# The effectiveness of Kida model for predicting   financial failure of insurance companies in Algeria –A field study-

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| A R T I C L E  I N F O | A B S T R A C T |
|---|---|
| | _This study aims to investigate the effectiveness of the Kida model for predicting financial failure in Algerian insurance companies, and  to achieve the objectives of the study it was dropped on a sample of four Algerian insurance companies represented by Alliance ,CAAT,CASH , and CCR, based on actual data derived the financial statements for periode 2014-2019._<br>_The most important results of study is   the Kida model is considered effective for predicting financial failure in Algerian insurance companies, as its results were positive during most of the years of research._ |

## 1.  Introduction_:_

Insurrance  companies  are  among  the  important  financial  institutions because  of  their  social  and  economic importance ,especially with the growth of the insurance sector in the recent years.

These companies have a specific privacy as they differ from other  industrial and even service institutions ,because they play a dual role where the first one is to provide an insurance service to those who request it by paying a certain premium ,and the second role is to get the insured's money and reinvest it for a certain return ,this make them vulnerable to many risks including Financial failure which leads to bankruptcy, this failure can be predicted by using several models among them kida model   which we will address in this study.

The study problem can be formulated as follows:

**How effective is  the Kida model for predicting financial failure in Algerian insurance companies?**

Which can be divided into the following sub-questions:

- What is financial failure and what are its causes in insurance companies?

- What are the financial ratios that make up the Kida model?

- Can we predict the financial failure in Algerian Insurance companies by using Kida Model ?

And to answer the problematic and the previously raised sub-questions we formulated the following hypotheses :

- One of the main causes of financial failure in insurance companies is insolvency.

-The Kida model is considered ineffective in Algerian insurance companies.

The study derives its importance from:

- Financial failure is one of the most important problems for study and research ;
- Predicting financial failure provides important information to stakeholders to take appropriate corrective actions ;
- Avoid recurrent bankruptcy that have negative effects on the economy .

- Many insurance companies experienced financial failure and bankruptcy in previous years in the United States and the European Union.

we aim through this study to the following **:**

- Identify  the financial failure in insurance companies  and its causes;
- Learn about kida model ;
- Drop the Kida model on a sample of Algerian  insurance companies.

To answer the problematic raised , the following points were addressed :

**Section 01 : The concept of financial failure and its causes .**

**Section 02 : Prediction financial failure  by using  the Kida  model .**

**Section 03 : A case study of Algerian insurance companies**.

## 2.   The concept of financial failure and its causes.

### 2.1. Definition of  financial  failure
*Many financial and accounting researchers disagreed about the definition of financial failure, and became there are many concepts and terminology associated with this concept, which made the views of those interested in determining the stages and types of failure, some of them believe that financial failure means the failure of the institution to pay its obligations at maturity, and others believe that it means the institution to stop paying its debts due to insufficient liquid assets to cover their financial obligations.*

