📈 Full Causal Inference Dashboard (Interpretation + What-If + Visualization)

Select Part Number

PN-001	⌄

Select Machine

M1	⌄

📊 Averages for PN-001 on M1

- Pressure: `5.0` bar

- Speed: `99.99` RPM

- Temperature: `199.99` °C

📄 Sample Data

	PartNo	Machine	Pressure	Speed	Temperature	DefectRate	Operator_O124	Operator_O125
4	PN-001	M1	4.5227	96.7276	198.213	0	☑	☐
5	PN-001	M1	4.9295	109.6071	202.7936	0	☐	☑
6	PN-001	M1	4.9537	97.5912	194.0859	0	☐	☐
7	PN-001	M1	4.5478	101.0754	202.3285	0	☐	☑
11	PN-001	M1	4.4325	108.3399	203.6141	0	☐	☑

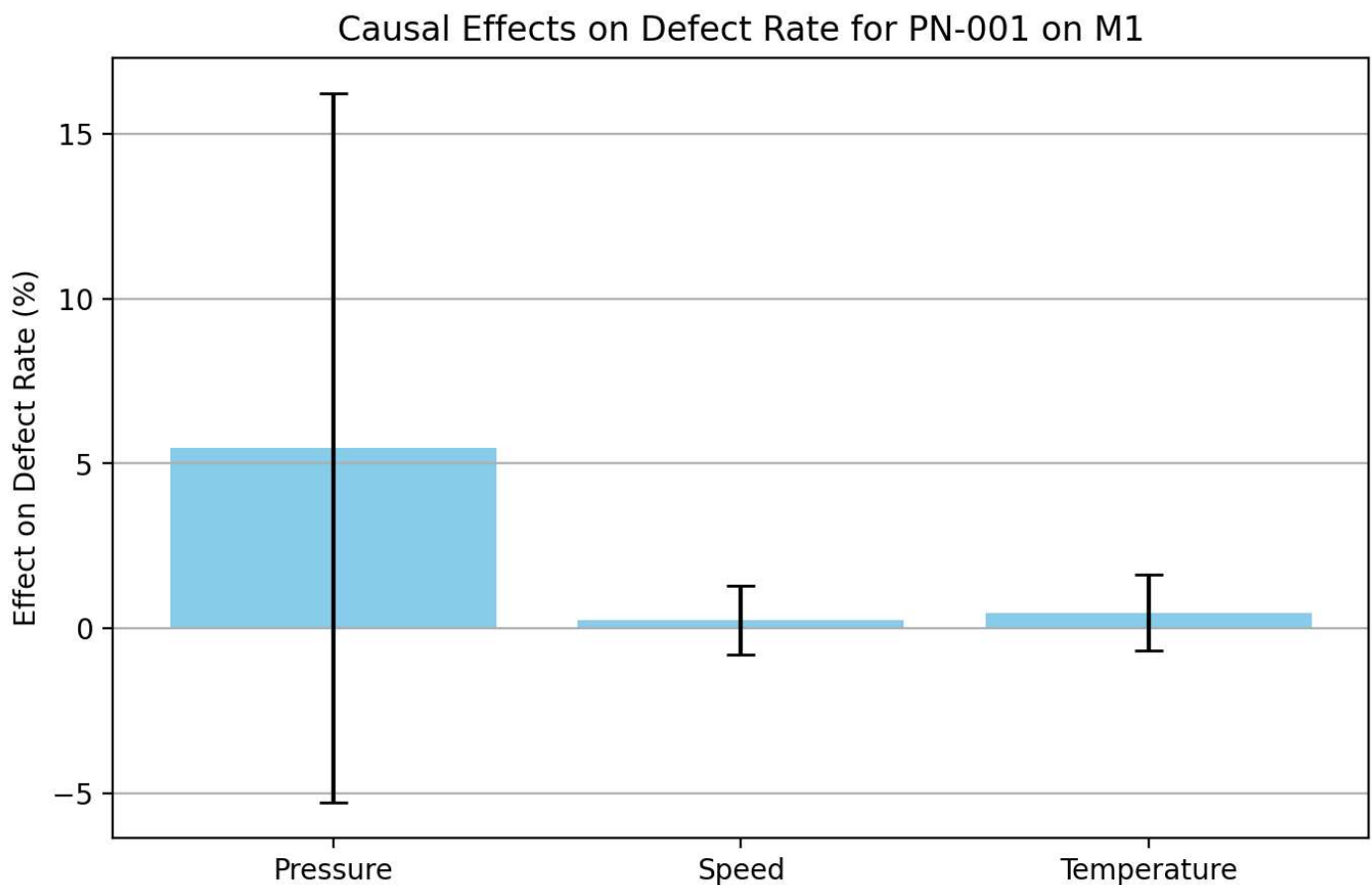# 📌 Causal Effect Summary with Interpretation

Pressure - Effect: `5.49` - 95% CI: `[ -5.27, 16.25 ]` - Interpretation: ❓ **Uncertain (wide CI, includes 0)**

Speed - Effect: `0.25` - 95% CI: `[ -0.81, 1.31 ]` - Interpretation: ❓ **Uncertain (wide CI, includes 0)**

