

Abstract: this paper, we propose a robust approach against heteroskedasticity, error serial correlation and slope heterogeneity for large linear panel data models. First, we establish the asymptotic validity of the Wald test based on the widely used panel heteroskedasticity and autocorrelation consistent (HAC) variance estimator of the pooled estimator under random coefficient models. Then, we show that a similar result holds with the proposed bias-corrected Bai's (2009) estimator for models with unobserved interactive effects. Our new theoretical result justifies the use of the same slope estimator and the variance estimator, both for slope homogeneous and heterogeneous models. This robust approach can significantly reduce the model selection uncertainty for applied researchers. In addition, we propose a novel test for the correlation and dependence of the random coefficient with covariates. The test is of great importance, since the widely used estimators and/or its variance estimators can become inconsistent when the variation of coefficients depends on covariates, in general. The finite sample evidence supports the usefulness and reliability of our approach.