

# Correlation Does NOT Imply Causation

## Possible Explanations for Correlation



1. X causes Y



2. Y causes X (reverse)



3. Z causes both  
(confounding)



4. Pure coincidence

## Finance Examples

### Low VIX vs High Returns

Correlation, not causation!  
Both reflect calm markets

### Analyst Upgrades vs Price

Does upgrade cause price rise?  
Or did price rise prompt upgrade?

### GDP Growth vs Stock Returns

Many confounding factors:  
interest rates, policy, sentiment

## How to Establish Causation

### 1. Temporal Order

Cause must precede effect

### 2. Correlation

Must be correlated (necessary but not sufficient)

### 3. No Confounders

Control for other variables

### 4. Mechanism

Plausible explanation exists

### 5. Experiment

Randomized controlled trial (gold standard)

**CORRELATION**



**CAUSATION**

*In finance: True experiments are rare, be skeptical!*

*Always ask: What else could explain this relationship?*