Predictive Ability of Financial Distress Forecasting Model Utilizing Cash Flow Components Combinations

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Abstract: Financial distress and bankruptcy forecasting is one of the important issues in business environment because it can avoid the wealth and welfare of investors to be destroyed and so, it can prevent from the loss of invested capital. The purpose of this study is to investigate whether incorporating different combinations of cash flow information in the model of financial distress forecasting (by utilizing other financial ratios) can improve its explaining ability. 120 firms from TSE (Tehran's Stock Exchange) were selected for 1378-1387 and examined thorough a logistic model. In the model used, seven different combinations of cash flow information with other financial ratios were utilized incrementally and totally for financial distress forecasting. The findings show that there is no incremental ability by incorporating the combinations to the model and so, we can say that, the different combinations of cash flow information couldn't improve the predictive ability of the other financial ratios. The relation between components of cash flow statement is less important relative to the pure amount of each section with respect to the financial distress forecasting and the users of financial statement in capital markets, didn't have consider the relations and the implications that they can consist of. That is the financial knowledge of market participants isn't deep and conceptual and they don't consider the relations.
[Zahra Hassani, Mohaddese Kargarfard, Abdolrasoul Rahmaniankoushkaki, Alireza Firoozi. **Predictive Ability of Financial Distress Forecasting Model Utilizing Cash Flow Components Combinations.** *J Am Sci* 2012;8(9):191-199]. (ISSN: 1545-1003). http://www.jofamericanscience.org. 28

Keywords: Financial Distress, Bankruptcy, Cash Flow Components, Logistic Model, Financial Ratios

Introduction

The beneficiary theory studies the consequences and influences of the performance of the company on the interests of these groups, focusing on the interactions between the company and beneficiaries. On this basis, beneficiaries consider financial statements as significant information sources for predicting future events. They have always paid a considerable amount of attention to predicting financial crisis using various methods such as the analysis of relations which have contributed to appearance of various models such as the Bior, Altman, Deakin, Zagren, Taffler, Wallace, Springate predictive models. The success of these models in predicting financial crisis has provided a good opportunity to expand on previous research and has contributed to attracting researchers to expand and develop these models using the cash flow statements and macro-economic variable (Talebnia et al, 2009).

In the financial literature, financial distress has been defined in various ways. Gordon (1971), in one of the earliest academic studies on the theory of financial distress, introduces it as a factor decreasing the profitability of companies and one that increases the likelihood of inability to repay interest and original debts. Whitaker (1999) considers financial distress in settings in which the cash flow of the company is less than the sum of the interest costs related to long-term debts. Economically, the financial distress could be defined as unprofitability of the company, when the return rate of the company is lower than the stock cost. In the financial distress literature, four terms are commonly used: failure, distress, fault, and bankruptcy. Although to some extent different, these terms are normally used synonymously.

The models for predicting bankruptcy are one of the tools for predicting future status of businesses which have attracted the attention of shareholders and creditors to achieve this goal, since they are aware that if they are bankrupted, the business will suffer from irrecoverable loss. Although each of these models have their own strengths and weaknesses (Adnan et al, 2002), selecting a specific model for users of financial information which is in line with their needs and current circumstances is a complicated process (Mehrani et al, 2005).

One way to help prevent waste of resources as well as proper application of investing opportunities is to predict financial distress or bankruptcy. Therefore, at first, businesses are alerted against financial distress by giving proper warnings, so that they act properly, and second, investors distinguish favorable opportunities from unfavorable ones, and invest their resources in proper opportunities. Predicting financial distress has long been a vital issue in finance (Raie and Fallah Pour, 2004).

The findings of scientific research indicate that despite extensive attempts made to deal with financial

distress all over the world, financial distress and bankruptcy could not be predicted and interpreted by a single tool and an absolute way. The role of interfering variables in the environment which are vital in determining the stability of a business and are different from one country to another, have doubled the complications, and failing to consider the environmental settings of countries in using the results of studies could lead to improper utilization of these results and models. Especially, in Asian countries, access to the literature of financial distress is limited. Obviously, it is vital to identify potential problems prior to happening, since it will lead to political, economic, financial, and business stability of the environment (Zulkarnain and Hasbullah, 2009).

