Masters of Science (Banking)

UUM-IBBM

WBB 6013: SEMINAR IN BANKING

Impact of the 2007 Financial Crisis on the Malaysian Banking Stocks

By

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Abstract

The objective of this study is to examine whether the current global financial crisis has impacted the Malaysian banking stocks. The Dow Jones Industrial Average (DJIA) was used as a proxy for the crisis and it was ascertained that there was a strong relationship between the DJIA and the Kuala Lumpur Composite Index (KLCI). Statistical analysis was then performed on the KLCI and selected banking stocks which indicated that there was a strong and positive correlation between the two variables. The findings support the aim of this study - that the 2007-2008 financial crisis has indeed impacted the Malaysian banking stocks.

JEL classifications: C20, G10

Keywords: financial crisis, KLCI, Malaysian banking stocks, correlation

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1.0 INTRODUCTION

This paper examines the impact of the current global financial crisis on the Malaysian banking stocks. Amongst its contagion effects, the stock market collapse is deemed to be a key dynamic consequence of this crisis. Previous research[1] had established that the country's financial sector and the stock market index returns influence future economic growth. Since the financial market health depends crucially on stock market stability and banks are generally viewed to play a very crucial role in crystallizing the country's economic performance, this study will look at how the Malaysian banking stocks have reacted to the current global financial crisis.

How to measure the global financial crisis is a central question that may arise. The DJIA was used as a proxy for the financial crisis and a trend analysis was done between the DJIA and the KLCI to establish that the KLCI is directly impacted by the DJIA movements. The resultant chart[2] evidences that the changes in the two indices moves in tandem with one another. Statistical analysis was also performed on these two variables, outcome of which indicates that there is a significant positive correlation between the DJIA and the KLCI.

Since the banking sector stocks are categorized under the KL Financial Index (KLFI), a study of this sector index and five other major sector indices (viz. KL Plantation Index, KL Industrial Index, KL Consumer Index, KL Property Index and the KL Construction Index) was also undertaken in order to establish that there is a link between the KLFI and the KLCI. Based on the data obtained for the period 1st January 2007 till 1st December 2008, the strength of the relationship of each sector's index change was evaluated against the change in the KLCI. The outcome revealed that all six sectors had a significant positive correlation with the KLCI.

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[1] Rebel A Cole, Friborz Moshirian, Qiongbing Wu, Bank stock returns and economic growth, Journal of banking and finance (2008) 995 - 1007

[2] Chart 1 – Closing indices for DJIA and KLCI for the period Jan 2007 to Dec 2008

Having firmly established that the KLCI could be used as a proxy for the financial crisis, in the context of Malaysia, and that the KLFI is indeed linked to the KLCI, the statistical study then proceeded to investigate the dynamic relations between the changes in the stock prices of selected banks and the changes in the KLCI. Here too, the issue that arose was which of the banking stocks to select. Not leaving it to a game of chance e.g. "Eeny, Meeny, Miny, Moe…," criteria for selection was (a) banks with the largest market capitalisation (b) most active bank stocks and (c) at least one representation from the medium-sized and the smaller banks.

Investors, whether they are institutions, fund managers or individuals, will react to the crisis and either buy in order to add onto their stock portfolio or sell, in order to lock in their profits or cut their losses. The institutions refer to a gamut of information ranging from financial data, charts, analysis and other financial statistics while from the viewpoint of the average individual investor – he would probably look at the easily available and understood information to arrive at his decision – "to buy or not to buy" or conversely "to sell or not to sell". He could probably sell when the stock markets reel or if he does not believe in cutting his losses, he may hold on for the market to rebound. All this leads to prediction of the future. Since it is impossible to conclusively predict the future, all investors need to refer to historical prices and indices as well as predictive information to assist in their decision making. Knowing the intensity of the level to which the bank stock has been impacted by the global financial crisis, decisions based on statistically proven analysis, will be a better basis for the investors' decision making rather than relying on "a gut feeling". This is in fact the objective of this study.

This study contributes to the literature on the reaction of the Malaysian banking stocks during a financial crisis, by documenting a significant link between bank stocks and the KLCI. The remainder of this paper is organized as follows: In Section 2 is a very detailed background of the financial crisis, what caused it, how it has affected the financial markets and its impact on Malaysia. Section 3 presents

the research methodology while Section 4 describes how the data collection was obtained. The findings are detailed in Section 5 and it concludes in Section 6.

2.0 LITERATURE REVIEW

This section will focus on the causes of the 2007-2008 global financial crises which have sent virulent vibrations throughout various sectors of crisis-hit economies.

Since the crisis is a recent development and is still unraveling, there is a scarcity of published research. In all probability the many researches and studies that are being done are yet to be published. Remaining undaunted by this constraint, I had to resort to obtaining information from analysts and newspaper reports, as well as articles published by various authorities, bodies e.g. IMF.

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2.1 Causes of the financial crisis

The widely accepted cause is that the trigger was the meltdown of the United States (US) subprime mortgage issue. According to Dr. Michael Lim Mah Hui[3], the dynamics in fact started with what he termed as the "Triple Witches Brew" – a triple and lethal combination comprising of, firstly the housing bubble in the US and the UK, secondly the financial innovations and thirdly the spiraling commodity market. Reports and articles may depict a confusing picture, all too often emphasizing on different aspects of the crisis. This paper will adopt a four-fold way to explain the various dimensions of the crisis.

2.1.1 The Housing Bubble

Firstly, when the housing bubble burst in the US and the UK, it resulted in huge erosion in asset values and therefore capital and wealth.

In the US, the Federal Reserve encouraged a situation of excessive liquidity since 2000. This cheap money allowed for a spiraling increase in the demand for housing as well as in consumer spending. Imprudent banking lending practices by

[3] Dr Michael Lim, "Global Financial Crisis and Impact on Malaysia" 5th August 2008

banks allowed for subprime loans to be extended to weak credit borrowers using teasers like “adjustable rate mortgages” (ARM), low / zero down payments and loose documentation. A total of USD1.5 trillion sub primes had been booked in 2004-2005.

