THE EFFECT OF THE 1997 FINANCIAL CRISIS ON THE STABILITY AND PREDICTABILITY ON BETA OF THE MALAYSIAN STOCK EXCHANGE, 1992-2005

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ABSTRACT
This paper is a study on the stability and predictive quality of beta before and after the financial crisis of August 1997. Single securities and portfolios randomly formed from samples of the Main and Second Board were investigated. The mean and risk class bands of both boards had shifted lower indicating greater emphasis was placed on firm specific risk after the crisis. Substantial stability was found for pre and post crisis betas for the period immediately after the crisis but divergence was evident when comparing over a longer period. Product moment and Spearman rank correlation coefficient indicated generally weak correlations for pre and post crisis betas meaning that pre crisis values were poor predictors of post crisis betas. Possible extensions of this paper could include varying the length of the estimation period, forming industry-based portfolios and investing the extent of the presence of the dual bull-bear betas.

INTRODUCTION

In finance and investment literature, asset risk is conceptually categorised as systematic or macro-economic risk and non-systematic or firm specific risks based on the seminal works of William Sharpe (1964) and Lintner (1965). As firm specific risks are peculiar to the issuer and deemed diversifiable via portfolio formation, they are not priced while investors are compensated for bearing the systematic risk.

The CAPM according to Sharpe (1964) and Lintner (1965) defines a linear relationship between investors required return for bearing the firm's systematic risk and the volatility of the assets in relation to the market. The relative volatility of the asset is defined as the covariance of an asset in relation to a benchmark index , (cov(Ri,Rm)/var^2 m,) and is known as the beta of the asset. If the beta of an asset is greater than one, then it is classified as an aggressive asset and its return volatility is expected to be greater than the market.

If beta value is less than unity then the asset is deemed to be relatively stable compared to the market and is termed defensive assets. Assets with zero betas are termed neutral assets and their return moves in tandem with the market. As investors are deemed to be risk averse, and higher return volatility results in greater uncertainty, investors demand greater compensation for holding the aggressive assets (Elton and Gruble,(1995); Haugen,(2001); Francis and Ibbotson (2002).

Beta is primarily estimated as an input variable in the CAPM model, for evaluation of the correct pricing of a risky asset, as hedging index derivatives and in evaluating performance of portfolios.

The most common methodology in estimating beta is via OLS regression of the market model, with adjustment for thin trading, return interval, return estimation and mean reversion addressed according to the problem statement of the research objectives. As beta is normally estimated based on historical data (ex ante) but used for future (ex post) periods the stability of the estimated beta assumes a pivotal role.

Sharpe and Cooper (1972) first investigated in 1972 the stability of systematic risk using US data for NYSE stocks from 1931 to 1967 . The shares were divided into 10 deciles, with deciles 1 having the lowest value of beta and deciles 10

the highest value. Their shift from their original risk class was then tracked over each 5-year period. It was concluded that 40 to 70% of betas were stable (including jumps to adjacent period) over a subsequent 5-year period.

The issue of beta stability in emerging markets has been investigated by several authors in recent literatures. Deepak (2001) using monthly returns of 36 stocks over four years in Bombay Stock Exchange showed that 20 of the sample securities betas are unstable over the sample period from 1996-2000. Odabasi (2000) investigated 100 stocks on the Istanbul Stock Exchange from 1992 to 1997 and reached the conclusion that it is better to talk of the stationarity of beta rankings rather than stationarity of beta values.

Gong, Firth, Gullivane and Wang (2003) examined 14 U.S. shipping and 13 air transport shares from 1990 to1995 and provided evidence that individual stock betas are unstable and different estimations procedure leads to a range of beta values for the same stock.

The stability of the local stock exchange (Bursa Saham Malaysia then known as the Kuala Lumpur Stock Exchange shares) was examined by Annuar *et al.*(1998) over a 15 year period with 83 securities, using intervals of five and seven years from mid 70's to 1989.

Kok (1992) also conducted similar tests on the stability and predictability of the local individual securities and portfolio betas, from 1983 to 1990, based on 72 component stocks of the KLSE composite index, using intervals of four years. In both cases, beta was found to be relatively stable over the period of study.

