

Testing Z-Score Model on Lebanese Listed Banks

Fadi A. Ghosn

School of Business, Lebanese International University (LIU), Lebanon

Abstract

The study examines the financial health of a sample of public listed banks in the Lebanese banking sector covering a period of 5 years from 2013 till 2017; using the z-score model for emerging markets and the z-score model for non-manufacturing companies. The results show that the emerging markets factor is above the upper limit of 2.6 for the whole sample, meaning that the studied banks don't face any financial distress, which translates the current situation of such banks; it also shows an upward sloping trend in most of the banks Z-scores and its components. On the other side the study reveals that the usage of Z-score for non-manufacturing companies is inappropriate to be applied on banks in the Lebanese market.

Keywords: Banks, Financial institutions, Listed banks, Financial distress, Bankruptcy, Z-score, Non-manufacturing, Emerging markets.

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1. Introduction

Throughout history, the Lebanese banking sector played an important role in the development and stability of the country's economy and monetary policy. It overcame some disasters that are still threatening the depositors in such banks, starting from the collapse of Banque Intra in 1966, to some minor problems that happened with Al Madina bank, and lastly to the monetary and economic threats that are panicking depositors in the last two years. The banking industry is sensitive to news and rumors, which affect it either positively or negatively; where the role of research comes to show facts as found using different scientific models.

1.1 Research Structure

The research starts with an introduction that states the importance, nobility, and objectives of the study. In the second part, it applies the Altman Z-score model on a number of listed Lebanese banks to test its financial health. The study ends up with a conclusion stating the obtained results, limitations, and recommendations for future studies.

1.2 Research Problem

The Lebanese deep-seated monetary deficit in addition to trade deficit, is affecting the financing needs of the economy. Although, Lebanon is trying to manage financial problems throughout covering the deficit from abroad funds, but this solution can't maintain and may come in to an end. The banking sector in Lebanon is playing an important role in the stabilization of the economy and the exchange rate.

The shortage of studies regarding the financial distress of the Lebanese banking sector, with the current debate about its position raise up a problem to be solved by covering the gap in literature and obtaining results that solve for the debatable opinions. Liquidity enters in determining if a bank is healthy or not; banks that pay attention to their risk management operations will ensure their continuance in the long term. If banks' current obligations exceed its operating cash flows, then financial health can be converted to financial distress. This financial distress leads to either bankruptcy or liquidation in order to cover these obligations.

1.3 Research Objectives

The study satisfies the following objectives:

RO1) To examine the financial health of the Lebanese listed banks.

RO2) To examine the validity of the Z-score models in predicting bankruptcy in Lebanese listed banks.

RO3) To show the trend in the financial position and health of listed Lebanese banks.

RO4) To aid in keeping the financial sector healthy or at least to reduce bad circumstances whenever predicted.

1.4 Research Questions

The study is conducted to answer the following questions: Is the Z-score model efficient and critical in predicting financial distress and bankruptcy before its occurrence? Are Lebanese banks facing financial distress problems? Are all listed banks located in the same range in managing their financial health?

1.5 Research Hypotheses

H1: Lebanese listed banks don't face bankruptcy

- H2: Lebanese listed Banks don't face financial distress*
H3: The Z-score model for non-manufacturing firms can be applied to listed banks in Lebanon.
H4: The Z-score model for emerging markets can be applied to listed banks in Lebanon.

2. Lebanese Banking Sector

The Lebanese banking sector is one of the oldest in the region, where it plays an important role in the development and stability of Lebanon and the nearby countries throughout history.

Lebanese banking sector occupies high level of success which led to an international attention. Since the world financial crash in 2008, Lebanon was one of the few countries that report growth. Commercial banks incur a broad set of activities, which functions a crucial role in the Lebanese economy; in addition, the banking sector supplies a straight forward payment system that permits real and financial resources to stream freely to their maximum return uses. Banks are predominately substantial source of funds for small borrowers that have limiting access to other external financial sources. (Salem, et al., 2012)

3. Literature Review

Reasons of bankruptcy are classified into internal and external reasons. As for external Reasons, it is a result of, features of the economic system, competition, alteration in commerce, elaborations and feedback on public demand, variations in the business, and other events. As for internal reasons, it can be a result of inadequate capital, weak management, conflict of interest, and progressing more than the amount of validity (Moharrampour, et al., 2014).