The US housing market became a USD20 trillion industry. Comparatively, household wealth was a staggering USD45 trillion, with housing mortgages comprising USD10 trillion, of which 25% or USD2.5 trillion was under subprime financing. Even more alarming was the fact that 22% of the houses were for investment i.e. possible speculation and a further 14% were for vacation homes. Under this scenario, the median house prices rose by 40% to USD234,000 over the period 2000 till 2006. Invariably the US housing bubble burst in early 2007 – for the first time since the Great Depression[4] of 1929, with house prices falling by almost 20% and further expected falls in 2008. With every fall of 10%, it effectively shaved off USD2 trillion from household wealth. Since 70% of the US growth had been powered by consumption, the erosion of spending power had dire consequences. Published statistics revealed that the average US consumer has almost near zero savings and inevitably, borrowers defaulted in their loan and other financial obligations.

UK was an equally overheated housing market with house prices tripling between the years 1996–2007. The average median house price was GDP350,000–which is 6 times the average salary (2007) compared to 3 times the average salary (2003). The consumer debt in the UK was far more acute than in the US–the former being 166% of gross disposable income while the latter registered 127%. When the overheated housing bubble burst in the UK, housing prices fell by 10% in 2007 with further falls between 20–30% expected in 2008. A resultant effect of this was that 40% of the house sale agreements collapsed due to the inability of the buyers to source mortgage financing as banks went into credit crunch mode and tightened controls and lending criteria.

[4] Source: Richard Duncan, Finance Asia , Sept 2007

With rising defaults on housing mortgage payments, losses began to be reported by financial institutions. The various financial innovation products e.g. Collateralized Debt Obligations (CDO), and other securitization of loans (which had been given inaccurate ratings) were in fact backed by mortgages. The default in the mortgages caused a domino effect on these "innovative products" which consequently led to the eventual collapse of the financial institutions. The US financial giant Lehman Brothers succumbed under the credit default in the swaps and mortgage markets. Share markets plummeted and today stock markets are down by 40%-60% as compared to the early part of this year.

2.1.2 Collapse of financial institutions

The *second dimension is the actual failure of the financial institution*. In the US, three of the earliest banks to signal distress were Bear Stearns, Fannie Mae and Freddie Mac. Similarly in the UK one of the earliest banks to collapse was Northern Rock. However it was not until the failure of Lehman Brothers in September 2008, that panic buttons hit the stock markets which plunged to record lows as selling pressure mounted. For the week starting 6 October 2008, the DJIA closed lower for all 5 days, falling over 1,874 points or 18%. It was the worst weekly decline ever. 24th October 2008 saw many of the world's stock exchanges experiencing the worst declines for many years. Table 1 overleaf shows the performance of some of the regional stock markets on Black Friday 24th October, 2008.

Table 1: PERFORMANCE OF REGIONAL STOCK MARKETS				
Bourse	*Closing as at 24 October 2008 (points)	*Lowest level since	^Highest index during 2007 / 2008	^% drop
Australian Securities Exchange	7,649.10	Nov '04	NA	NA
Dow Jones Industrial Average	8,683.31	Jun'03	14,092.43 *15 Oct'07*	62%
Hang Seng Index	12,618.40	Aug '04	30,986.22 *29 Oct'07*	59%
Jakarta Composite Index	1,244.90	Jun '06	2,831.25 *14 Jan'07*	56%
Kospi	938.81	May'05	2,043.93 *15 Oct'07*	54%
Kuala Lumpur Composite Index	859.11	Oct '04	1,514.31 *14 Jan'07*	43%
Nikkei 225	7,649.10	Apr '03	17,399.67 *15 Oct'07*	56%
Shanghai Stock Exchange	1,839.60	Nov '06	5,934.77 *15 Oct'07*	69%
Straits Times Index	1,594.30	Sep '03	3,886.93 *15 Oct'07*	59%
Taiwan Taipei Exchange	4,579.60	May'03	9,743.73 *29 Oct'07*	53%
Thailand Stock Exchange	432.91	Jun '03	NA	NA
Sources : *Bloomberg and ^Yahoo Finance				

2.1.3 Credit crunch

Credit crunch was the third manifestation – with financial institutions being over cautious and unwilling to extend credit. The reason for this is that more than any other business, the financial institutions need capital to operate. They cannot lend if their balance sheet has been wiped out or impaired due to large losses. What they need to do is to reduce their debt and build up their capital base. This process is called de-leveraging and it will hurt all aspects of the economy that is correlated with the financial system. Governments world-wide have flooded their financial markets with liquidity to combat this issue.

2.1.4 Combined effect

Fourthly, is the combined effect of the above three forces in the wake of collapsing aggregate demand. What this means is that the world economy has entered into economic recession and the Governments must take immediate and effective efforts to avoid a prolonged recession. One such attempt is the stimulus package, which has to be sizeable for it to have a positive effect, in order to re-ignite the economy.

2.2 Was Alan Greenspan the author of the crisis?

Many critics blame the former chairman of the US Federal Reserve, Alan Greenspan for the financial crisis. According to them, Greenspan encouraged the bubble in housing prices by keeping the interest rates too low for too long and that he also failed to rein in the explosive growth of risky and often fraudulent mortgage lending. Greenspan had also as far back as 1994, opposed the proposed regulations on derivatives. The immense and largely unregulated business of spreading financial risk widely, through the exotic derivatives, had gotten out of control, fuelling the financial markets and finally added havoc to the financial crisis. According to Greenspan, the crisis has turned out to be much broader than anything he ever imagined and admitted that he had failed to anticipate the self destructive power of wanton mortgages. However, he places far more blame on the Wall Street companies that aggressively pushed the mortgage backed securities saying, “Without the excessive demand from the securitizers, subprime mortgage originations would have been far smaller and the defaults far lower.”

