

Could Lehman Brothers' Collapse Be Anticipated? An Examination Using CAMELS Rating System

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Abstract

The collapse of Lehman Brothers, the largest investment bank that has ever declared bankrupt has had a major impact among economies and in most stock markets across the globe. For this reason, the case of Lehman Brothers is being examined by analysing its financial particulars of the last five years (2003-2007) using the CAMELS ratios. Research results showed that its credits were found as bad and doubtful while its management appeared to be unwilling and unable to reverse its declining course. Also, the management was not complying with the rules set by the supervisory authorities while the risk management methods followed is regarded as insufficient proportionally to its size. Finally, the bank appeared to be vulnerable against risks or unstable conditions while the supervisory authorities and the US Federal Reserve should have foreseen that Lehman Brothers presented several signs of decline and react accordingly.

Keywords: CAMELS rating, Financial Institutions Rating Systems, World Economic Crisis, Banks' Supervising Authorities, Credit Rating Authorities

1. Introduction

The current financial crisis that commenced in 2007 has brought forward many weaknesses existing within the globalised financial system, triggering concerns relating to the safety of financial institutions, even states, against potential non-anticipated risks associated with periods of uncertainty (International Monetary Fund, 2009). The presence of defects in supervisory control also emerged, namely the weakness or incompetence of supervisory authorities to prevent similar large-scale crises from taking place, as well as, the "strange" role played by credit rating agencies in the creation of bubbles (Demyank & Ifterkhar, 2009, The Turner Review, 2009).

A series of events that, three years ago would seem unlikely, have led to extreme drops in global growth rates and have sky rocked unemployment rates, along with a sense of insecurity in almost every country in the world. While the crisis was still unfolding, its strength and extent increased continuously, forcing governments, central banks, analysts, investors, businessmen and consumers to constantly review their concepts and expectations. All former anticipations for reaching an era of financial stability, continuous prosperity and market self-regulation collapsed before the rapid economic aggravation (Freund, 2009).

The collapse of Lehman Brothers, the largest investment bank that has ever declared bankrupt, has had a major impact among economies and in most stock markets across the globe (Baldwin, 2009). For this reason, the case of Lehman Brothers is being examined by analysing its financial particulars of the last five years using the CAMELS ratios. The scope of this paper is to examine whether the bank's collapse was only due to the current crisis or whether it was the result of its malfunctioning, in which case it could have been foreseen and overcome by supervisory authorities and by the Fed.

2. The development of CAMELS Rating System

In 1979, the Uniform Financial Institutions Rating System (UFIRS) was implemented in US banking institutions, and later globally, following a recommendation by the US Federal Reserve (Epstein & Martin, 2003, Bauer et al, 1998). This system became internationally known with the abbreviation CAMEL, reflecting five assessment areas: capital, asset quality, management, earnings and liquidity ratios (Cox & Cox, 2006). The CAMELS system focuses on the assessment of the banking system by examining its balance sheet, as well as, profit and loss statement, thus observing the institution's dynamic aspect (Deyoung et al, 2001).

In the new globalised financial system, as with all new financial markets and products, the banks' economic situation can rapidly change than in the past. As a result of the new situation, supervisory authorities were led towards changing their way of approach and assessment, paying more emphasis on ways to overcome and manage risks (Doumpos & Zopounidis, 2009). As a result of this new situation that was created through the development of the financial system, a further area of assessment was added, that of the initial S, indicating market risk. This took place in 1995 by the US Federal Reserve (Fed) and the Comptroller of the Currency (Hafer, 2005), who replaced CAMEL with CAMELS and added a management assessment system scale from 1 (optimum) to 5 (worse) for risk management (Broz, 1997).

