UNIVERSITI PUTRA MALAYSIA

THE EFFICIENT MARKET HYPOTHESIS AND THE THINLY TRADED KUALA LUMPUR STOCK EXCHANGE: TESTS WITH APPROPRIATE REFINEMENTS

ANNUAR MD NASSIR

FEP 1991 3

THE EFFICIENT MARKET HYPOTHESIS AND THE THINLY TRADED KUALA LUMPUR STOCK EXCHANGE: TESTS WITH APPROPRIATE REFINEMENTS

ANNUAR MD NASSIR

DOCTOR OF PHILOSOPHY
UNIVERSITI PERTANIAN MALAYSIA

1991

THE EFFICIENT MARKET HYPOTHESIS AND THE THINLY TRADED KUALA LUMPUR STOCK EXCHANGE: TESTS WITH APPROPRIATE REFINEMENTS

by

ANNUAR MD NASSIR

Thesis Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy in the Faculty of Economics and Management, Universiti Pertanian Malaysia.

December 1991

ACNOWLEDGEMENTS

Writing this part of the dissertation signalled an end to a seemingly impossible and elaborate task ... that of completing the Ph.D. programme.

I am very grateful to my Ph.D. committee, consisting of Professor Dr. Mohamed Ismail Ahmad, Dr. Shaari Abdul Hamid (both from Universiti Pertanian Malaysia, UPM) and Dr. Mohamed Ariff of the Department of Finance and Banking, National University of Singapore (NUS). A special thanks to Dr. Mohamed Ariff, for his invaluable guidance, encouragement and constructive criticisms of the various aspects of the work leading to the completion of this dissertation. I have greatly benefited from his valuable help while attached to the Department of Finance and Banking, National University of Singapore, for which I express my sincere thanks to the University authorities, the staff of the Department of Finance and Banking and Associate Professor Dr. Wong Kie Ann, the head of the department.

This research has benefited from the help of numerous people whom I wish to name, Zainal Abidin Kidam and his research assistants, Dr. Zabid Abdul Rashid, Dr. Zainal Abidin Mohamed, Dr. Shamsher Mohamed, and Salleh Yahya, all from UPM, and to all those who have contributed in anyway towards the completion of this dissertation.

A special appreciation goes to Professor Dr. Mohd Ariff Hussein, Dean, Faculty of Economics and Management, UPM, who provided constant encouragement throughout the period of study. A special thanks to the staff of the research department, of the Kuala Lumpur Stock Exchange Berhad and staff of the Security Clearing Automated Network Services Sdn. Bhd. for providing the basic data.

Last, but not least, a special dedication to my wife, Hafizah Ismail and my three children, Akid, Afiq and Afham for their understanding and continuous encouragement throughout the long and lonely period of study.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abstract of thesis submitted to the Senate of Universiti Pertanian Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy.

THE EFFICIENT MARKET HYPOTHESIS AND THE THINLY TRADED KUALA LUMPUR STOCK EXCHANGE: TESTS WITH APPROPRIATE REFINEMENTS

By

ANNUAR BIN MD NASSIR

December 1991

Supervisor: Mohamad Ariff, Ph.D.

Faculty: Economics and Management

Studies on the Efficient Market Hypothesis (EMH) in both the developed and developing capital markets have revealed mixed evidence. EMH presupposes an ability to detect incorrectly priced securities and profitable arbitraging opportunities which move the market towards efficiency. The early empirical work on developed securities markets purported to provide evidence that securities market prices are unbiased in their reaction to relevant information. This means that investors cannot consistently profit from any delays in price adjustment reflecting new information.

However, evidence from subsequent studies, in the early 1980s, have not reached such consistent conclusion. These studies show anomalous price behaviour in securities markets: among others, size effects, turn of the year effects, week-end effects, etc., which are argued by some as evidence of market inefficiencies.

The Kuala Lumpur Stock Exchange (KLSE) being small and illiquid provides a suitable setting to evaluate the EMH in a thinly traded scenario. In prior studies on market efficiency of the KLSE, no attempt was made to control for market thinness. In order to control for market thinness, ten portfolio deciles of KLSE listed stocks which differ in the degree of market thinness were created. The standardised volume of trading was proxied as a suitable indicator for measuring market thinness.

