An Early Warning Model of Financial Distress Sharia Banks in Indonesia

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Abstract: Predictive models of financial distress presented by highly qualified researchers have identified conclusively as an early warning of financial distress. This study aims to develop a model of an early warning before the onset of financial distress in the group of Islamic or Sharia banks in Indonesia. Approach to the development of models using multiple discriminant analysis (MDA) on panel data of 11 companies studied Islamic banks in the period 2013-2017. The results showed that the financial variable flow cycle (FFC), Cash Conversion Cycle (CCC) and Debt to Equity could be a differentiator. The discriminant model can predict cases accurately at 81,8%. The study's findings provide empirical support to the stakeholder in the identification of the financial distress in Sharia banks.

1 INTRODUCTION

Since the collapse of Arthur Andersen, Enron, WorldCom, Lehman Brothers, American Airlines and Kodak, the global economy is becoming increasingly sensitive to signs of financial distress, bankruptcy and bankruptcy of the company, (Cunningham and Harris, 2006; Adnan and Humayon 2006; Stinson, 2010; Muller, Steyn and Hamman, 2012). So is various problems arise in the process of growth and sustainability of financial institutions in various countries. For example, the collapse of financial institutions such as Ihlas Finance in Turkey and Bank Taqwa in the Bahamas, as well as aid the prevention of bankruptcy (bail-in/bail-out) on banks as happened in Fortis Bank Belgium, Commerzbank Germany, Dubai Islamic Bank and Al-Rajhi Bank of Saudi Arabia, could threaten the economic system as a whole (Iqbal, 2001; Ali, 2007; Hasan, 2010; Haron, 2012; Husna and Rahman, 2012). Similarly, in Indonesia, in 2015, showed that Bank Muamalat Indonesia is also experiencing financial distress. On the other hand, Sharia banks in Indonesia has proliferated with an average growth of 5 percent per year (FSA, 2017). It is essential fatherly reviewing financial distress in Sharia banking in Indonesia.

Definition, classification and predictive modeling of financial distress and bankruptcy of the company is an exciting research topic (Ward, 1997; Trussell, 2002; Kpodoh 2009; Senbet and Wang, 2012). Financial distress is the inability of the company to pay its obligations, the case before the company becomes insolvent or fails (Fitzpatrick, 1932; Beaver, 1966; Altman, 1968; Altman et al. 1977; Ohlson, 1980). While others, financial distress is defined as the process of financial loss phase (Hofer, 1980; Whitaker, 1999; Platt and Platt, 2002 in Atmini 2005). However, some researchers suggest that financial difficulties are when a company fails to pay its obligations ((Latinen, 1994; Ward and Foster, 1997; Whitaker, 1999; Cybinski, 2001; Kuruppu, 2003; Steyn-Bruwer and Hamman, 2006; Arena, 2008). It becomes a real difference, to make a distinction between companies that fail classification (fraud) or non-fail. Differences due to the determination of variable definition and analysis. Some researchers suggest studying financial distress, it is not a failure, because of the narrow definition of failure (Keasey and Watson, 1991; Kahya and Theodossiou, 1996; McLeay and Omar, 2000; Platt and Platt, 2002). On the other hand, the importance of developing specific technical models and different analysis to financial distress. (Keasey and Watson, 1991; Hayden, 2003; Taffler and Agarwal, 2007, Fitzpatrick and Ogden, 2011, Zhiyong Li et al. 2017). Because of the narrow definition of failure (Keasey and Watson, 1991; Kahya and Theodossiou, 1996; McLeay and Omar, 2000; Platt and Platt,