The concept of failure has been associated with the economic researcher Beaver, who is the first to use this term to indicate the beginning of the institution to reach bankruptcy, where it is defined as "the inability of a firm to pay its financial obligations as they mature. Operationally a firm is said to have failed when any of the folllM'ing events have occurred: bankruptcy, bond default, an overdrawn bank account or non-payment of a preferred stock dividend. (MEDJOUB & HOUAS, 2020, p. 93)
We can say that failure is a situation that arises when the realized rate of return on invested capital is significantly and continually lower than prevailing rates on similar investments .It may involve cases where , revenues are insufficient to cover costs , or the average return on investment is lower than the cost of capital (Ibrahim, 2003, p. 15).
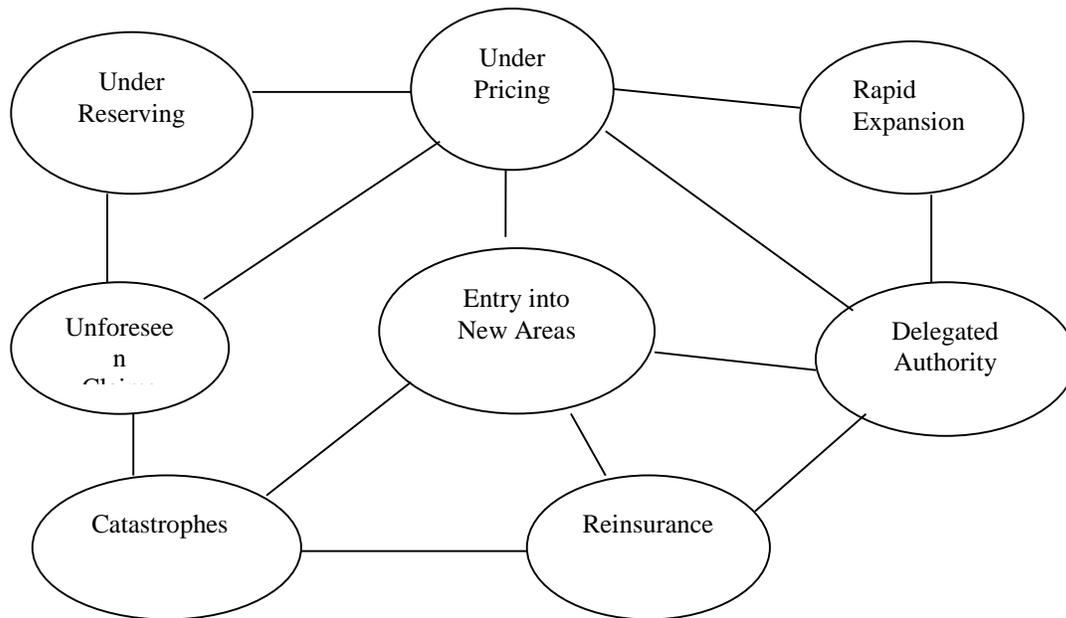
### 2.2. Causes of financial failure in insurance companies

All the causes that may generate the bankruptcy of insurance companies are reunited under the form of its insolvency (Luminita, 2010, p. 103) .
We have identified some common causes of insurance company failure supported by both recent and past failures. In addition to the fraudulent activities and management ,incompetence, which may be found in any industry, there are many closely linked factors that are more specific to insurance company failures. (Roger & others, p. 40)
The following figure shows the most important reasons that lead to financial failure in insurance companies.

**Figure 01** : Causes of financial failure in insurance companies .

Through the previous figure, it can be said that the most important reasons that lead to the financial failure of insurance companies is the company's entry into new markets without prior study which makes it unable to compete with other insurance companies, and this appears through the lack of good appreciation of the prices of insurance products,also insufficient provisions.

In addition, the poor study of reinsurance operations by accepting large amounts of operations, which the insurance company cannot compensate for in the event of realizing the risk

2.3 *Reasons to care about financial failure in insurance companies*

there are many reasons why the insurance industry , and those associated with it ; should be concerned with the failure of insurance companies.The failure of a company has an impact on (Roger & others, p. 3):

- The policyholders at the time of the failure : if they have an outstanding claim it may not be paid , or paid in full.Even if there is a market scheme to pay claims in such a situation , it may not pay the full value of the claim .In addition the policyholder may not get all the unexpired premium back , and even if they do , they will probably have to take out a newn policy before they get the money .
- Other insurers : other insurance companies can lose out if :
  - They were reinsured by the company , since they may not be able to get their claim paid in full ;
  - Fewer people buy insurance because of a lack of trust in insurance companies ;
  - The failure leads to increased regulation ;
  - They have to pay levies to meet the shortfall in claims .
  - The staff and any contractors or consultants : sta ff will suffer a loss of wages , perhaps some for work they have already done but all future wages until they can find re-employment .For some more senior people that may be made more difficult if there is any stigma attached to having worked for a failed insurance company.
  - Other creditors of the company **:** creditors are unlikely to get back all that they are owed .
  - The shareholders of the company **:** the shareholders lose out on future dividends and their capital .It is interesting to consider where this capital has gone. Assuming fraud is not an issue , it may well have gone to policyholders in the form of lower premiums .In some senses failure can be thought of as distributing capital shareholders ( arguably the richer in society ) to the more general public .
  - The general public and the economy **:**the general public could suffer from higher taxes used to fund increased regulation , higher taxes to pay unemployment benefits ,higher premiums to pay for levies on insurers to pay

the shortfall in claims and higher premiums because of the reduced competition in the market place .There can also be a general  the economy .This has been demondstrated recently in Australia .HIH was the second largest general insurer, it collapsed in 2001 .As a result of this , many small businesses and community organisation have been unable to get cover or have had very large premium increases . Without cover , many organisations are unable to continue operating **.**

