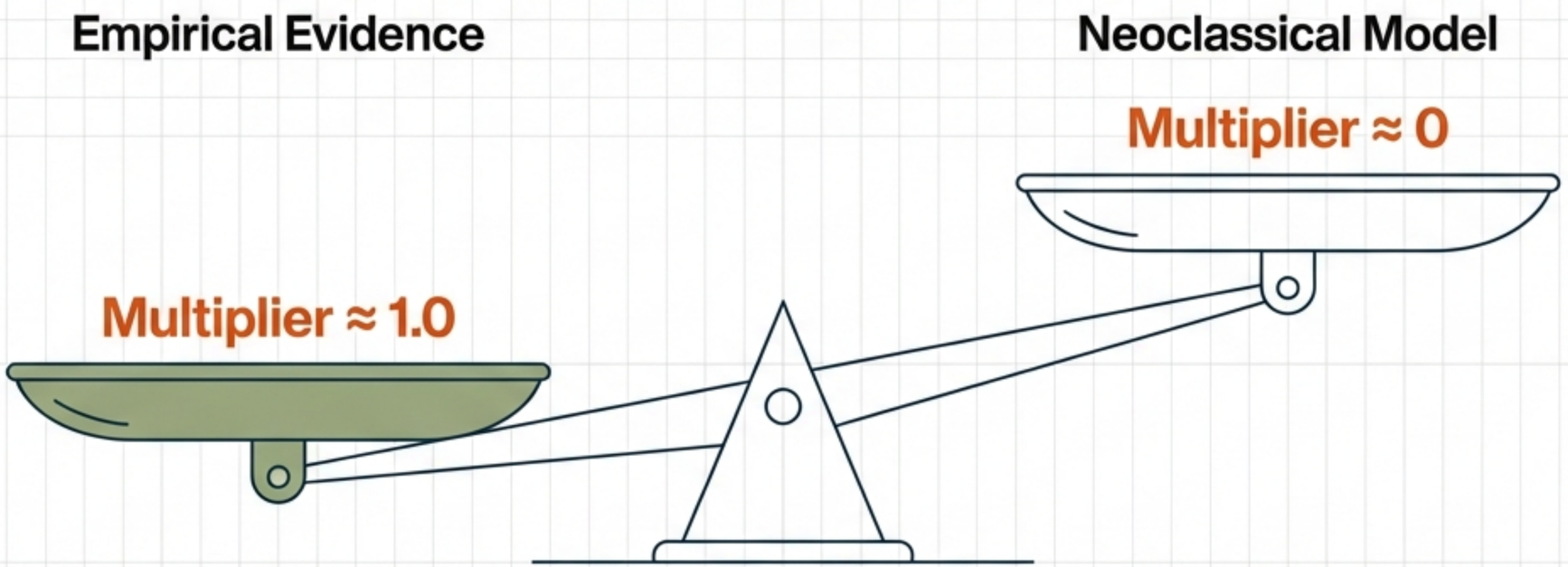
Running the Experiment: Impulse Responses



The Neoclassical Result

- **Short Run**
  Output rises slightly as people work more.
- **Long Run**
  Output falls because capital stock is depleted by lower investment.
- **Sensitivity**
  Multiplier is higher if the shock is more persistent or if labor is more elastic.

The Conflict: Theory vs. Empirics



Analysis

- **The Gap**
  Empirical methods consistently find larger multipliers than the standard Neoclassical model can generate.
- **The Reason**
  The model relies on "Wealth Effects" to drive work effort, which is a weak channel.
- **The Missing Piece**
  To match the data, the model likely needs Keynesian channels (demand-driven expansion, sticky prices).

Choosing Your Weapon

Natural Experiments

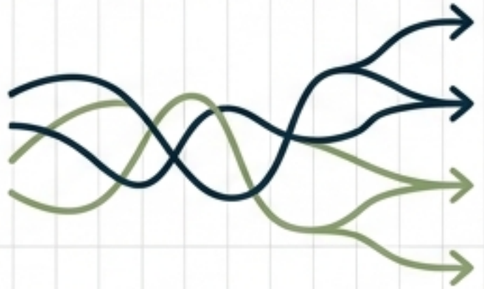
High Causality / Specific Context

Use when you can identify clean historical shocks (e.g., *Wars*).

