

## Performance of Autoregressive Order Selection Criteria: A Simulation Study

Venus Khim-Sen Liew<sup>1</sup>, Mahendran Shitan<sup>2\*</sup>, Choong Chee Keong<sup>3</sup>  
and Hooy Chee Wooi<sup>3</sup>

<sup>1</sup>*Labuan School of International Business and Finance, Universiti Malaysia Sabah,  
Jalan Sungai Pagar, 87000 Labuan, Malaysia*

<sup>2</sup>*Department of Mathematics/ Mathematics Research Institute, Universiti Putra Malaysia,  
43400 UPM, Serdang, Selangor, Malaysia*

<sup>3</sup>*Faculty of Accountancy and Management, Universiti Tunku Abdul Rahman,  
Jalan Genting Kelang, 53000 Kuala Lumpur, Malaysia*

### ABSTRACT

Proper selection of autoregressive order plays a crucial role in econometrics modeling cycles and testing procedures. This paper compares the performance of various autoregressive order selection criteria in selecting the true order. This simulation study shows that Schwarz information criterion (SIC), final prediction error (FPE), Hannan-Qiunn criterion (HQC) and Bayesian information criterion (BIC) have considerable high performance in selecting the true autoregressive order, even if the sample size is small, whereas Akaike's information criterion (AIC) over-estimated the true order with a probability of more than two-thirds. Further, this simulation study also shows that the probability of these criteria (except AIC) in correctly estimating the true order approaches one as sample size grows. Generally, these findings show that the most commonly used AIC might yield misleading policy conclusions due to its unsatisfactory performance. We note here that out of a class of commonly used criteria, BIC performs the best for a small sample size of 25 observations.

**Keywords:** Autoregressive, order selection criteria, simulation

### INTRODUCTION

Most econometric models are formulated based on the Autoregressive (AR) process. In particular, AR process forms the main building block of the celebrated Integrated Autoregressive Moving Average (ARIMA) model, Vector Autoregressive (VAR) model, Vector Error Correction (VEC) model, Autoregressive Distributive Lag (ARDL) model, Generalized Autoregressive Conditional Heteroscedasticity (GARCH) models, Threshold Autoregressive (TAR) model and the Smooth Transition Autoregressive (STAR) model, to name a few. A major problem with these econometric models is that the true order ( $p$ ) of the AR ( $p$ ) process is always unknown and the optimal order has to be determined by certain order selection criteria. Moreover, several econometric test procedures in empirical research such as the unit root tests, causality tests and cointegration tests are sensitive to the choice of autoregressive order. Thus, proper selection of autoregressive order is an important task in econometric modeling cycles and testing procedures.

The final prediction error (FPE) criterion, Schwarz information criterion (SIC), Hannan-Qiunn criterion (HQC) and Akaike's information criterion (AIC), among

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\* Corresponding Author