The first ratios used in predicting financial distress goes back to the year 1930. In 1966, Beaver conducted the single-variable method, and ending with Altman's Z-score method in 1968. Several studies were conducted to determine the effectiveness of Z-score model in determining the bankruptcy in both listed and unlisted banks.

(Khaddafi, et al., 2017) Examines bankruptcy predictions among 29 listed (public) banks in Indonesia, using Z-score model for the years 2011, 2012, and 2013; found that, in 2011, 13 banks are successful, 14 banks facing bankruptcy, and 2 banks are in the grey zone .In 2012, 10 banks are successful, 14 banks facing bankruptcy and 5 banks occupies the grey zone. Finally in 2013, the same number of banks facing bankruptcy stayed the same, with 4 banks in the grey zone and 11 healthy banks. (Pradhan, 2014) Uses the Z-score model to predict the presence of bankruptcy in Indian public banks; the interpretation shows that the Oriental Bank of Commerce Z-score is the highest compared to Punjab National Bank and State Bank of India.

(Ghenimi, et al., 2017) Discusses the origin of banking weakness in a sample of 49 banks among MENA region for the period 2006-2013, in order to test both credit and liquidity risks and to interpret their effects on bank's settlement .It was concluded that although liquidity and credit risks have no reciprocal relationship, they significantly affect the banks' stability. (Saji, 2018) In using the Z-score model on 10 Indian firms found that z-score model has utility in predicting distress and classifying it, where business failure is due to several reasons such as, setting wrong targets, illogical decisions of managers, and mismatching between supply and demand constraints. Truly, although firms may come upon many risks, the gravest risk is financial failure.

4. Data Collection Method

The study uses published data extracted from listed Lebanese banks' websites, thus using secondary data in a quantitative research approach. It covers a period of 5 years spanning from 2013 till 2017. It uses the extracted data to compute ratios that serve as components in the computation of Z-score models.

The audited consolidated financial statements are the main origin of the collected data, where numbers are presented either in thousands or in millions of Lebanese Lira. Four banks listed at Beirut Stock Exchange (BSE) are selected to conduct the study, which are BLOM, BLC, BOB, and Byblos.

5. Methodology

The study starts by using collected data to compute the ratios that form the components of z-score models including working capital to total assets (X1), retained earnings to total assets (X2), operating profits to total assets (X3), and book value to equity to book value of liabilities (X4).

Networking capital is normally computed by current assets minus current liabilities, but since in banks the balance sheets does not segregate assets and liabilities as current or non-current; rather it lists them according to liquidity. In this manner we will consider all liabilities as liquid, and liquid assets as a sum of all the following:

- Cash and deposits with central bank
- Deposits with banks and financial institutions
- Loans to banks and financial institutions
- Loans and advances to customers
- Loans and advances to related parties
- Investment securities at fair value through profit or loss

- Investment securities at fair value through comprehensive income
- Investment securities at amortized cost
- Customer's Liabilities under acceptance

The ratios are then presented in a chart that shows the change in their trend over the period under study, in an aim to notice whether they are improving or deteriorating; thus knowing where and how to improve. The next step involves the computation of Z-score model for non-manufacturing firms, where:

$$Z = 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

After that, the study computes the Z-score for emerging markets where:

$$Z = 3.25 + 6.56X1 + 3.26X2 + 6.72X3 + 1.05X4$$

Following computation of the two models, charts are created in order to show their trend over the years from 2013 till 2017 which translate the trend in the financial health of listed banks.

Both models have two critical points, where a result below 1.1, means that the firm under study is facing bankruptcy in less than 1 year, however if the result is between 1.1 and 2.6, means that the firm is in a financial distress situation, and thus can be recovered when noticed by improving the weak variables or any of their influencers. Lastly if Z-result is more than 2.6, means that the firm is not facing any financial distress.

6. Sample

The chosen sample includes four out of the six listed banks at Beirut stock Exchange namely, Bank of Beirut, BLOM bank, BLC bank, and Byblos bank.

7. Findings and Results

7.1 Bank of Beirut (BOB)

Table 1. BOB Z- Variables

	2013	2014	2015	2016	2017
X1	0.0952	0.1059	0.1052	0.1174	0.1098
X2	0.0097	0.0101	0.0111	0.0114	0.0133
X3	0.0127	0.0141	0.0135	0.0133	0.0128
X4	0.1260	0.1385	0.1406	0.1551	0.1469

Source: Prepared by Author.