The present study investigates whether the combination of the components of the cash flow is effective in predicting financial distress. This is specifically the first study conducted in Iran which compares the ability to predict financial distress with the help of combinations of components of the cash flow as a result of operational activities, investing, and financial provision as well as other financial information investigated in previous studies.

Methodology

This is an applied research which describes the relationships between variables using the correlation analysis. The hypothesis to be tested is:

The combinations of cash flow resulting from operational activities, investment, and financial provision increase the ability to predict financial distress by other financial variable.

The population of the study includes all companies admitted to the TSE (Tehran Stock Exchange). All companies having these conditions were included in the study:

1- The end of their financial year was March 20th (the end of Iranian solar year) and during the research, they did not change their financial year.
2- They are not members of financial or investing companies.
3- The information needed for calculating the variables of the study are accessible from different sources

The time period is divided into two periods:

1- The control period from 1999 to 2000
2- The research period from 2001 to 2008

The sample was divided into two main groups:

1- Businesses with financial well-being or free from financial distress (31 companies)
2- Suffering companies or the ones with financial distress (89 companies)

The hypothesis was tested using the input logistic regression. The primary model used for testing the hypothesis is as follows:

$$P(DISTRESS) = 1/\{1+\exp[-(\beta_0+\beta_1 CFC1+\beta_2 CFC2+\beta_3 CFC3+\beta_4 CFC4+\beta_5 CFC5 +\beta_6 CFC6+\beta_7 CFC7+\beta_8 NITA+\beta_9 OCFTL+\beta_{10} ICFTL+\beta_{11} FCFTL +\beta_{12} CACL+\beta_{13} TLTA+\beta_{14} FIRMSIZE)]\}$$

The dependent variable is financial distress which is defined, using two alternative variables, as:

1- Dropping the cash profit of each shares after adjusting the stock dividends and stock shares with a rate of over 40% more than that of the previous year (1st model), or
2- Reporting operational loss for two successive years.

The dependent variable is a dummy one because if a business has one of these conditions, that variable is considered 1 for that business in that year (suffering business), and if not, the variable will be zero (non-suffering business). Previous research has suggested that prior to bankruptcy, various events of financial distress happen. Giroux and Wiggins (1984) found that businesses experience financial distress one or two years before bankruptcy. Continuous poor financial performance indicates financial distress. Businesses experiencing at least two years of loss face financial distress. Gilbert et al (1990) stated that using the loss index continuously and for several years in order to identify companies suffering from financial distress will contribute to the elimination of businesses with irregular poor financial performance.

A decrease in the profit of pain stocks may reflect financial problems (Bior, 1966). Di Angelo et al (1992) found that businesses experiencing continuous poor financial performance will face a decrease in the ratio of paid cash profit; while companies with only one period of financial loss do not consider decreasing the paid cash profits. Furthermore, companies with good financial performances are less likely to decrease their paid cash profits because it will project a poor future perspective about the company. These researchers reported that only 1% of 440 companies without losses decreased their paid cash profits. Jensen and Johnson (1995) studied the financial statuses of companies whose upward trends for paying cash profits had decreased to 20% after 12 successive periods. They reported that decreasing the paid cash profit will lead to the collapse and failure of the company. When the cash profit decreases, companies experience remarkable failure in profitability, cash, financial conditions, as well as a significant increase in financial leverage and operational costs. Lau (1087) and Ward & Foster (1992, 1996) stated that a decrease in the paid cash profit for more than 40% is and indicator of financial distress because such decrease suffices to have fatal impacts on shareholders. The present study considers the decrease in cash profits as criteria. Each indicator of financial distress (a decrease in paid cash profit for more than 40% than that of the previous year and two

successive years of operational loss) is studied separately since it is likely that businesses suffering from financial distress do not have these criteria simultaneously.