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This study will develop models and techniques of financial analysis with consideration to determine a good prediction related to the financial condition and performance prediction. The financial analysis involves static financial ratios have been widely used in predicting the company's financial distress and bankruptcy (Damodaran, 2001; Alkhatib and Bzour 2011; Burksitiene and Mazintiene, 2011). Over time, the static model of financial analysis is less able to predict the financial distress in the changing economic environment and changes in its operations effectively and continuously (Sun and Li, 2011). On the one hand, some researchers argue dynamic working capital can participate in providing

a simple methodology with the purpose of evaluating financial performance (Flueriet 1980; Kehdy and Blanc 2003; Costa and Gracias, 2009; Fleuriet and Zeidan 2015). Along with this, working capital can reflect the financial health of the company related to profitability and liquidity (Sagner 2014 Talonpoika, 2016). The use of total debt in the funding of companies (financial leverage) risk within the period, the volatility of the fund and asset value growth, with leverage dynamic measurement also able to generalize the risk of failure of the company (Smirnov, 2004; Xiadongzhang and Jonghe 2015; Marzo and Zhiguo, 2016).

The study was oriented management of Islamic finance, especially in Islamic banking in Indonesia. Islamic banking or Sharia banking (Al-Mashrafiyah al-Islamiya) has a banking system operating with Islamic principles. Assumed to have partial resistance and health adequate (Saeed, 1996; Rammal, 2007; Jaizah and Mehmet 2017). Even so, some Sharia banks in Indonesia have indications of financial distress. Below in Table 1 are presented the phenomenon of Sharia banking, which processed with priority dimensions of income (EBIT) of debt relationships with the company's assets.

Table 1: Dimensions phenomenon Earning Before Income Tax (EBIT), Debt to Asset Ratio (DAR) of Sharia Banking in Indonesia in 2012-2016

No.	EBIT TO DAR		2012	2013	2014	2015	2016
1	Bank Aceh Syariah	BASS	-	-	-	-	117,363
2	Bank Muamalat Indonesia	BMI	552,095	709,266	105,693	116,120	124,537
3	Bank Victoria Syariah	BVS	12,409	5,589	(28,717)	(36,261)	(31,671)
4	Bank BRI Syariah	BRIS	149,382	203,834	16,795	187,140	262,397
5	Bank Jabar Banten Syariah	BJBS	24,859	46,833	39,695	17,796	(618,860)
6	Bank BNI Syariah	BNIS	155,034	197,099	244,603	340,549	409,127
7	Bank Syariah Mandiri	BSM	1,188,779	956,543	118,535	406,559	473,065
8	Bank Mega Syariah	BMS	286,501	218,154	26,255	19,848	182,630
9	Bank Panin Dubai Syariah	BPD	60,705	33,511	115,733	89,939	32,106
10	Bank Syariah Bukopin	BSB	28,687	31,488	13,909	45,621	53,973
11	Bank BCA Syariah	BCAS	13,532	19,802	22,123	42,073	63,130
12	Bank Maybank Syariah Indonesia	BMSI	104,244	104,095	133,951	(519,050)	(292,558)
13	Bank Tabungan Pensiunan Nasional Syariah	BTPNS	-	-	173,210	298,969	71, 202

Source: compiled from various sources for research purposes

Table 1 shows during the five years from 2012 to 2016, Sharia banking in Indonesia is experiencing the dynamics and dimensions fluctuations EBIT of DAR. Also, in 2014, several Sharia banks experienced a decline in profitability. Sharia banking

development is also experiencing difficulties in profitability, working capital and debt (Hasan, 2010; Hassairi 2011; Husna and Rahman, 2012; Pappas and Izzeldin 2012; Jaizah, 2013).

This study will be different from previous research that has done. As a comparison, it can serve on the differentiation of the prediction model of financial distress in the banking industry are presented in Table 2. From Table 2, the apparent disparity research, financial distress prediction studies on Sharia banking is still minimal. Besides, dynamic models in the prediction of financial distress have begun to be used since 2012. The current study aims to develop a new model of early warning of financial distress in Sharia banks in Indonesia, taking into account the dynamic and leverage the working capital of the company.