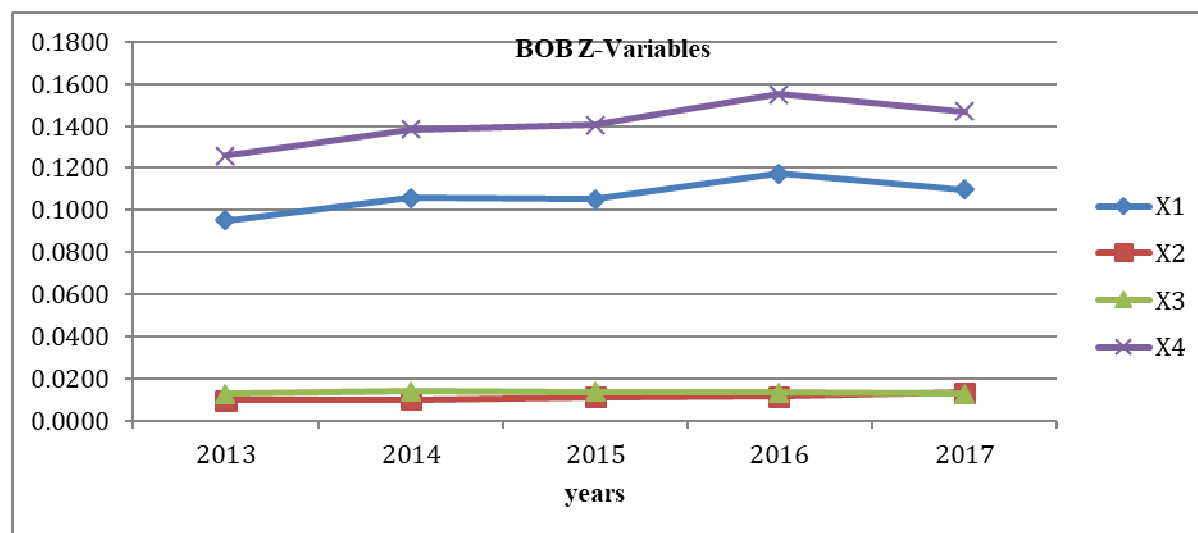


Figure 1. Trend in the Z-Variables of BOB Bank

Table 2. BOB Z-Results

	2013	2014	2015	2016	2017
Z-Non Manufacturing	0.8738	0.9673	0.9649	1.0598	1.0040
Z-emerging	4.1238	4.2173	4.2149	4.3098	4.2540

Source: Prepared by Author.