2.3 Impact on the world economies

Moving on as to how the financial crisis has impacted the world economies – the US economy is expected to move into stagflation while the Asian economies are expected to slowdown. Governments world-wide are looking into stimulus packages as a catalyst to re-ignite their economies. Economists expect the US to lead with a stimulus package of USD1 trillion. Japan’s response is a USD255 billion package to combat the financial tsunami while Australia has to date announced a total of AUD15.1 billion for their nation-building plan. World trade

is expected to shrink leading to the issues of rise in unemployment rate, especially in the finance industry. Bank of America[5] has announced 35,000 job cuts for the next 3 years while Citibank plans to eliminate 52,000 jobs by 2009. According to the International Monetary Fund (IMF), in their World Economic Outlook 2008 publication, the world output will contract significantly in 2009. Table 2 overleaf shows the projected world output for 2009, as a result of the global crisis:-

Table 2: Projected world output[6] in 2009

Serious global downturn

A deep financial crisis and continuing high commodity prices have led to fast deteriorating global growth.
(percent change, unless otherwise noted)

	Year-on-Year		
		Projections	
	2007	2008	2009
World output	**5.0**	**3.9**	**3.0**
Advanced economies	2.6	1.5	0.5
United States	2.0	1.6	0.1
Euro area	2.6	1.3	0.2
Germany	2.5	1.8	—
France	2.2	0.8	0.2
Italy	1.5	–0.1	–0.2
Spain	3.7	1.4	–0.2
Japan	2.1	0.7	0.5
United Kingdom	3.0	1.0	–0.1
Canada	2.7	0.7	1.2
Emerging and developing economies	8.0	6.9	6.1
Developing Asia	10.0	8.4	7.7
China	11.9	9.7	9.3
India	9.3	7.9	6.9
Western Hemisphere	5.6	4.6	3.2
Brazil	5.4	5.2	3.5
Mexico	3.2	2.1	1.8

Source: *World Economic Outlook*, October 2008.
Note: Real effective exchange rates are assumed to remain constant at the levels prevailing during August 18–September 15, 2008.

2.4 Impact on Malaysia

Malaysia cannot be insulated from the global financial crisis and the same concerns that exist for the other economies are mirrored for us. A quote from Tun

[5] Reuters, New Straits Times report dated 13 December 2008

[6] Source: International Monetary Fund, October 2008

Dr. Mahathir[7] (former Prime Minster, Malaysia), "If the Government does not study the financial crisis properly, their plan will be merely "cosmetic changes." What he was driving at was that the Malaysian Government must take effective measures to counter the crisis including making unpopular and hurtful decisions.

Estimates of the economic growth for 2009 according to an undated article in the Malaysian Finance blog spot is that the Malaysian merchandise trade surplus will fall to USD22.9 billion (RM82 billion) in 2009 from an estimated USD 5.3 billion(2008). According to a newspaper report, the October exports saw a downturn of 2.6 per cent to RM53.46 billion; the total merchandise trade was RM97.3 billion for the 10 months – mainly attributed to the lower demand for electronic and electrical products and commodities. HSBC Bank economist described the export data as "the worst in more than 20 months." While the current account posted a RM61 billion surplus, this figure is expected to drop once the demand for Malaysian exports reduces.

Meanwhile the spotlight on the finance industry in Malaysia from various analysts was that "Rough times ahead for Malaysia."[8] The credit crunch will lead to slower loan growth and profit forecasts will be severely reduced. Non-performing loans are expected to increase and the individual banks will have to manage their net loans/deposits and the net assets/total assets ratios. According to the same report, domestic banks are not directly exposed to the US subprime crisis-due to the Malaysian government's ruling limiting the outflow of foreign investments. An Association of Bank Malaysia source[9] said that the country was not experiencing any credit crunch and was of the view that the banking sector remains strong and well-capitalized.

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[7] Quoted in New Straits Times, 12 December 2008

[8] Sahamas stock forum, 18 October 2008

[9] Souce: Horizonmy: Investment blog 3 November 2008

According to Sahamas, the biggest leading indicator of financial health is the stock market and that the Kuala Lumpur Stock Exchange (KLSE) is the best performing stock market in South East Asia, meaning that it has fallen the least.

Findings of Mansor H. Ibrahim[10] in his research was that the *health of the banking sector depends crucially on the stock market stability.*.

3.0 RESEARCH METHODOLOGY

Model specification:

Main assumption made in this study is that the DJIA is a proxy for the financial crisis and that the movements in the DJIA are a reflection of the various events and occurrences that have impacted the stock exchange.

While the analysis was done via SPSS, the *mathematical formula* for computing the correlation is as follows:-

$$r = \frac{n\sum xy - \left(\sum x\right)\left(\sum y\right)}{\sqrt{n\left(\sum x^2\right) - \left(\sum x\right)^2}\sqrt{n\left(\sum y^2\right) - \left(\sum y\right)^2}}$$

where n represents the pair of data ***x*** and ***y***. The quantity ***r***, called the *linear correlation coefficient,* measures the strength of the correlation viz. the direction of a linear relationship between x and y. The linear coefficient is sometimes referred to as the *Pearson product moment correlation coefficient* in honor of its developer *Karl Pearson*.

Should the outcome be a *positive correlation*, it would mean that the variables ***x*** and ***y*** have a strong positive linear correlation where ***r*** is close to +1. In the event the result was a *negative correlation* where *r* is negative, it would mean that the variables *x* and *y* have a strong negative linear correlation i.e. when the value for *x*

[10] Journal of Applied Economics, 2006, Stock Prices and Bank Loan Dynamics in a developing country: Malaysia

increases the value for *y* decreases. A *no correlation situation* would mean that there is no linear or a very weak linear correlation, where r is close to 0. A perfect correlation of ± 1 occurs only when the data points all lie exactly on a straight line.

The KLCI is the Malaysian equivalent of the DJIA and the first analysis done was to establish whether both these variables had a relationship. The sample size of the data was taken from January 2007–December 2008 coinciding with the time when the simmering of the financial crisis began. Firstly, the impact of the DJIA on the KLCI was examined where the month end closing indices of both were plotted on a graph to determine the trend of the movements of the two indices. *(Please refer to Chart 1: Month End Indices for DJIA and KLCI*). Then the variance of the DJIA (expressed as a percentage of the previous closing figure) was plotted against the variance of the KLCI and a similar trend analysis was undertaken. (*Please refer to Chart 2: Variances in the Month End Indices for DJIA and KLCI).* Finally a statistical analysis (via correlation) of these variables was undertaken (using the SPSS) to ascertain the strength of the relationship between these two quantifiable variables.

For the second analysis, the sector indices, including the KLFI, was similarly tested against the KLCI to ascertain the strength of their relationship. The reason why the KL Financial was selected was because the banks are categorised under this broad financial sector. If it were true that the health of the banking sector depended on the stock market stability then the results would show a close relationship between these two sets of variables

For the third analysis, six banking stocks were selected, using the parameters, which were stated earlier viz :- (a) high market capitalisation (b) most active stocks and (c) at least one representation from the medium-sized and the smaller banks. Table 3 below depicts how the six banks met the selection criteria. Expected outcome of the statistical analysis is that the share prices of the banks are expected to move together with the KLCI – viz. when the KLCI falls, as in the

case of this crisis, the share prices too would fall and when the KLCI recovers, the share prices would rise.

