INTRADAY ANALYSIS OF THE MALAYSIAN STOCK INDEX FUTURES MARKET

By

LIM CHEE SEONG

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirement for the Degree of Doctor of Philosophy

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Specially dedicated to,

My beloved parents, wife, son, brother and sisters,

for their invaluable love, support and sacrifices.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy

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Chairman: **Associate Professor Tan Hui Boon, Ph.D.**

Faculty: **Economics and Management**

The use of any aggregate financial data to examine the relationship between information and prices using daily, weekly and monthly data leads to loss of information. The problem with such studies that employ time aggregated data is that it ignores the real time price dynamics and intraday interaction of the markets. Generally, most Malaysian financial economists have employed such inadequate methods. Specifically, for the Malaysian futures market, the intraday properties of the Kuala Lumpur Stock Exchange Composite Index (KLCI) futures contracts (FKLI) have not thoroughly examined, and hence, not well understood.

Intraday analyses are crucial for investors and policy makers since many of the price adjustments could have taken place during the trading hours. Such real time adjustments can only be captured effectively by the intraday price analysis. In this study, the intraday data of 5-minute and 15-minute intervals of KLCI and FKLI is used to investigate the intraday price discovery mechanism, trading activity, volatility

characteristics and spillover effects which has not been examined before by proir studies. The causal effect of both markets is measured by the computation of the bivariate Granger causality. The intraday lead and lag relationships between the KLCI and FKLI were examined under the orientation of multiple regression analysis. The short run dynamics of the volatility movement of the two markets is studied by the impulse response functions. In addition, in order to study the intraday volatility spillover between the cash and futures markets, the Bivariate Error Correction-Exponential Generalised Autoregressive Conditional Heteroscedasticity (ECM-EGARCH) model is employed to capture the long-run equilibrium relationship, short-run causality effect and the nature of the time varying variance in the series. Besides, this model is also used to investigate the asymmetric impact of shocks on stock and futures markets volatility, known as the leverage effect.

The empirical evidence obtained from this study indicates that the intraday price volatility of FKLI does not exhibit a convex U-shaped pattern but instead a 'reverse J-shaped' pattern. However, the conventional U-shaped curve exists in the tick volume analyses. The results from the bivariate cointegration analysis are in line with those found in the developed markets. The futures prices appear to react more rapidly to new information as compared to the cash prices. The study of lead and lag relationships between the futures and cash markets revealed a bi-directional relationship. The futures returns tends to lead strongly the cash returns, in the time period up to 20 minutes; while the cash returns leads weakly the futures returns, in the time period between 5 to 10 minutes. Generally, the futures index consistently indicates a stronger degree of price discovery and price leadership over the cash index.

The bivariate EGARCH analysis of volatility spillover found that there is a persistent bi-directional information flow between the futures and cash markets. It implies that innovations in the futures market could predict the future volatility of the cash market, or vice versa. However, the futures index has a higher degree of volatility spillover as compared with the cash index. Thus, it can be used by market participants to anticipate the future performance of the cash index. Finally, both markets exhibit the asymmetric volatility effects as predicted. In other words, any bad news tends to create greater impact on volatility, than the good news, for both markets.

In conclusion, the interesting microstructure discoveries with a reverse J-shape for volatility and a U-shape for tick volume is definitely important for all market participants. As a result, investors with different risk appetite should be able to time their trades in accordance with the volatility and trading activity patterns of FKLI revealed in this study. In terms of price leadership and price discovery, the futures index seems to play a more dominant role in the information transmission mechanism of the two markets, as it possesses a stronger degree of price leadership over the cash index. Hence, the futures index can be perceived as a vehicle for price discovery and the performance of the intraday futures prices can be used by traders to predict the future movements of the cash prices. Finally, emphasizing that volatility is a proxy for information flow, the bivariate ECM-EGARCH analysis indicates that a bi-directional volatility spillover exits between the KLCI and the FKLI markets. However, the spillovers from the futures market to the cash market are more significant and prominent than the reverse. These results are consistent with the evidence supporting the dominant role of FKLI in price discovery. Therefore, it is proven that the futures market is more informationally efficient than the cash market.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

ANALISIS INTRA-HARI UNTUK PASARAN NIAGA HADAPAN STOK INDEK DI MALAYSIA

Oleh

LIM CHEE SEONG

Mei 2004

Pengerusi: **Profesor Madya Tan Hui Boon, Ph.D.**

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Penggunaan data kewangan agregat bagi mengkaji hubungan informasi dan harga dengan menggunakan data harian, mingguan dan bulanan menyebabkan kehilangan maklumat yang penting. Masalah untuk kajian-kajian yang menggunakan data agregat ialah pengabaian interaksi dan dinamik harga masa benar intra-hari pasaran. Umumnya, kebanyakan ahli-ahli ekonomi kewangan Malaysia telah menggunakan pendekatan yang tidak lengkap ini. Secara khususnya, untuk pasaran niaga hadapan di Malaysia, sifat intra-hari bagi kontrak-kontrak niaga hadapan Indek Komposit (KLCI) Bursa Saham Kuala Lumpur (FKLI) masih tidak diselidiki dengan mendalam maka, pemahaman mengenainya adalah amat kurang.