Independent variables in this study are various combinations of the cash flow statement components, which are as follows (Pyiaratt, 2006):

CFC1: the dummy variable which is 1 if the company has negative operational cash flow and positive investment and financial provision cash flow and otherwise, it is zero.

CFC2: the dummy variable which is 1 with negative operational cash flow, positive investment cash flow and negative financial provision cash flow, and otherwise, it will be zero.

CFC3: the dummy variable which is 1 if the operational and investment cash flows are negative and the financial provision cash flow is positive, and otherwise, it will be zero.

CFC4: the dummy variable which is 1 if the operational and investment cash flows are positive and the financial provision cash flow is negative, and otherwise, it will be zero.

CFC5: the dummy variable which is 1 if operational cash flow is positive, the investment cash flow is negative and the financial provision cash flow is positive, and otherwise, it will be zero.

CFC6: the dummy variable which is 1 if the operational cash flow is positive, the financial provision and investment cash flows are negative, and otherwise, it will be zero.

CFC7: the dummy variable which is 1 if investment, operational, and financial provision cash flows are negative, and otherwise, it will be negative.

The net created cash (positive net cash) or the net spent cash (negative net cash) for operational, investment, and financial provision activities reported in the cash flow statement during one financial year constitute a combination of cash flow. For example, a cash flow combination is a combination in which the cash flow of operational activities is positive, and the cash flows of investment and financial provision are negative. This combination highlights this fact that the company is facing serious problems and is not able to provide enough cash to pay for operational needs. Therefore, the company is forced to sell properties, machinery, or other investments, or to borrow from creditors or to publish new shares. If this continues, the company is likely to go bankrupt (Pyiaratt, 2006).

The information regarding these various combinations of cash flow provides another approach to investigate whether the company is successful or it is experiencing difficulties. The meanings and interpretations of other combinations are provided in the appendix.

Furthermore, the influences of control variables on the relationships between dependent and independent variables are controlled as follows:

NITA: the net income relative to total assets

OCFTL: net operational cash flow relative to total liabilities

ICFTL: the net investment cash flow relative to total liabilities

FCFTL: the net financial provision cash flow relative to total liabilities

CACL: current assets relative to current liabilities

TLTA: total liabilities relative to total assets

FIRMSIZE: the size of the firm which is the natural log of total asset

Testing the hypothesis and findings

In this study, the data from 120 firms of the population during 2001-2008 were gathered from the data bank and based on the mentioned limitations. The control years were 1999 and 2000 when no firms experienced financial distress. After controlling these years, 120 firms were selected. 79 firms had paid cash profit 40% less than the previous year, 10 firms had 2 successive years of operational loss, and the remaining 31 firms which were free from any financial distress criteria were classified as healthy.

Data were analyzed using the logistic analysis based on the input method, and independent variables remained in the predicting model in order of significance, using the Wald statistic. The models resulted from each financial distress criterion were tested for significance, using the Nagelkrek R square, the Cox Snell ratio, and the -2 log-likelihood function.

The descriptive analysis of the variables is presented in table 1.

The results of the significance test for coefficients of the first model (the alternative variable of more than 40% decrease in divided cash profit) based on the logistic model are presented in table 2.

Table 1: descriptive statistics of variables

At this stage, at first, financial variables were incorporated into the model regardless of cash flow combinations. The final model based on resulting coefficients is:

$$\ln\left(\frac{p}{1-p}\right) = -7.890 - 0.955\text{OCFTL} + 0.444\text{FIRMSZE} + 1.785\text{CACL} + 2.169\text{ICFTL} + 2.333\text{NITA} + 2.771\text{TLTA}$$

Then, each dummy variable was added to and deleted from the model separately, and their incremental abilities were observed in the model, individually.

Table 2 shows the significance test of coefficients of the first model (incremental).

