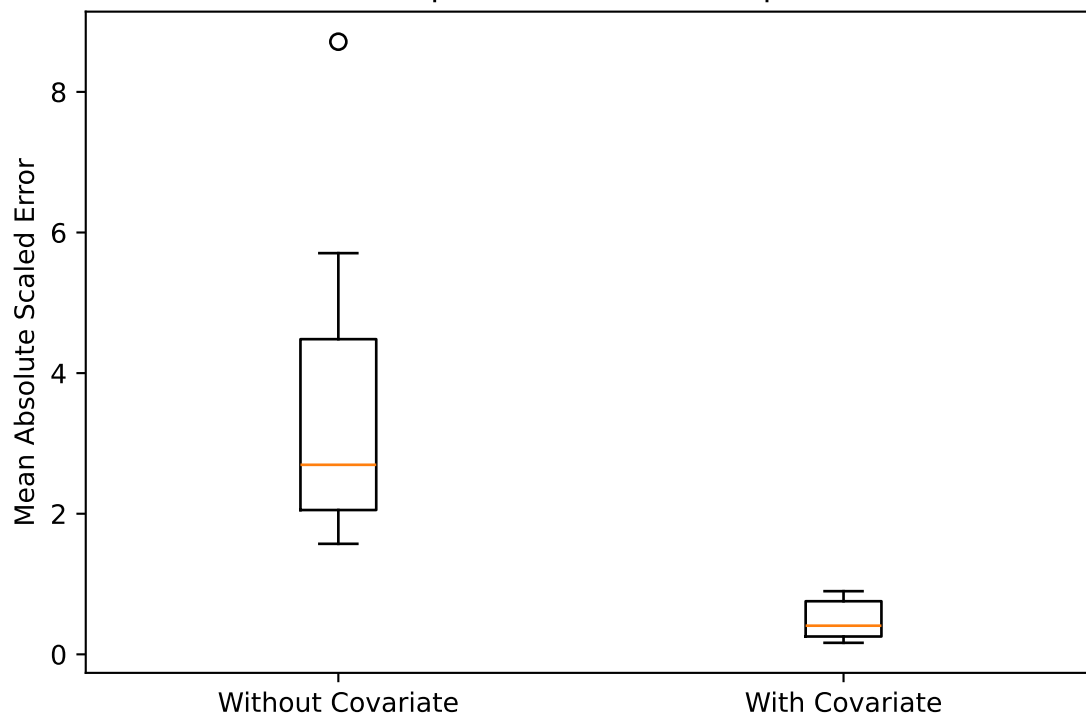
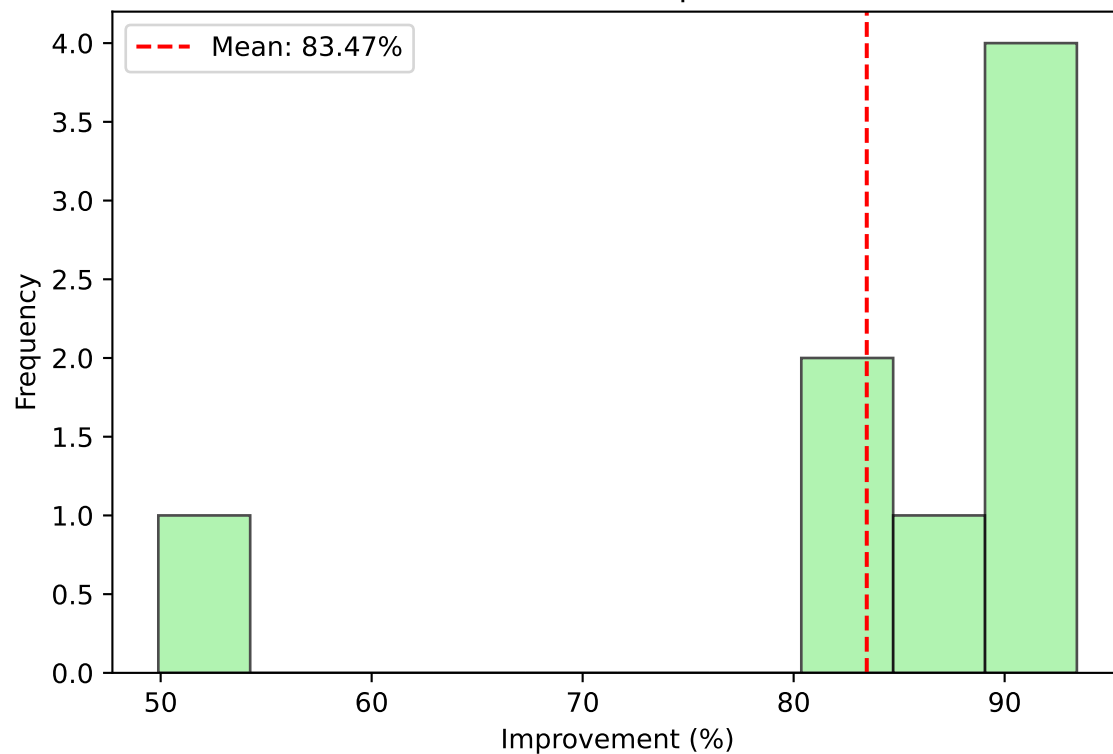


