

Alaa Salhani, 2019

Volume 4 Issue 3, pp.902-910

Date of Publication: 5<sup>th</sup> January, 2019

DOI-<https://dx.doi.org/10.20319/pijss.2019.43.902910>

This paper can be cited as: Salhani, A., (2019). A Proposed Model for Predicting the Financial Distress of Private Conventional Banks in Syria: An Empirical Study. *PEOPLE: International Journal of Social Sciences*, 4(3), 902-910.

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## **A PROPOSED MODEL FOR PREDICTING THE FINANCIAL DISTRESS OF PRIVATE CONVENTIONAL BANKS IN SYRIA: AN EMPIRICAL STUDY**

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### **Abstract**

*This study aims to find the best set of financial ratios that can be used to predict the financial distress of private conventional banks in Syria and to distinguish between distressed and non-distressed banks in the first and second year before the distress. In order to warn the concerned parties to intervene and take corrective actions in a timely manner and to restore the health of these banking institutions. To achieve this, a stepwise discriminant analysis was used and 21 financial ratios were calculated for a sample of 11 banks for a period between the years (2010-2016). The following proposed model was reached:  $Z = 14.746 (D/A) + 35.069 (L/A) - 15.899 (NFE/A) - 5.134 (NPM) - 26.076$ . Test of the model has been done, and it was found to be able to predict the financial distress and distinguish between distressed and non-distressed banks with an accuracy rate 100% in the first and second year before the distress.*

### **Keywords**

Conventional Banks, Financial Distress, Predicting

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## **1. Introduction**

Predicting the financial distress is considered as one of the most important topic, due to failure of many international banks in the last financial crisis. In Syria, this topic takes a priority especially during the war and political crisis that threats stability of most Syrian banks. All stakeholders in Syria need to predict the distress one or more year before the distress. Supervisory authorities need to take action in order to save banks from default, bank managers need to take corrective actions in a timely manner to restore the health of banks (EL-Ansary & Saleh, 2018), and investors prefer to invest in successful banks that would achieve a great performance in the future. This study focuses on the financial distress because it precedes the financial failure and bankruptcy, which enables the managers and supervisory authorities to get an early warning detection and decrease the negative effect as much as possible (Shaheen & Mater, 2014). According to (Ross et al, 2013) distress means one these two or both cases: Lack of return or stopped, and stop paying obligations. This paper classifies the distressed banks based on those that have made losses for at least three consecutive years, because the successive losses indicate a poor conditions and a precedence stage of financial failure and bankruptcy (Kerroucha et al, 2016). This study will try to find the best set of financial ratios that would help to predict the financial distress and distinguish between distressed and non-distressed banks.

The rest of this paper is structured as follows: section 2 reviews the related literature about prediction the financial distress and failure. Section 3 presents the research problem and hypothesis. Section 4 presents sample and methodology. Results are in section 5. Conclusion and recommendations are presented in section 6 with summarizing results.

## **2. Literature Review**

Many studies in different countries have dealt with financial failure and distress and ways to predict them by proposing a model that can be used as a warning detection. Examples of these studies are:

Moghadas et al (2014), this study has used the logistic regression to predict the financial distress of firms in Tehran stock exchange. Nine independent variables have been used for a sample of one hundred banks from 2002 to 2010. The results show that the proposed model is 89.7% accurate to predict the financial distress.

Shaheen & Matter (2010), this study aimed to find the best model of financial ratios that can be used to predict the faulting of banks in Palestine. To achieve this the study used an

analysis of linear multi- discriminatory. A set of financial ratios have been calculated for sample of eight banks. A test of the proposed model has been done and it was found to be able to predict the faulting with accuracy (75%, 75%, and 62.5%) in the first, the third, and the fourth year, respectively before the faltering.

Al-Gehmani (2001), this study aimed to find the best set of financial ratios that can be used to distinguish between distressed and non-distressed banks in Jordan one year before the distress. Twenty-three financial ratios have been calculated and linear discriminant analysis have been used. The results show the proposed model is 75% accurate in the first year before the distress.

Ateya (1993), this study aimed to find the best model of financial ratios to distinguish between distressed and non-distressed banks in in Jordan. To achieve this the study used linear discriminant analysis and sample of twenty-seven financial ratios have been calculated. The study reached to model consists of seven financial ratios.