The objectives of this paper are to study the impact of the 1997 financial crisis on the stability of a sample of Main and Second Board securities and randomly formed portfolios from the samples over 5-year period, and to test the impact of the crisis on the predictive capability of the individual betas and portfolios' betas

We expect the stability and the correlations of the samples not to hold between the periods before and after the financial crisis as betas are affected by macro events.

MATERIALS AND METHODS

The stability of the local betas over a 13-year period, from July 1992 to July 2005 for 33 samples from the Main Board and 30 samples from the Second Board for 11 years from January 1994 to July 2005 were studied (Appendices 1 and 2).

We adapted different commencing dates for the two boards as we could not find sufficient Second Board samples to commence from a common commencing date of July 1992 as originally intended. In fact, only nine of the Second Board samples have price data commencing from January 1994, most of the sample data commence from July 1996. We are aware of the biased readings, but have to accept this as a limitation of this investigation.

We used August 1997 as the separation point for the first period to study the impact of the Asian financial crises on the stability of the local beta. For the Main Board samples, we chose July 1992 to July 1997, the five years before the financial crisis as our first period, August 1997 to July 2001, as our second period and August 2001 to July 2005 as our third period of investigation.

For the Second Board samples, the three periods are January 1994 to July 1997, August 1997 to July 2001 and August 2001 to July 2005. We used monthly data from July 1992 to July 2005 for 33 Bursa Saham Malaysia Main Board and 30 Second Board shares from January 1994 to July 2005 obtained from Perfect Analysis.

Initially, we had randomly selected 38 Second Board shares and 38 Main Board shares. However, several of the shares were discarded as they were later delisted. The KLSE composite index was taken as the market benchmark.

The log returns of the index and samples were taken as the returns for this paper.

A summary of the distribution of beta samples of the two boards is provided in Table 1 below. We then tested the stability of betas via pair t tests and shifts in risk class from the beta transition matrix. We used Pearson's and rank order correlation coefficient to determine the nature and strength of association and ranking stability and hence the quality of predictability of the betas of the three periods. The methodology for this paper largely follows that

of current works on the tests of stability and predictability of the market systematic risk.

To test if the beta of the individual and portfolio stocks is relatively stable for the three periods, the beta obtained from the pre-crisis period was compared with the post crisis period, and the two post crisis betas were also compared with each other.

The pair t test, which tests the significance of the differences between the value of the statistics between two periods is used to test the differences of each stock. If the test statistics are significant then this is an indication that the beta of the two periods has deviated from each other.

Another method used to test the stability of the samples is based on Sharpe and Cooper's (1972) beta transition matrix. The betas of the first period are classified into ten deciles, with decile one being the lowest value and decile 10 the highest beta value. The procedure is repeated for the next period. The aim is to track the movement of the beta of each sample to see if it still remains in the same decile or has shifted to other risk class. The betas are deemed to be stable between successive periods if they remain in the same risk class or shift to an adjacent risk class.

Correlation measures the linear relationship between two values. A high positive value indicates high direct linear relationship and a high negative value indicates high inversed relationship, with the value of unity as the limit of relationship at either end. A zero value serves as the benchmark of no relationship.

Two correlation measurements, the Pearson's product moment correlation measuring the strength of linear relationship between the betas of the two periods and rank correlation coefficients which test if the rankings of the beta values of one period are still discernible in the subsequent period are used for testing the predictive ability of the pre and post crisis betas in this paper.

EMPIRICAL RESULTS

Distribution of beta

The statistics for the distribution of betas for the periods under study investigated are summarized in Table 1.

An examination of Table 1 shows that the mean is highest during Sub-period 1,the pre-crisis period, for both Main and Second Boards. The systematic risk in BSM has been declining in value since then with the lowest mean value in period 3.This could imply that greater attention is paid to issuer risk following the crisis.

Regression tendency for the mean is noted as evidenced by the tight standard deviation in period 1 and 2 but divergent tendency is indicated in period 3 for both boards by the wider standard deviation. This is supported by the third moment of distribution, with its tendency towards higher positive skewness. The higher the positive skewness, the more firms here are with beta less than one.

