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CONTENT

CLICK ON THE TITLE TO LINK TO THE FULL PAPER.

****A=Accouting; B= Information Management, Marketing & Management; C=Economy & Finance; D= FSKM; E=Other Discipline (CITU, APB, LAW)***

8.	B113	Cointegration And Causality Between Overnight Policy Rate And Commercial Bank Rate	1. Abdul Razak Bin Jambari 2. Azizah Binti Daut 3. Noranita Abdamia
9.	C115	Energy Consumption, Gross Domestic Product, Foreign Direct Investment And Co2 Emission In Malaysia	1. Mohd Azim Sardan 2. Azman Ali 3. Tan Yan Ling 4. Abdul Razak Jambari
10.	C118	Systematic Risk Of Malaysian Stock	1. Tay Bee Hoong 2. Tan Yan Ling 3. Nur'asyiqin Ramdhan 4. Zulkifli Mohamed
11.	B119	The Impact Of Semantic Web On Digital Libraries Development	1. Muhammad Asyraf Bin Wahi Anuar 2. Isma Bin Ishak
12.	E120	Penggunaan Kata Kerja Kini (الفِعْل المُضَارِع) Dalam Al-Quran Dari Sudut Masa	Abd Rahman Jamaan
13.	B128	Pusat Sumber Sekolah Sebagai Ejen Kecemerlangan Sijil Pelajaran Malaysia (Spm): Kajian Ke Atas Pelajar Baru Sesi Disember-April 2010, UiTM , Johor	1. Nor Diana Bte Abd. Rahman 2. Nor Ezan Bin Omar 3. Zailani Bin Shafie
14.	E129	Pengurusan Zakat Di IPTA : Pengalaman Dan Cabaran di UiTM	1. Nazrudin Bin Hashim 2. Mohd Zainoddin Bin Mustaffa
15.	E130	Kajian Ke Atas Penggunaan Partikel Mod UiTM al Pelajar Johor Dalam Pembelajaran Bahasa Mandarin	Chong Peng Hwa
16.	B135	A Case Study Of Digi Telecommunications Sdn Bhd Strategic Marketing Analysis	1. Rohanizan Md Lazan 2. Roslina Ali 3. Shaherah Abd Malik 4. Rabiatul Alawiyah Zainal Abidin
17.	B138	Entrepreneurial Strategic Alliances And Partnership Of Marketing And Retailing In Small And Medium Enterprises In Agro Sapling Supply Chain	1. Shaherah Abd. Malik 2. Wan Haslin Aziah 3. Syaidatul Zarina Mat Din 4. Roha Mohamed Noah 5. Norhayati Omar

18.	D139	Student Timetable Asistant System (Stasys)	1. Noor Azrin Binti Zainuddin 2. Nafisah Binti Jamingan @ Amin 3. Mohamad Azlan Shah Bin Mohamed Azman
19.	E141	Using Readers Theatre To Improve Reading Fluency And Comprehension	1. Evelyn Sharminnie Vasuthavan 2. Dr Carolyn Soo Kum Yoke 3. S Kunaratnam Sita Raman 4. Nor Haniza Hasan 5. Cecilia Bai Rajendran 6. Noridah Sain
20.	A142	How Quantitative And Qualitative Of Data Research Can Be Embedded Together?	1. Dr. Norhayati Alias 2. Pn Noraizah Abu Bakar
21.	B143	Preliminary Study On Social Network Among Malay Smes Entrepreneurs: Gender Differences	1. Oswald Timothy Edward 2. Ehsan Fansuree Surin
22.	E144	Penambahbaikan Pembelajaran Di Sekolah Agama Kerajaan Negeri Johor: Kajian Pelaksanaan Sistem Anjal	1. Prof. Madya Ahmad Nawawi Yaakob 2. Nor Rashidah Mohamed
23.	E137	Representasi Semantik Lewat Adat-Istiadat Perkahwinan Dalam Alam Minangkabau	Ainol Hasanal Bin Jalaluddin