None of the literature studied the predicting of financial distress in Syria due to newness of private Syrian banks compared to other countries. Moreover, what enhance the importance of this paper is the unstable economic conditions in Syria that would increase possibility of Syrian banks to suffer from financial distress.

### **3. Research Problem and Hypothesis**

#### **3.1 Research Problem**

This paper aims to answer the following two questions:

- Is it possible to develop a mathematical model to predict the financial distress and distinguish between distressed and non-distressed banks in the first and second year before the distress?
- To what extent and how accurate the proposed model could predict the financial distress and distinguish between distressed and non-distressed banks in the first and second year before the distress?

#### **3.2 Research Hypothesis**

The suggested model that consists of a set of financial ratios, predict the financial distress and distinguish accurately between distressed and non-distressed banks in the first and second year before the distress.

#### 4. Sample and Methodology

A sample of all private conventional banks that are listed on Damascus securities exchange (11 banks) have been selected during the period (2010 – 2016). In addition, 21 financial ratios were calculated for all banks during that period (see table 1).

**Table 1:** Variables, source: researcher

Variables	Definition
<b>X1</b>	Net foreign exposure to total assets
<b>X2</b>	Net Interest income to total assets
<b>X3</b>	Net profit margin
<b>X4</b>	Net profit margin with the foreign exchange gain
<b>X5</b>	Net income to total asset
<b>X6</b>	Net income to total asset with foreign exchange gain
<b>X7</b>	Net income to total equity
<b>X8</b>	Net income to total equity with foreign exchange gain
<b>X9</b>	Total revenue to total assets
<b>X10</b>	Total assets to total equity
<b>X11</b>	Liquid assets to total assets
<b>X12</b>	Non-performing loans to total loans
<b>X13</b>	Capital adequacy ratio
<b>X14</b>	Loan loss reserve to total loans
<b>X15</b>	Loan loss reserve to non-performing loans
<b>X16</b>	Loans to deposits
<b>X17</b>	$(\text{Delinquent loans} + \text{non-performing loans}) / (\text{capital} + \text{loan loss reserve})$
<b>X18</b>	$\text{Total non-interest expenses} / (\text{interest income} + \text{non-interest income})$
<b>X19</b>	$\text{Total non-interest expenses} / (\text{interest income} + \text{non-interest income} + \text{provision})$
<b>X20</b>	Total loans to total assets
<b>X21</b>	Total deposits to total assets

This study defined distressed banks on the basis of those that have made losses for at least three consecutive years. The following table (table 2) shows which banks made losses for at

least three years, and which did not make any losses. In addition, BBS, QNBS and SHRQ have been excluded because that has made not losses for at least three consecutive years.

**Table 2:** *Classification of banks, source: researcher*

	<b>Banks</b>	<b>Classification</b>
1	ARBS	Made losses for at least three years successive
2	BASY	Did not make losses
3	IBTF	Did not make losses
4	SGB	Made losses for at least three years successive
5	BBSF	Did not make losses
6	BSO	Did not make losses
7	FSBS	Did not make losses
8	BOJS	Made losses for at least three years successive
9	QNBS	NA
10	BBS	NA
11	SHRQ	NA

Financial Ratios were unloaded at SPSS program in a form of 21 independent variables. Data was analyzed using stepwise discriminant analysis to find the best set of financial ratios that can be used in building this model to predicate the financial distress and distinguish between distressed and non-distressed banks.

## **5. Results**

By using the stepwise discriminant analysis, the following model has been resulted for predicting the financial distress:

$$Z = 14.746 (D / A) + 35.069 (L / A) - 15.899 (NFE / A) - 5.134 (NPM) - 26.076$$

1. (D/A): Deposits to assets.
2. (L/A): Loans to assets.
3. (NFE/A): Net foreign exposure to assets
4. (NPM): Net profit margin.

If  $Z > 0.695$  bank should be classified at distressed banks.

If  $Z < 0.695$  bank should be classified at non-distressed banks.

The sign of each coefficient in the proposed model indicates the direction of distinguish; positive sign indicates the direction toward distressed banks while negative sign indicate the opposite.