Table 2: Differentiation Prediction Model for Financial Distress and Bankruptcy in Banking Industry

empirical era	Model Related features	Object of research
1970	Using MDA multivariate discriminant analysis (Altman 1968; Meyer and Pifer, 1970; Sinkey, 1975; Sinkey, 1977), logit regression (Martin, 1977)	conventional banking
1980	Using Logit and Probit models, the ratio of CAMEL (Bovenzi, 1983; West, 1985; Zavgren, 1985; Whalen and Thomson, 1988; Looney et al. 1989), Factor Analysis (West, 1985).	conventional banking
1990	Using a logit model, Neural Network, CAMELS ratio, macroeconomic approach and professional assessment (Espahbodi, 1991; Thomson, 1992; Tam and Kiang 1992; Henage, 1995; Tan, 1996; Hermosillo, 1996; Bell 1997; Swicegood, 1998), Methods AEIS and neural networks (neural network) (Tam and Kiang, 1990; Tam, 1991; Swicegood and Clark, 2000).	conventional banking
2000	During the 2000s, began to develop an early warning system (system EWS warning) Using logit analysis of parametric and non-parametric, Genetic Neural Network, MDA, Probit, research areas in the United States (Kolari, 2002; Tung, 2004, Canbas, 2005; Lanine and Vennet, 2006), the territory of Japan, Indonesia, Malaysia, Turkey, Norway, Britain, Austria and Russia (Kutznetsov 2003, Logan, 2003; Golovan, 2003; Hayden and Baeur 2004; Montgomery, 2005; Lanine and Vennet 2006 ; Konstandina 2006; Halling and Hayden, 2006; Andersen 2008; Bakir and Tahir 2009; Boyacioglu, 2009). The dynamic model of financial distress in Banking (Kahl, 2002; Cole and Qionghy, 2009).	Conventional banking, (starting inferred from the dynamic model)
2010 -2017	In addition to conventional banking, Islamic or Sharia banking, began to also develop a model of financial distress (financial distress) in various countries, (Hasan, 2010; Hassairi 2011; Zaabi, 2011; Husna and Rahman, 2012; Pappas and Izzeldin 2012; Jaizah, 2013, Baklaci and Baydoan 2014; Nawaz, 2017; Laila and Widihadnanto, 2017). Some dynamic model predictions of financial distress in conventional banking (Achsani, Nuryatono and Haymens 2010; Zhiyong, Crook and Andreeva, 2016).	Conventional and Sharia (Islamic) banking

Source: compiled from various sources for research purposes

This research is expected to explain the gap between researchers on the issue of working capital as a variable dynamic early warning of financial distress so it can be used for the achievement of the sustainability performance of Sharia banking.

Subsequently, in the next section, conducted a literature review with the support of theories have been developed previously. Moreover, it will focus on the development of early warning models of financial distress. Next, it presented a description of the findings, discussion, and conclusion.

2 LITERATURE

Decisions on finance companies can be grouped into three critical decisions: (1) a decision on the investment (the investment decision): related to the choice between investment potential and right, (2) the funding decision: relates to collecting / obtain funds for investment that create value and choice mix money owners (equity) or borrowed money (debt) must use the company. (3) The decision of dividend: related to the number of funds to be reinvested in the funding of business activities and how much should be returned to the owner

(Damodaran, 2004; Copeland, Weston and Shastri, 2005).

Funding decisions relating to the selection of the company's financial resources. As a result, along with the debt increases, the likelihood of financial distress or even bankruptcy will increase with the risk of bankruptcy is higher, the debt holders will demand payment of the promised higher, which also will increase the cost of pre-tax debt (Brigham and Daves, 2007). The increase in debt (leverage) will increase the likelihood of financial distress and bankruptcy (Jensen and Smith, 1984). The trade-off theory assumes the company will have a capital structure that is optimal based on the balance (trade-off) between the benefits to the cost of the use of debt (Peirson, 2006). In turn, financial distress will lead to a reduction in the company (firm value).

