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Integer-valued moving average modelling of the number of transactions in stocks

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Abstract

The Integer-valued Moving Average Model (INMA) is advanced to model the number of transactions in intra-day data of stocks. The conditional mean and variance properties are discussed and model extensions to include explanatory variables are offered. Least squares and generalized method of moment estimators are presented. In a small Monte Carlo study a feasible least squares estimator comes out as the best choice. Empirically we find support for the use of long-lag moving average models in a Swedish stock series. T... number of transact...

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Notes

[1] The INMA(∞) can also be obtained from the INAR(1), i.e. $y_t = \alpha \circ y_{t-1} + \varepsilon_t$ and $y_t = \alpha^t \circ y_0 + \sum_{i=1}^{t} \alpha^{t-i} \circ \varepsilon_i$ are equal in distribution. As $\alpha \in [0, 1)$ a large t gives that $\alpha^t \approx 0$ and $\beta_i = \alpha^i$.

[2] Pairs of thinning operations of the type and , for , are independent (McKenzie, 1988). Assumptions of this type can be relaxed (cf. Brännäs and Hall, 2001).

[3] The experiments are performed using Fortran codes. Poisson random deviates are generated by the POIDEV function (Press et al., 1992), while the binomial thinning is performed by the BNLDEV function.

[4] and $\beta_k < 0.01$ for $k \geq 32$ for $\gamma_1 = -0.1$, the sum is 1.87 for $k \geq 16$ and $\gamma_1 = -0.2$, 1.61 for $k \geq 11$ and $\gamma_1 = -0.3$, and 1.45 for $k \geq 8$ and $\gamma_1 = -0.4$.

[5] Note that for a count data INAR(1) model with a unit root the observed sequence of observations can not decline. Adding a MA part to the INAR(1) does not alter this feature. As is obvious from Fig. 3 there are ups and downs in the present time series, so that a unit root can not logically be supported by the data.

[6] In some experimentation with an AstraZeneca series lower order model representations (q = 18 and 30) are found.

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