Table 3: Selection criteria of the banking stocks

Bank	High market capitalisation [11] RM Billion	Appears weekly as most active stock	Category
Malayan Banking Berhad (Maybank)	25.63	Yes	Large
Bumiputra-Commerce Holdings Berhad (Commerce	20.23	Yes	Large
Public Bank Berhad (PBB)	20.33	Yes	Large
AMMB Holdings Berhad (AMMB)	6.29	Yes	Medium
RHB Capital Berhad (RHB)	8.18	Sometimes	Medium
Affin Bank Berhad (Affin)	1.87	Sometimes	Small

4.0 DATA COLLECTION

There was no primary data, only secondary data. Data was to be collected for DJIA, KLCI and the various sectors as well as the share prices of the selected banks. Many attempts were made to source the historical data from the Bursa Saham and Bank Negara Malaysia websites. It was disappointing that the information was not readily available despite many variations in the inquiries. Finally, the majority of the required data was accessed from the Yahoo Finance website[12] under "*historical prices."*

The user friendly website allowed for options in selection of the required data– daily, weekly or monthly. Further, the data could be downloaded into spreadsheet for further processing purposes.

[11] Source New Straits Times dated 15 December 2008

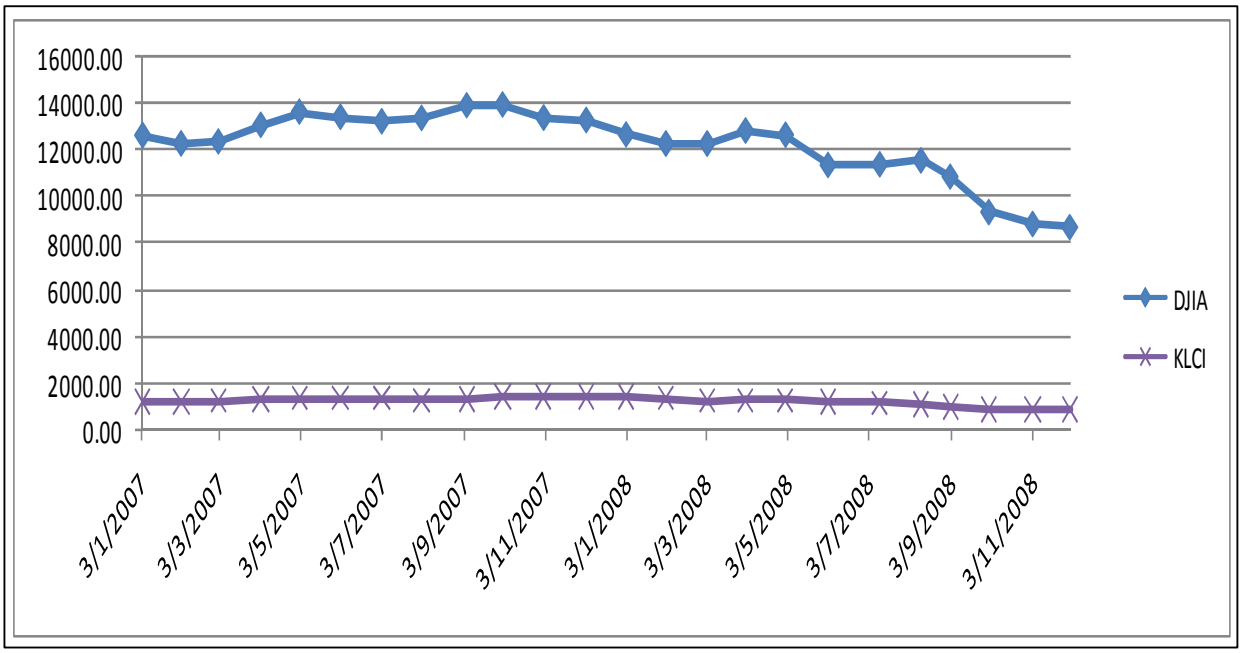
[12] In order to access the website type in Yahoo Finance in the google bar

All data collected was for the period January 2007 till December 2008. Month end closing indices were obtained for DJIA and the KLCI while for the banking stocks, the month end closing share price was used. The data for the sector indices sector indices was not available online and for this I had to request the assistance of my remisier. His contribution for this research is the month end sector indices data.

5.0 FINDINGS

The study of the first set of data (viz. the DJIA and the KLCI indices) was to establish that the KLCI is impacted by the financial crisis, using the proxy DJIA. A graph was plotted to ascertain the trends of the indices.