Temperature - Effect: `0.47` - 95% CI: `[ -0.68, 1.63 ]` - Interpretation: ❓ **Uncertain (wide CI, includes 0)**
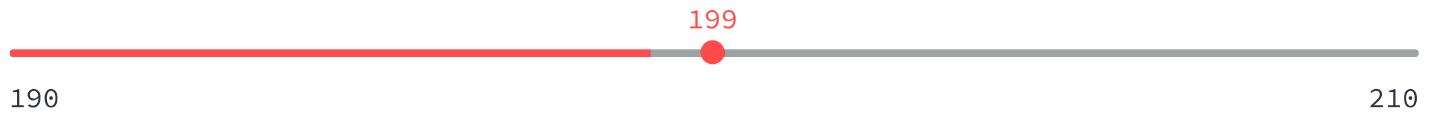
📊 Visual Causal Summary

Causal Effects on Defect Rate for PN-001 on M1

🧪 What-If Scenario Simulator

Pressure (bar)

6.90

3.00   8.00

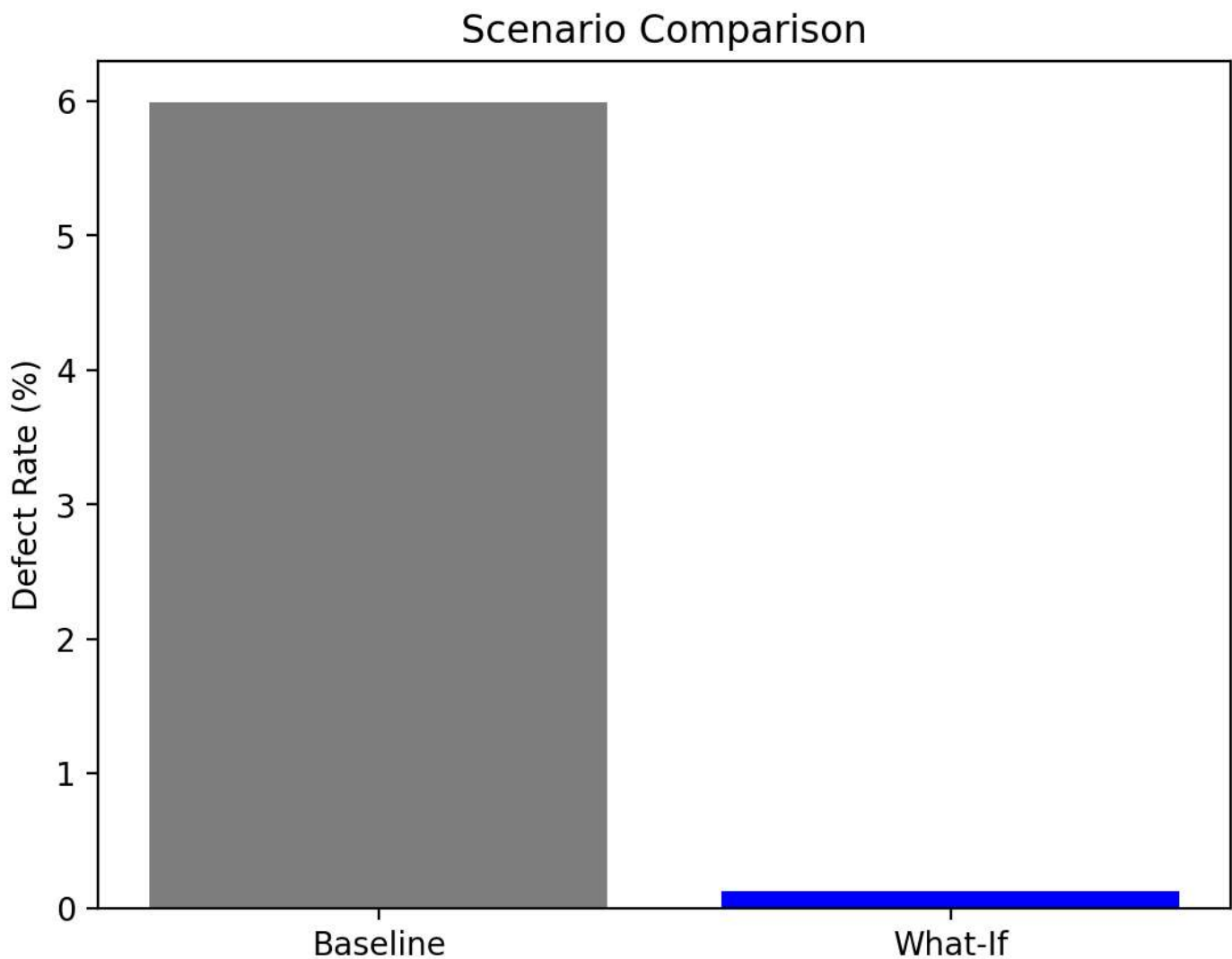**Speed (RPM)**

99

Temperature (°C)

199

📈 What-If Causal Effects

- `Pressure` → effect = `-9.71`

- `Speed` → effect = `2.12`

- `Temperature` → effect = `1.73`

📉 Baseline vs What-If Defect Rate

Scenario Comparison

📌 **Baseline Defect Rate:** `6.00%`

📌 **What-If Defect Rate:** `0.13%`

Full causal analysis complete.