Three tests were performed to evaluate the weak-form efficiency of the KLSE: (i) Q-statistic which measures the average serial correlations, (ii) individual serial correlations analysis (for 12 lags) and (iii) unit roots analysis.

Test results on six equally-weighted dividend-distributed industry sector portfolios, two existing indices (namely the KLSE Composite Index and the New Straits Times (NST) Industrial Index) and an equally-weighted market portfolio

(R_{mt}) indicate that the KLSE Composite, the NST Industrial and the two industry sectors (hotel and tin sectors) exhibit average serial correlations consistent with weak-form efficiency. Results on the ten portfolios which differ on the degree of market thinness showed that all except three exhibit average serial correlations consistent with weak-form efficiency. For individual serial correlation results, 90 percent of the 30 component stocks of the NST Industrial Index showed price behaviour consistent with random walk or weak-form efficiency.

A unit root test was applied using a sample of stocks from each of the ten portfolio deciles. The Dickey-Fuller test of significance suggested that current prices are the best estimates of future prices. An average of 87 percent of the current price behaviour is explained by the immediate price lag variable.

To evaluate the semi-strong form efficiency, an infrequently traded sample (Sample One) and a frequently traded sample (Sample Two) of annual earnings and dividend changes were used to study price reactions to information arrival. Three methods were used to estimate the residual returns: the market adjusted returns, the risk-adjusted returns and the risk-adjusted returns incorporating the Dimson, Fowler and Rorke (DFR) corrections for thin trading bias.

The findings suggests that (i) earnings and dividend announcements contain information relevant for security pricing and (ii) the market anticipates the information contained in these announcements three to four months before the actual announcement. There were, occasionally, significant post-announcement residuals which may be interpreted as pockets of market inefficiencies: this is generally true for the infrequently traded sample (Sample One).

To complete the previous investigation, an attempt was made to evaluate the strong-form efficiency of the KLSE using sample of "stock of the month" recommendations. The results appear to support the notion that the market is strong-form inefficient.

The overall findings of this study are not inconsistent with the weak-form and semi-strong form EMH especially for actively traded portfolios (stocks). There is evidence of inefficiencies in the thinly traded portfolios (stocks) at the margin. Further work is needed to disentangle the reward for delayed immediacy in the pricing of thinly traded stocks. However, the evidence of strong-form inefficiency is pronounced.

Abstrak tesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi syarat untuk Ijazah Doktor Falsafah.

HIPOTESIS PASARAN CEKAP DAN BURSA SAHAM KUALA LUMPUR YANG BERDAGANGAN RENDAH: PELBAGAI UJIAN DENGAN KEHALUSAN YANG SESUAI

Oleh

ANNUAR BIN MD NASSIR

December 1991

Penyelia: Mohamad Ariff, Ph.D.

Fakulti: Ekonomi dan Pengurusan

Kajian terhadap Hipotesis Pasaran Cekap (HPC) di negara maju dan negara sedang membangun menunjukkan bukti yang bercampur-campur. HPC mengandaikan kebolehan mengenalpasti harga sekuriti yang tidak menggambarkan nilai sebenar dan peluang-peluang memperolehi keuntungan melalui arbitraj yang mana menggerakkan pasaran menjadi cekap. Kajian-kajian awal di pasaran saham negara-negara membangun mengukuhkan pandangan bahawa harga pasaran sekuriti bergerak tanpa bias mengikut kesesuaian maklumat. Ini bermakna para pelabur tidak berpeluang mengaut keuntungan secara tekal dari kelambatan tindakbalas harga sekuriti terhadap maklumat semasa.

Walau bagaimanapun, kajian-kajian berikutnya, terutama di awal 1980an, mendapati bukti-bukti sebaliknya. Kajian-kajian

ini menunjukkan gelagat "anomali" dalam pasaran sekuriti seperti kesan saiz, kesan hujung tahun, kesan mingguan dan sebagainya, yang telah dimajukan oleh setengah penyelidik sebagai bukti bahawa pasaran adalah tidak cekap.