All suggested financial ratios are so suitable with Syrian economic and banking environment. The bigger deposits to assets ratio the more interest expenses conventional banks should pay regardless of their performance, which increase the probability of bank to be classified at distressed banks. The researcher thinks that this is a special case in Syria, where most banks have low income due to very small investing opportunities, which would make the interest income much lower than interest expense. The same is true for loans to assets ratio, the bigger loans to assets ratio the more non-performing loans and credit losses the conventional banks could incur due to political and economic crisis that has led many companies to bankruptcy. On the other hand, the bigger net foreign exposure to assets ratio the more income Syrian banks have made due to depreciation of Syrian currency against other currencies, which increase the probability of bank to be classified at non-distressed banks. The same is true for net profit margin, which indicates ability of bank to generate profit from each Syrian pound of revenue.

**Table 3: Wilks' Lambda test**

Test of Function(s)	Wilks' Lambda	Chi-square	Sig.
1	0.108	26.735	0.000

Wilks' Lambda test indicates (table 3), that the proportion of total variability not explained is only 10.8%, In addition to high significance of the discriminant function (0.000).

The proposed model was found to be to predict the financial distress and distinguish between distressed and non-distressed banks with an accuracy 100% in the first and second year before the distress (see table 4).

**Table 4: Testing the model by comparing the actual classification with predicted one.**

Case number	Actual classification		Z score	Condition	Predicated classification		Accuracy
1	0	Distressed	4.104	>0.695	0	Distressed	Right
2	0	Distressed	4.194	>0.695	0	Distressed	Right

3	0	Distressed	2.876	>0.695	0	Distressed	Right
4	0	Distressed	2.471	>0.695	0	Distressed	Right
5	1	Non-distressed	-1.104	<0.695	1	Non-distressed	Right
6	1	Non-distressed	-2.248	<0.695	1	Non-distressed	Right
7	1	Non-distressed	-2.781	<0.695	1	Non-distressed	Right
8	1	Non-distressed	0.186	<0.695	1	Non-distressed	Right
9	1	Non-distressed	-1.681	<0.695	1	Non-distressed	Right
10	1	Non-distressed	-3.010	<0.695	1	Non-distressed	Right
11	1	Non-distressed	-2.419	<0.695	1	Non-distressed	Right
12	1	Non-distressed	-1.462	<0.695	1	Non-distressed	Right
13	0	Distressed	3.096	>0.695	0	Distressed	Right
14	0	Distressed	4.114	>0.695	0	Distressed	Right
15	1	Non-distressed	-2.588	<0.695	1	Non-distressed	Right
16	1	Non-distressed	3.749	<0.695	1	Non-distressed	Right

## 6. Conclusion and Recommendations

This paper was attempted to find the best set of financial ratios that can be used to predict the financial distress of private conventional banks in Syria and to distinguish between distressed and no-distressed banks. A Sample has been chosen which consists of all private conventional banks in Syria that are listed on Damascus securities exchange during the period (2010-2016). Twenty-one ratios were calculated for every bank (11 banks) during 2010 until 2016. Ratios were unloaded at SPSS program in a form of 21 independent variables. Data was analyzed using stepwise discriminant analysis and resulted with this proposed model:  $Z = 14.746 (D / A) + 35.069 (L / A) - 15.899 (NFE / A) - 5.134 (NPM) - 26.076$ . The suggested model was tested and it was found to be able to predict the distress one and two year before the distress with an accuracy rate 100%. The financial ratios of that model are different from what are resulted in other research (Shaheen & Mater, 2011; El-Ansary & Saleh, 2018; Africa, 2018) due to economic and political crisis that greatly affect the financial ratios. Moreover, that makes the proposed model suitable for countries that are suffering from political and economic crises. The study recommends supervisory authorities, auditors, managers, and investors to use the proposed model in order to predict financial distress and take the best action in a timely manner. The

proposed model works as a useful and effective instrument in identifying early warning signs for all related parties. The study encourages banks to prepare their financial statement at least monthly and to use consistent accounting standards in order to be able to use the proposed model in an effective way. Three caveats apply to this research. First, our findings are based only on private conventional banks in Syria. Hence, expanding the sample to cover public banks and conventional banks in other countries would give a better and unbiased results. Second, this study concentrates only on financial ratios, and ignored non-financial and macro-economic indicators, further research could include those indicators in order to get a more comprehensive and accurate results. Third, the study has been greatly affected by the Syrian political and economic crisis, which makes the model useful only in the economic and political crises periods, further research could develop a model that considers the economic and political crises as one of its variable or develop a special model for stable economic and political environment. Addressing those caveats would be a venue for further research.

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