

MASTER'S THESIS

New econometrics models with applications

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Date of Award:
2010

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New Econometrics Models with Applications

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A thesis submitted in partial fulfillment of the requirements

for the degree of

Master of Philosophy

Principal Supervisor: Prof. Michael K. Ng

Hong Kong Baptist University

September 2010

ABSTRACT

Granger causality test is used to detect whether one time series is helpful in the forecasting of another time series. Vector autoregressive regression model (VAR) has been widely used to examine linear Granger causality relations among time series in bivariate settings as well as multivariate settings. Hiemstra and Jones (1994) develop a nonlinear Granger causality test in a bivariate setting to investigate the nonlinear causality between stock prices and trading volume. In this thesis, we expand the bivariate nonlinear causality test to multivariate settings which can be used to detect causality relations between two vectors of time series. Monte Carlo simulation shows the superiority of our proposed multivariate test over its bivariate counterpart under a data generating process which possesses multivariate causality nature. We illustrate the applicability of our proposed test to analyze the relationships among different Chinese stock market indices.

Stochastic dominance (SD) analysis provides an utility-based framework for evaluating investment prospects under uncertainty. Davidson and Duclos (DD, 2000) develop a test statistic, $T^j(x)$ ($j = 1, 2, 3$), to test SD relations between assets at a finite number of grid points $\{x_k\}$. The Studentized Maximum Modulus (SMM) distribution is used for multiple comparison. However, the independence of $T^j(x_k)$ at different grid points required by SMM distribution is violated even for two points of partition. To solve this problem, Bai *et al.* (2009) modify the test statistic and decision rules, and propose a bootstrap method to determine the critical point of the new test (named as bootstrapped DD test). We conduct simulations to show that the bootstrapped DD test achieves better size and power performance, and its perfor-

mance is robust to the choice of number of grid points. For illustration purpose, we study the preference of risk averters for stock market and stock index futures market in Taiwan through bootstrapped DD test.

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