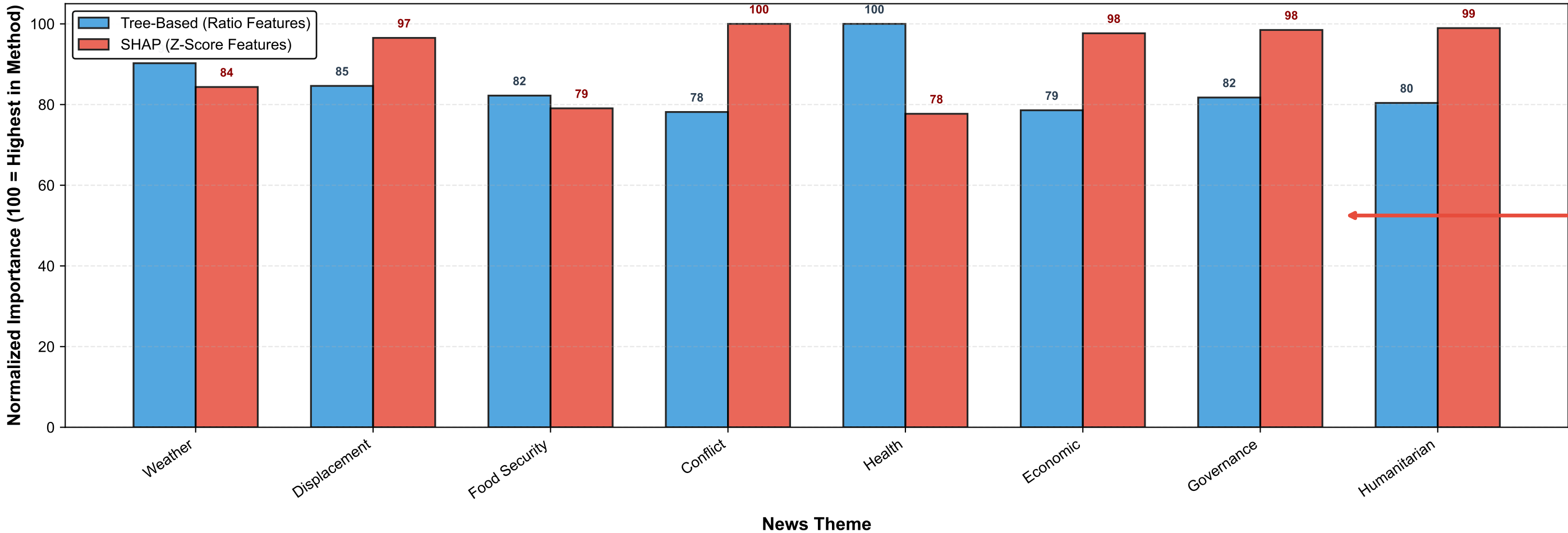


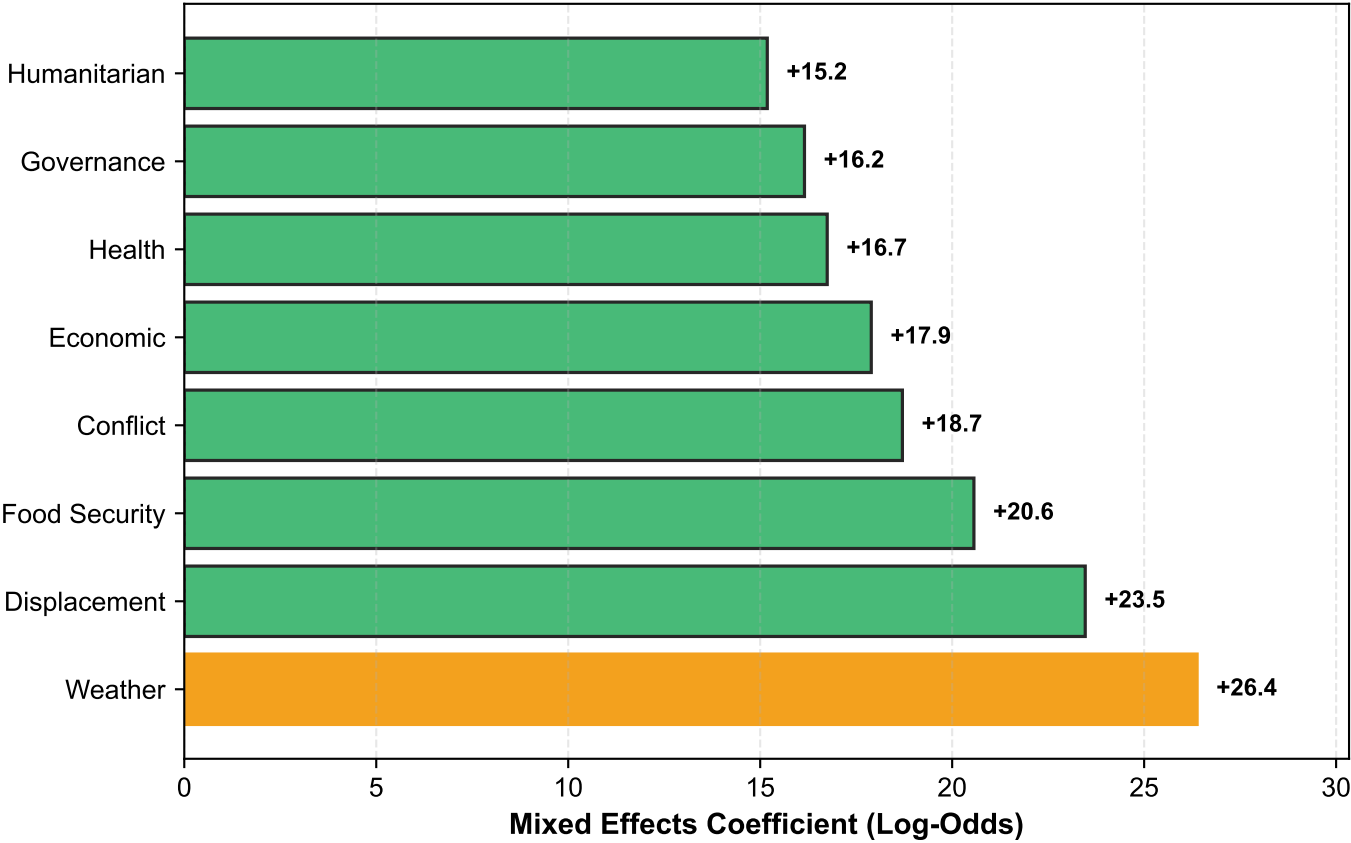
News Themes: Resolving Contradictory Rankings Across Measurement Methods

