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Article · June 2014

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The Effects of the Financial Crisis on the Financial Performance of Malaysian Companies

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Abstract

The 2007/08 financial crisis which began in the United States was not felt in Malaysia until the last quarter of 2008 where GDP stalled and then began to fall. The country has a high export to GDP ratio and in 2009 the contraction in manufacturing exports was steep. This paper investigates the effects of the crisis on the financial performance of 70 companies in the manufacturing sector over a period of 5 years from 2006 to 2010. Using factor analysis, an initial set of 21 financial ratios was reduced to just six significant ratios. Using this smaller set of representative ratios, the sample companies were cluster analyzed into 4 categories of poor, below average, above average and good financial performers. The results showed that there is a direct effect of the financial crisis on the financials of companies in the study where 46 companies categorized as good in 2006 fell to just 6 in 2010 while 7 companies in the poor category increased to 27 during the same period. Of particular concerns would be the 15 companies that fell three clusters down from good to poor performers and 15 out of 17 companies in the average categories that dropped into the poor performing category. A key finding from this study is that when a financial or economic crisis occurs, most companies' financials would be severely and adversely impacted and if the negative economic conditions do not improve, there would be high probabilities that many companies would face liquidity

and solvency issues that could eventually lead to collapse and bankruptcies. Finally, with just 6 key financial ratios, a company's financial performance can be tracked and analyzed over a period of time resulting in the enhancement of the quality of credit evaluations as well as the minimizing of investor risks.

Keywords: Financial crisis, financial performance, financial ratios, Factor analysis and Cluster analysis

JEL Classifications Codes: G33, C39, M41

1. Introduction

Maximizing shareholders' equity values has been generally accepted as one of the most important objective of any business organization even though this goal may not be stated explicitly. Whether the other motivations for a business entity are corporate social responsibility, environmentally friendly policies or sustainable business development, maximizing profit will still be a dominant factor in management decision makings. According to Hanson and Wernerfelt (1989), there are two main areas of research on the determinants of company performance and success namely, the external market environment and organizational factors. However, the performance of a company depends on many factors internal and external. External factors would include the market conditions of the country where the company is located, government policies and regulations and the country's current stage of economic development. Internal factors would include the products and services the company is offering, the financial strength of the company as well as the quality of its management team. During normal times, however, poor financial performances are more likely to be caused by falling profits or losses for several years in succession, excessive debts, insufficient working capital, managerial errors and misjudgements, though management frauds have surfaced now and then and recently involving large multinationals.

An economic downturn like the 1997-98 Asian financial crises resulted in dampened business confidence, poorer company financial performance and increased company bankruptcies. In a study by Cirmizi, Klapper and Uttamchandani (2012), the 2007/2008 financial crisis affected companies around the world resulting in reduced demand for goods and services, contraction in availability of business financing and a declining flow of inter-border investment funds. There was an increase in the level of insolvency among business entities due to declining demand for goods and services and decreasing availability of external finance. Another study by Erkens, Hung and Matos (2012) stated that due to the large numbers of collapses in the financial institutions around the world, there was a freeze of global credit markets that requires widespread government interventions. Shama (1978) found that consumers felt more insecure over their employment during economic slowdowns and their buying behavior changes with the changing economic conditions.

Companies that are affected more severely during economic crisis may be forced to liquidate and cease business, while others affected less severely may have to curtain their operations, retrenching some of their workers, asking employees to accept a smaller compensation package and finding ways and means to cut costs so as to remain competitive. The study by Koksal and Ozgul (2007), found that managers are asked to either delay or abandon investment projects during an economic downturn while the study by Ang, Leong and Kotler (2000) found that businesses will encounter cash flow issues as lending institutions and suppliers are reluctant to offer favorable financial terms and customers default on their outstanding credits or they simply buy and spend less. The resulting combinations of tight financing, reduced demand and fall in exports, reduced consumer spending and consumer sentiments will contribute to tight cash flows, declining cash positions, falling profitability and losses leading to potential insolvency and bankruptcy.

Therefore, to be able to analyse and track companies' financial performance closely over time and to be able to classify companies into good or poor financial performers is of utmost importance. Many interested stakeholders including individuals, institutional investors and fund managers who manage large investment portfolios can enhance the market value and returns of their clients' investments if they are able to discriminate the weak companies from the healthy ones. Having sufficient knowledge and skills in financial statement analysis can be very useful. Financial ratios when used and properly interpreted will enable an external party to make informed judgments about a company's profitability, management effectiveness and financial health and its ability to sustain and compete with other players in the industry.