Kajian-kajian intra-hari adalah mustahak untuk para pelabur dan penggubal polisi kerana kebanyakan pengubahsuaian harga berlaku pada waktu dagangan. Pengubahsuaian harga sedemikian hanya dapat diteliti secara efektif dengan analisis harga intra-hari. Dalam kajian ini, data intra-hari yang terdiri daripada 5 minit and 15 minit bagi KLCI dan FKLI telah digunakan untuk menyelidik mekanisme penemuan

harga, aktiviti dagangan, ciri-ciri kemudahubahan dan kesan pelimpahan yang tidak pernah diteliti oleh mana-mana kajian sebelum ini. Kesan sebab-menyebab antara kedua-dua pasaran telah diukur dengan pengiraan bivariate 'Granger causality'. Hubungan 'memimpin dan dipimpin' antara KLCI dan FKLI telah dikaji di bawah orentasi analisis regresi berbilang. Dinamik jangka pendek untuk pergerakan kelincahan antara kedua-dua pasaran telah dikaji dengan menggunakan fungsi impuls respon. Tambahan lagi, demi meneliti pelimpahan kelincahan antara pasaran tunai dan pasaran niaga hadapan, model Bivariat Pembetulan Ralat Eksponensial Teritlak Autoregresi dan Heteroskedastisiti Bersyarat (ECM-EGARCH) telah digunakan untuk merangkumi hubungan jangka panjang, kesan jangka pendek sebab-menyebab dan sifat semulajadi varian berbeza mengikut masa dalam siri. Selain itu, model ini juga digunakan untuk menyelidik kesan asimetrik untuk kejutan pada kelincahan pasaran stok dan pasaran niaga hadapan, yang juga dikenali sebagai kesan pengumpilan.

Bukti-bukti empirikal yang diperolehi dari kajian ini menunjukkan bahawa kemudahubahan harga intra-hari untuk FKLI tidak memaparkan satu corak berbentuk U tetapi satu bentuk 'J terbalik'. Akan tetapi, keluk yang berbentuk U wujub dalam analisis volum detikan. Keputusan yang diperoleh dari analisis cointegrasi bivariat adalah sejajar dengan keputusan yang didapati di kebanyakan pasaran maju. Harga-harga niaga hadapan kelihatan bertindak lebih cepat terhadap informasi baru berbanding dengan harga tunai. Dalam kajian hubungan 'memimpin dan dipimpin' antara pasaran niaga hadapan dan pasaran tunai, didapati wujudnya satu hubungan dua hala, di mana pulangan niaga hadapan cenderung memimpin pulangan tunai dengan kuat, sehingga tempoh masa 20 minit lamanya, manakala pulangan tunai hanya mendahului pulangan niaga hadapan secara lemah untuk tempoh masa 5 hingga

10 minit. Secara umumnya, indek niaga hadapan secara konsistennya menunjukkan darjah penemuan harga dan kepimpinan harga yang lebih kuat terhadap indek tunai.

Analisis bivariat EGARCH dalam pelimpahan kemudahubahan mendapati wujudnya satu aliran informasi dua hala yang berterusan antara pasaran niaga hadapan dan pasaran tunai. Ini menunjukkan bahawa inovasi dalam pasaran niaga hadapan boleh meramal kelincahan masa hadapan pasaran tunai dan sebaliknya. Akan tetapi, indek niaga hadapan mempunyai darjah pelimpahan kelincahan yang lebih tinggi berbanding indek tunai. Justerus itu, indek niaga hadapan boleh digunakan oleh peserta-peserta pasaran untuk menjangka harga masa hadapan indek tunai. Akhirnya, kedua-dua pasaran memaparkan kesan kelincahan yang asimetri seperti yang dijangkakan. Dalam erti kata yang lain, untuk kedua-dua pasaran, sebarang berita buruk berkecenderungan menghasilkan impak yang lebih mendalam terhadap kelincahan berbanding dengan berita baik.

Kesimpulannya, penemuan mikrostruktur yang menarik dengan suatu bentuk 'J-terbalik' untuk kelincahan dan bentuk U untuk volum detikan sememangnya penting untuk semua peserta pasaran. Maka, para pelabur yang mempunyai citarasa risiko yang berbeda dapat mengatur waktu urusniaga mereka berdasarkan corak kelincahan dan aktiviti dagangan yang didedah dalam kajian ini. Dalam segi kepimpinan harga dan penemuan harga, indek niaga hadapan memainkan peranan yang lebih dominan dalam mekanisme transmisi informasi untuk kedua-dua pasaran berdasarkan darjah kepimpinan harganya yang lebih tinggi. Oleh yang demikian, indek niaga hadapan boleh dianggap sebagai jentera untuk penemuan harga dan prestasi harga intra-hari niaga hadapan boleh digunakan oleh pedagang-pedagang dalam meramal pergerakan

masa hadapan harga tunai. Akhirnya, melandaskan kelincahan sebagai proksi untuk aliran informasi, analisis bivariat ECM-EGARCH mendapati wujudnya pelimpahan kelincahan secara dua hala antara pasaran KLCI dan FKLI. Namun demikian, pelimpahan kelincahan dari pasaran niaga hadapan ke pasaran tunai adalah lebih signifikan dan prominan daripada arah yang sebaliknya. Keputusan in adalah konsisten dengan bukti-bukti yang menyokong peranan dominan FKLI dalam penemuan harga. Oleh yang demikian, adalah dibuktikan bahawa pasaran niaga hadapan adalah lebih cekap meberi maklumat daripada pasaran tunai.

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I certify that an Examination Committee has met on 26th May 2004 to conduct the final examination of Lim Chee Seong, on his Doctor of Philosophy thesis entitled "Intraday Analysis of the Malaysian Stock Index Futures Market" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulation 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

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LIM CHEE SEONG

Date :

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