The narrower range of beta value in period 2, is indicative of beta value tending to coalesce

Table 1. Summary of Beta Coefficients for Main Board and Second Board

Main Board Period	Mean	Std deviation	Min Value	Max Value	Range	Skewness	Kurtosis
Full period	0.995	0.411	0.364	2.247	1.883	0.830	1.248
Sub-period 1	1.153	0.413	-0.129	2.893	3.022	0.409	0.452
Sub-period 2	0.971	0.462	0.351	2.447	2.096	0.962	1.592
Sub-period 3	0.864	0.626	0.037	2.453	2.416	0.845	0.002
Second Board							
Full Period	1.300	0.248	0.698	1.829	1.131	0.229	0.365
Sub-period1	1.456	0.541	-0.104	2.553	2.657	-0.481	1.580
Sub-period 2	1.324	0.270	0.6	1.965	1.365	-0.008	1.264
Sub-period 3	1.299	0.572	0.399	2.655	2.256	0.396	-0.108

to unity during a crisis. A frequency distribution output was obtained by arranging the betas in seven deciles at 0.5 intervals, with deciles one having the lowest beta value and deciles seven the highest, as in Table 2.

Table 2 indicates that the risk class concentration of betas in the Main Board and Second Board samples has shifted lower following the financial crisis. For Main Board, 25 or 75.7% of the samples are concentrated around deciles 3 –5 (beta 0.50-2.0) during pre- financial crisis, 24 or 72.8% are concentrated around deciles 3-4 (beta 0.50-1.5) immediately after the Asian financial crises and 21 or 63.7% around deciles 2-3 (beta 0.00-1.0) in sub period 3.

The concentration of betas of the Second Board has also shifted lower, with 23 or 76.7% in a risk class band of 4-5(beta1.0-2.0), 28 (93.4%) in risk class band 4-5 (beta1.0-2.0) and 25(83.4%) in a risk class band of 3-5(beta 0.5-1.0) in sub-period 1,2 and 3 respectively.

The general shifting downwards of betas in the post financial crisis period could reflect that greater emphasis is placed on firm specific risk in this period. Another possible reason could be the effects of lower trading volume and autocorrelation.

Stability of Betas:

The stability of beta for the 3 periods was tested by the pair t test and the beta transition matrix. The computed pair t test results are as follows:

Table 3 indicates that there is substantial stability between the pre and post crisis individual betas of the samples for period to period comparison for the 3 periods of the two boards, with the exception of sub period 1 and 3 for the main board.

This was rather unexpected, as the expectation was that the stability would not hold. The possible reasons for this include strong auto-correlation and smoothening effect over a four to five year period. On the other hand, coupled with the earlier works of Kok (1992) and Annuar *et al.* (1998), this provides strong support that a four to five year period is an optimal period for estimating stable betas in the local market.

The stability of the betas was next tested by the beta transition matrix in Table 4. Stability was defined to mean any beta value that remains in

Table 2. Frequency Distribution of betas of Main and Second Board

Main Board Deciles	Beta range	Full Period	Sub period 1	Sub period 2	Sub period 3
1	-0.5-0.00	Nil	1 (3 %)	Nil	Nil
2	0.0-0.5	3 (9.1%)	4 (12 %)	5 (15.6%)	12(36.4%)
3	0.5-1.0	15(45.5%)	11(33.3%)	12 (36.4%)	9 (27.3%)
4	1.0-1.5	10(30.3%)	6 (18.2%)	12 (36.4%)	5 (15.2%)
5	1.5-2.0	4(12.1%)	8 (24.2%)	3 (9.1%)	5 (15.2%)
6	2.0-2.5	1(3.0%)	2 (6.1%)	1 (30.%)	2 (6.1%)
7	2.5-3.0	Nil	1 (3.0%)	Nil	Nil
		33 (100%)	33(100%)	33(100%)	33(100%)
Second Board Deciles	Beta range	Full Period	Sub-period 1	Sub-period2	Sub-period3
1	-0.5-0.00	Nil	1 (3.3%)	Nil	Nil
2	0.0-0.5	Nil	Nil	Nil	2 (6.7%)
3	0.5-1.0	1 (3.3%)	2 (6.7%)	2(6.7%)	8(26.7%)
4	1.0-1.5	24(80 %)	14(46.7%)	20(66.7%)	8(26.7%)
5	1.5-2.0	5 (16.7%)	9 (30%)	8(26.7%)	9(30 %)
6	2.0-2.5	Nil	3 (10%)	Nil	2 (6.7%)
7	2.5-3.0	Nil	1 (3.3%)	Nil	1 (3.3%)
		30(100%)	30(100%)	30(100%)	30(100%)

Table 3. Pair t tests results for individual securities

Main Board:	Sub period 1 & 2	Sub period 1 & 3	Sub period 2 & 3
t value	1.58	2.26	1.32
p value (2 tails)	0.124	0.031*	0.195
Second Board:	Sub period 1 & 2	Sub period 1 & 3	Sub period 2 & 3
t value	1.24	1.15	0.25
p value (2 tails)	0.2258	0.258	0.804

*Significant at 5%.