The ratios used to produce the results (Gaillard, 2009) and to evaluate the situation (Jeffrey & Thomas, 2002) of the financial institution under examination are:

A. Capital Adequacy Ratio

A bank's capital ratio is a very important index. It can act as a saver for potential risks, as well as, for important decisions that banking institutions take with regard to growth (Shelagh, 2005) and their future course in general. This index is a product of Basil (Kose et al, 2000, BCBS, 2000, 2004, 2005a, 2005b). In order for a banking institution to have capital adequacy, this ratio should be higher than 8%, namely the total amount of capital must be over 8% of its risk-weighted assets.

CAR= (TIER I + TIER II) / RISK-WEIGHTED ASSETS

TIER I: forms the basic and own capital and includes: common and preferred stocks, the bank's minority rights in subsidiary companies, convertible bonds.

TIER II: forms the bank's supplementary capital. This is, also, known as hybrid because it includes amounts of capital deriving from bonds issued by the bank itself; these amounts are long-term and offer reduced guarantees to buyers. TIER I is required to be 50% of the total amount of the numerator. The higher the value of the index, the better the bank's capital adequacy, and the institution can rely on self-financing and have better profitability than other institutions with lower CAR ratios.

B. Asset Quality Ratio

The asset quality assessment is based on evaluating credit risks associated with a bank's portfolios. A bank's ability to detect, measure, monitor and regulate credit risks is also assessed, while taking into account any provisions against bad and doubtful claims.

(TOTAL NON-PERFORMING LOANS>90 DAYS – PROVISIONS) / TOTAL LOANS

The nominator contains the net non-performing loans. The total of non-performing loans over 90 days has been defined by Basil II as a critical point for loan repayment. The provisions include reserve capital withheld by the bank in order to compensate for losses originating from loans the delay of which has been provisioned. The lower the index the more accurate the bank provisions of these delays and consequently, the higher the quality and reliability of its portfolios.

C. Management Quality Ratio

Management forms the mechanism that makes decisions to ensure the bank's smooth course of operation handles risks and exercises control. Thus, proper management in line with regulations in force is essential for the bank's smooth course of operation.

MANAGEMENT EXPENSES/ SALES

This ratio measures the percentage of operating expenses in relation to sales. Management expenses include all the operating expenses borne by the bank, while sales include all interest expenses and similar charges from the bank's profit and loss account. The lower the ratio, the better for the bank because it indicates that it has good management.

D. Earnings Ratios

Earnings and profitability form the primary source for capital base increases and are examined in relation to interest rate policies and provisions adequacy. These ratios, also, help support a bank's current and future activities. Strong profits combined with its earnings profile reflect a bank's ability to support current and future tasks. More specifically, this ratio reflects the bank's ability to absorb losses, expand its financing, as well as, its ability to pay dividends to its shareholders, and helps develop an adequate amount of own capital. The assessment of earnings is not only performed in terms of amount and profit tendencies, but also in respect of quality and duration.

(a) ROA= NET PROFITS/ TOTAL ASSETS

This ratio correlates net profits with total assets and indicates whether asset management is efficient enough to produce profits. The higher the ratio the more efficient the bank; a satisfactory performance would produce a value between 1% and 2.5%.

(b) ROE= NET PROFITS/ OWN CAPITAL

This ratio correlates net profits with own capital. The higher the ratio the more the bank uses its own capital in an efficient manner. The more efficient a bank is the easier it is to produce money using its own capital.

E. Liquidity Ratios

During liquidity assessment, the current liquidity status of the bank is taken into account in relation to the liabilities it has undertaken. It also tests the bank's ability to deal with changes in its financing resources, as well as, changes in market conditions which alter the fast liquidation of its assets, with the least possible losses.

(a) LOANS TO TOTAL DEPOSITS (L1) = TOTAL LOANS / TOTAL DEPOSITS

This ratio presents the extent in which deposits are maintained for issuing loans and therefore the bank's dependence in interbank markets. The lower this ratio is the better the bank's liquidity status, while a value of less than one offers security for loans since deposits alone are sufficient to cover such loans.