Based on the incorporation of each cash flow combination into the model and the resulting coefficients, the final models are as follows:

(1) $\ln\left(\frac{p}{1-p}\right)$ =-7.961- .99OCFTL+ .457FIRMSZE+1.776CACL+ 2/228ICFTL + 2.368NITA + 2.765TLTA

(2) $\ln\left(\frac{p}{1-p}\right)$ =-7.970-0.791OCFTL+0.461FIRMSZE+1.41CFC2+1.723CACL+2.092ICFTL+2.236NITA+ 2.721TLTA

(3) $\ln\left(\frac{p}{1-p}\right)$ =-7.991-0.924OCFTL+0.431FIRMSZE+1.7CFC3+1.719CACL+2.17ICFTL+2.425NITA+ 2.874TLTA

(4) $\ln\left(\frac{p}{1-p}\right)$ =-7.930-1.021OCFTL+0.442FIRMSZE+1.776CACL+2.002ICFTL+2.396NITA+2.758TLTA

(5) $\ln\left(\frac{p}{1-p}\right)$ =-7.930- 1.021OCFTL+0.442FIRMSZE+1.776CACL+2.002ICFTL+2.396NITA+2.758TLTA

(6) $\ln\left(\frac{p}{1-p}\right)$ =-8.312-1.144OCFTL+0.452CFC6+0.458FIRMSZE+1.792CACL+2.154NITA+2.337ICFTL+2.931TLTA

(7) $\ln\left(\frac{p}{1-p}\right)$ =-7.884-1.006OCFTL+0.443FIRMSZE+1.763CACL+ 2.161ICFTL+2.293NITA+2.792TLTA

As it can be seen, the significance level of CFC1, CFC4, CFC5, and CFC7 is higher than 5% and do not enter the model, but CFC2, CFC3, and CFC6 are effective in the first model and enter it (paid cash profit 40% more than the previous year). Also, according to table 3, in the first model, the Nagelkrek coefficient is 0.231 when financial variables are incorporated, and it increases 20 0.249, 0.257, and 0.238, when CFC2, CFC3, and CFC6 are incorporated, respectively. Therefore, these combinations are effective in the model for decreasing DPS, and able to predict financial distress, although the explanatory power of the model increases very slightly, which is less than 2%. In the next stage, by replacing the dependent variable (two years of loss) the previous stages were duplicated. Based on the findings represented in table 2, at first, financial variables were incorporated regardless of cash flow combinations, giving the final model as:

$\ln\left(\frac{p}{1-p}\right)$ =-45.254- 22.311NITA+ 3.225CACL+ 4.527OCFTL +5.063FIRMSZE

Table 3 shows the Nagelkrek determination coefficient for the first model (incremental).

Table 4 show the significance test for the second model coefficients.

Then, each combination of cash flow is added to the model, one by one, and separately, and then they are excluded, examining their effects, individually. Based on the incorporation of each combination of cash flow (table 4) the final model will be:

(1) $\ln\left(\frac{p}{1-p}\right)$ =-45.155-22/26NITA +3.22CACL +4.515OCFTL+ 5.052FIRMSZE

(2) $\ln\left(\frac{p}{1-p}\right)$ =-46.104 -23.051NITA +3.245CACL +4.555OCFTL+ 5.205FIRMSZE

(3) $\ln\left(\frac{p}{1-p}\right)$ =-45.181 -22.992NITA +3.249CACL +4.676OCFTL+ 5.063FIRMSZE

(4) $\ln\left(\frac{p}{1-p}\right)$ =-45.263 -22.357NITA +3.222CACL +4.527OCFTL+ 5.068FIRMSZE

(5) $\ln\left(\frac{p}{1-p}\right)$ =-43.786 -21.098NITA +3.118CACL +4.333OCFTL+ 4.910FIRMSZE

(6) $\ln\left(\frac{p}{1-p}\right)$ =-44.422 -21.857NITA +3.139CACL +4.522OCFTL+ 4/996FIRMSZE

(7) $\ln\left(\frac{p}{1-p}\right)$ =-46.334 -22.884NITA +3.265CACL +4.643OCFTL+ 5.180FIRMSZE

Table 4 shows that the significance levels of all combinations are over 5%, which means none of them is effective in the model, so they are not incorporated. Therefore, in the second model, the number of years of loss, financial variables, the firm size, the operational cash flow, liabilities, and current ratios have a better predictive ability. Based on the information in table 5, the determination coefficient is 0.919 when the financial ratios enter the model, and after they are incorporated, this value either didn't change, or it changed very slightly.