*In  summary , the failure of other companies costs money .So it should be a concern of every company both to identify potential failure and so to minimise the finantial impact of such failures. Actuaries are well placed to do a lot of this work .From a public interest point of view they also might have a role to play in preventing and minimising the cost of such failures to the public (Roger & others, p. 4)*

### 3.   Prediction financial failure  by using  the Kida  model

*3.1. Importance of the financial failure 's prediction*

Over the last five decades, financial failure prediction has been an interesting topic for researchers because of its incredible significance to companies, the economy, and all other concerned parties (Sumaira, Elisabete, & Zélia, 2019, p. 3).

Financial failure prediction could be regarded as a specific form of classification problem. Before applying prediction methods to corporate financial failure prediction, which is generally based on analyzing the financial ratios, predictor variables should be selected from many financial ratios or should be constructed from the combination of financial ratios (Ashoori & Mohammadi, 2011, p. 570).

 prediction of the financial failure enables us to reach to causes of entreprises 's failure. All persons and foundations being in a profit relation with entreprises are closely interested with financial failure predictions (Gulsum & Umit, p. 128)

*3.2. Models of prediction finacial failure*

In the late 1960s , several studies were developed a several models for failure prediction ,researchers have examined some of these models in order to identify their ability to predict corporate failure (Sufian & Suleiman, 2018, p. 182) **.**
The origin of the development of business failure prediction models is placed in Beaver's and Altman's work, which is considered to be pioneering in this field.
Using their models as a basis, a large list of researchers has developed their own ones, usinga wide range of financial ratios as independent variables in statistical models obtained by a variety of methodologies, in order to predict failure (GARCIA-GALLEGO & MURES-QUINTANA, 2012, pp. 3-4)

The more notable published contributions are Beaver (1966 ;1968 a ;1968b), altman (1968 ;1973) , Altman and lorris(1976) , Altman and McGough  (1975) , Altman ,Haldman and Narayanan (1977), Deakin (1972) , Libby (1975) ,Blum (1974) , Edmister (1972) ,Wilcox (1973) , Moyer(1977) ,and Lev (1971) .Tow unpublished papers by White and Turnbull (1975a,1975b), and a paper by santomero and Vinso (1977) are a particular interest as they appear to be the first studies which logically and systematically develop probablistic estimates of failure (Ohlson, 1980, p. 109). The following table shows the most important models according to their chronological order.

**Table 01** : models of prediction financial failure.

| year | researcher | year | researcher |
|---|---|---|---|
| 1966 | BEAVER | 1982 | TAFFLER |
| 1968 | ALTMAN | 1983 | BOOTH |
| 1970 | MEYER & PIFER | 1984 | FUIMER |
| 1971 | WILCOX | 1984 | ZMIJEWSKI |
| 1971 | LEV | 1985 | CAMPISI |
| 1972 | DEAKIN | 1985 | ZAVEGREN |
| 1974 | ALTMAN & MCGOUGH | 1986 | CASEY |
| 1974 | BLUM | 1987 | SHERROD |
| 1975 | LIBBY | 1990 | KOH |
| 1975 | SINKEY | 1992 | HART |
| 1976 | ARGENTI | 1992 | PAZ |
| 1977 | MOYER | 1993 | EDWARDS |

| 1977 | TAFFLER and TISSHOW | 1997 | WARD and FOSTER |
|------|---------------------|------|-----------------|
| 1980 | OHLSON | 1999 | LENNOX |
| 1981 | KIDA | 1999 | KOH and TAN |
| 1981 | VEAZY | 2002 | SHIRATA |

**Source :** Prepared by the researcher to rely on :

- Ana GARCIA-GALLEGO , Maria-Jesus MURES-QUINTANA, <u>BUSINESS FAILURE PREDICTION MODELS: FINDING THE CONNECTION BETWEEN THEIR RESULTSAND THE SAMPLING METHOD</u>, Economic computation and economic cybernetics studies and research, cademy of Economic Studies · January 2012,p p1-2.