Pasaran Saham Kuala Lumpur yang bersaiz kecil dan mempunyai tahap kecairan yang rendah, mewujudkan ruang yang sesuai untuk menguji HPC dalam suasana dagangan yang tipis. Dalam kajian-kajian lepas mengenai kecekapan pasaran Pasaran Saham Kuala Lumpur, metodologi untuk mengawal ketipisan pasaran tidak diambilkira. Untuk mengawal masalah ketipisan pasaran ini, sepuluh decile portfolio yang mempunyai darjah ketipisan pasaran yang berbeza telah dibentuk. Jumlah saham yang didagangkan menjadi proksi ketipisan dagangan.

Tiga ujian telah dijalankan untuk menguji hipotesis pasaran cekap dalam bentuk lemah: (i) Statistik-Q yang mengukur purata korelasi, (ii) korelasi individu (12 lags), dan (iii) analisis "unit root". Keputusan ujian terhadap enam portfolio sektoran, dua indeks pasaran (Indeks Composite KLSE dan Indeks Perusahaan New Strait Times, NST) dan satu portfolio pasaran (R_{mt}) menunjukkan Indeks Composite KLSE, Indeks Perusahaan NST dan dua portfolio sektoran (hotel dan tin) mempunyai ciri-ciri purata korelasi bertekalan dengan HPC dalam bentuk lemah. Sementara keputusan ujian sepuluh decile portfolio menunjukkan tujuh decile portfolio mencerminkan ciri-ciri purata korelasi

yang menyokong HPC dalam bentuk lemah. Keputusan korelasi individu 30 saham komponen Indeks Perusahaan NST menunjukkan 90 peratus saham mempunyai gelagat harga bertekalan dengan teori "perjalanan rambang" atau kecekapan pasaran dalam bentuk lemah.

Analisis "unit root" telah dilakukan terhadap sampel saham dari setiap decile portfolio. Ujian keberkesanan Dickey-Fuller menunjukkan bahawa harga semasa adalah anggaran terbaik harga di masa hadapan. Secara puratanya, 87 peratus gelagat harga semasa dihuraikan oleh variabel terdekat lag harga.

Untuk menguji HPC dalam bentuk separuh kuat, dua sampel iaitu sampel perubahan pendapatan dan dividen akhir tahun yang berdagangan lemah (Sampel Satu) dan yang berdagangan cergas (Sampel Dua) telah digunakan untuk mengkaji tindakbalas harga sekuriti terhadap maklumat yang relevan. Tiga kaedah digunakan untuk menganggarkan pulangan residual: pulangan pasaran terlaras, pulangan risiko terlaras dan pulangan risiko terlaras yang mengambilkira pembetulan Dimson, Fowler dan Rorke (DFR) untuk bias dagangan tipis.

Hasil kajian menunjukkan bahawa (i) pengumuman pendapatan dan dividen akhir tahun mengandungi maklumat-maklumat relevan untuk penentuan harga sekuriti, dan (ii) pasaran telah menjangka maklumat-maklumat yang terkandung dalam pengumuman

pendapatan dan dividen tiga atau empat bulan sebelum pengumuman maklumat-maklumat tersebut. Terdapat pulangan residual yang signifikan yang boleh diinterpretasikan sebagai bukti bahawa pasaran adalah tidak cekap: pengamatan ini adalah benar untuk sampel saham yang berdagangan lemah (Sampel Satu).

Satu analisis tambahan telah dibuat untuk menilai HPC dalam bentuk kuat di Pasaran Saham Kuala Lumpur dengan menggunakan "saham bulanan terpilih" sebagai sampel untuk tujuan ini. Keputusan ujian menunjukkan bahawa Pasaran Saham Kuala Lumpur adalah tidak cekap dalam bentuk kuat.

Keputusan menyeluruh kajian ini membuktikan bahawa Pasaran Saham Kuala Lumpur adalah cekap dalam bentuk lemah dan separuh kuat terutamanya untuk portfolio (saham) yang berdagangan cergas. Terdapat juga bukti yang menunjukkan pasaran tidak cekap terutamanya untuk portfolio (saham) yang berdagangan lemah. Kajian lanjut diperlukan untuk memahami kelewatan tindakbalas harga terhadap maklumat dalam penentuan harga saham-saham yang berdagangan lemah. Bukti ketidakcekapan pasaran dalam bentuk kuat adalah kukuh.