(b) CIRCULATING ASSETS TO TOTAL ASSETS (L2) = CIRCULATING ASSETS/ TOTAL ASSETS

This ratio gives us a bank's liquidity status of circulating assets, such as cash in hand, claims against other banking institutions and its trading, investment and derivatives portfolios. The ratio offers banks the ability to know the extent if their liabilities that may be covered by its not directly available assets. The higher the bank's ratio, the better its liquidity status.

F. Sensitivity to market Ratio

A bank's assessment on sensitivity towards market risks examines the extent to which potential changes in interest rates, foreign currency exchange rates, product purchase and selling prices, affect the bank's profits and the value of its assets.

TOTAL SECURITIES TO TOTAL ASSETS = TOTAL SECURITIES / TOTAL ASSETS

Market forces, especially in the recent years, consist of a major reason for changes in the viability of banks. Price movements in favour of a bank's portfolio may boost the Bank's results whereas unfavorable movements may create severe problems to the Bank. This ratio correlates a bank's total securities portfolio with its assets and gives us the percentage change of its portfolio in changes of interest rates or other issues related to the issuers of the securities. The lower the value of this ratio, the better for the bank since this indicates that its reactions towards market risks are appropriate. On the other hand, a higher value of this ratio would indicate that the bank's portfolio is susceptible to market risks.

3. Research Results

A. CAPITAL RATIO

2003 CAR= (13,174 TIER I + 2,226 TIER II) / 156,031 WEIGHTED = 9.870%

2004 CAR= (14,921 TIER I + 2,925 TIER II) / 185,727 WEIGHTED = 9.609%

2005 CAR= (16,794 TIER I + 3,407 TIER II) / 221,434 WEIGHTED = 9.123%

2006 CAR= (19,191 TIER I + 5,881 TIER II) / 287,021 WEIGHTED = 8.735%

2007 CAR= (22,491 TIER I + 7,645 TIER II) / 414,638 WEIGHTED = 7.268%

Results in Table 1 show that Lehman Brothers maintained a very low capital ratio while in 2007 this fell below the limit of 8%. The ratio decline was continuous over the years. This means that the financial situation of Lehman

Brothers was not good and continued to get worse each year. Its bad and doubtful claims were very high while its access to capital markets was difficult.

Its inadequate capitals made Lehman Brothers unprotected against regular and extraordinary risks, making its support by shareholders or other sources a matter of urgency. Supervisory authorities should have exercised immediate pressure and should have imposed strict measures from the time its capital inadequacy had reached the levels considered as unsafe for the Group's survival.

B. ASSETS RATIO

2003 (852 NON-PERFORMING - 459 PROVISIONS) / 15,310 LOANS= 0.02567

2004 (1,188 NON-PERFORMING - 563 PROVISIONS) / 18,763 LOANS= 0.033316

2005 (1,255 NON-PERFORMING - 649 PROVISIONS) / 21,643 LOANS= 0.027986

2006 (2,054 NON-PERFORMING - 1,119 PROVISIONS) / 27,971 LOANS= 0.033433

2007 (4,073 NON-PERFORMING - 1,731 PROVISIONS) / 43,277 LOANS= 0.054115

As mentioned during this analysis of the asset quality ratio, the lower its value the better for the organisation being examined. In the case of Lehman Brothers, this ratio tended to increase with the exception of 2006 when it was characterised only by minor increase. Indicatively, its value in 2003 was 2.5% which was more than doubled in 2007 reaching 5.4% (Table 2). The results that emerge from the asset quality analysis of Lehman Brothers demonstrate its low ability to detect, measure, monitor and regulate credit risks while at the same time considering its bad and doubtful claims; such ability continued to decline each year. The policy adopted by Lehman Brothers in issuing loans was proven to be the worst. By granting loans to insolvent, high-risk borrowers, it led to an increase of its non-performing loans each year, namely its bad and doubtful loans. This fact, combined with the results from its capital ratios, was detrimental to its survival and has finally led to its collapse. Supervisory authorities, along with the US Federal Reserve, should have foreseen the critical situation it was in from the results of its asset quality ratios and make strict recommendations towards immediate improvements, by restraining its credit policies and thoroughly assessing potential borrowers, in order to improve Lehman Brother's internal control.