The purpose of this study is identify a smaller set of significant and representative financial ratios using factor analysis (from an initial set of 21 commonly used ratios found in the literature), that would be most effective in classifying 70 listed manufacturing companies from the Malaysian Stock Exchange (Bursa Saham Malaysia) according to their financial performance. The companies are randomly selected and represent about 28% of the total number of companies that are involved in the manufacturing of industrial products. Another objective of this study is to use the smaller set of representative ratios as identified, to cluster these companies into four clusters namely good financial performers, above and below average performers and the poor performers. Each company's performance are analysed and tracked over a five year period from 2006 to 2010 to see how they have moved or migrated between the clusters. Finally, a comparison is made to see whether there is a direct link between company financial performance and the financial crisis that started in 2007/2008. The Gross Domestic Product (GDP) growths as well as the export data for the five years are used as indicators of the economic conditions during each of the five years.

The rest of the paper is organized as follows: Section 2 reviews the relevant literature, Section 3 discusses the methodology, sample sizes and variables used, Section 4 presents the findings and discussions on the findings, Section 5 gives the concluding remarks of the paper and finally Section 6 briefly describes the limitation of the study and recommendations for future studies.

2. Literature Review

Most businesses and corporations are compelled to produce a set of financial statements annually to comply with legal and regulatory requirements. For most stakeholders, to understand and evaluate the financial performance and financial status of companies may not be easy unless they have some basic knowledge in accounting and finance. When it comes to understanding how a company has performed in the past and its likely future performance, analysing financial statements is one of the most useful tools an interested party can use. Eidleman (1995) states that financial-statement analysis looks at a firm's past performance to predict its future condition. Lev and Sunder (1979) found that financial ratios are used extensively by both practitioners and researchers. Ratio variables have also been used in studies by Cleary (1999) in explaining investment decisions by companies and by Ozkan (2001) in his study on the determinants of companies' capital structure. In the area of distress and bankruptcy prediction, quite a number of statistical techniques were employed in different models using quite a wide array of ratios in their initial studies and later selecting a

few that is felt to be most effective for prediction accuracy (Altman (1968), Pinches (1973), and Jones and Hensher (2004). Using a combination of financial ratios on a set of financial statements can reveal strengths and weaknesses in a company. Ratios are commonly used to track a company's financial trend over time, whether profitability is acceptable and whether cash flows and cash positions are healthy. There are so many financial ratios that can be computed from the financial data found in a set of financial statements. As many of the ratios measure similar characteristics, it would not be necessary to use all of them. It has been found that a smaller set of dominant ratios are sufficient to evaluate the financial performances of companies (Taffler 1983, and Koh and Killough (1990).

One statistical method often used as data summarization and data reduction is factor analysis. . The result of data summarization is to derive the underlying dimensions that will describe the data in a much smaller number of concepts than the original individual variables. Data reduction on the other hand extends the process of data summarization. It obtains an empirical value or factor score for each factor and this value will be used instead of the original values. Some past studies that have used factor analysis to reduce a larger set of financial ratios into a smaller set of representative ratios include Pinches (1973), Tan et al. (1997), Ganalsingam and Kumar (2001), Öcal et al. (2007) and Anupam et al. (2011).

Cluster analysis is a statistical technique where similar entities are identified from the characteristics the entities possess. Companies are clustered in the same group where the degree of association is strong between companies in that group and association is weak between members of different clusters. This is minimizing within-cluster variation and maximizing between-cluster variation. According to Sharma and Wadhawan (2009), in their study on using cluster analysis on small medium enterprises, clustering is explained as a mathematical method for segregating the observed data into groups so as to maximize the similarity of observations within the same group and minimize the similarity of observations across different groups. Jensen and Meckling (1976), in their study on using cluster analysis to study the financial performance of business firms, said that cluster analysis is about "classifying the entities into various clusters where items "within" a cluster are deemed to be more homogeneous than items "between" clusters". Sharma and Wadhawan (2009) used eleven variables and produced three clusters. The objective of their study is to cluster the successful SMEs based on their growth, mode and strategies. Using cluster analysis, they tried to search for the common characteristics between the different types of SMEs.

3. Research Methodology

3.1 Sample Size

In this study, financial statements from the annual reports of companies from the Industrial Products sector as listed in the Bursa Saham Malaysia (Malaysian Stock Exchange) are used in this study. The companies would be randomly selected and analyzed over a period of five years from 2006 to 2010.