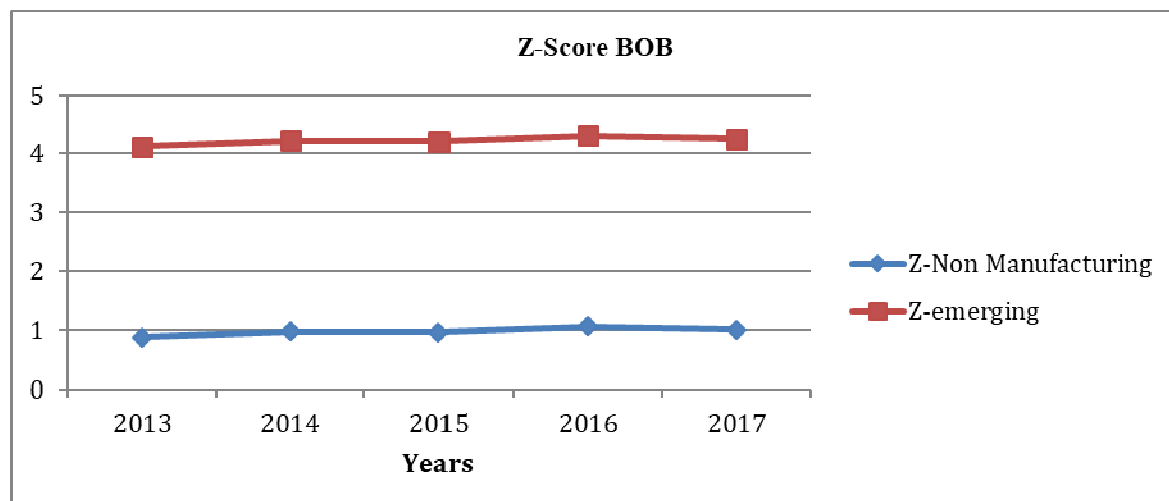


Figure 2. Trend of the Z-Results for BOB Bank

Looking at the Z-score for emerging markets shown above, we can notice a healthy situation over the 5 years period, with improving variable above the cutoff of 2.6. On the other hand we can see contradicting results for the Z-score for non-manufacturing firms which is below the cutoff of 1.1 since 2013, indicating a bankruptcy within 1 year which in turn contradicts the reality since the bank did not face any financial distress during the past 5 years period. BOB is showing the highest results among its peers in the sample.

7.2 BLC Bank

Table 3. BLC Z-Variables

	2013	2014	2015	2016	2017
X1	0.0389	0.0448	0.0469	0.0600	0.0733
X2	0.0118	0.0147	0.0143	0.0172	0.0182
X3	0.0096	0.0100	0.0094	0.0093	0.0095
X4	0.0940	0.0975	0.0965	0.1117	0.1055

Source: Prepared by Author.

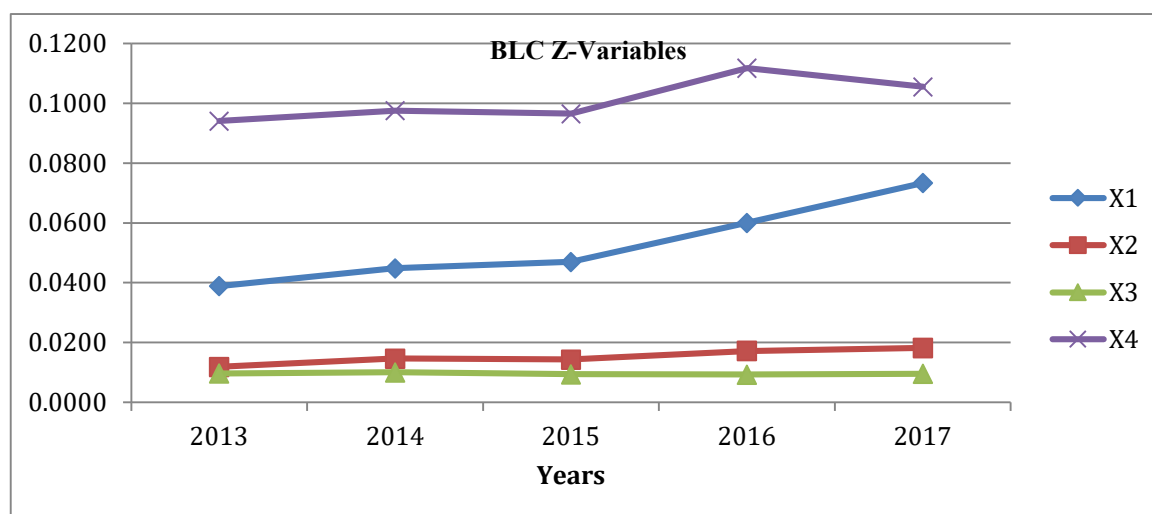


Figure 3. Trend of the Z-Variables for BLC Bank.

Table 4: BLC Z-Results

	2013	2014	2015	2016	2017
Z-Non Manufacturing	0.4571	0.5116	0.5189	0.6293	0.7150
Z-emerging	3.7071	3.7616	3.7689	3.8793	3.9650

Source: Prepared by Author.