C. MANAGEMENT RATIO

2003 4,750 / 17,287 = 0.274773

2004 6,386 / 21,250 = 0.300518

2005 7,929 / 32,420 = 0.244571

2006 9,536 / 46,709 = 0.204158

2007 10,599 / 59,003 = 0.179635

The management of banking institutions, just like the management of enterprises, determines its operation through decisions, ensures the bank's smooth business, handles risks and exercises control. As shown by the Lehman Brothers' management ratios (Table 3), its management has shown signs of improvement and the ratio remains in relatively high levels. This indicates either that its operating expenses have improved in combination with its sales or that its sales have increased. As has emerged by these numbers, the decline of this specific ratio was due to sales, namely the issuing of more loans. By combining results with the above-mentioned ratios it emerges that many of these loans were bad, approved as a result of poor borrower assessment, a task that falls within the responsibilities of the management of Lehman Brothers. The bank's management should have been more flexible and cooperative with respect to recommendations received by supervisory authorities; the latter should have taken further control of the situation and of the policies followed by the bank.

D. EARNINGS RATIOS

2003

ROA = 1,699 NET PROFITS / 312,061 TOTAL ASSETS= 0.005444

ROE = 1,699 NET PROFITS / 13,174 OWN ASSETS= 0.128966

2004

ROA = 2,369 NET PROFITS / 357,168 TOTAL ASSETS= 0.006633

ROE = 2,369 NET PROFITS / 14,920 OWN ASSETS= 0.15878

2005

ROA = 3,260 NET PROFITS / 410,063 TOTAL ASSETS= 0.00795

ROE = 3,260 NET PROFITS / 16,794 OWN ASSETS= 0.194117

2006

ROA = 4,007 NET PROFITS / 503,545 TOTAL ASSETS= 0.007958

ROE = 4,007 NET PROFITS / 19,191 OWN ASSETS= 0.208796

2007

ROA = 4,192 NET PROFITS / 691,063 TOTAL ASSETS= 0.006066

ROE = 4,192 NET PROFITS / 22,490 OWN ASSETS= 0.186394

An assessment of Lehman Brothers' earnings reveals that its profits are low and insufficient (Table 4). It is obvious that the bank lacks in several areas to such an extent that it is led towards its collapse. As mentioned earlier in the presentation of ratios, a fair price for ROA would be between 1% and 2.5%. This specific ratio is found well below these limits and, despite the fact that it was moderately increasing until 2006, it remained at low levels while further decreasing in 2007.

The results of Lehman Brothers' earnings ratios show that ROE is close to the average of the acceptable range. Its profits seem to be continuously increasing over the last five years, except 2007, giving the signal of the coming unexpected dramatic collapse. The institution's provisions were proven to be lower than those that should be. Since earnings ratios show a company's ability to support its operations and future activities, the evaluation results of the last five years should have rung a bell that the bank would face survival issues in periods of potential instability or unexpected risks should it not improve its profits and quality of profits.

E. LIQUIDITY RATIOS

L1

2003 15,310 / 39,999 = 0.38276

2004 18,763 / 50,140 = 0.374212

2005 21,643 / 44,975 = 0.481223

2006 27,971 / 58,609 = 0.477248

2007 43,277 / 86,346 = 0.501204

L2

2003 131,099 / 312,061= 0.420106966

2004 150,077 / 357,168 = 0.420186019

2005 179,362 / 410,063 = 0.437401082

2006 230,175 / 503,545 = 0.457109097

2007 313,103 / 691,063 = 0.4530744669

With respect to Lehman Brothers' liquidity ratios, the results relating to this aspect of assessment (Table 5) have shown that Lehman Brothers' L1 ratio results were satisfactory. This means that its loans were less than its deposits. This could indicate that the bank issued part of its loans using the funds available from its deposits and was in position to withhold part of these funds as reserve. The highest value was in 2007, when the bank issued 50% of its deposits.