# Covariate Study Summary: Ar1, Pulses, Steps, Ramps

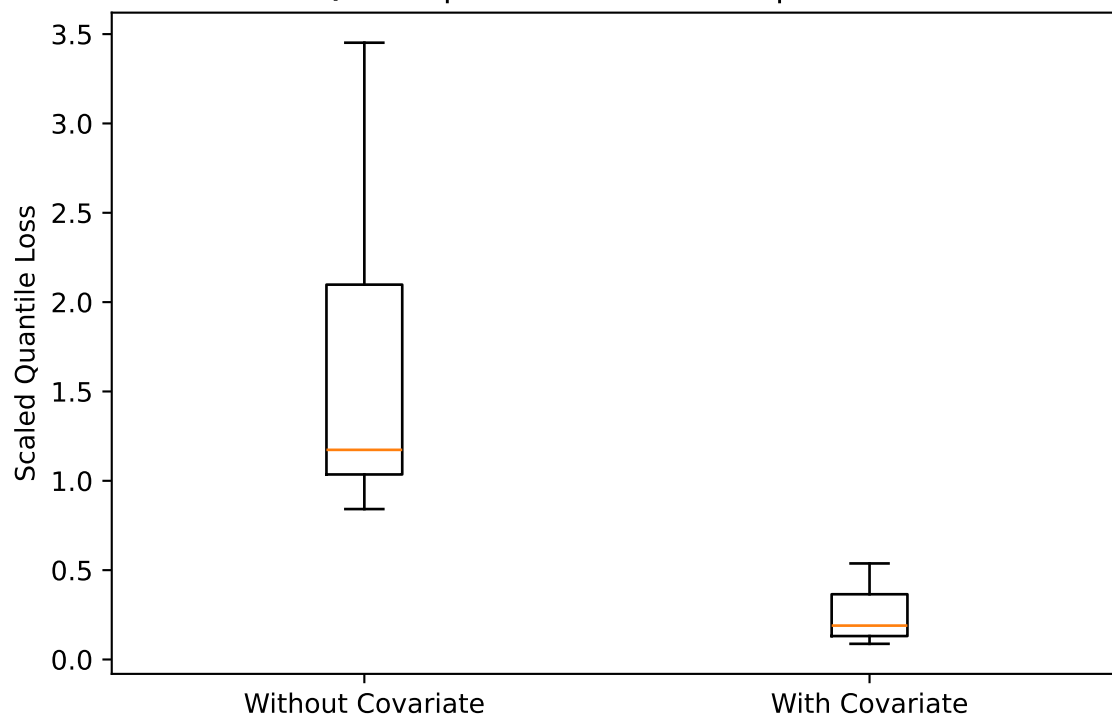
## MASE Comparison Across All Experiments