Table 4. Beta transition matrix

Main Board		Remaining in same class		
Deciles	Beta range	Period1&2	Period2&3	Period1&3
1	<0.2	0/2 (0%)	0/0 (n.a)	1/2 (50%)
2	0.2-0.4	1/1 (100%)	2/3 (66%)	1/1 (100%)
3	0.4-0.6	2/3 (66%)	4/5 (80%)	2/3 (66%)
4	0.6-0.8	1/3 (33%)	3/5 (60%)	0/3 (0%)
5	0.8-1.0	3/6 (50%)	1/4 (25%)	3/7 (43%)
6	1.0-1.2	2/3 (66%)	2/7 (29%)	1/1 (100%)
7	1.2-1.4	3/4 (75%)	2/4 (50%)	1/5 (20%)
8	1.4-1.6	1/2 (50%)	2/4 (50%)	1/2 (50%)
9	1.6-1.8	0/4 (0%)	0/0 (n-a)	1/4 (25%)
10	>1.8	0/5 (0%)	1/1 (100%)	2/5 (40%)
		13/33(39.4%)	17/33 (51.5%)	13/33(39.4%)

n.a : not applicable

the same risk class or shifted to adjacent class during the next period. The percentages in Table 4 indicate the percentages remaining in the risk class in the next period.

In line with current literature, we studied the stability of the mid range beta (deciles 4-7) against the betas at the extreme ends. For the Main Board 56.25% and 53.3% of the mid range beta remain in the same risk class when comparing their period-to-period transition over periods (1,2) and (2, 3). Over the whole period only 31.25% remain in same risk class for the mid range betas.

For the lower end values, 44.4% and 75% remain in the same deciles when comparing subsequent period (1,2) and (2,3) movements. For the whole period, a significant 66% remained in the same risk class.

For the higher end betas, only 9.09% remain in the same risk class for the period immediately after the crisis. Reversion tendency was noted as 36.36% were found to remain in the same risk class eight years after the crisis. Between periods 2 and 3, 60% remained in the same deciles.

The mid range betas were more stable immediately after the crisis but over the longer period only about one third remained in the same class. It was the lower value betas (defensive betas) that were more resilient for the whole period. The higher value betas (aggressive betas) live up to expectations showing greatest volatility immediately after crisis. Regression tendency was noted for both end of the range, leading to more betas remaining in same risk class when comparing pre crisis betas and betas in period 3, 8 years after the crisis.

For the Second Board, it was the higher end betas that were more stable, with 50% remaining in the same risk class immediately after the crisis,

and 40% remaining when comparing periods (2,3) and also periods (1,3). For mid range betas 44.4% remained in the same class immediately after crisis, declining to 35% between period 2 and 3, and only 22.2% between period 1 and 3 (Table 4a).

For the lower end betas none remained in the same risk class after the crisis. Hence, while there was a general shift in risk class downwards, it was the aggressive betas that shifted downwards and the defensive betas all shifted upwards.

Stability of portfolios' beta

In line with the normative theory, investors are assumed to be risk averse and non-systematic risk is diversified via portfolios. Portfolio betas are expected to be more stable than individual betas and stability is to increase with the number of shares in the portfolio. As such, 10 portfolios of 5,10,and 15 shares were randomly selected. The computed pair t test results are summarized in Table 5.

Table 5 supports the results of Table 3 indicating stable relationship between the pre and post crisis betas for Second Board and the post crisis betas for the Main Board. The differences between the pre and post crisis betas for main board become significant as the number of securities is increased, signifying divergence in values between the betas of these periods. The substantial stability results for second board is likely due to thin trading and auto correlation effects as is typical of smaller capitalization markets.