SYSTEMATIC RISK OF MALAYSIAN STOCK

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ABSTRACT

The aims of this study are to examine the stability and predictive ability of beta values as a forecasting tool to evaluate the investment risk. Beta values are computed based on Single Index Model proposed by Sharpe (1964). Stability of beta is examined based on a simple paired observation test while predictive ability of betas is investigated based on correlation analysis for the one hundred stocks listed in Bursa Malaysia from the year 1998 to 2007. The study reveals that even though the beta values are not stable during the observation period for Malaysian stocks, however, it can be predicted with confidence from those in an earlier period. The results suggest that the investors need to be careful when examine the stability of beta values for the stocks as there may be changing economic conditions which can contribute to the changing of the company profile over time. Nevertheless, investors and fund managers may still use beta as one of their risk forecasting tools as beta can be predicted with certain degree of accuracy from those in an earlier period.

1. Introduction

Stock market is a place where investors choose to invest their money. However, investment in the stock market is often distracted by the volatility of the stock prices over time. In regards to this, investors need to consider the issue of stock prices volatility that would have an impact on their investment. As such the information asymmetry problem has caused these investors to be unable to access the information they need to make wise investment decisions.

Risks of investments have been the major issue discussed when making investment decisions. Nonetheless, there are still queries about how the risk should be measured. Blume (1971) in his article on the assessment of risk has given the rationale of using beta as a measure of risk. He suggests the use of equilibrium approach on the assessment of risk which relates the risk premium for an individual security proportional to the risk premium of the market. The constant of proportionality beta can therefore be interpreted as a measure of risk for individual securities. However, due to the weaknesses of one of its assumptions, namely the borrowing and lending rates are equal and same for all investors, his study suggested the use of Portfolio Approach in assessing risk.

Using the same methodology as mentioned above, many studies have been conducted to evaluate the rational of using beta as risk measurement tool, but with inconclusive results. Levy (1974) investigates correlation between historical beta and future stock performance proposes the similar results with the study by Blume. He concludes that betas for large portfolios were stable over time, but the stability depreciates as portfolio size decreased, and betas for individual securities were unpredictable. Roenfeldt et al. (1978) examined the influence of length estimation period of one, two, three and four years towards beta values. The results implied that beta values are generally unstable for short–term period and beta coefficients estimated from four-year historical data is more consistent than one-year data.

By means of an equal beta class classification, Eubank and Zumwalt (1979) suggest that betas in both high and low risk classes are more stable than betas in the middle groups. Murray (1995) examined the effects of thin trading to the beta value by the ordinary market model, the generalised Scholes-Williams correction method, the trade related correction method, the Bayesian correction (Vasicek) method and the adjusted Bayesian method. The results indicate that beta values tend to move towards one when there is correction for thin trading and the study reveals lower unadjusted beta values with increase levels of thin trading in the period of study.

Kok and Goh (1995) investigated the stability of the stocks listed on the Kuala Lumpur Stock Exchange from January 1983 to December 1990. The beta values of 72 components stocks are computed based on weekly closing prices and divided into two sub-periods. The results of their study show that beta is stable during the period of observation and could be predicted with confidence from those in an earlier period. In addition, Keith (1999) in his study showed that when beta distributions were investigated separately for individual sub-periods, it exhibits short and median term stability. Brooks et al. (2004) investigated performance of beta risk estimator based on the sample selectivity model and compared it to the Ordinary Least Square (OLS) beta and Dimson Betas. The results indicate that the selectivity-corrected beta does correct the downward bias of the OLS estimates and is likely to better estimate stock risk.

With linear regression equation as well as Pearson's and Spearman Correlation Coefficient, Rohini (2008) examined the stability and stationary of the beta in the Indian Stock Market. The study showed that beta is not stable when the interval period is change from daily, weekly and monthly. Calculations of the beta values from one to five years show that monthly betas fluctuates more than daily and weekly beta values. It implied that beta should be calculated over a two-year period.

