Chapter 19
Multi-Process Analysis and Portfolio Optimization Based on Quantum Mechanics (QM) Under Risk Management in ASEAN Exchanges:
A Case Study of Answering to the E-Commerce and E-Business Direction

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ABSTRACT

This research attempts to classify, predict, and manage the financial time-series trends of the large stock prices of significant companies in the development of e-commerce and e-business in the ASEAN countries. Moreover, the Markowitz portfolio optimization analysis based on quantum mechanics was utilized to find out the direction of e-commerce and e-business in the future. Data collection for this study consists of Maybank, PPB Group Berhad, Golden Agri-Resource, SingTel, and Global Logistic Properties. And the stock prices of those companies were carried out to this study from 2004 to 2018 by daily data. Interestingly, the empirical results would provide a possible solution and efficiently suggest a beneficial for the development of both e-commerce and e-business in the ASEAN countries. The commerce and business based on electronics in ASEAN, especially agribusiness, energy business, and telecommunication business, still play a major important role in the economy of ASEAN countries.

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INTRODUCTION

Financial time series can continuously have attentions from economists and statistical researchers. Obviously, this type of data is extremely difficult to precisely predict since its frequently daily updates and velocities of data fluctuations. Additionally, financial forecasting will become more complex and elusive when they have been trying to solve the estimated answer by initially assuming the normal distribution is fitted for this calculation. Results will be suspicious when only single method is employed to do econometrical predictions. Consequently, multi-analytic estimations are definitely suitable for financial issues, which are dynamically depended on time variations.

Generally, some interesting points that should be considerably focused are data classifications, data estimations, and data managements. Since it is inevitable that information is uncertainty, meaning there are error terms inside every time-series trends, this is why the classification process should be helpfully employed. For example, unit-root testing, regimes switching, and entropy analyses. For econometric forecasting, it is undeniable that linear calculations cannot be appropriated for financial data. This is the reason why data estimations such as non-linear simulations and structural analyses should be applied. For the section of data managements, this process is the tool that usefully explains the econometrical results to be more substantial for policy implementations. Hence, it is practical that multi-analytic processes are recently becoming crucial for financial econometric researches.

This research is to brightly clarify the mixed up tool regarding mathematics, statistics, and modern physics (Quantum mechanics). These are adopted to analyze data in capital markets or stock exchange markets which are the crucial part of economic systems. Deeply considering into the systems, business and economics, it is very well-known that E-commercial activities for online businesses are becoming a very important market and they are rapidly grown as numerical details in ASEAN economic development countries. Moreover, ASEAN continent is an emerging internet market in the world by increasing new users approximately 125,000 amateur and skilled users per day every day. Consequently, the digital economy of ASEAN shall be more significant to develop the ASEAN economy by predicting approximately $1 trillion contributions to GDP in ASEAN member countries. This vast expansion shall be the possible financial catastrophe, if estimated predictive results suggest wrong scenarios.

The purpose of this research is to econometrically compute the multi-analytic methods to fulfill the research question that who is the player of E-commerce and E-business in ASEAN countries by observing from the log return of those stock prices. The daily stock prices of the five predominant companies were collected from ASEAN stock exchanges during 23rd April 2014 to 22nd May 2018 (994 daily samples). These significant companies are MayBank, referring to Indonesian financial index which are representative the substantial company in the financial field. The PPB GROUP BERHAD is presented as the company covering energy and agribusiness sectors in Malaysia. Golden Agri-Resource is the index representing the company producing food, beverage and agribusiness in Singapore. SingTel is the substantial company playing the role of the telecommunication sector in Singapore. Global Logistic Properties stands for the business builder in the logistics sector and real estate sector. Headquarter is located in Singapore. All selected companies are major to develop E-Commerce and E-Business in ASEAN countries.