Chart 1: Month End Indices for DJIA and KLCI

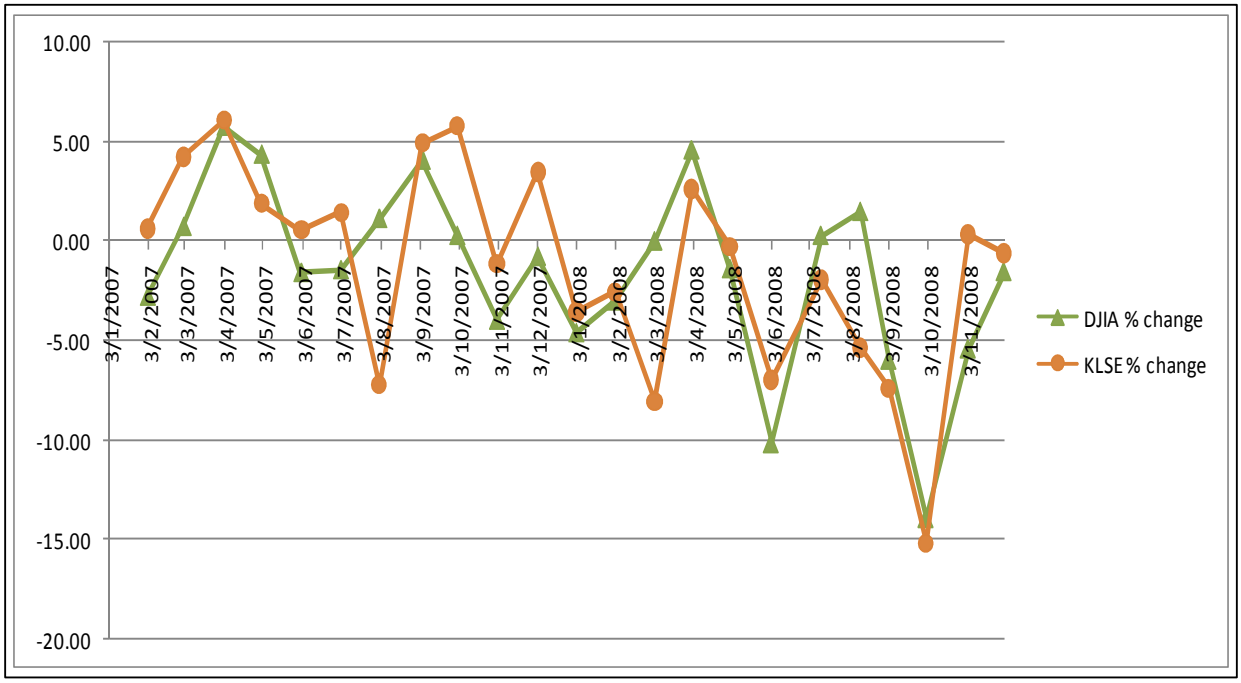


From the results it appeared that the DJIA had more fluctuations compared to the KLCI which showed a flattish trend during the period under study. This observation was based on the fact that the data used was absolute figures and the range of values for DJIA was from 8691 to 13930 whereas the range of values for

KLCI was from 860 to 1445. The y axis was from 0 to 16000, thus making it easier to see the fluctuations only for DJIA.

Instead of the absolute values, the variances in closing indices for DJIA and the KLCI was then used to plot the graphs

Chart 2: Variances in the Month End Indices for DJIA and KLCI



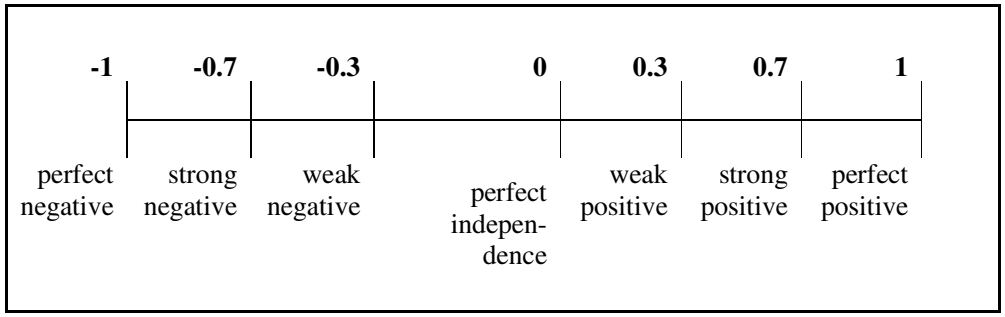
The graph showed that the variance in both the indices moved in tandem with each other i.e. when there was a positive variance for the DJIA, there was an upward movement, which was also reflected in the KLCI movement. The peaks for both indices in April 2007, December 2007 and April 2008 coincided. Similarly the sharp falls in November 2007, January 2008, June 2008 and October 2008 were mirrored for both indices. *This established the fact that there was a close and strong relationship between the two indices and that the KLCI is impacted by the financial crisis (as manifested in the DJIA).*

Statistical analysis -as per Table 4 – revealed that for the period under review, the DJIA had a mean index of 12208.05 with a standard deviation of 1496.32

compared to KLCI which had a mean index of 1229.52 with a standard deviation of 174.58. This meant that the DJIA was more volatile than the KLCI. The study however confirmed that the KLCI is very strongly influenced by the DJIA – as it is positively and significantly correlated to the DJIA with a rho (***r***) of 0.943 and a significant level of 0.01 (two tailed) with a confidence level of 0.99. Statistically significant does not mean that the results are conclusive. It just indicates that the difference is unlikely to be due to chance.

Table 4 below interprets the value of rho.

Table 4: Values of rho or the correlation coefficient r



The second statistical analysis was performed on all the six sector indices and the KLCI – to determine whether the individual sectors, in particular the KLFI, had a close relationship with the KLCI. The results are tabulated in Table 5 overleaf.

Table 5: Sector analysis - Correlations and descriptive statistics

	Mean	Standard Deviation	N	Correlation
KL Composite Index	1229.5271	174.58531	24	1.0
KL Financial Index	9293.4750	2328.74119	24	.570
KL Industrial Index	2535.6504	268.65813	24	.909
KL Consumer Index	308.0433	22.89457	24	.810
KL Property Index	860.6025	213.58036	24	.895
KL Construction Index	250.7008	54.54364	24	.949
KL Plantation Index	6260.5492	1380.86258	24	.704

All six sectors exhibited a positive correlation with the KLCI, at the significant level of 0.01 (with a confidence level of 0.99). For five sectors (excluding KLFI), the indices are highly correlated to the KLCI changes, as evidenced from the above table. For instance, the KL Plantation Index, which had a correlation of 0.704, comprises of commodity counters and the prices of these stocks would immediately reflect the changes in the global commodity prices – e.g. when the price of crude oil plummeted, the price of crude palm oil too dived and this emphasizes that the plantation sector moves very closely with the KLCI. Similarly for the other sectors, the global crisis concerns would affect the industrial output, e.g. electronic and electrical industries; the consumer spending; the property values and the construction and infra-structure projects. However in the case of KLFI, the rho was 0.57 which indicated that while the sector would react positively to the volatility in the KLCI, it would be at a more restrained level. Underlying factors viz. the fundamentals of the banks which determine their financial strength, would also influence the share price, but to a lesser degree. These fundamentals would include the liquidity position, the existing and the expected non-performing loans, the future loan growth, investment and expansion policies etc.

While the correlations between the other sectors and the KLCI are stronger, for the purpose of this study, the outcome of the analysis does establish that there is a strong and positive correlation between the KLFI and the KLCI at a significant

level at 0.01. This then satisfies the expected outcome for the KLFI being closely linked to the KLCI.