The ability to predict financial failure is dependent on models whose variables requires other models or relatively complex formulas to ascertain (Kutum, 2015, p. 80)

### 3.3. Kida model

The study aimed to determine the predictability of financial failure of companies through the construction of a prediction model, based on the method of discriminatory analysis step-by-step based on 20 financial ratios and a sample of 40 institutions, half of which are distressed and the other half non-defaulted. A short period of time spanned from 1974 to 1975, while the results of this study coincided with the results of the Altman study in ratios that have the ability to predict financial failure (MEDJOUB & HOUAS, 2020, p. 96)

Kida's model relied on five separate financial indicators to predict financial failure .According to the discriminant function developed by Kida is as follow :

$$Z=-1.042 X_1-0.427X_2-0.461X_3-0.463X_4+0.271X_5$$

Where :

$X_1$ : net income /total assets .

$X_2$ : total shareholders'equity /total debts .

$X_3$ :quick assets / current liabilities .

$X_4$ : sales(revenue)/total assets .

$X_5$ : cash /total assets .

A negative Z-score implies a problem firm, where as a positive Z-score implies a non –prpblem firm (Islam S & Renas I, p. 38).

### 4. A case study of Algerian insurance companies

#### 4.1 Introducing companies under study

The kida model has been applied in four Algerian insurance companies represented by Alliance Insurance , CASH ,CAAT and CCR as follows :

- **Allince insurances** : it was established on July 30, 2005 by virtue of Order No 95-07 of January 25, 1995, issued by the Ministry of Finance related to the opening of the insurance market ; with a capital of 2.2 billion DZD. It is a company with shares of Algerian shareholders. It targets the traditional sectors of insurance such as industrial risks, cars, transport and others.
  By entering the Algiers Stock Exchange in 2011, Alliance Insurance was the first private company to enter the stock market in Algeria, which divides its capital into 5804511 shares with a nominal value estimated at 200 DZD per share, and has 262 agencies distributed over 44 states. Alliance Insurance provides its services to the private , professional And companies (www.alliance.dz).
- **CASH** : it is one of the most recent insurance companies for risks (commodities and liability), with public capital, which was established according to Order No 95-07 which provides for the opening of the insurance market and that was on July 31, 1999 and began its work in 2000, it is considered a branch of the Sonatrach complex, which is the main shareholder in 82% of its social capital is in the name of the Ministry of Energy, and the remaining 18% is from two institutions in the Ministry of Finance, represented by CCR and CAAR.
  Now it  occupies an important position in the national market in terms of securing major risks, and it provides several services and products, the capital of which is estimated at 7.8 billion DZD (www.cash-assurances.dz).

- **CAAT** :It was adopted on April 30, 1985 in accordance with Decree 82/85 for insurance against the risks of transportation. After adopting a market economy policy  by Algeria, the principle of specialization was abolished on insurance companies on January 1, 1990, when the company was transformed into an economic public institution with shares, and it became called the Algerian Insurance Company with a capital  11.49 billion DZA .
- **CCR** : The Central Reinsurance Company is a company with shares with a capital of 22 billion DZD, and its social headquarters is located in Oulaed Fayet. It is a public company established on October 1, 1973, and this company is charged with reinsuring companies located in Algeria, and securing the activity of Algerian institutions abroad, which It includes major risks, whether industrial, marine or air, and this company has several branches where it has a branch in England, which is LTD MED RE, and it also participates in the capital of several international companies such as the African Reinsurance Company AFRICA RE, the Arab Reinsurance Company ARAB RE and others. The company provides its services in the local and international markets (www.ccr.dz)

4.2  *Analysis of the results* :