In general, beta is a measure of stock price volatility which is used to evaluate the sensitivity of each stock's price to changes in the market (Levy, 1974). Beta of a stock is the measure of systematic risk which relates the returns of the stocks against the returns of the market. Commonly, a stock with beta coefficient of more than one is regarded as volatile stock. Thus, is considered to be more risky and therefore able to provide higher returns based on the concept of risk-return trade-off. While beta less than one is a defensive stock, which is less risky and provide lower returns. Therefore, from the behaviour of the beta coefficients, investors can make investment decisions to invest in whether active or defensive stocks with different risk levels.

The discussions that involve beta value as a measurement of volatility were discussed in the Capital Asset Pricing Model (CAPM). The model proposed that when the market is in equilibrium, expected return of a security, security i, is given as follows:

$$E(r_i) – R_f = b_i[E(r_m) – R_f] \quad (1)$$

where $E(ri)$ = the expected return on security i
R_f = the risk-free rate
$E(r_m)$ = the expected return of the market
b_i = beta coefficient, a measure of the market risk of Security i.

From the above equation, it is important to understand the relationship between risk and return in the context of accuracy of beta estimation (Brenner and Smidt, 1977). However, some confusion has emerged regarding stability of the beta values. Studies that examined the stability of beta have generally concluded that the risk measure using beta was not stable for individual stocks [Blume (1971) and Levy (1974), Murray (1995)], but the stability of the beta for portfolios of stocks increased dramatically (Kok & Goh, 1995).

Therefore, since beta coefficients are often used by investors to measure the risk and to determine the volatility level, it is essential to know the stability of the stocks' beta in order to determine whether past betas can be used as estimator of future betas. Based on the issue, this study aims to examine the stability of the beta coefficients as a measure of systematic risk for the Malaysian stocks.

2. Methodology

This study covers the period from January 1998 to December 2007. Stratified random sampling is used to select the sample for the study. Samples are chosen based on the proportion of the stocks in each sector to the overall stocks in Bursa Malaysia.

2.1 Beta Coefficient

Beta coefficients of the selected stocks are calculated based on market model. The weekly closing price data is used in the analysis.

$$E(R_i) = \alpha_i + \beta_i R_m \quad (2)$$

where $E(R_i)$ is the expected return on stock i
α_i is the parameter of the regression equation
β_i is the beta for stock i, as defined by $Cov_{i,m} / \sigma^2_m$
R_m is the market rate of return.

The model is used to relate the return on a particular stock to the market, which are proxies by the Kuala Lumpur Composite Index (KLCI). A beta value greater than one indicates that the stock is more volatile than the market, while a beta value less than one suggests that the stock is less volatile than the market.

The analysis of this study is conducted based on the method used by Kok and Goh (1995). The computed betas were divided into two periods for further analysis:

Period 1: Jan 1998- Dec 2002 (5 years, 260 observations)
Period 2: Jan 2003-Dec 2007 (5 years, 261 observations)

2.2 Stability of betas is examined based on paired observation test

Paired observation test was conducted to test for a significant difference between the beta values of the sub-period 1 and sub-period 2. The difference in the beta values is computed for each stock based on the t-test analysis as follows:

$$t = \bar{d} / [s_d / \sqrt{n}] \qquad (3)$$

which follow a student's t distribution with (n-1) degrees of freedom where $\bar{d}$ is the mean of the beta differences over 100 securities, s_d is the standard deviation of these beta differences and n= 100 securities.

Hypothesis 1

$$H_o: \beta_1 = \beta_2$$
$$H_1: \beta_1 \neq \beta_2$$

As null hypothesis, we hypothesized that there is no difference between the mean of the beta in period 1 and 2.