Table 4a. Beta transition matrix for the Second Board:

	Beta range	Period 1& 2	Period 2&3	Period 1&3
1	<0.2	0/0 (n.a)	0/0 (n.a)	0/1 (0%)
2	0.2-0.4	0/1 (0%)	0/0 (n.a)	0/0 (n.a)
3	0.4-0.6	0/1 (0%)	0/0 (n.a)	0/1 (0%)
4	0.6-0.8	0/1 (0%)	1/1 (100%)	0/1 (0%)
5	0.8-1.0	0/0 (n.a)	1/1 (100%)	0/0 (n.a)
6	1.0-1.2	2/5 (40%)	1/8 (13%)	1/5 (20%)
7	1.2-1.4	2/3 (66%)	4/10 (40%)	1/3 (33%)
8	1.4-1.6	6/9 (66%)	2/6 (33%)	4/9 (44%)
9	1.6-1.8	0/3 (0%)	1/2 (50%)	1/3 (33%)
10	>1.8	2/7 (29%)	1/2 (50%)	3/8 (38%)
		12/30(40%)	11/30(36.7%)	9/30(30%)

n.a : not applicable

Table 5. Paired t tests of portfolios

	Main Board			Second Board		
	Period 1 & 2	Period 2 &3	Period 1&3	Period 1&2	Period 2&3	Period 1&3
5 securities						
t value:	1.13	3.10	2.71	0.43	0.82	1.49
p value:	0.322	0.364	0.537	0.6875	0.459	0.215
10 securities						
t value:	(1.43)	0.51	1.35	0.45	0.13	0.33
p value:	0.227	0.640	0.247	0.673	0.903	0.758
15 securities						
t value:	3.26	1.24	3.17	1.45	0.44	1.0
p value:	0.031*	0.283	0.034*	0.221	0.684	0.375

Significant at 0.05 level

Table 6. Transition matrix of portfolio betas

Beta range	Main Board Period 1 & 2	Main Board Period 2 &3	Main Board Period 1&3	Second Board Period 1&2	Second Board Period 2&3	Second Board Period 1&3
5 securities						
0.5-1.0	4/4	7/9	3/4	n.a	n.a	n.a
1.0-1.5	0/5	0/1	0/5	5/7	10/10	6/7
1.5-2.0	0/1	n.a	0/1	0/3	n.a	0/3
10 securities						
0.5-1.0	1/3	5/9	2/4	n.a	n.a	n.a
1.0-1.5	2/9	1/1	1/6	4/4	9/10	2/3
1.5-2.0	n.a	n.a	n.a	2/6	n.a	3/7
15 securities						
0.5-1.0	2/3	7/7	1/1	n.a	n.a	n.a
1.0-1.5	2/7	1/3	4/9	1/1	9/10	7/8
1.5-2.0	n.a	n.a	n.a	1/9	n.a	0/2

n.a : not applicable

Table 7. Pearson's correlation coefficient of individual securities:

	Main Board Period 1 & 2	Main Board Period 2 &3	Main Board Period 1&3	Second Board Period 1&2	Second Board Period 2&3	Second Board Period 1&3
Pearson's correlation	r=0.319	r=0.668*	r=0.328	r=0.020	r=0.312	r=0.059

Significant at 5%(2 tails): 0.361
Significant at 1%(2 tails):0.463

The stability of the portfolios was then analysed based on shift in risk class for the 3 periods as detailed in Table 6.

The results indicate that for the Main Board lower-end portfolios are more stable than mid-range and higher end portfolios while for the Second Board it were the mid-range that are more stable (Table 6).

This is in line with the findings of the individual transition matrix where it was the lower-end betas that remained in the decile group compared to the middle and higher range betas.

Predictability of Betas

The application of historical beta for future period beta estimation is only reliable if there is a high correlation between the betas of the two periods as measured by their product moment correlation and rank correlation. The product moment correlation for the individual shares of the two boards for the three periods is as follows:

The results in Table 7 showed the correlation coefficient was weak and insignificance between the pre- and post crisis betas , except for the post crisis periods of period (2,3). This could imply that prediction of betas using pre crisis value is useless for estimating post crisis betas. For Second Board the correlation is strongest when comparing period 2 and 3.

Table 8 indicates that the product moment correlation coefficient is insignificant for all the portfolios. However, as the number of securities is increased for the post crisis portfolios the correlation coefficient approaches significance at 5 percent for both main and second Boards.

The Spearman rank order correlation output for the individual securities for the two boards is shown in Table 9.