 The kida model has been applied to the companies under study, where the financial ratios that make up the  model were calculated and the value of the z index was extracted through which to predict their future financial success or failure, and the results are as follows :

**Table 02** : results of kida model in Alliance Insurances

| years | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| $X_1$ | 0,048 | 0,05 | 0,054 | 0,052 | 0,054 | 0.048 |
| $X_2$ | 0,592 | 0,667 | 0,67 | 0,653 | 0,682 | 0.796 |
| $X_3$ | 0,14 | 0,192 | 0,134 | 0,15 | 0,176 | 1.86 |
| $X_4$ | 0,601 | 0,615 | 0,594 | 0,585 | 0,591 | 0.428 |
| $X_5$ | 0,075 | 0,098 | 0,066 | 0,078 | 0,096 | 0.09 |
| Z | -0,023 | -0,014 | 0,018758 | 0,009 | 0,013 | -0.646 |
| result | problem firm | | non problem firm | | | problem firm |

**Source** : Prepared by the researcher reliying on the financial statements of the company.

Through the previous table we notice  that the value of Z was negative during the first tow years of the study (2014 and 2015), this indicates a warning of financial failure in the future , as the company has a weak financial position during this period . However ,it can be said that the company discovered the problem and took appropriate corrective measures before falling into bankruptcy which makes it continue its activity ,this is confirmed by the value of Z during the years 2016, 2017 and 2018 which was positive and this is what predicts its success in the coming years .
However, we notice a negative result for the value of Z  in 2019, which indicates its occurrence in financial failure if the appropriate corrective measures are not taken.

**Table 03** : results of kida' model in Cash Insurances

| years | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| $X_1$ | 0,02 | 0,012 | 0,025 | 0,009 | 0,014 | Lack of informations |
| $X_2$ | 0,355 | 0,357 | 0,369 | 0,281 | 0,335 | |
| $X_3$ | 0,327 | 0,156 | 0,132 | 0,165 | 0,164 | |
| $X_4$ | 0,301 | 0,249 | 0,235 | 0,208 | 0,199 | |
| $X_5$ | 0,236 | 0,112 | 0,094 | 0,125 | 0,12 | |
| Z | -0,056 | 0,005 | 0,036 | -0,011 | 0,02 | |
| result | problem firm | non problem firm | | problem firm | non problem firm | |

**Source** : Prepared by the researcher reliying on the financial statements of the company .

Through the results obtained we note that the value of Z during 2014 and 2015 is negative this means the company is vulnerable to fiancial failure , as for the remaining years ,we may obtain positive results and this indicates that the company is safe from financial failure .

**Table 04**: results of kida' model in CAAT

| years | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| **X₁** | 0.031 | 0.037 | 0,04 | 0,04 | 0,041 | 0,034 |
| **X₂** | 0.599 | 0.567 | 0,582 | 0,581 | 0,583 | 0,552 |
| **X₃** | 0.091 | 0.104 | 0,095 | 0,088 | 0,109 | 0,125 |
| **X₄** | 0.244 | 0.213 | 0,216 | 0,0001 | 0,179 | 0,168 |
| **X₅** | 0.049 | 0.059 | 0,052 | 0,049 | 0,06 | 0,07 |
| **Z** | **0.142** | **0.146** | **0,156** | **0,258** | **0,17** | **0,15** |
| **result** | **non problem firm** | | | | | |

**Source** : Prepared by the researcher reliying on the financial statements of the company

Through the results shown in the table which were all positive during the years of study, it can be said that the company is in a good financial position, which predicts that it will not fall into financial failure in the future.
Through the previous results for the four companies we note that CCR and CAAT are the best during the six years of study.