2.3 Predictive ability of beta

Predictive ability of betas is examined based on the correlation analysis. Correlation analysis is used to compare the strength of the correlation for the beta of two periods. Correlation coefficient is given as follows:

$$\rho_{1,2} = Cov_{1,2} / \sigma_1\sigma_2 \qquad (4)$$

where $Cov_{1,2}$ is the covariance between period one and two, $\sigma_1\sigma_2$ is the standard deviation of beta value for sub period one and two.

If the beta values of stocks in the subsequent period are highly correlated with betas in period 1, it shows that beta in sub-period 1 is a good estimator of beta in sub-period 2, vice-versa.

Hypothesis 2

H_o: $\rho = 0$ (The correlation of beta values in period 1 and period 2 is zero).
H_1: $\rho \neq 0$ (The correlation of beta values in period 1 and period 2 is different from zero)

As a null hypothesis, we hypothesised that there is no correlation between beta values in period 1 and period 2.

3. Findings and Discussion

3.1 Descriptive Analysis

Referring to Table 1, the average mean return for all stocks for sub-period 1 and sub-period 2 are 0.35% and 0.25% respectively. The average mean return in sub-period 2 is substantially less than that in sub-period 1. This is supported by the decreasing average standard deviation of return from 0.0382 to 0.0264 for sub-period 1 and sub-period 2. In addition, the minimum and maximum amounts of stock returns are narrowed from sub-period 1 to sub-period 2.

To study the shape of the probability distribution under observation in order to determine whether a random variable follows a normal distribution, skewness and kurtosis of the stock return for sub-period 1 and 2 is conducted. The stock return distribution in both periods shows moderate positively skewed distribution where the return distributions are skewed to the right. These right-skewed return distributions indicate that the mean is greater than median. However, return distributions in sub-period 1 possess a relatively larger positive skewness than those in period 2. This shows that the data is not normally distributed.

While the kurtosis of the stock returns that measure the peakedness of the probability distribution indicates 14.76 and 12.76 respectively for sub-period 1 and 2. The kurtosis values of greater than 3 suggest the distribution with slim or long tailed shape. Higher kurtosis value may suggest more of the variance is due to frequent extreme deviations, as opposed to frequent modestly-sizes deviations. This implied that the distribution of stock return is highly peaked and volatile.

Table 1. Descriptive Analysis on Betas for Period 1 and Period 2

	Period 1	Period 2
Mean of return	0.0035	0.0025
Minimum of return	-0.1413	-0.0897
Maximum of return	0.2607	0.1622
Standard Deviation of return	0.0382	0.0264
Variance of return	0.0016	0.0009
Skewness	1.5743	1.2918
Kurtosis	14.7593	12.7639
Slope (Beta)	1.0117	0.8992

3.2 Frequency Distribution

The 100 individual stocks are then divided into seven risk classes according to their beta values. The risk classes are beta of less than 0.5, 0.5 to less than 0.7, 0.7 to less than 0.9, 0.9 to less than 1.1, 1.1 to less than 1.3, 1.3 to less than 1.5 and 1.5 or more.

Table 2 shows that at one end, there are as many as 12 stocks and 15 stocks that have beta values less than 0.5 in period 1 and period 2. While at the other end of the scale, there are 14 stocks in period 1 and only 9 stocks in period 2 that have beta values of more than 1.5. Hence, there are relatively more stocks with beta values within 0.5 to 1.3 in period 2 than in period 1. This may suggest that the stocks are generally less volatile in period 2 relatively compared with in period 1.

Table 2. Frequency Distribution of Betas of 100 Stocks in Bursa Malaysia

No.	Risk Class Interval	Period 1 Jan 98-Dec 2002	Period 2 Jan 2003-Dec 2007
1	Less than 0.5	12	15
2	0.5 to less than 0.7	12	18
3	0.7 to less than 0.9	20	24
4	0.9 to less than 1.1	17	13
5	1.1 to less than 1.3	13	16
6	1.3 to less than 1.5	12	5
7	1.5 or more	14	9
	Total	100	100

3.3 Stability of Betas of 100 Individual Stocks of the Bursa Malaysia

Paired observations test is conducted to test for significant differences between the beta values of period 1 and period 2. From table 2, the t statistic for the beta values between period 1 and period 2 is 2.7724. The computed t-value is 1.9842 which is less than the theoretical t statistic.