The ranking correlation coefficient indicates that there is an insignificant ranking stability for pre and post crisis beta. The rank order correlation indicates ranking stability for the post crisis betas

Table 8. Pearson's correlation coefficient of portfolio.

	Main Board			Second Board		
	Period 1 & 2	Period 2 &3	Period 1&3	Period 1&2	Period 2&3	Period 1&3
5 securities						
Pearson's correlation	r=0.663	r=0.354	r=0.253	r= 0.331	r=(0.907)	r=0.193
10 securities						
Pearson's correlation	r=(0.513)	r=0.561	r=(0.606)	r=(0.628)	r=0.530	r=(0.940)
15 securities						
Pearson's correlation	r=(0.25)	r=0.811	r=0.361	r=(0.110)	r=0.805	r=(0.659)

*Significant at 5%(2 tails): 0.878
**Significant at 1%(2 tails):0.959

Table 9. Spearman Rank Order correlation of individual securities:

	Main Board			Second Board		
	Period 1&2	Period 1&3	Period 2&3	Period 1&2	Period 1&3	Period 2&3
Rank correlation	r=0.322	r=0.331	r=0.567**	r=0.05	r=-0.02	r=0.313

Significant at 5%(2 tails): 0.344
Significant at 1%(2 tails): 0.442

only for the Main Board and approaches significant value at 5 percent for second board. This would imply random ranking stability for pre and post crisis betas, and ranking relationship only exists for post crisis betas.

The outcome for the rank order coefficient tests for the portfolios of the two boards is as follows:

The results of Table 10 are similar to the results of Table 9 as ranking coefficient was insignificant for all the pre and post portfolios betas of both boards. Ranking coefficient was only significant for the Second Board portfolios and tends to significant level for the Main Boards. Had the number of securities in the portfolio been increased, it is likely the ranking relationship could have been significant.

Discussion

This paper tries to explore the topic of beta stability of Bursa Saham Malaysia Main Board and Second Board securities and portfolios before and after the August 1997 financial crisis. The findings of the study permitted the researchers to reflect on a few points of the effects of the financial crisis on the local systematic risks.

The mean and risk class band of betas of both boards had shifted lower indicating greater emphasis was placed on firm specific risk after the financial crisis. This was in line with expected management behaviour trying to abandon or delay high risk projects in a financial crisis and reduce the systematic risk to a level acceptable to the market.

The researchers were of the view that inevitably in a crisis even those firms which were considered of lower risk, either due to leverage or cyclical effects, would be deemed to have a high risk. This, in turn, could have the effect of uplifting the lower beta firms a few notches higher.

It was noted that stability was maintained at the individual and portfolio level for second board samples. This phenomenon was highly suggestive of auto correlation and thin trading effect rather then immunity to a macro event of such magnitude. The behaviour of the first board betas seemed more in line with normative reasoning, significant stability was observable

Table 10. Spearman rank order correlation of portfolio betas

	Main Board			Second Board		
	Period 1 & 2	Period 2 &3	Period 1&3	Period 1&2	Period 2&3	Period 1&3
5 securities						
Rank correlation	r=0.100	r=0.600	r=0.200	r=(0.200)	r=(0.900)*	r=(0.1)
10 securities						
Rank correlation	r=(0.600)	r=0.700	r=(0.600)	r=(0.500)	r=0.600	r=(0.90)
15 securities						
Rank correlation	r=(0.300)	r=0.700	r=0.200	r=(0.100)	r=0.900*	r=(0.300)

*Significant at 5% (2 tails): 0.878
**Significant at 1% (2 tails):0.959

between the post crisis betas only.

Predictive power using product moment and rank order correlation coefficients indicate that only the post crisis betas were highly related to each other. Hence, investors using commercial betas need to note that the betas they are using are current and reflective of the economic conditions under which they would be used. This was in line with general perception that systematic risk of a security should shift following a macro crisis and firm specific risk of an asset would have taken greater magnitude.

These results were consistent with the earlier findings of local academicians that a five year estimation period do provide a stable beta. However, as the thin trading effect was not addressed, future research could include this element in finding the optimal estimation period for the local beta.

The phenomenon of a lower beta value in the post crisis could be explained as a shift in investors' attention to the non-systematic risk. An alternative explanation could be that our market systematic risk maybe shielded from the regional volatility by the introduction of capital control and the pegged exchange rate regime. Further research could shed light on this.