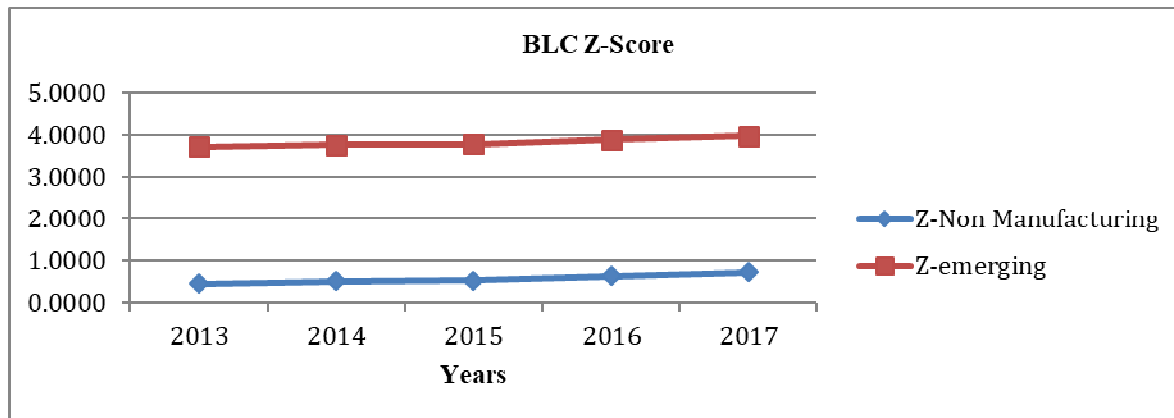


Figure 4. Trend of the Z-Results for BLC Bank

BLC bank is also showing a satisfactory emerging market indicator over the 5 years period with improving variables, all above the cutoff of 2.6.

7.3 Byblos Bank

Table 5. Byblos Bank Variables

	2013	2014	2015	2016	2017
X1	0.0753	0.0754	0.0727	0.0739	0.0706
X2	0.0019	0.0014	0.0021	0.0022	0.0015
X3	0.0100	0.0116	0.0099	0.0193	0.0087
X4	0.0979	0.0973	0.0944	0.0949	0.0904

Source: Prepared by Author.

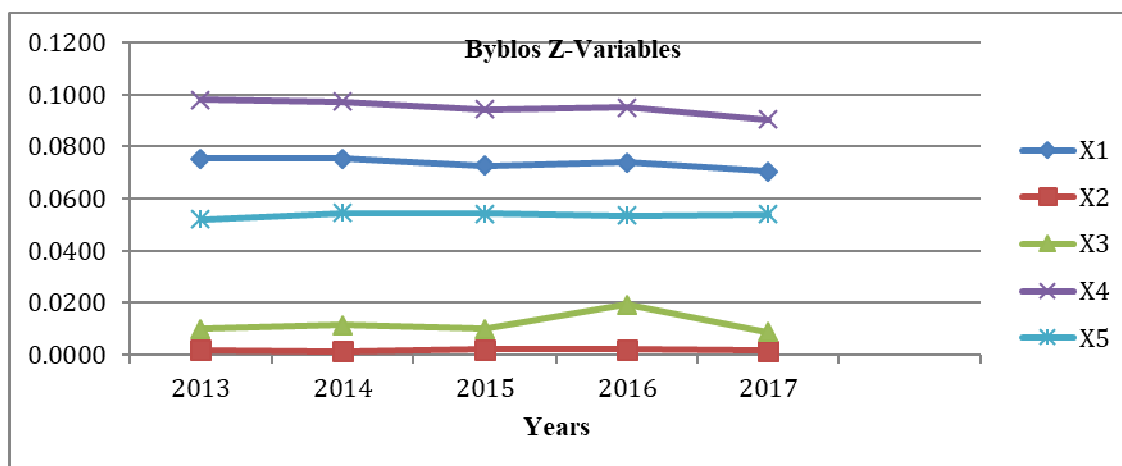


Figure 5. Trend of the Z- Variables for Byblos Bank

Table 6. Byblos Z- Results

	2013	2014	2015	2016	2017
Z- non manufacturing	0.6701	0.6790	0.6493	0.7208	0.6215
Z-Emerging	3.9201	3.9290	3.8993	3.9708	3.8715

Source: Prepared by Author.