CHAPTER I

OBJECTIVES AND BACKGROUND

Research Problem Definition

Two decades have passed since the term "efficient market" was first coined in the financial economics literature. The term efficient market was first used in the context of Efficient Market Hypothesis (EMH) by Fama, Fisher, Jensen and Roll (1969, p. 1), where it was defined as a market that adjusts rapidly to new information. Prior to that Fama (1965) proposed the EMH in some details. The idea of random walk, which preceeded EMH, is attributed to Bachelier (1900).

The idea has stimulated interest and controversy, agreement and, lately, some disagreement among both researchers and practitioners in the field of finance and economics. Over the years, a rich body of literature has grown documenting the general validity of EMH particularly in several developed securities markets of the world. As Fama (1970, p. 416) pointed out:

> *the evidence in support of the efficient market models is extensive, and (somewhat uniquely in economics) contradictory evidence is sparse.*

This study is concerned with examining the efficiency of a developing capital market namely, the Kuala Lumpur Stock

Exchange. It will be fruitful to examine the status of the theory before defining the research objectives.

The early empirical works which provide evidence that securities market prices are unbiased in their reaction to relevant information was seen as the consequence of rational investor behaviour of wealth maximising in competitive markets. In a well-functioning market, the prices of stocks will reflect unbiased predictions based on all relevant and available information. It is generally believed that stock market, being intensely competitive in nature, is efficiently priced both in the weak-form sense and semi-strong sense: Fama, op. cit.

However, findings from subsequent studies have not reached such consistent conclusion, (although at the same time, evidence supporting EMH, is continually documented). For example, evidence of "anomalous" return behaviour is now widespread: size effects, turn of the year effects, low price earning (P/E) ratio effects, Value Line phenomenon, week-end effects, among other voluminous evidence of market idiosyncracies (for an excellent elucidation of stock market seasonalities, see Ariff and Johnson, 1990).

However, Officer (1975, p. 31) and Ball and Brown (1978, p. 1) asserted that the presence of a seasonal behaviour in stock prices is not in itself a sufficient condition for

rejecting the EMH. A more likely explanation is related to the structure of the economy, for example, changing opportunity costs of money through the year: the assumption of constant returns over all time period is not a necessary condition of capital market equilibrium.

Jensen (1978, p. 95), in an introductory comment:

> *I believe there is no other proposition in economics which has more solid empirical evidence supporting it than the EMH. It is evidence which we will not be able to ignore.*

Ball (1989, p. 27) anticipates:

> *I expect many (though certainly not all) of the anomalies ("inefficiencies") to be resolved in favour of efficiency.*

Based upon these commentory and the evidence to-date (to be discussed at a later stage) it is therefore premature to reject EMH based purely on empirical issues raised by the persistent anomalous stock return behaviour documented in the 1980s. Furthermore as Ball (1989) noted the evidence of apparent inefficiency is uncomplicated and readily discernible to investors, implying a relatively disingenuous use of information.

There are various reasons why market efficiency should hold. First, stock markets must rank highly among markets on *a priori* likelihood of being competitive: there are no

serious entry barriers, there are many buyers and sellers, and transaction costs are low and continues to get lower. Second, since tests of efficiency implicitly or explicitly involve test of efficiency as modelled by a particular equilibrium price behaviour, it seems more likely that failure to document efficiency might be prejudiced by failure in asset pricing model itself. As Ball (1978a, p. 111) raised: "The hypothesis is that: (i) the two parameter model when applied to a portfolio of common stocks, misspecified the process generating securities' yields in equilibrium." Strictly speaking, tests of market efficiency are joint tests of the hypothesis and the price-generating model assumed in the tests.

Third, there is a solid body of empirical work documenting the general validity of EMH and qualified interpretation of market "inefficiencies" (in view of the reluctance to totally reject the notion of market efficiency especially among academic researchers and to a lesser extent among practitioners). Fourth, the existence of a powerful and irreversible tendency for market's efficiency to increase over time rather than to diminish that is, markets will learn from experience (see, for example, Dawson, 1984b). Most tests of EMH generally conform to expectations in the developed stock markets, characterised by among others, active trading, large turnover, large number of utility maximising investors, no