To the contrary, the L2 ratio results show that the directly available assets of Lehman Brothers' circulating assets were low. Therefore, in the event of an emergency, the bank would not be able to directly liquidate 60% of its total cash reserves, claims against other banking institutions and transaction portfolios, as well as, its investments in derivatives.

It is apparent that the bank's liquidity status, as compared with its liabilities was poor while its management had no contingency plan that could produce the required flexibility when needed. Moreover, supervisory authorities should have foreseen the risks entailed in Lehman Brothers' liquidity problems and should have imposed regulations and measures to improve its status and prevent its collapse.

F. SENSITIVITY RATIO

2003 142,218 / 312,061= 0.45573782

2004 174,598 / 357,168 = 0.488839986

2005 140,743/ 410,063 = 0.343222870

2006 225,196 / 503,545 = 0.44722120

2007 301,234 / 691,063 = 0.43589947

The data available shows that Lehman Brothers suffered from poor management of risk sensitivity (Table 6). The ratio presented several fluctuations throughout the examined period of five years, reaching its peak of almost 50% in 2004. This shows that the bank was neither prepared nor protected to face unexpected risks in periods of instability. As a pure Investment Financial Institution, Lehman Brothers is exposed to even higher interest rate variations,

foreign exchange rates, product purchase and sales prices affecting its profits, as well as, to the value of its assets. Especially, following the globalisation of the financial system, with the extremely rapid developments in data circulation and the changes it entails, Lehman Brothers, being an investment bank, should have ensured its protection against market risks. On the other hand, supervisory authorities had the obligation to diagnose the problem at hand and impose strict measures to protect and secure Lehman Brothers' profits and assets.

4. Lehman Brothers' Combined Rating Scores

The combined rating scores of banks using the CAMELS rating system are usually conducted to compare results among different banking institutions. This enables us to draw conclusions on which banking institutions are in better condition and which suffer. Given that this paper analysis concerns only Lehman Brothers, and therefore it does not intend to rate the total number of banks within a sector, this paper aims at comparing the results of this particular bank across several years, in order to see whether CAMELS may consist of a reliable method to foresee future problems of banks. This method works as follows:

All individual sector ratios analysed above are scaled from 1 to 5, with five indicating the highest performance and one the lowest. Then, an importance coefficient is (subjectively) selected, again in a scale of 1-5, for each CAMELS assessment area. The results prove that the coefficient of each assessment area for a specific year is multiplied by the score of the respective ratio representing that particular area (for example, the capital adequacy coefficient is multiplied by the score of the CAR ratio for that year) while the remaining areas are then added in the same way as the first. The higher the result the better the status of the bank (or banks) being examined. In this case, the coefficients selected for the individual areas are: C=3.5 A=1.5 M=1 E=3 L=2 S=2. The results and data of the assessment are shown in Tables 7 & 8.

From the combined rating assessment of Lehman Brothers using the CAMELS method it emerges that the best years in terms of combined assessment is 2005 and 2006 while the bank's situation became notably worse the following year, which was also the worst year out of the five-year examined period. This is expressed as follows: in 2007, compared with the previous years, Lehman Brothers was found at the worst possible situation. Its credits are considered as bad and doubtful while its management appears to be unwilling and unable to reverse its declining course. The management is not complying with the rules set by the supervisory authorities while the risk management methods followed is regarded as insufficient, proportionally to its size. The bank appears to be vulnerable against risks or unstable conditions. Based on Camels' ratings examination, the supervisory authorities and the US Federal Reserve should have foreseen that Lehman Brothers presented several signs of decline, which were evident from the analysis of its data and should have taken strict steps and measures in order to prevent the possibility of and its actual collapse.