Finally statistical analysis is performed on the final set of data which is in fact the objective of this study. The price changes of the six selected banks (Affin, AMMB, Commerce, Maybank, PBB and RHB) were compared to the index changes in the KLCI. Expected outcome is that there should be a relationship between the two which would indicate that the Malaysian banking stocks are impacted by the financial crisis. The results as summarized below reveal that the correlation for all the six banking stocks is positive. The impact of the KLCI strongly influences the banking stocks. However some of the counters have a stronger link than others. Table 5 below lists the rho for the six banking stocks together with their mean and standard deviation.

Table 6: Bank-wise - Correlations and descriptive statistics

	Mean	Std. Deviation	N	Correlation
KL Composite Index	1245.5639	159.41333	23	1.0
Affin Bank Berhad (Affin)	2.1339	.41127	23	0.930
Arab Merchant Holdings Berhad (AMMB)	3.6009	.64915	23	0.898
Bumiputra Holdings Malaysia Berhad (Commerce)	9.5461	1.56039	23	0.941
Malayan Banking Berhad (Maybank)	9.2300	2.04395	23	0.790
Public Banking Berhad (PBB)	9.9100	1.00273	23	0.512
RHB Capital Berhad (RHB)	4.6552	.77973	23	0.822

While PBB has the lowest correlation with KLCI, rho being 0.512, and a mean of 9.9100 with a standard deviation of 1.00273, its price movements are not as volatile as Commerce which has the closest rho with KLCI at 0.941 with a lower mean of 9.5461 and a broader standard deviation of 1.56039. This means that the volatility of Commerce is higher than PBB and it moves more in tandem with the KLCI index changes

PBB's lower correlation is due to its underlying strengths i.e. lowest non-performing ratio in the industry and high dividend payouts. PBB is in fact the most expensive banking stock in Asia, according to a Business Times report dated 15 December 2008, and its share price had come down the least, sliding down by 32 per cent since January 2008 compared to the regional average of over 50 per cent. The same source quoted PBB as smelling like roses.

In the case of Maybank, which had a correlation rho of 0.790 with the KLCI, other underlying issues too came into play in determining the stock price. This could be attributed to the erosion of investor confidence coupled in part due to herd instinct – arising from the bank's large investments in Bank Internasional Indonesia and the MCB Bank in Pakistan. Firstly, the price paid for the acquisitions was deemed to be too high and secondly the perceived potential losses arising from regulatory risk in Indonesia and sovereign risk in Pakistan did not go well with the investors.

Despite the different banks displaying variations in their rho, all six banks have exhibited a positive correlation – which confirms the expected outcome of this study.

6.0 CONCLUSION

The findings of this study can be summarized as follows:

The current global financial crisis which originated from the US has impacted all sectors of its economy and the performance of the various stock exchange indices in the US are testimony to this. The DJIA which had been selected for the purpose of this study had fallen by 43 per cent from 14092.43 in October 2007 to 8048.69 in November 2008 . Locally the KLCI had also fallen by 43% from its peak of 1514.31 in January 2007 to 867.04 in November 2008.

The sector analysis proved that all six sectors have been impacted by the KLCI (a.k.a. the financial crisis) and that the banking shares which are categorized under

the KL Financial Index were similarly adversely affected. The KLFI reduced from its highest index of 11280.38 (July 2007) to its low of 6616.46 – i.e. by 41 per cent which is comparable to the reduction of 43 per cent in the KLCI. This indicates the strong relationship between these two indices and that the financial sector does influence the KLCI.

And finally the reduction in the share prices during the period under study indicate that the bank stocks are indeed affected by the reduction in the KLCI – Affin's share price dropped by 57 per cent, AMMB's and Maybank's by 56 per cent , Commerce by 52 per cent , RHB by 42 per cent and PBB by only 26 per cent . All price reductions (except for PBB) have been at the level of the KLCI reduction which supports our study that the Malaysian banking stocks have been impacted by the global financial crisis.

In conclusion, it is very important for the Malaysian investor to closely monitor the economic development in the US as signs of improvement in the US will lead to improvement in our local equity market, as investor confidence returns.

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7.0 Appendix A

Table 7: Month end closing indices - DJIA & KLCI

Month	DJIA	DJIA % change	KLCI	KLCI % change
3/1/2007	12621.69	na	1189.35	na
1/2/2007	12268.63	-2.80	1196.45	0.60
1/3/2007	12354.35	0.70	1246.87	4.21
2/4/2007	13062.91	5.74	1322.25	6.05
1/5/2007	13627.64	4.32	1346.89	1.86
1/6/2007	13408.62	-1.61	1354.38	0.56
2/7/2007	13211.99	-1.47	1373.71	1.43
1/8/2007	13357.74	1.10	1273.93	-7.26
4/9/2007	13895.63	4.03	1336.30	4.90
1/10/2007	13930.01	0.25	1413.65	5.79
1/11/2007	13371.72	-4.01	1396.98	-1.18
3/12/2007	13264.82	-0.80	1445.03	3.44
2/1/2008	12650.36	-4.63	1393.25	-3.58
1/2/2008	12266.39	-3.04	1357.40	-2.57
3/3/2008	12262.89	-0.03	1247.52	-8.09
1/4/2008	12820.13	4.54	1279.86	2.59
1/5/2008	12638.32	-1.42	1276.10	-0.29
2/6/2008	11350.01	-10.19	1186.57	-7.02
11/7/2008	11378.02	0.25	1163.09	-1.98
11/8/2008	11543.55	1.45	1100.50	-5.38
2/9/2008	10850.66	-6.00	1018.68	-7.43
1/10/2008	9336.93	-13.95	863.61	-15.22
3/11/2008	8829.04	-5.44	866.14	0.29
1/12/2008	8691.33	-1.56	860.68	-0.63
Correlation coefficient = r = 0.69				
Coefficient of determination = r^2 = 0.48				