Table 5 shows the Nagelkrek determination coefficient for 2nd model (incremental).

Finally, all variables are incorporated into the model and tested, simultaneously. The significance of the resulting models is tested by R^2 Cox Snell, the Negelkrek coefficient, and -2log likelihood function. Based on the information in table 6, the Nagelkrek determination coefficient is 0.319 for the first model and 0.925 for the second model.

Table 2 shows the Nagelkrek coefficient (all variables and combinations).

The results of the significance tests for models (Hosmer and Chi-square) are presented in tables 7 and 8. Based on the information in table 9, the significance levels of both models are lower than 5%, so independent variables have influence on dependent variables.

The results of table 7 show the significance of both models.

Table 7 shows chi-square test (all combinations and variables).

Moreover, based on the results in table 8, the statistic of the chi-square test indicates a fit between expected and observed cases.

Table 8 shows Hosmer test (all combinations and variables)

The results for the significance of the coefficients for the first model are presented in table 9.

Table 9: significance test for the first model coefficients (all variables and combinations).

As it can be seen, except for the first combination, all other combinations are incorporated into the model. The resulting model based on table 9 is:

$\ln\left(\frac{p}{1-p}\right)$ = -9.677 + 3.138TLTA + 2.485ICFTL + 2.371CFC3 + 2.148NITA+1.784CACL +1.631CFC5 +1.587CFC2 +1.559CFC6 +1.446CFC4+.954CFC7 +.435FIRMSIZE – 1.020FCFTL -1.254OCFTL

The results of the second model are resented in table 10. It is evident that the first combination as well as the liabilities and investment ratios are not incorporated. The resulting model based on table 10 is:

$\ln\left(\frac{p}{1-p}\right)$ = -42.246 +4.830FIRMSIZE +4.735OCFTL +3.066CACL+1.680CFC3+1.400CFC5 +1.213CFC6 +1.100CFC4+.905CFC7 -5.320FCFTL -22.289NITL

Table 10: the significant test for coefficients of the second model (all variables and combinations)

Conclusion

The resent study investigated different combinations of cash flow components for shareholders, creditors, and other users of financial statements to predict financial distress. The relationships among the components of cash flow are important for users in evaluating performance, the ability to fulfill duties, and future cash flows of the firm. In order to determine whether different combinations of cash flow and the relationships among the classes of cash flow statements will contribute to increased predictive abilities of other financial variables, seven combinations of operational, investment, and financial provision cash flow components were investigated. The results after corporation of each combination, individually, along with other financial variables into the first model show that only the second, third and sixth combinations are effective in this model. The results of testing the second model (two successive years of loss) indicated that no combination is effective in predicting financial distress and that other financial variables such as the ratios of the operational cash flow to total liabilities, net profit to total assets, current assets to current liabilities, and the firm size are more effective in predicting distress. After incorporating each combination, individually, into the model, they were incorporated simultaneously and the results were investigated. The results showed that in the first model (40% decreases in paid cash profit compared to the

previous year) except for the first combination, all other ones can boost the predictive ability of distress by financial variables, and in the second model, the results were the same.

All in all, it could be concluded that various combinations of cash flow don't have more informational content than other financial variables, and given the corporation of ICFTL and OCFTL variables into the first and second optimized models, it could be concluded that the components of the cash flow statement (separated by activities such as operational, investment, and financial provision) can better explain the financial distress experienced by firms admitted to the Tehran Stock Exchange, compared to the relationships among components of cash flows. It seems that pole engaged in market activities do not have a deep financial knowledge in predicting distress, and the relationships among values are not understood by these people, who just notice final values.

Investors, creditors, auditors, and other users of accounting are advised to notice the use of models developed in this study to predict distress, because these models can predict distress prior to bankruptcy. Moreover, educating people to understand the relationships among values in statements is advised. It should be noted that a business cannot be declared bankrupt firmly, because a model may declare it bankrupt but another model may declare it healthy. Therefore, judgments made by each model can give warnings about the future status of the business, and it cannot firmly declare distress.