5. Conclusions

The current economic crisis has greatly stirred the foundations of the financial system and its future across the globe. The financial map is now irreversibly marked with the collapse of large financial colossi, such as Lehman Brothers which was the object of research in the present study. Yet, the CAMELS rating analysis showed that the Group's collapse was not, only, due to the outbreak and extent of the crisis. The role played by credit rating agencies is extensive considering that Lehman Brothers was in fact an investment bank (the fourth largest) that collapsed while having received excellent ratings. For reasons of speculative gains, the precise Group was presented as a healthy organisation, concealing its problematic status while its portfolio consisted of a pile of bad and doubtful structured bonds.

The US Federal Reserve was, also, greatly responsible, as following the results of the above CAMELS analysis, it should have foreseen the upcoming collapse and impose strict measures to Lehman Brothers, accompanied by strict monitoring to ensure compliance (Greenspan, 2008). To the contrary, the Fed did not proceed with such actions and further refused to finance Lehman Brothers in times of difficulty, as it had done in the case of Bears Stern a couple of months earlier, when it had guaranteed its sale and had later proceeded with state ownership of Fannie Mae and Freddie Mac, with loans amounting to 12 trillion dollars in their portfolio. Unfortunately, it had not predicted the chain of events that would follow the collapse of Lehman Brothers nor its size and intensity.

The poor ratings scored by Lehman Brothers over the last five years before its collapse, should force supervisory authorities to review their way of operation, becoming more effective and diagnostic in predicting and interpreting possible market upheavals, in order to avoid any similar events (Altman & Rijken, 2004). Currently, Basel III guidelines are supposed to treat these discrepancies, giving more emphasis on the enhancements of equity (TIER I). Finally, credit rating agencies should, also, review their way of operation in such a way as to ensure transparency of assessments and maintain their international market worthiness.

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Table 1. CAR

YEAR	CAR
2003	9.870%
2004	9.609%
2005	9.123%
2006	8.735%
2007	7.268%

Table 2. Assets Ratios

YEAR	ASSETS RATIO
2003	0.02567
2004	0.03331
2005	0.02800
2006	0.03343
2007	0.05412

Table 3. Management ratios

YEAR	MANAGEMENT RATIO
2003	0.274773
2004	0.300518
2005	0.244571
2006	0.204158
2007	0.179635

Table 4. Earnings Ratios

YEAR	ROA	ROE
2003	0.005444	0.128966
2004	0.006633	0.15878
2005	0.007950	0.194117
2006	0.007958	0.208796
2007	0.006066	0.186394

Table 5. Liquidity Ratios

YEAR	L1	L2
2003	0.382760	0.420106966
2004	0.374212	0.420186019
2005	0.481223	0.437401082
2006	0.477248	0.457109097
2007	0.501204	0.453074466

Table 6. Sensitivity Ratios

YEAR	SENSITIVITY
2003	0.455738
2004	0.488840
2005	0.343223
2006	0.447221
2007	0.435899

Table 7. Combined Rating Scores

YEAR	2003	2004	2005	2006	2007
CAR	9.870%	9.609%	9.123%	8.735%	7.268%
RATING	5	4	3	2	1
ASSET	0.02567	0.03331	0.02800	0.03343	0.05412
RATING	5	3	4	2	1
MANAGEMENT	0.274773	0.300518	0.244571	0.204158	0.179635
RATING	2	1	3	4	5
ROA	0.005444	0.006633	0.007950	0.007958	0.006066
RATING	1	3	4	5	2
ROE	0.1289661	0.15878	0.194117	0.208796	0.186393953
RATING	1	2	4	5	3
L1	0.382760	0.374212	0.481223	0.477248	0.501204
RATING	4	5	2	1	3
L2	0.420107	0.420186	0.437401	0.457109	0.453074466
RATING	1	2	3	5	4
SENSITIVITY	0.455738	0.488840	0.343223	0.447221	0.435899
RATING	2	1	5	3	4

Table 8. Results of Combined Rating

RATING 2003	47
RATING 2004	50.5
RATING 2005	63.5
RATING 2006	66
RATING 2007	43