Table 8: Month end closing indices – KLCI and KL Financial Index

Month	KLCI	KLCI % change	KL Financial Index	KL Financial index % change
3/1/2007	1189.35	na	9599.04	na
1/2/2007	1196.45	0.60	9893.25	3.06
1/3/2007	1246.87	4.21	10246.53	3.57
2/4/2007	1322.25	6.05	10583.46	3.29
1/5/2007	1346.89	1.86	10706.55	1.16
1/6/2007	1354.38	0.56	10903.90	1.84
2/7/2007	1373.71	1.43	11280.58	3.45
1/8/2007	1273.93	-7.26	10449.67	-7.37
4/9/2007	1336.30	4.90	10551.92	0.98
1/10/2007	1413.65	5.79	11238.79	6.51
1/11/2007	1396.98	-1.18	10715.06	-4.66
3/12/2007	1445.03	3.44	10905.35	1.78
2/1/2008	1393.25	-3.58	10602.26	-2.78
1/2/2008	1357.40	-2.57	10166.64	-4.11
3/3/2008	1247.52	-8.09	9579.43	-5.78
1/4/2008	1279.86	2.59	9944.57	3.81
1/5/2008	1276.10	-0.29	9792.63	-1.53
2/6/2008	1186.57	-7.02	8746.18	-10.69
11/7/2008	1163.09	-1.98	9077.09	3.78
11/8/2008	1100.50	-5.38	8871.66	-2.26
2/9/2008	1018.68	-7.43	8252.38	-6.98
1/10/2008	863.61	-15.22	6618.56	-19.80
3/11/2008	866.14	0.29	6616.46	-0.03
1/12/2008	860.68	-0.63	6710.44	1.42
Correlation coefficient = r = 0.90				
Coefficient of determination = r^2 = 0.82				

Table 9(a) : Month end closing indices KLCI & KL Financial, KL Industrial & KL Consumer indices

Month	KLCI	KLCI % change	KL Financial Index	KL Financial index % change	KL Industrial Index	KL Industrial index % change	KL Consumer Index	KL Consumer index % change
3/1/2007	1189.35		9599.04		2357.60		273.74	
1/2/2007	1196.45	0.60	9893.25	3.06	2336.77	-0.88	278.49	1.74
1/3/2007	1246.87	4.21	10246.53	3.57	2416.07	3.39	293.55	5.41
2/4/2007	1322.25	6.05	10583.46	3.29	2582.36	6.88	309.59	5.46
1/5/2007	1346.89	1.86	10706.55	1.16	2606.85	0.95	301.34	-2.66
1/6/2007	1354.38	0.56	10903.90	1.84	2535.93	-2.72	310.03	*2.88*
2/7/2007	1373.71	1.43	11280.58	3.45	2626.86	3.59	315.27	1.69
1/8/2007	1273.93	-7.26	10449.67	-7.37	2479.35	-5.62	305.00	-3.26
4/9/2007	1336.30	4.90	10551.92	0.98	2653.46	7.02	325.47	6.71
1/10/2007	1413.65	5.79	11238.79	6.51	2745.95	3.49	335.85	3.19
1/11/2007	1396.98	-1.18	10715.06	-4.66	2913.46	6.10	331.48	-1.30
3/12/2007	1445.03	3.44	10905.35	1.78	3014.43	3.47	343.89	3.74
2/1/2008	1393.25	-3.58	10602.26	-2.78	2949.65	-2.15	330.32	-3.95
1/2/2008	1357.40	-2.57	10166.64	-4.11	2878.64	-2.41	328.12	-0.67
3/3/2008	1247.52	-8.09	9579.43	-5.78	2621.09	-8.95	316.61	-3.51
1/4/2008	1279.86	2.59	9944.57	3.81	2695.19	2.83	331.55	4.72
1/5/2008	1276.10	-0.29	9792.63	-1.53	2690.57	-0.17	332.72	0.35
2/6/2008	1186.57	-7.02	8746.18	-10.69	2558.26	-4.92	320.94	-3.54
11/7/2008	1163.09	-1.98	9077.09	3.78	2420.63	-5.38	303.71	-5.37
11/8/2008	1100.50	-5.38	8871.66	-2.26	2293.15	-5.27	300.27	-1.13
2/9/2008	1018.68	-7.43	8252.38	-6.98	2228.32	-2.83	290.70	-3.19
1/10/2008	863.61	-15.22	6618.56	-19.80	2085.64	-6.40	264.77	-8.92
3/11/2008	866.14	0.29	6616.46	-0.03	2088.17	0.12	277.08	4.65
1/12/2008	860.68	-0.63	6710.44	1.42	2077.21	-0.52	272.55	-1.63
Correlation coefficient = r				0.90		0.58		0.76
Coefficient of determination = r^2				0.82		0.34		0.57

Table 9(b) : Month end closing indices KLCI & KL Property, KL Construction & KL Plantation indices

Month	KLCI	KLCI % change	KL Property Index	KL Property index % change	KL Construction Index	KL Construction index % change	KL Plantation Index	KL Plantation index % change
3/1/2007	1189.35		750.50		237.53		4509.08	
1/2/2007	1196.45	0.60	820.45	9.32	252.00	6.09	4704.31	4.33
1/3/2007	1246.87	4.21	922.91	12.49	270.76	7.44	5091.13	8.22
2/4/2007	1322.25	6.05	1061.75	15.04	280.92	3.75	5791.99	13.77
1/5/2007	1346.89	1.86	1032.93	-2.71	299.17	6.50	6130.20	5.84
1/6/2007	1354.38	0.56	1128.37	9.24	299.96	0.26	6000.90	-2.11
2/7/2007	1373.71	1.43	1209.93	7.23	312.27	4.10	6156.58	2.59
1/8/2007	1273.93	-7.26	1072.85	-11.33	287.57	-7.91	5638.42	-8.42
4/9/2007	1336.30	4.90	1093.69	1.94	303.87	5.67	6406.12	13.62
1/10/2007	1413.65	5.79	1094.82	0.10	316.59	4.19	7395.35	15.44
1/11/2007	1396.98	-1.18	1031.14	-5.82	302.48	-4.46	7252.72	-1.93
3/12/2007	1445.03	3.44	1035.66	0.44	313.04	3.49	8089.30	11.53
2/1/2008	1393.25	-3.58	954.45	-7.84	301.79	-3.59	7645.65	-5.48
1/2/2008	1357.40	-2.57	878.17	-7.99	272.13	-9.83	8421.24	10.14
3/3/2008	1247.52	-8.09	782.61	-10.88	242.13	-11.02	7490.15	-11.06
1/4/2008	1279.86	2.59	813.22	3.91	238.69	-1.42	7764.19	3.66
1/5/2008	1276.10	-0.29	790.19	-2.83	229.12	-4.01	7996.36	2.99
2/6/2008	1186.57	-7.02	698.68	-11.58	207.82	-9.30	7924.93	-0.89
11/7/2008	1163.09	-1.98	675.23	-3.36	209.51	0.81	6438.08	-18.76
11/8/2008	1100.50	-5.38	664.80	-1.54	196.87	-6.03	5779.54	-10.23
2/9/2008	1018.68	-7.43	620.56	-6.65	180.88	-8.12	4853.55	-16.02
1/10/2008	863.61	-15.22	509.46	-17.90	146.30	-19.12	4623.89	-4.73
3/11/2008	866.14	0.29	510.91	0.28	154.71	5.75	4267.03	-7.72
1/12/2008	860.68	-0.63	501.18	-1.90	160.71	3.88	3900.47	-8.59
Correlation coefficient = r				0.69		0.82		0.82
Coefficient of determination = r^2				0.67		0.57		0.57

