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Threshold non-linear dynamics between Hang Seng stock index and futures returns

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Abstract

We test the joint dynamics between the Hong Kong Hang Seng Index futures and the underlying cash index using a Bivariate Threshold AutoRegressive model, which is better able to capture the complex return dynamics evident in financial time series. The results are consistent with a three-regime version of the model, where the lead-lag relation between the index and futures returns is a non-linear threshold-type and the regime switching process depends on the state of the threshold variable. This interaction is symmetric rather than unidirectional, with the strength of the interaction dependent on the regime. These three regimes are also characterised by significant variation in volume, which is consistent with liquidity-induced arbitrage trading.

Keywords:

lead-lag relationship | threshold autoregression | non-linearity test | futures markets | Hang Seng index

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Notes

Market capitalisation of the Hong Kong Exchange was US$1238 billion in January 2009, compared with Tokyo (US$2922 billion) and the New York Stock Exchange (US$9363 billion) World Federation of Exchanges (2009).

In fact, the improvement in correlation is consistent with a growth rate model of the form y=ax/(b+x), where a=0.9976818 and b=0.287548. The standard error of this model is 0.0008218 and the correlation is almost 1 (0.999205).

ADF statistics for () are, respectively (−29.76, −31.19, and −13.31, with the 1% critical).