3.2 Selection of Variables

Twenty-one ratios are initially selected and classified into five groups. The ratios are chosen to ensure that all the financial characteristics of the companies are not excluded. The ratios

are grouped under five main categories to illustrate and represent the companies' short-term liquidity and cash positions, profitability performance, solvency and leverage status and the efficient utilization of the company's assets. Table 1 below shows the groupings, the financial ratios and their codes used in the study"

Table 1. Financial Ratios

Group 1: Short- term Liquidity		Group 2: Profitability	
Working Capital Ratio	WCR	Earnings B. Interest and Tax/Total Assets	EBITTA
Quick Ratio	QR		
Working Capital/Sales	WCS	Net Profit Margin	NP
Cash Flow/Sales	CFS	Net Income/Total Assets	NITA
Cash Flow/Total Assets	CFTA	Net Income/Total Debts	NITD
Cash Flow/Total Debts	CFTD	Retained Profit/Total Assets	RPTA
Group 3: Cash Position		Group 5: Operating Asset Efficiency	
Cash/Sales	CS	Debtors Turnover	DT
Cash/Total Assets	CTA	Inventory Turnover	IT
Cash/Current Liabilities	CCL	Total Assets Turnover	TAT
Cash/Total Debts	CTD		
Group 4: Solvency & Leverage			
Total Debts/Total Assets	TDTA		
Total Debts/Shareholders Fu	TDSF		
Long Term Debt/Total Assets	LTDTA		

3.3 Factor Analysis

Factor analysis is a statistical tool from the SPSS is used as a data reduction technique to reduce the initial set of 21 financial ratios into a more parsimonious and smaller set of ratios to be used for the classification of the 70 companies according to their financial performance. This statistical method examined the interrelationships among a large number of variables and then tries to explain them in accordance to their underlying characteristics called factors. According to Hair et al. (2009), for factor analysis to be used effectively, there should be at least five variables, that there should be more observations than the variables and that the minimum absolute sample size should be 50 observations. In this study, the sample size is 70 companies covering a period five years giving a total of 350 observations. To determine the number of factors to extract, this study will use the latent root criterion which sets a threshold value for assessing the eigenvalues of the derived factors. This means that only factors with an eigenvalue of more than 1 will be considered as significant and will be extracted. There must be multicollinerity in the variables and this is assumed to be the case before factorizing.. The variables must be interrelated, whether strongly or not, as the analysis aims to find the underlying common characteristics among the variables. If each variable is not related to

another, then each variable will be its own factor as factor analysis has no common underlying dimensions with which to create factors. Therefore, tests of appropriateness will be undertaken with the test of sphericity and the measure of sampling adequacy (MSA) will be utilized.

The Bartlett test of sphericity test the null hypothesis that the correlation matrix is an identity matrix where all the diagonal elements is 1 and the off diagonal elements is 0 and this null hypothesis must be rejected. The Bartlett test must have a p-value of < 0.05 to indicate that sufficient correlations exist among the variables. The measure of sampling adequacy is measured by the Kaiser-Meyer-Olkin (KMO) statistic. If the variables (financial ratios) are correlated or at least partially correlated, then the KMO statistic will predict that the variables used will factor well and it can also identify the variables that need to be taken out of the analysis due to lack of interrelationship. The KMO statistic varies between 0 and 1, and values closer to 1 are better. If the reading is less than 0.5 then the variable with the lowest individual KMO statistic value will be removed one at a time until the KMO overall rises above .50, as well as when each individual variable KMO is above .50.

3.4 Cluster Analysis

After factor analysis, the smaller set of ratios is then used in another statistical technique called cluster analysis from the SPSS to classify the sample companies into four clusters: good, above average, below average and poor performers. Companies are clustered in the same group where the degree of association is strong between companies in that group and association is weak between members of different clusters. This is minimizing within-cluster variation and maximizing between-cluster variation. For this study, the K-means clustering method will be employed. The K-means algorithm method is a partitioning clustering approach In the K-means analysis, the number of clusters (k clusters) is initially specified. Each cluster will have a centroid to be called the k centroid. The characteristics of a cluster are the centroid or average values of the characteristic of the variables comprising the cluster. These centroids should be placed as far away as possible from each other as the location can affect the result.