A. The SHAP Paradox: Tree-Based Importance ≠ Marginal Prediction

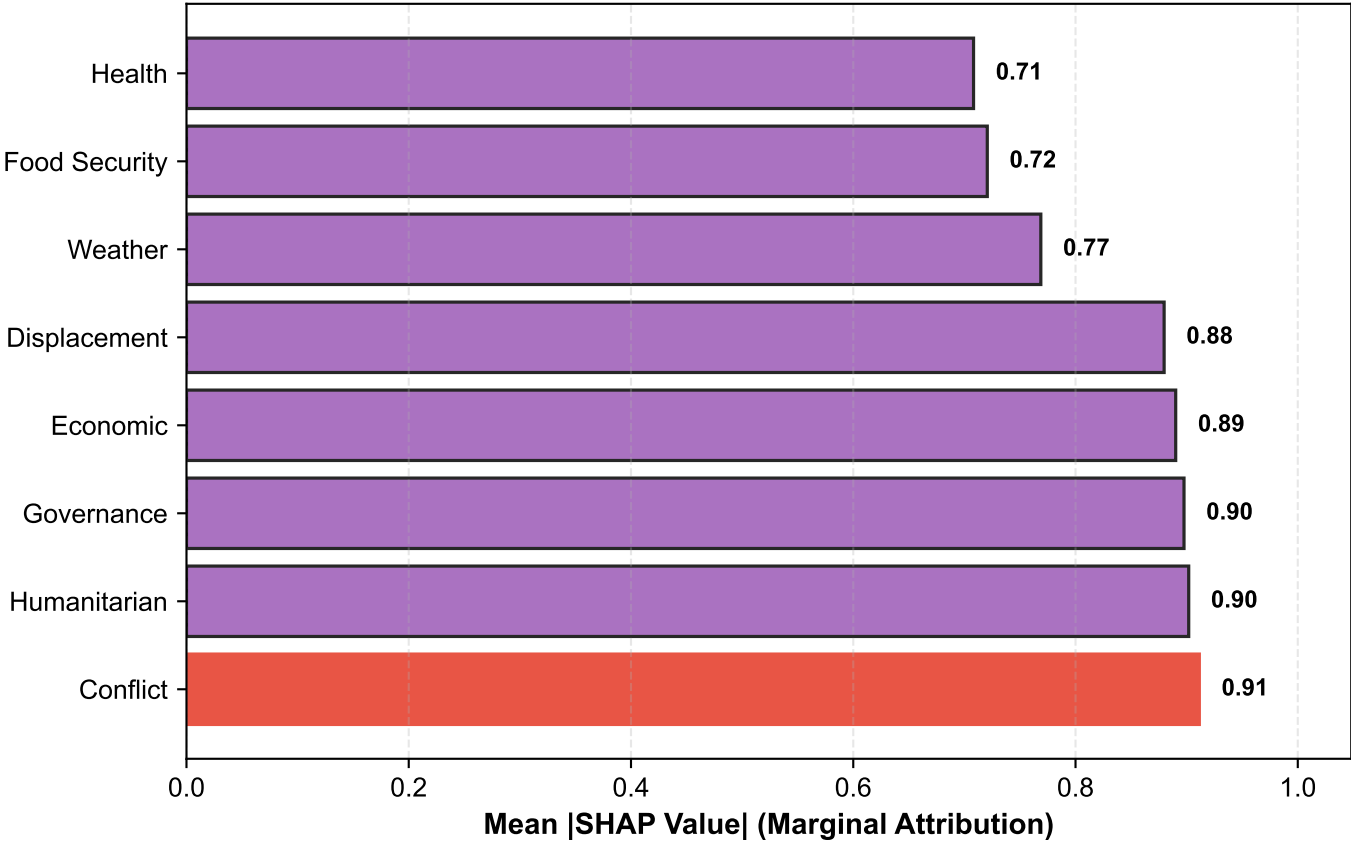


PARADOX REVEALED:
Tree-based: Ratios split nodes (stratification utility)
SHAP: Z-scores drive predictions (74.7% marginal attribution)
Split frequency ≠ Predictive power

B. Mixed Effects: Weather Ranks #1



C. SHAP Rankings: Z-Scores Drive Predictions



THE SHAP PARADOX EXPLAINED: Panel A reveals why different methods produce contradictory rankings—tree-based importance (split frequency) measures stratification utility (how often features create decision nodes), while SHAP (game-theoretic attribution) measures marginal predictive contribution (impact on individual predictions). Tree-based XGBoost: Location features dominate (29.3%), followed by ratio features (19.6%) and zscore features (18.5%). SHAP: Z-score features drive 74.7% of marginal predictions, demonstrating split frequency ≠ predictive power. Panel B (Mixed Effects): Weather ranks #1 (+26.4) - direct causal pathway (climate→agriculture→food), Conflict ranks #4 (+18.7) - redundancy with baseline risk (country_baseline_conflict 9.3%). Panel C (SHAP z-scores): Conflict #1 (0.911) for anomaly detection, Weather #6 (0.769) for sustained shifts. **RESOLUTION:** Measurement method determines ranking—use ratios for compositional shifts, z-scores for transient shocks.