Could the panel regression be used to examine the relationship between $I(0)$ and $I(1)$ series? [*]

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Abstract:

We have read many papers in the literature and found that some papers report results of regressing a stationary time series on a non-stationary time series (we call it the IOI1 model). Wong, Pham, and Yue (2024) have examined

whether regressing a stationary time series, Y_t, on a non-stationary time series, X_t (that is, $Y_t = \alpha + \beta X_t + u_t$) could get any meaningful result. To do so, they first conduct a simulation and find that regressing a stationary time series on a non-stationary time series could be spurious. Thereafter, they have developed the estimation and testing theory for the $I0I1$ model and find that the statistics T_N^β for testing $H_0^\beta : \beta = \beta_0$ versus $H_1^\beta : \beta \neq \beta_0$ from the traditional regression model (we call it IOI0 model) does not have any asymptote distribution with $E(T_N^\beta) \to \infty$ and $Var(T_N^\beta) \to \infty$ as $N \to \infty$, and thus, it cannot be used for the $I0I1$ model. Nevertheless, as far as we know, no study in the literature has investigated whether we could use the panel regression to examine the relationship between a stationary series and a non-stationary series. This paper investigates the issue.

Keywords: Cointegration; stationarity; non-stationarity, panel regression

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