Based on the results, it is proposed future studies:

1- Investigate the relationships of these variables as indicators of financial distress with future bankruptcy and financial crisis of companies and develop proper variables to predict distress.

2- Duplicate this study for other time periods.

3- Rather than investigating distress using 3-class cash flow statements, investigate predicting distress using 5-class cash flow statements.

Table 1: descriptive statistics of variables

maximum	minimum	Standard deviation	mean	median	observations	variable
5.84	0.21	0.49180	1.1100	1.1788	960	CACL
5.69	0.17	0.23406	0.6718	0.6702	960	TLTA
7.87	2.70	0.58818	5.5176	5.5819	960	FIRMSIZE
1.06	-0.25	0.13454	0.1163	0.1475	960	NITA
2.54	-1.13	0.29023	0.1162	0.1783	960	OCFTL
.80	-9.30	0.43283	-0.0720	-0.1511	960	ICFTL
1.58	-1.76	0.27864	-0.1389	-0.1746	960	FCFTL

Table 2: significance test of coefficients of the first model (incremental)

The logistic regression method		Number of observations: 120		Dependent variable: more than 40% decreasein cash profit compared to the previous year	
Exp(B)	significance	Wald statistic	Standard deviation	Beta	Input variables
0.000	0.000	55.017	1.064	-7.890	Constant value
5.801	0.000	60.251	0.226	1.758	CACL
15.981	0.000	19.285	0.631	2.771	TLTA
1.560	0.002	9.742	0.142	0.444	FIRMSIZE
10.309	0.003	8.558	0.797	2.333	NITA
0.385	0.013	6.122	0.386	-0.955	OCFTL
8.753	0.000	22.442	0.458	2.169	ICFTL
0.528	0.113	2.508	0.403	-0.638	FCFTL
0.601	0.383	0.760	0.585	-0.510	First combination
4.097	0.000	13.677	0.381	1.410	Second combination
5.474	0.000	19.593	0.384	1.700	Third combination
2.026	0.052	3.781	0.363	0.706	Fourth combination
1.529	0.158	1.989	0.301	0.424	Fifth combination
Logistic regression method		Observations: 120		Dependent variable: 40% decreased in cash profit compared to the previous year	
Exp(B)	significance	Wald statistic	Standard deviation	beta	Input data
1.572	0.021	5.359	.195	0.452	Sixth combination
0.909	0.724	0.124	0.269	-0.095	Seventh combination

Table 3: The Nagelkrek determination coefficient for the first model (incremental)

Nagelkrek coeficient	R^2 cox Snell	-2log liklihood function	First model
0.231	0.152	868.230	Financial variables
0.232	0.152	867.440	First combination
0.249	0.164	854.571	Second combination
0.257	0.169	848.906	Third combination
0.236	0.155	864.600	Fourth combination
0.234	0.153	866.308	Fifth combination
0.238	0.156	862.767	Sixth combination
0.231	0.152	868.105	Seventh combination

Table 4: Significance test for the second model coefficients.

Logistic regression		Observations:120		Dependent variable(two successive years of loss)	
Exp(B)	significance	Wald statistic	Standard deviation	Beta	Input variables
0.000	0.000	12.322	12.892	-45.254	Constant value
25.151	0.001	10.490	.996	3.225	CACL
Logistic regression		Observations:120		Dependent variable(two successive years of loss)	
Exp(B)	significance	Wald statistic	Standard deviation	beta	Input variables
32.239	.056	3.639	1.821	3.473	CLCA
158.139	.001	10.331	1.575	3.063	FIRMSIZE
.000	.003	9.053	7.415	-22.311	NITA
92.462	.029	4.749	2.077	4.527	OCFTL
1.155	0.961	0.002	2.973	.144	ICFTL
0.002	0.078	3.106	3.613	-6.367	FCFTL
0.000	0.999	0.000	8368.889	-12.650	1st combination
0.266	0.682	0.168	3.234	-1.326	2nd combination
0.671	0.863	0.030	2.318	-.399	3rd combination
0.727	/938	0.006	4.118	-.319	4th combination
0.007	/644	0.214	10.869	-5.025	5th combination
0.460	/564	.333	1.346	-.777	6th combination
1.728	/679	0.171	1.322	0.547	7th combination