The initial literature, a relationship between financial distress and bankruptcy on the company's capital structure proposed by Modigliani and Miller (1958, 1963), known as the capital-MM Structure Theory. It also assumes that bankruptcy does not cause economic hardship. There is confusion about a pair of related but different concepts: financial distress and economic hardship. Financial distress means that the company promises to creditors damaged (Haugen and Senbet 1978, Gertner and Scharfstein 1991). This is directly related to utilizing the company's decision. Furthermore, in the Pecking Order Theory (Myers, 1984) states that there is a sequence (hierarchy) for companies in the use of capital. Companies prefer to use internal funding sources, then with debt, and the latter with equity funding. Debt as a source of funding that comes from outside the company while in the company. This debt, in turn, must be repaid. Besides that, in the structure of the financial statements, the Sharia banking is known that has not bound investment. Which is the separation of the elements of the debt or capital (Husna and Rahman, 2012).

This study develops a study on the management of working capital finance (Fleuriet et al. 1978), as part of a dynamic model of working capital. This model divides the current assets and current liabilities into financial and operational cycles are flexible between assets and liabilities. Finance working capital management is one of the possibilities to get the dynamic flexibility of the financial performance and optimize profitability, with a focus on asset flexibility, cash flow and debt management (Marttonen et al. 2013; Talonpoika, 2016). In this case, the approach of the cycle time to be the size of financial working capital and liquidity, showing how the company can operate with liquid

assets after closing the current liabilities and is known as the cycle of financial flows or FFC (Talonpoika, 2016).

On the other hand, the increase in working capital funding will affect the operational working capital, so that the performance measures in the form of cash conversion cycle (CCC) is used to measure the operational working capital (Knauer and Wohrmann, 2013; Talonpoika 2016). FFC performance measures are only able to be enhanced by financial items and then shifted to the operational steps. Thus, the FFC measurement should be used in conjunction with the CCC, to produce an accurate decision. Additionally, some researchers estimate the company's financial distress, uses dynamic prediction models with various approaches (Fitzpatrick and Ogden, 2011; Konstantaras and Siriopoulos, 2011; Kim and Partington, 2014; Zhiyong, Crook and Andreeva, 2017).

3 RESEARCH METHODS

In many studies, a large number of ratios have been used in predicting financial distress. The ratio is dominant, with the main criteria: working capital, profitability, liquidity, solvency generally better in predicting potential and financial distress (Bhunia and Sarkar, 2011; Fitzpatrick and Ogden, 2011, Zhiyong Li et al. 2017). In this study the selected ratio is as follows:

Financial flows Cycle (FFC): shows the gap of time and value, operational between current assets and current liabilities of operations, related to finance working capital cycle. FFC consists of two components: other current assets (Other Current Assets) and other current liabilities (Current Liabilities) (Flueriet, 1980; Silva, 2010; Rehn 2012; Camargos and Leao in 2014; Talonpoika, 2016).

Cash Conversion Cycle (CCC): is a variant of the cycle time inventory and accounts receivable cycle with the cycle of debt. It is intended to test the limits of financial and operational working capital. Operating working capital includes three components: inventory accounts receivable and payable (Flueriet, 1980; Camargos and Leao in 2014; Talonpoika, 2016).

Debt to Equity Ratio (DER): indicates the relative proportion or the extent to which companies take on debt as a means to increase its value. More debt used by the company about total assets, the higher the risk can not meet debt payments are contractual (Souza and Smirnov, 2012; Sagner 2014

Xiadongzhang and Jonghe 2015; Marzo and Zhiguo, 2016; Saračević and Šarlija, 2017).

Debt to Assets Ratio (DAR): the extent to which the company's ability to meet the total liabilities, the capital structure which compares the size of debt with asset management. Can also be used to measure how much of the company's assets are financed by debt. The higher the ratio, the higher the degree of leverage and cause financial risks (Souza and Smirnov, 2012; Sagner 2014; Xiadongzhang and Jonghe, 2015; Marzo and Zhiguo, 2016; Saračević and Šarlija, 2017).

Debt to EBITDA: shows the company's ability to meet the total liabilities, the capital structure which compares the size of the debt to EBITDA, ignore the factor of interest, taxes, depreciation, and amortization. The ratio of Debt / EBITDA are high indicates that the company may not be able to service the debt properly and ensure that the credit ratings downgraded(Souza and Smirnov, 2012; Sagner 2014; Xiadongzhang and Jonghe, 2015; Marzo and Zhiguo, 2016; Saračević and Šarlija, 2017).