The results indicate that the probability value is less than 0.05 which is significant. Thus, the study rejects the null hypothesis. This suggests that there are significant differences between the beta values in period 1 and 2. We can therefore conclude that the beta values are not stable over time.

As a result, the computation of beta values on 100 stocks in Bursa Malaysia indicates that beta values are not consistent over the sub-periods from 1998 to 2007. This study supports previous researches by Blume (1971), Lam (1999) and Rohini (2008). However, it contradicts with the studies conducted by Roenfeldt et.al (1978) and Kok and Goh (1995) who proposed that beta distribution are stable over long period. The resultant differences may be due to different observation periods where the study by Kok and Goh (1995) investigated stability of beta values from 1983 to 1990, while this study undertakes beta values from 1998 to 2007. Apparently, the economic conditions are different during both studies which may bring significant changes to the performance of the market as well as individual stocks.

Table 3. t-Test: Paired Two Sample for Means

	Variable 1	Variable 2
Mean	1.0117	0.8992
Variance	0.1632	0.2133
Observations	100	100
Pearson Correlation	0.5671	
Hypothesized Mean Difference	0	
df	99	
t Stat	2.7724	
P(T<=t) one-tail	0.0033	
t Critical one-tail	1.6604	
P(T<=t) two-tail	0.0066	
t Critical two-tail	1.9842	

3.4 Analysis of predictive ability of betas

Table 4: Predictive Ability of Beta Value

Regression Statistics					
Multiple R	0.5671				
R Square	0.3216				
Adjusted R Square	0.3147				
Standard Error	0.3327				
Observations	101				
ANOVA					
	df	SS	MS	F	Significance F
Regression	1	5.1961	5.1961	46.9300	6.3E-10
Residual	99	10.9612	0.1107		
Total	100	16.1573			
	Coefficients		Standard Error	t Stat	P-value
Intercept	0.5656		0.0730	7.7435	8.47E-12
X Variable	0.4961		0.0724	6.8505	6.3E-10

To investigate the predictive ability of the beta values, correlation analysis between the two periods was performed. The beta values are assumed to possess predictive ability if the beta values in sub-period 2 are highly correlated with the beta values in the sub-period 1. Linear regression analysis is used to measure the strength of the correlation and to present the relationship between the beta values under observation.

From the result showed in table 4, the correlation coefficient between beta values for sub-period 1 and sub-period 2 is 0.5671. The t-test conducted shows that H_0 is rejected at the 0.05 significance level for Hypothesis 2. This means the beta correlation in the population is not zero. It suggests a significant positive moderate association between beta values for sub-period 1 and sub-period 2.

From a practical standpoint, it indicates that the betas of the 100 individual stocks from Bursa Malaysia are predictable from the earlier period. However, R^2 value of 0.3216 shows that the explanation power of the relationship is 32.16% only. This indicates that the beta values are influence by other 67.84% external factors.

The relationship between the both beta values from the sub-period 1 and 2 is presented in the following equation:

$$\beta_2 = 0.5656 + 0.4961\,\beta_1 + e \tag{5}$$

Where β_1 is the beta value in sub-period 1
β_2 is the beta value in sub-period 2

The results of this study are consistent with the study by Kok and Goh (1995) where the betas of the individual stocks could be predicted with confidence from those in an earlier period. However, it is conflicting with Levy (1974) who proposed that betas for individual stocks are unpredictable.

4. Conclusion

All in all, even though analysis on beta values indicates that it is predictable from one sub-period to another, the study on the stability of beta for 100 individual stocks listed on Bursa Malaysia is not stable for two sub-periods from year 1998 to 2007. The beta values exhibit some degree of instability as supported by the resultant paired observation analysis which rejects the null hypothesis for Hypothesis 1 and demonstrates that beta values are not stable over the two sub-periods of study.