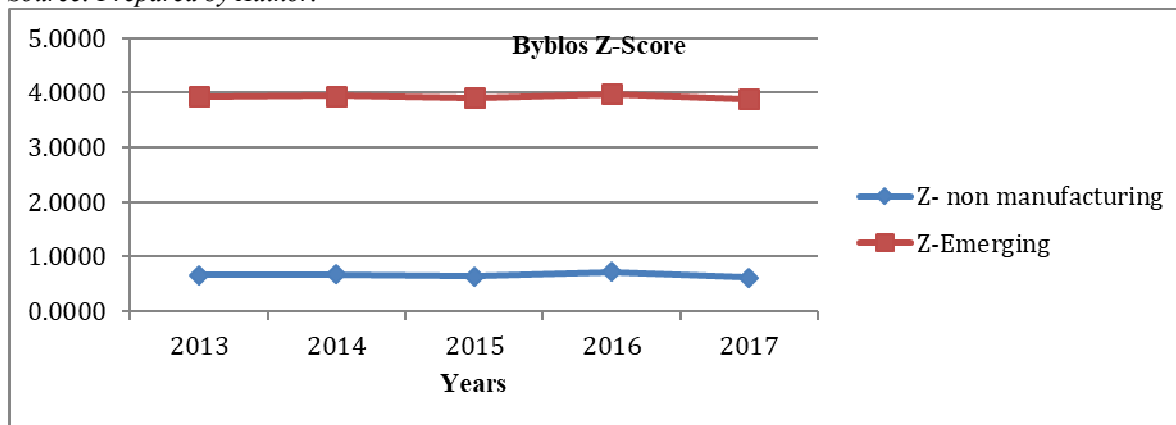


Figure 6. Trends of the Z-Results for Byblos Bank

The results for Byblos bank look semi stable with a slight decrease in 2017 as a result of declining X3 and X4. Looking in more details on the variables and the financial statements of the bank, we can notice that the percent increase in assets and liabilities is higher than the percent increase in profits.

7.4 BLOM Bank

Table 7. BLOM Bank Variables

	2013	2014	2015	2016	2017
X1	0.0741	0.0666	0.0733	0.0788	0.0707
X2	0.0233	0.0265	0.0287	0.0318	0.0310
X3	0.0166	0.0161	0.0169	0.0287	0.0186
X4	0.0987	0.0991	0.1032	0.1103	0.1017

Source: Prepared by Author.

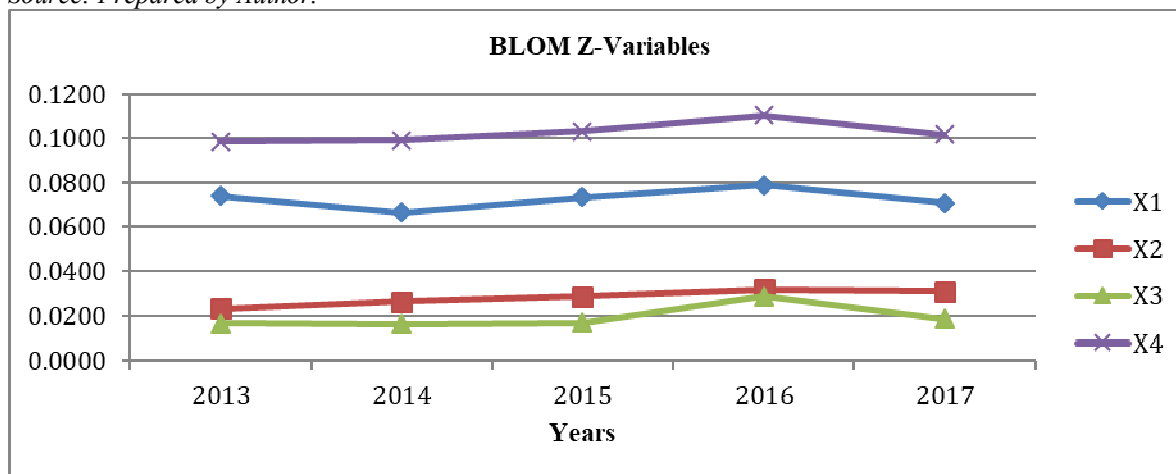


Figure 7. Trends of the Z-Variables for BLOM Bank

Table 8. BLOM Bank Z- Results

	2013	2014	2015	2016	2017
Z- Non-Manufacturing	0.7771	0.7355	0.7963	0.9289	0.7965
Z- Emerging	4.0271	3.9855	4.0463	4.1789	4.0465

Source: Prepared by Author.

