

**Abstract:** We begin by introducing large panel data models with interactive fixed effects. Then, we propose an efficient iterative principal components (IPC) estimator for large linear panel data models incorporating common factor-type interactive fixed effects. It is recognized that the original IPC estimator is biased due to the presence of correlated and heteroskedastic idiosyncratic errors across both the cross-sectional and temporal dimensions. To address this issue, the proposed estimator applies a residual sparse regression to simultaneously correct for correlations in both dimensions, complemented by a conventional bias correction to account for heteroskedasticity. The asymptotic properties of the proposed estimator are rigorously derived. Numerical studies demonstrate its robust performance in finite samples, both in estimation and inference.