SVARs

Flexible Dynamics / Identification Difficult

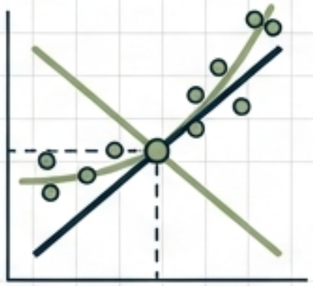
Use when you want *data to speak* without full theory.



Structural Estimation

Data-Coherent / Model-Dependent

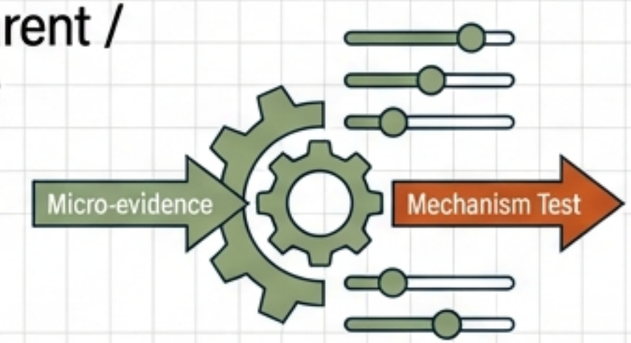
Use when you have a *trusted model* and want best fit.



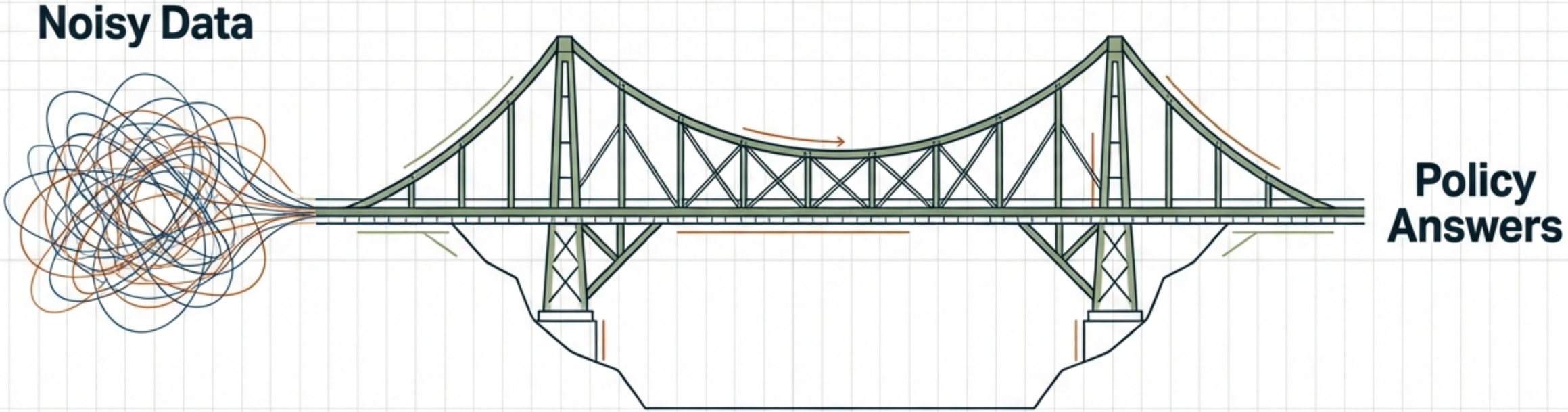
Calibration

Mechanism-Transparent / Parameter Sensitive

Use to test *specific mechanisms* with micro-evidence.



The Art of the Argument



No Magic Bullet

Every method forces a compromise between assumptions and noise.

The Synthesis

The strongest arguments combine methods: using Natural Experiments to establish facts, and Structural Models to explain the "why".

Final Takeaway

Quantitative Macroeconomics is the process of bridging the gap between available evidence and the answers we need.