Table 5: The Nagelkrek determination coefficient for 2nd model (incremental)

Nagelkrek coefficient	R^2 cox Snell	-2log liklihood function	Second model
0.919	0.223	24.704	Financial variables
.919	0.223	24.695	1st combination
0.919	0.223	24.512	2nd combination
0.919	0.223	24.674	3rd combination
0.919	0.223	24.689	4th combination
0.922	0.224	23.725	5th combination
0.920	0.223	24.357	6th combination
0.919	0.223	24.537	7th combination

Table 6. The Nagelkrek coefficient (all variables and combinations)

Nagelkrek coefficient	Cox Snell R^2	-2log lilelihood function	model
0.319	0.210	800.172	First (over 40% decrease in cash profit)
0.925	0.225	22.729	Second (2 successsive years of loss)

Table 7: chi-square test (all combinations and variables)

significance	freedom	Chi sqauer	model	
0.000	14	225.970	step	first
0.000	14	225.970	block	
.000	14	225.970	model	
0.000	14	244.268	step	second
0.000	14	244.268	block	
0.000	14	244.268	model	

Table 8: Hosmer test (all combinations and variables)

significance	freedom	Chi square	model
0.132	8	16.813	first
0.986	8	1.825	second

Table 9: Significance test for the first model coefficients (all variables and combinations).

Logistic regression		Observations: 120		Dependent variable (40% decresd in paid cash profit)	
Exp(B)	significance	Wald statistic	Standard deviation	beta	Input variables
0.000060	0.00	65.730	1.194	-9.677	Constant value
5.742	0.00	52.335	0.242	1.748	CACL
23.046	0.00	20.927	0.686	3.138	TLTA
1.573	0.00	9.164	0.150	0.453	FIRMSIZE
8.564	0.00	6.317	0.854	2.148	NITA
0.285	0.00	7.138	0.469	-1.254	OCFTL
11.997	0.00	22.873	0.520	2.485	ICFTL
0.361	0.044	4.039	0.507	-1.020	FCFTL
1.666	0.453	0.563	0.680	0.510	1st combination
4.891	0.00	15.786	0.400	1.587	2nd combination
10.712	0.00	28.878	0.441	2.371	3rd combination
4.244	0.001	10.763	0.441	1.446	4th combination
5.110	0.00	16.246	0.405	1.631	5th combination
4.753	0.00	25.315	0.310	1.559	6th combination
2.597	0.00	6.891	0.364	0.954	7th combination

Table 10: The significant test for coefficients of the second model (all variables and combinations)

Logistic regression		Observations:120		Dependent variable (two successive years of loss)	
Exp(B)	significance	Wald statistic	Standard deviation	beta	Input data
0.00001	0.001	10.472	13.055	-42.246	constant value
21.462	0.004	8.419	1.057	3.066	CACL
125.162	0.100	2.713	1.892	3.117	TLTA
0.500	0.002	9.245	1.588	4.830	FIRMSIZE
113.874	0.016	5.844	9.221	-22.289	NITA
0.393	0.006	3.525	2.522	4.735	OCFTL
0.003	0.827	0.048	4.274	-0.934	ICFTL
0.300	0.048	2.353	3.867	-5.320	FCFTL
4.414	0.999	0.000	8343.387	-13.256	1st combination
4.311	0.001	22.990	3.575	1.222	2nd combination
1.136	0.000	27.360	2.767	1.680	3rd combination
2.002	0.006	9.230	3.330	1.100	4th combination
3.297	0.000	15.680	12.885	1.400	5th combination
1.230	0.000	22.600	1.709	1.213	6th combination
0.00001	0.005	5.030	1.658	0.905	7th combination

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7/25/2012