

ABSTRACTMODELBUILDING AND FORECASTING WITH UNIVARIATEARIMA PROCESSES IN SHORT DATA SETS:A MONTE CARLO STUDY

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Box and Jenkins have suggested that it may be inadvisable to build ARMA(p,q) models with data sets of under fifty (50) observations. Implicit in their suggestion is the resulting notion that modelbuilding and forecasting in the Caribbean using ARMA(p,q) processes may be a futile undertaking since the size of the observation sets usually encountered in practical modelbuilding work in the Caribbean, often falls well short of the Box-Jenkins limit.

The thesis, in light of the above, seeks to examine whether good ARMA(p,q) models can be constructed from short data sets of the sizes that are commonly encountered in practical modelbuilding work in the Caribbean (i.e. data sets with a maximum of 30 observations).

Central to the objective of the thesis is the contention that the size of the data set need not necessarily restrict the ability to construct useful ARMA(p,q) models. Instead the more important issue should be the information content of the data set.

Long data sets swamped by white noise innovations may yield far less useful ARMA(p,q) models than shorter data sets with relatively smaller white noise elements.

The method of experimentation adopted is based on Monte Carlo simulation. Realization sets of varying lengths (both long and short) are generated from specific ARMA(p,q) processes i.e. processes which border on white noise or "no-information" processes as well as processes with strong information contents (strong coefficient signals). The realization sets are then subjected to the Box-Jenkins three-stage iterative cycle to examine how effectively the short realization sets, as opposed to the long ones, reproduce the features and characteristics of the specific ARMA(p,q) processes from which they emanated originally.

The thesis concludes that there may be little difficulty in building useful and adequate ARMA models from short data sets which emanate from ARMA processes with strong information (coefficient) signals. However in processes which border on white noise innovations, there may be great difficulty in constructing good ARMA models, and especially so, when the realization sets are very short.

Finally the dissertation underscores the need for developing parsimonious models especially in the context of short data sets.