Table 10(a): Month end closing index for KLCI and closing prices for Affin, AMMB & Commerce

Month	KLCI	KLCI % change	Affin	Affin % change	AMMB	AMMB % change	Commerce	Commerce % change
3/1/2007	1189.35		1.89		3.16		8.84	
1/2/2007	1196.45	0.60	2.15	13.76	3.30	4.43	8.99	1.70
1/3/2007	1246.87	4.21	2.27	5.58	3.72	12.73	9.56	6.34
2/4/2007	1322.25	6.05	2.29	0.88	3.95	6.18	10.38	8.58
1/5/2007	1346.89	1.86	2.30	0.44	3.87	-2.03	11.60	11.75
1/6/2007	1354.38	0.56	2.44	6.09	4.27	10.34	11.40	-1.72
2/7/2007	1373.71	1.43	2.66	9.02	4.65	8.90	11.50	0.88
1/8/2007	1273.93	-7.26	2.48	-6.77	4.29	-7.74	10.62	-7.65
4/9/2007	1336.30	4.90	2.45	-1.21	4.29	0.00	10.43	-1.79
1/10/2007	1413.65	5.79	2.86	16.73	4.22	-1.63	11.21	7.48
1/11/2007	1396.98	-1.18	2.53	-11.54	4.02	-4.74	10.43	-6.96
3/12/2007	1445.03	3.44	2.55	0.79	3.80	-5.47	10.72	2.78
2/1/2008	1393.25	-3.58	2.31	-9.41	3.66	-3.68	10.04	-6.34
1/2/2008	1357.40	-2.57	2.21	-4.33	3.72	1.64	10.23	1.89
3/3/2008	1247.52	-8.09	1.96	-11.31	3.44	-7.53	9.70	-5.18
1/4/2008	1279.86	2.59	2.01	2.55	3.76	9.30	9.70	0.00
1/5/2008	1276.10	-0.29	2.04	1.49	3.98	5.85	9.50	-2.06
2/6/2008	1186.57	-7.02	1.87	-8.33	3.18	-20.10	8.00	-15.79
11/7/2008	1163.09	-1.98	1.84	-1.60	3.32	4.40	8.75	9.38
11/8/2008	1100.50	-5.38	1.85	0.54	3.06	-7.83	8.35	-4.57
2/9/2008	1018.68	-7.43	1.60	-13.51	2.96	-3.27	7.65	-8.38
1/10/2008	863.61	-15.22	1.22	-23.75	2.14	-27.70	6.10	-20.26
3/11/2008	866.14	0.29	1.30	6.56	2.06	-3.74	5.95	-2.46
1/12/2008	860.68	-0.63	1.25	-3.85	2.22	7.77	5.55	-6.72
Correlation coefficient = r			0.78		0.74			0.79
Coefficient of determination = r^2			0.62		0.54			0.63

Table 10(b): Month end closing index for KLCI and closing prices for Maybank, PBB & RHB

Month	KLCI	KLCI % change	Maybank	Maybank % change	PBB	PBB % change	RHB Cap	RHB % change
3/1/2007	1189.35		11.07		8.46		3.45	
1/2/2007	1196.45	0.60	10.98	-0.81	8.42	-0.47	4.17	20.87
1/3/2007	1246.87	4.21	11.24	2.37	8.56	1.66	4.55	9.11
2/4/2007	1322.25	6.05	10.88	-3.20	9.14	6.78	4.50	-1.10
1/5/2007	1346.89	1.86	10.97	0.83	9.62	5.25	4.52	0.44
1/6/2007	1354.38	0.56	10.88	-0.82	9.48	-1.46	4.59	1.55
2/7/2007	1373.71	1.43	11.15	2.48	9.86	4.01	5.81	26.58
1/8/2007	1273.93	-7.26	10.51	-5.74	9.27	-5.98	5.10	-12.22
4/9/2007	1336.30	4.90	9.97	-5.14	9.86	6.36	5.77	13.14
1/10/2007	1413.65	5.79	10.51	5.42	11.00	11.56	6.10	5.72
1/11/2007	1396.98	-1.18	10.70	1.81	10.31	-6.27	5.58	-8.52
3/12/2007	1445.03	3.44	10.96	2.43	10.90	5.72	5.62	0.72
2/1/2008	1393.25	-3.58	11.24	2.55	11.30	3.67	5.14	-8.54
1/2/2008	1357.40	-2.57	8.67	-22.86	10.50	-7.08	4.77	-7.20
3/3/2008	1247.52	-8.09	8.19	-5.54	10.50	0.00	4.59	-3.77
1/4/2008	1279.86	2.59	7.76	-5.25	11.40	8.57	4.81	4.79
1/5/2008	1276.10	-0.29	7.27	-6.31	11.50	0.88	4.85	0.83
2/6/2008	1186.57	-7.02	6.83	-6.05	10.40	-9.57	4.13	-14.85
11/7/2008	1163.09	-1.98	7.71	12.88	10.40	0.00	4.11	-0.48
11/8/2008	1100.50	-5.38	7.61	-1.30	10.20	-1.92	4.09	-0.49
2/9/2008	1018.68	-7.43	6.69	-12.09	10.00	-1.96	4.00	-2.20
1/10/2008	863.61	-15.22	5.35	-20.03	8.35	-16.50	3.06	-23.50
3/11/2008	866.14	0.29	5.15	-3.74	8.50	1.80	3.76	22.88
1/12/2008	860.68	-0.63	5.00	-2.91	8.30	-2.35	3.52	-6.38
Correlation coefficient = r				0.52		0.82		0.64
Coefficient of determination = r^2				0.27		0.68		0.41