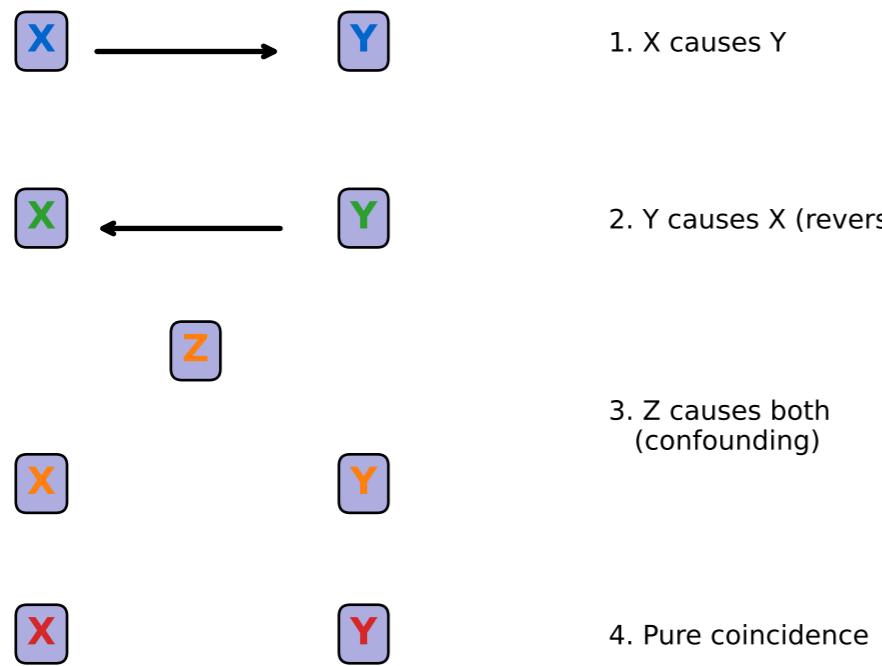


# Correlation Does NOT Imply Causation

## Possible Explanations for Correlation

## 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

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# CAUSATION

In finance: True experiments are rare, be skeptical!

Always ask: What else could explain this relationship?