

Stochastic Cointegration I: Estimation and Inference

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A new model of non-stationary time series is proposed that replaces and generalises the standard integrated processes of the Engle-Granger cointegration framework. The generalisation is the inclusion of random coefficients in a stochastic trends representation that gives rise to a new class of non-stationary time series, called stochastically integrated, that may exhibit increased short term heteroscedasticity relative to standard integrated time series. The definition of the relevant concept of a long run equilibrium relationship between stochastically integrated time series is given, and is referred to as stochastic cointegration. We develop a theory of consistent estimation for stochastic cointegrating regressions based on a new class of instrumental variables estimators, and make use of heteroscedasticity and autocorrelation consistent variance estimators to construct asymptotically standard normally distributed t statistics. The finite sample properties of these statistics are considered in a Monte Carlo experiment, and an illustrative application to the term structure of interest rates is provided.

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