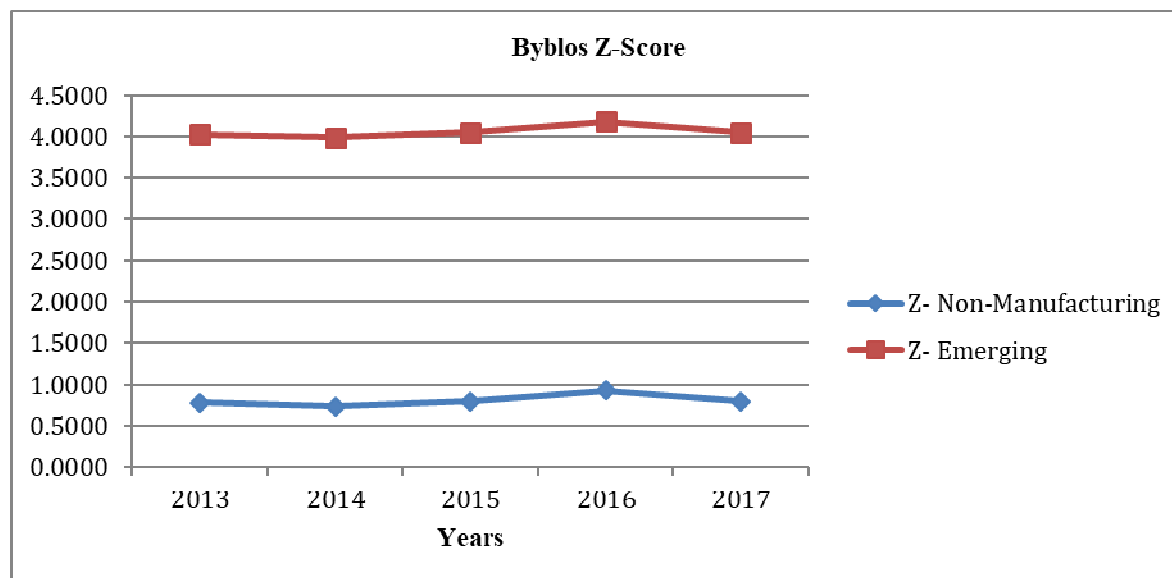


Figure 8. Trends for the Z-Results of BLOM Bank

From the above obtained results, BLOM Bank shows a healthy position with stable and improving variables. Neither bankruptcy is predicted, nor financial distress since the Z-score for emerging markets has results above 2.6 over the 5 years period.

8. Research Limitations

There is no specific model that shows details of a company or bank failure. Thus, Z-score model has many limitations. First, as per (Tilden & Janes, 2012), the public information provided by banks and used in ratio analysis may be subject to window dressing. In addition the information provided by the financial statements is somehow complicated while calculating the value of variables included in the Z-score model, mainly the net working capital (Current Assets – Current Liabilities), thus determining the actual value of both liquid assets and liquid liabilities is not that an easy process due to the lack of detailed information in some banks' financial statements. In addition banks don't account for current assets and current liabilities rather for liquid assets. At last, the z-score high predictive power in one industry is not a sign that it is effective in another country's industry.

9. Conclusion and Recommendations

Even though the Lebanese economy is seen to be away from healthy, yet it is not close to bankruptcy. About 148 percent of GDP is the public debt, yet this value was higher in the past, and there are many efforts to refinance debt as it comes due. In order to keep Lebanon solvent, the confidence of creditors must be maintained. Numerous analysts eulogize the Lebanese banking sector on its luminary performance in an economy full of social and political rockiness. So far, scrutiny of loans' portfolios provided by these banks reveal that they are slightly concentrated on providing investment loans, which would stimulate long term growth. (Mann, 2018)

The study computed the Z-score model for emerging markets and the Z-score model for non-manufacturing firms on a sample of 4 Lebanese public banks including BOB, BLOM, Byblos, and BLC, covering a period of 5 years ranging from 2013 till 2017. The results for non-manufacturing Z-score rejects the null hypothesis that Lebanese public banks don't face financial distress for all banks over the 5 years period since the result Z-score is less than 1.1, and they may face bankruptcy. This result contradicts the reality since the mentioned banks did not face any distress during the past 5 years, which ends to rejecting the null hypothesis that the Z-score model for non-manufacturing companies can be applied on the Lebanese listed banks.

On the other side the Z-score results for emerging markets show more reliable outputs for all banks since it is higher than the cutoff of 2.6 thus accepting the null hypothesis that z-score for emerging markets can be applied to Lebanese banks and reflecting the current situation of non-financial distress among the banks in sample.

In addition we can notice that both indicators are improving for most of the public banks in Lebanon, thus reflecting a better and healthier future in the Lebanese banking system.

Based on the approached results and on the analysis, and even if Z-score model in one of its versions, is powerful in predicting the financial distress and bankruptcy in listed banks, this model still needs support using other methods to obtain more accurate and reliable results. It is recommended to apply a combination of bankruptcy prediction methods, compare the results, and then deduce the outcomes.

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