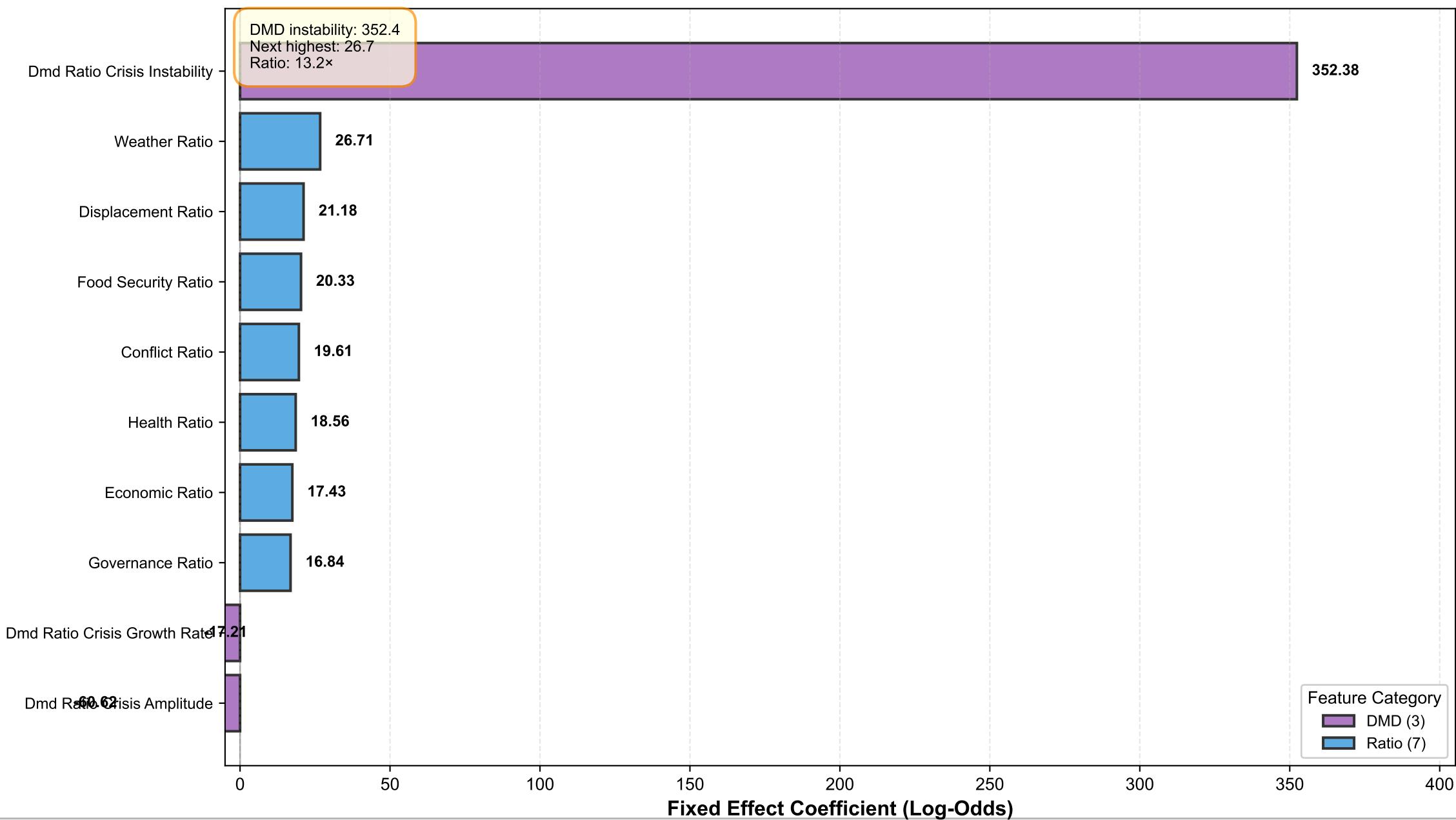


Mixed-Effects Model: Top 10 Fixed Effect Coefficients



Fixed effect coefficients from mixed-effects logistic regression (Ratio + HMM + DMD model, 23 features) trained on WITH_AR_FILTER subset (6,553 observations, 534 districts where AR baseline got it wrong). Coefficients represent log-odds contribution of each feature to crisis probability, averaged across all countries. DMD ratio crisis instability achieves largest coefficient (+352.4, 13.2× larger than next highest), demonstrating spectral decomposition identifies extreme leverage events: synchronized multicategory exponential growth (conflict + displacement + food security) signals complex emergencies. However, this feature triggers rarely (mean 0.002, 98th percentile 0.014), creating discrimination-interpretation paradox: DMD lacks statistical power for aggregate AUC improvement yet enables identification of rare catastrophic crises. Weather ratio (+26.7), displacement ratio (+21.18), and food security ratio (+20.33) emerge as strongest practical predictors: moderate coefficients combined with reasonable prevalence. Random intercepts by country (not shown) quantify geographic heterogeneity (Somalia +3.70 to Madagascar -4.56, 8.26 log-odds span). 5-fold stratified spatial cross-validation, $h=8$ months.