Samples of data derived from the financial statements for five (5) years from 2013 to 2017. The unit of analysis in this research is the Indonesian Sharia banks, which is a company engaged in the financial industry sector, as a Sharia commercial bank. Data Sharia banks experiencing financial distress is taken from the measurement approach the level of performance and classified into 2 (two) groups: low performance and high-performance group. Performance is measured by ratings and an average score of four financial ratios: profitability, productivity, efficiency, and leverage. (Osaimy, 2004; Jaizah, 2013). Analyzes were performed with Multiple discriminant analysis (MDA). MDA is a statistical method that allows for the study of more than two variables simultaneously and used to understand the structure of high dimensional data (Bryman and Cramer, 2005). Use of Multiple discriminant analysis (MDA) has been widely applied in research management and accounting (Altman 1968, 1993, 2005; Syahida and Ameer 2010, Bhunia, 2011). As a multivariate technique, Multiple Discriminant Analysis (MDA) has a prevailing assumption in the multiple regression analysis and perform well if the variable in the group follow a normal distribution (Bhunia and Sarkar, 2011). Data analysis technique in this research is to analyze the variable ratio in the company's financial statements and processing discriminant analysis. The processing stage of discriminant analysis consists of: estimating the coefficients of the discriminant function with stepwise, test the similarity of the average group, significant test between the two groups, test the accuracy of the model, determine the functional equation and validation determine the cut-off point.

4 FINDINGS

After identifying the research methodology, this section presents the empirical findings by the particular method used.

Test Similarity Average Group: this test uses two methods; namely, Wilks 'lambda and significant value to the F test value of Wilks' lambda close to 0 indicate increasingly significant. Here in Table 3 are presented the results of median equality test groups and test for normality

Table 3: Tests of Equality of Group Means & Normality

	Wilks' Lambda	F	DF1	DF2	Sig.	Kolmogorov-Smirnova		
						statistical	Df	Sig.
FFC	, 730	19.592	1	53	, 000	, 099	55	, 200 *
DebttoAsset	, 934	3.716	1	53	, 059	, 072	55	, 200 *
trans_CCC	, 794	13.726	1	53	.001	, 087	55	, 200 *
trans_DebtoEqu	, 880	7.217	1	53	.010	, 099	55	, 200 *
trans_DebttoEbitda	, 971	1,607	1	53	, 210	, 114	55	, 070

Source: (Data from SPSS, 2018)

Based on Table 3, the variables that can distinguish between healthy and unhealthy groups namely FFC, trans_CCC and trans_ DebttoEqu because it has significant value <0.05 and has a value of 0. The test results wilks'lamda approaching normality Kolmogorov-Smirnova showed that the independent variable distribution normal.

Significant Test Between Two Variables: this test uses *stepwise* method to find the best variables.

Table 4: Significant Test (Variable Entered / Removeda, b, c, d)

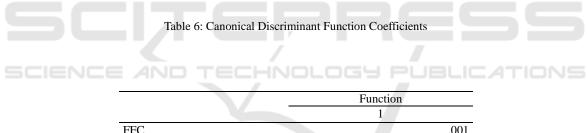| Step	Entered	Min. D Squared					
		Statistics	Between Groups	Exact F			
				statistics	DF1	DF2	Sig.
1	FFC	1,539	0 and 1	19.592	1	53,000	4,815E-005
2	trans_CCC	2,170	0 and 1	13.547	2	52,000	1,839E-005
3	trans_DebtoEqu	2.746	0 and 1	11.211	3	51,000	9,216E-006

Source: (Data from SPSS, 2018)

In Table 4 independent variables that satisfy the requirements to enter the discriminant equation is FFC, trans_CCC, and trans_DebttoEqu that have significant value <0.05.

Accuracy Test of Discriminant: This test measured using *wilks'lamda*.