Survivorship bias was inevitable as the data excludes those companies that were subsequently delisted. Future research could include companies that were delisted in order to resolve the survivorship bias. Extensions of current research could include varying the length of the estimation period to arrive at the most stable period for estimating the Malaysian betas, the bull- bear dual betas, and industry based portfolios to examine which industries are hit hardest by the crisis.

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Appendix 1.
Main Board Securities and their betas before and after the financial crisis. *

MAIN BOARD Period	7/92-7/05	7/92-7/97	8/97-7/01	8/01-7/05
CCM	0.553	0.931	0.360	0.815
ESSO	0.603	0.539	0.611	0.554
IOI	1.064	1.656	0.82	1.135
UMW	1.222	0.657	1.569	0.312
Guthrie	0.809	1.614	0.56	0.461
Golden Hope	0.860	1.534	0.637	0.724
MBB	1.152	1.121	1.158	1.169
Commerce Asset	1.558	1.537	1.589	1.607
KFC	0.956	0.092	1.291	0.732
Shell	0.504	0.406	0.504	0.612
F & N	0.806	1.264	0.690	0.353
MULPHA	1.569	2.177	1.258	1.849
AJINOMOTO	0.719	1.148	0.599	0.443
MAS	1.114	0.489	1.199	2.175
Tenaga	1.159	0.706	1.347	1.15
Telekom	0.971	0.824	0.999	1.242
Time	2.247	1.749	2.447	2.453
MISC	0.569	0.805	0.484	0.506
Sime Darby	0.951	0.884	1.002	0.739
BAT	0.468	0.888	0.351	0.214
Cycle & Carriage	0.811	0.750	0.893	0.216
Southern. Acids	0.896	0.990	0.822	1.221
DUTCH LADY	0.569	0.980	0.497	0.520
NESTLE	0.364	0.339	0.394	0.181
GUINESS	0.413	-0.129	0.600	0.387
MALAKOFF	1.053	1.221	1.134	0.037
IOI PROPERT	1.186	1.909	1.042	0.383
BERJAYA S Toto	1.204	1.328	1.092	1.573
EON	1.311	1.223	1.454	0.675
H&L	0.867	1.687	0.626	0.41
TA ENT	1.565	2.045	1.385	1.541
MAHSING	1.588	1.804	1.541	1.694
SEG	1.153	2.893	1.100	0.885

*Date of crisis taken as August 1997

Appendix 2.
Second Board Securities and their betas before and after the financial crisis.

SECOND BOARD Period	1/94-7/97	8/97-7/01	8/01-7/05	1/94-7/05
STAMFORD	1.449	1.053	1.645	1.129
NEPLINE	1.041	1.344	2.459	1.457
TAMADAM	0.727	1.275	0.597	1.182
MCSB	1.163	1.965	1.863	1.829
JUAN KUANG	0.552	1.486	1.574	1.372
KAI PENG	1.299	1.213	1.775	1.284
SKB	1.567	1.503	0.596	1.399
SETEGAP	1.831	1.610	2.655	1.724
CHEE WAH	1.309	1.149	0.632	1.093
PL SETIA	1.647	1.152	1.673	1.228
HARVEST	2.219	1.372	1.56	1.433
SARAWAK CO	-0.104	1.542	0.951	1.397
STS TECHNIC	1.907	1.131	0.399	1.077
HIL	1.471	1.303	1.798	1.361
MERCURY	1.406	1.591	1.303	1.539
GOLDEN FR	1.687	1.381	1.006	1.386
ROCK CHEMICAL	1.094	0.600	0.863	0.698
JASA KITA	1.429	1.299	1.191	1.287
SUPER ENT	2.553	1.503	0.955	1.477
HWA TAI	2.387	1.643	1.221	1.031
KFM	1.518	1.187	0.564	1.127
FED FURNITURE	2.183	1.42	2.044	1.527
WELLI CORP	1.445	1.145	0.405	1.003
PROLEXUS	1.904	1.338	1.319	1.356
LAY HONG	1.218	0.981	1.064	1.001
PARAGON NION	1.72	1.107	1.414	1.171
TEOH GL	1.100	1.845	1.247	1.756
ITRONIC	1.597	1.005	0.927	1.006
CEPAT	1.053	1.262	1.682	1.313
PWE	1.42	1.320	1.587	1.357