The K-means algorithm aims at minimizing an *objective function*, in this case a squared error function. The objective function is:

$$J = \sum_{j=1}^{k} \sum_{i=1}^{n} \left\| x_i^{(j)} - c_j \right\|^2 \int$$

where $\left\| x_i^{(j)} - c_j \right\|^2$ is a chosen distance measure between a data point $x_i^{(j)}$ and the cluster centre c_j, is an indicator of the distance of the n data points from their respective cluster centers. The Euclidean distance method measures the straight line distance between two points. For example, if we used the squared Euclidean distance to measure the similarity between two points with specified dimensional spaces, the squared distance between any two points in a p-dimensional space is given by the formula:

$$D_y^2 = \sum_{k=1}^{p} (x_{ik} - x_{jk})$$

where x_{ik} is the coordinate of the *ith* consumer for the variable and x_{jk} is the coordinate of the *jth* consumer for the *kth* variable. Dy is the distance between *i* and *j, p* is the number of variables and *n*=1, 2, 3,…, ∞.

The F statistic and significance level of each variable will be examined on the significant differences across the three clusters. Here, only the significant variables will be taken into account in the interpretation and the labeling of the three clusters. Profiling of the clusters will be calculated with the use of discriminate analysis. Profiling is a descriptive way to understand the characteristics of each cluster and how they differ from each other. Anova may be used other than discriminate analysis as mentioned above.

The companies are then clustered into good financial performers, average and poor performers within each sector. Each cluster depending on the characteristics of the data used will defined the class they belong to. The cluster analysis will be performed for each year to check whether companies will remain or move within each cluster in each of the five years.

4. Results and Findings

Table 2 below showed the results of the factor analysis. Six variables were selected as most significant and representative from the initial set of 21 ratios. Of the six ratios, two measure operating asset efficiency while one each measure cash position, profitability, solvency and short-term liquidity. Each of the six ratios showed high factor loadings and the criteria for selecting the ratios is that each must have an eigenvalue of more than 1. The communalities showed how much of the variance in the variables has been accounted for by the extracted factors. For example, 91.7% of the variance in Cash to Current Liabilities are accounted for and 95% of the variance in Earnings before Interest and Tax are explained. For all the ratios selected after the factor analysis, the factor loadings are very high ranging from 0.849 for Total Assets Turnover to 0.943 for Earnings before Interest and Tax indicating that the ratios selected are good representation of the initial set of ratios. The sampling adequacy was good with the Kaiser-Meyer-Olkin (KMO) measure showing a p-value of 0749. The Bartlett's test of shpericity showed a p-value of 0.00 indicating that the null hypothesis that the variables in the correlation matrix are uncorrelated can be rejected.

Table 2. Selected ratios after factor analysis

Ratio Variables	Codes	Ratio category	Eigen-values	Factor Loadings	Communalities
Cash to Current Liabilities	CCL	Cash position	7.120	0.923	91.7%
Earnings Before Interest & Tax	EBITTA	Profitability	2.742	0.943	95%
Total Debts to Shareholders' Funds	TDSF	Solvency	2.059	-0.807	76.7%
Cash Flow to Total Assets	CFTA	Short-term liquidity	1.761	0.876	82.9%
Total Assets Turnover	TAT	Efficiency	1.590	0.849	80.8%
Inventory Turnover	IT	Efficiency	1.059	0.923	86.7%

Table 3 below shows the results of the cluster analysis. The sample companies are classified into four clusters and the number of companies in each cluster for each of the years 2006 to 2010 is shown to illustrate the changes in the number of companies for each cluster over the five years, Table 4 below shows the Gross Domestic Product growth over the same five years. The effect of the financial crisis that started in 2007/2008 is clearly seen from the two tables below. In 2006 there were 46 companies in the good performing cluster and the number of companies in this cluster decreases over the five years and by 2010, they total only 6 companies. For the poor cluster, the number of companies increases from 7 in 2006 to 27 in 2010. Analysing the 17 companies in both the average performing cluster, it was found that 15 of those companies have actually migrated downwards to the poor performing cluster. The performance of the companies is also reflected by the GDP and exports data as shown in Table 4. The worst year for these two statistics was 2009 when GDP contracted 1.7% and exports contracted 17%.. The economic data improves quite quickly in 2010 coinciding with the improved economic indicators in the United States and China where much of Malaysia's external trade are with but the financial performance of Malaysian companies have not recovered to the pre-crisis level.