Nevertheless, correlation analysis reveals that the beta values of the stocks display a moderate significant positive correlation between the two periods under observation. It demonstrates the beta values of the stocks can be predicted with certain degree of accuracy from those in an earlier period. The beta values of the 100 individual stocks in Bursa Malaysia may thus be used in the investment analysis.

The results of the study suggest that investors must take precautions when using beta as one of the tools for their analysis. For instance, they should not base investment decision solely on beta value as beta shows risk estimation with time-varying properties. Investors should therefore study on other factors that deemed to influence the performance of the stock.

However, the information derived from this study has enriched the study on Malaysian stock market. It updates the beta study in relations to beta stability and predictive ability over time which is important to the investors. More specifically, it is beneficial for retail and institutional investors in terms of making more informed decision in investment as they could decide whether or not to make the investment based on beta values as the measurement of risk. Last but not least, beta value is beneficial to fund managers in constructing a portfolio, where negative betas are proficient for risk eliminating.

This study has investigated the stability and predictability of the individual stocks in Bursa Malaysia and disregards the portfolio of stocks. It will be interesting if the stability and predictive ability could broaden portfolio of stocks across different sectors in Bursa Malaysia. In addition, it is suggested that future studies should consider the effects of thin trading bias to the beta values of Malaysian stocks.

References

1. Allen, Russell G., Impson, C.M. and Karafiath, I., 1994, An Empirical Investigation on Beta Stability: Portfolios vs. Individual Securities, *Journal of Business Finance and Accounting*, Vol. 21, No 6.
2. Alexander, Gordon J. and Chervany, N.L.,1980, On the Estimation and stability of Beta, *Journal of Financial and Quantitative Analysis*, Vol. XV, No 1.
3. Blume , M.E., 1971, On the Assessment of Risk, *The Journal of Finance*, Vol. XXVI, No 1.
4. Blume , M.E., 1975, Betas and Their Regression Tendencies, *The Journal of Finance*, Vol. XXX, No 3.
5. Brookes, Robert D., Faff, Robert W., Fry. Tim and Maldonado-Rey, Diana,(2004), Alternative Beta Risk Estimators in Emerging Markets: The Latin American Case., *International Finance Review*, Vol. 5, Pages 329-334.
6. Eubank, J., Arthur A. and Zumwalt,J.K., 1979, How to determine the stability of beta values, *Journal of Portfolio Management*, Vol. 5, Issue 2.
7. Fowler, David J, Rorke, C. H. and Jog, V.M., 1981, A Note on Beta Stability and Thin Trading on the Toronto Stock Exchange, *Journal of Business Finance and Accounting*, Vol. 8, No 2.
8. Kok, K.L. and Goh, K.L., 1995, *Malaysian Securities Market*, Pelanduk Publications, Malaysia.
9. Keith S.K. L., 1999, Some Evidence on the Distribution of Beta in Hong Kong, *Applied Financial Economics*, Vol 9, 251-262.
10. Levy, R.A, 1974, Beta Coefficients as Predictors of Return, *Financial Analyst Journal*, Jan-Feb 1974.
11. Murray, L., 1995, An Examniation of Beta Estimation using Daily Irish Data, *Journal of Business Finance and Accounting*, Vol. 22(6).
12. Roenfeldt, R.L., Griepentrog, G.L. and Pflaum, C.C., 1978, Further Evidence on the Stationarity of Beta Coefficients, *Journal of Financial and Quantitative Analysis*.

13. Rohani, S., 2008 Beta Estimation in the Indian Stock Market: Stability, Stationarity and Computational Considerations. *Decision*, Vol 35, No 2, 63-85.
14. Sharpe, William F. 1964."Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk." Journal of Finance 19, no 13 (September):425-442.
15. Vasicek, O.A., 1973, A Note on Using Cross-sectional Information in Bayesian Estimation of Security Betas, *Journal of Finance*, Vol. 28, No 5.