Table 5: Wilks' Lambda

Test of Function (s)	Wilks' Lambda	Chi-square	Df	Sig.
1	, 603	26.084	3	, 000

Source: (Data from SPSS, 2018)

Wilks'lamda value of 0.603 and 0.000 significant value, which means there are significant differences between healthy and unhealthy groups on the discriminant model.

Discriminant function analysis: discriminant function so formed can be seen in Table of *Canonical Discriminant Function Coefficients*.

Table 6: Canonical Discriminant Function Coefficients

	Function
	1
FFC	.001
trans_CCC	, 037
trans_DebtoEqu	-1.170
(Constant)	-2.191

Source: (Data from SPSS, 2018)

Discriminant function which is formed by a table of 6, namely:
Z = -2.191 + 0.001FFC + 0.037 trans_CCC – 1.170 trans_DebttoEqu

Cut-Off Point: used to group company based on the value obtained. The following table is used to determine the cut-off point.

Table 7: Functions at Group centroids

Dependen0_1 (Y)	Function
	1
Healthy	-1.055
Not healthy	, 603

Source: (Data from SPSS, 2018)

According to the table above, Sharia banks are healthy have an average score: -1.055. Sharia banks do not have an average score of 0.603. Cut off score = (-1.055 + 0.603) / 2 = -0.226. Thus, if the value of Z score <-0.226 classified as Sharia banks are healthy and if the value of Z score> -0.226 classified as Sharia banks are not healthy.

Hit ratio: is one of the criteria for assessing the strength of the sensitivity of the discriminant equation in classifying objects. From Table 8 below, the discriminant function can predict accurately the case of 81.8%.

Table 8: Classification Results[a,c]

		Dependen0_1	Predicted Group Membership		Total
			0	1	
Original	Count	Healthy	20	0	20
		Not healthy	10	25	35
		ungrouped cases	0	1	1
	%	Healthy	100.0	, 0	100.0
		Not healthy	28.6	71.4	100.0
		ungrouped cases	, 0	100.0	100.0
Cross-validatedb	Count	Healthy	19	1	20
		Not healthy	11	24	35
	%	Healthy	95.0	5.0	100.0
		Not healthy	31.4	68.6	100.0

a. 81.8% of original grouped cases Correctly classified.
b. Cross validation is done only for Reviews those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.
c. 78.2% of cross-validated grouped cases Correctly classified.

5 CONCLUSIONS AND IMPLICATIONS

Based on the results of the discriminant analysis, financial ratios that proved significant for Sharia banks differentiate healthy and unhealthy in Indonesia in 2013-2017, namely the Financial Flow Cycle (FFC), conversion Cash Cycle (CCC) and Debt to Equity. Discriminant function equations were formed, namely **Z = -2.191 + 0.001FFC + 0.037trans_CCC–1.170 trans_ DebttoEqu** and *cut-off point* that is formed is -0.226. CCC has the highest coefficient in the formation of the discriminant.

The results of the discriminant analysis, Sharia banks are considered as healthy, if the value of *FFC* and *CCC* is getting smaller or negative, so it will minimize the value of the discriminant function. Likewise, with the *DebttoEqu* coefficient being negative, if the *DebttoEqu* value is greater, it will reduce the value of the discriminant function.

Furthermore, Sharia banks are considered as unhealthy, if the value of *FFC* and *CCC* is getting bigger, so it will enlarge the value of the discriminant function. Likewise, with a negative *DebttoEqu* coefficient, if the *DebttoEqu* value gets smaller, it will increase the value of the discriminant function

Finally, this model can be used by government regulators to monitor the performance of Sharia banks are likely to experience financial problems. On the one hand, from the standpoint of the regulator, the ability to detect early performance of Sharia banking using publicly available data will have a significant impact on the cost of monitoring and inspection. Given that the authentic character of Sharia banks, which provide durability and uniqueness partially operational, it is essential to further develop the financial distress early warning mechanisms to proactively by considering new variables associated with the uniqueness of Sharia banks.

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