Table 3. Classification of companies after Cluster Analysis

Clusters	2006	2007	2008	2009	2010
Poor	7	7	4	2	27
Below Average	15	17	42	48	3
Above Average	2	1	1	1	34
Good	46	45	33	19	6
Total	70	70	70	70	70

Table 4. Gross Domestic Products (GDP) and Exports

Years	2006	2007	2008	2009	2010
GDP growth %	5.9	6.3	4.6	-1.7	7.2
Exports USD	187	192	210	175	202
Exports Growth %	10	3	9	-17	15

Table 5 below shows the F-statistics and the p-values of the ratio variables used in the cluster analysis. The F values would show how well the variables discriminate in the clustering process. Variables with large F values will discriminate better than those with lower F values. The significance or p-values would not be useful in the usual tests of the hypothesis that the cluster means are equal and the F tests should be used as descriptive only. However, it is quite certain that those variables with F values greater than 0.05 would cluster the companies well. In different years different variables are found to cluster well. In 2006, CCL, TDSF and CFTA are significant in clustering the companies well. For 2007, the significant variables are CCL, TAT and It, for 2008 the variables are EBITTA, CFTA and It, for 2009, there is only one significant variable which is TAT while for 2010, the significant variables are CCL, TAT and IT. Overall, for the five years, TAT and IT are found to be potent as a clustering variable for 4 of the 5 years while CCL is useful for 3 of the years.

Table 5. Anova statistics

	2006		2007		2008		2009		2010	
	F Value	Sig.	F value	Sig.	F value	Sig.	F value	Sig.	F value	Sig.
CCL	35.07	.000	23.34	.000	1.136	.351	.181	.96	41.83	.000
EBITTA	0.32	.895	1.59	.175	25.97	.000	1.13	.35	1.96	.096
TDSF	3.76	.005	2.11	.075	2.01	.089	2.26	.05	1.03	.406
CFTA	0.44	.815	2.02	.086	2.61	.033	0.34	.88	1.87	.111
TAT	216.4	.000	2345	.000	1.136	.351	585.5	.00	222.1	.000
IT	2.28	.057	4.04	.003	1069.8	.000	1.957	.09	4.12	.003

5. Concluding Remarks

This paper investigates the effects of the 2007/2008 financial crisis on the financial performance of 70 randomly selected listed companies in the manufacturing sector in Malaysia over a period of 5 years from 2006 to 2010. Using factor analysis, an initial set of 21 financial ratios was reduced to just six significant ratios which represented the underlying dimensions of the 21 ratios. Of the six ratios identified, two are measures of efficiency in utilization of assets (Total Assets Turnover and Inventory Turnover), and one each to measure cash position (Cash to Current Liabilities), profitability (Earnings before Interest and Tax), short term liquidity (Cash Flow to Total Assets), and one that measures solvency (Total Debts to Shareholders' Funds). Another objective of this study is to use the smaller set of representative ratios as identified, to cluster these companies into four clusters namely good financial performers, above and below average performers and the poor performers. Each company's performance are analyzed and tracked over a five year period from 2006 to 2010 to see how they have moved or migrated between the clusters. It was found that the companies' financial performance have all declined sharply over the five years. Of 46 companies in the good performing cluster in 2006, there were only 6 in this cluster in 2010. Of the 7 poor performing companies in 2006, there were 27 in 2010 and analysing the average performing companies in the average clusters in 2006, it was found that 15 of those companies have actually fall downwards into the poor cluster in 2010. The results also showed that not all ratios are significant in its clustering abilities. The ratios that stand out are Total Assets Turnover and Inventory Turnover which are significant in 4 of the 5 years while Cash to Current Liabilities is found significant in 3 out of the 5 years. A comparison is made to see whether there is a direct link between company financial performance and the financial crisis. The findings showed that there is a direct correlation between the two where the country's GDP growth and exports have contracted gradually since the crisis started with the most severe contraction in GDP and drop in exports in 2009 at the height of the financial crisis. However, the financial performance of Malaysian companies has still not recovered to the pre-crisis level even in 2010. In conclusion, the study showed that with just 6 financial ratios, a company's financial performance can be tracked and analysed over a period of time resulting in the enhancement of the quality of credit evaluations as well as the minimizing of investor risks. Finally, this paper showed that though the 2007/08 financial crisis has affected the financial performance of companies, the extent and severity of the impact has been found to be much more devastating on companies' financials than has generally been known as media reports then suggesting that the emerging economies like Malaysia will not been too badly affected as they are not exposed to the many complex financial instruments including derivatives that to a great extent contributed to the subprime crisis.

6. Limitation of the Study and Future Studies

This study is limited to 70 companies in the industrial products sector representing 28% of total companies in this sector. Future studies could not only expand on the number of companies to be studied in this sector but in other sectors to see whether similar conclusions can be made. This study can be extended beyond 2010 to see whether the continuing economic recovery in 2011 and 2012 has also been reflected in better financial performance

of these companies for those years.

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