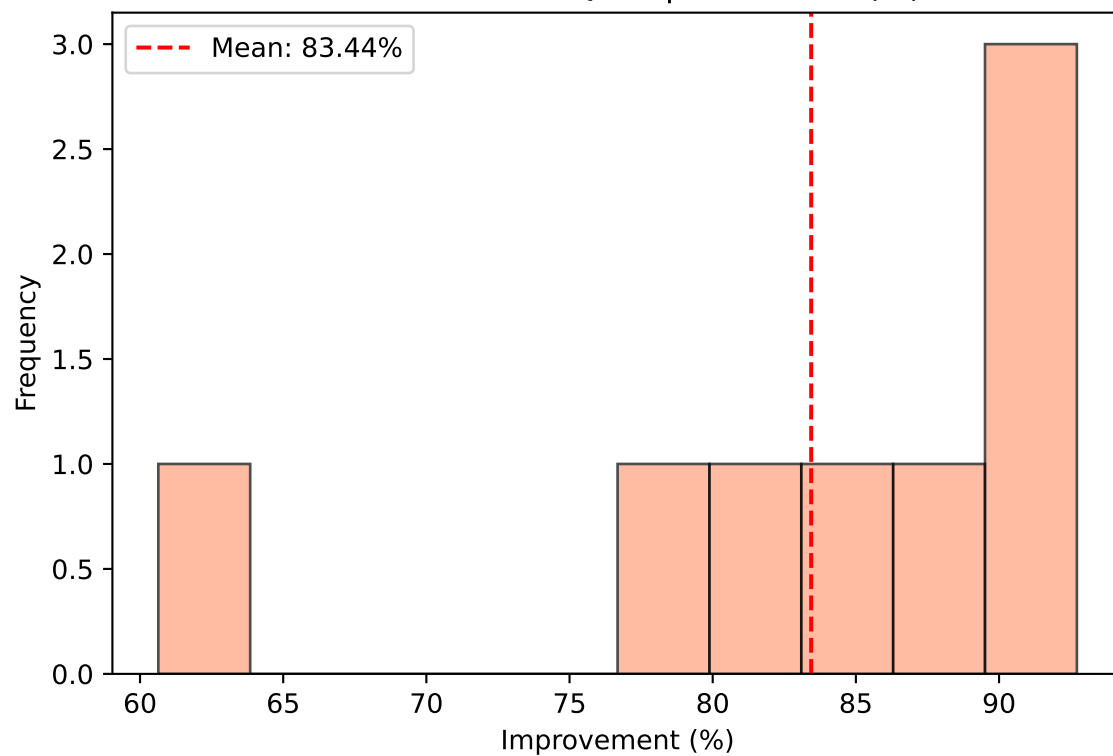
## Distribution of MASE Improvements (%)



## SQL Comparison Across All Experiments



## Distribution of SQL Improvements (%)



## Detailed Statistics

### Covariate Study Detailed Results

Covariate Types: ar1, pulses, steps, ramps

Number of Experiments: 8

#### MASE Results:

- Without Covariate:  $3.6716 \pm 2.2934$
- With Covariate:  $0.4960 \pm 0.2824$
- Average Improvement: 83.47%
- Median Improvement: 88.78%

#### SQL Results:

- Without Covariate:  $1.6234 \pm 0.8599$
- With Covariate:  $0.2526 \pm 0.1551$
- Average Improvement: 83.44%
- Median Improvement: 85.84%

#### Study Parameters:

- Weight: 1.0
- Relation: additive
- Train Ratio: 0.6
- Covariate Weights: Randomized per experiment (Dirichlet distribution)

#### Best Performing Experiment (MASE):

- Experiment 1: 93.42% improvement

#### Worst Performing Experiment (MASE):

- Experiment 4: 49.89% improvement