Model Fairness Interpretation

The logistic regression model performs reasonably well overall, with an accuracy of about 84.6% and an F1-score of 0.65, meaning it balances precision and recall fairly well. However, the fairness metrics show that the model exhibits some bias. The demographic parity difference of 0.177 indicates that one gender group receives positive predictions noticeably more often than the other, even when their true outcomes might not justify that gap. The equal opportunity difference of 0.113 suggests that one group also has a higher true-positive rate, meaning the model is more likely to correctly identify high-income individuals in that group. Although the overall calibration (Brier score = 0.106) shows the model's predicted probabilities are fairly reliable, the fairness results suggest there is measurable gender bias that should be reduced through further preprocessing or reweighting.