**Table 05** : results of kida' model in CCR Insurance

| Years | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|---|
| **X₁** | 0,042 | 0,041 | 0,041 | 0,037 | 0,035 | 0.030 |
| **X₂** | 0,576 | 0,589 | 0,595 | 0,572 | 0,536 | 0.457 |
| **X₃** | 0,196 | 0,231 | 0,327 | 0,347 | 0,184 | 0.092 |
| **X₄** | 0,21 | 0,211 | 0,223 | 0,225 | 0,227 | 0.387 |
| **X₅** | 0,102 | 0,124 | 0,174 | 0,191 | 0,098 | 0.051 |
| **Z** | 0,125 | 0,119 | 0,086 | 0,066 | 0,099 | 0.015 |
| **Result** | **non problem firm** | | | | | |

**Source** : Prepared by the researcher reliying on the financial statements of the company

By the calculating the value of Z based on the financial ratios that compose the model ,it is positive , therefor , the company is safe and not subject to financial failure in the future .

## 5. Conclusion

Insurance companies occupy a great importance in the national economy because of the services it provides to its various clients ,whether they are individuals ,institutions or professionals.However ,it is exposed to several risks due to the nature of its activities .
Among this risks is financial failure ,which may lead to bankruptcy and liquidation of the company if it does not remedy the problem and try to address it , given the importance of this problem and its impact on all sectors, many studies have been conducted in this area for early detection,

The latter resulted in the emergence of several models, in which the researchers used a set of financial ratios which were attached to Weighting weights according to the importance of each of them.
One of the most important of these models is the Kida model which was applied on four Algerian insurance companies represented in Alliance insurances, CASH,CAAT and CCR.
The Kida model is considered one of the most important quantitative models used to predict financial failure, and by applying it to the Algerian insurance companies, which are estimated by four insurance companies that share the fact that they provide damage insurance services or in reinsurance, the results were similar, and all of them indicate that they will not be exposed to financial failure in the future, and this is consistent With the practical reality that these companies are experiencing, as they practice their activities naturally and have never before fallen into financial failure.
*5.1 Results :*

- the soundness of the company's financial position, this is confirmed by the practical reality as it carries out its activities normally and has never failed to fail.
- The KIDA model is considered effective for predicting financial failure in Algerian insurance companies, as its results were positive during most of the years of research.
- The success or failure of insurance companies cannot be judged by relying on the Keida model only, but we need other indicators such as liquidity and profitability ratios, market share, and others

*5.2 recommendations*

- The necessity of training, qualifying and motivating managers in insurance companies because the main reason for financial failure is weak and inefficient management
- Carrying out studies before entering new markets, or launching products, setting accurate prices, etc.
- early detection of financial failure in insurrance companieds by usin models of prediction  because it affects several parties, the most important of which is the state, policyholders, other insurance companies and other institutions

## 6. References

1. Altman, E. (2000, July). Predicting Financial Distress Of Companies Revising The Z –Score And Zeta Models .

2. Ashoori, S., & Mohammadi, S. (2011). Compare failure prediction models based on feature selection technique: empirical case from Iran. *ELSEVIER*

3. Carson, J. M. Financial Distress In The Life Insurance Industry : An Empirical Examination. *4th Afir International Colloquium.*

4. GARCIA-GALLEGO, A., & MURES-QUINTANA, M.-J. (2012). BUSINESS FAILURE PREDICTION MODELS: FINDING THE CONNECTION BETWEEN THEIR RESULTSAND THE SAMPLING METHOD. *Economic computation and economic cybernetics studies and research .*

5. Gulsum, I., & Umit, G. (s.d.). Prediction The finantial success in Turkish Insurancd Companies,. Ankara Universitesi SBF Dergisi.

6. Hawar, A. (2015). The Resived Altman Z' – score Model : Verifying its Validity as a predictor of Corporate Failure in the case Of UK Private Companies ,. *A dissertation submitted to the University of Leicester In partial fulfilment of the requirements for the degree of MSC banking and finance .* England.

7. Ibrahim, E. A. (2003). prediction of financial distress in sudanese commercial banks. *thesis submitted in fulfillment of the of requirement of the degree PhD in Accounting .* university of khartoum.

8. Islam S, T. B., & Renas I, M. (s.d.). Business Failure prediction using sherrod and Kida models : Evidence from Banks Listed on Iraqi Stock Exchange ( 2011-2014 .

9. Kutum, I. (2015). predicting the Finantial Distress of Non *Banking Companies Listed on the Palestine Exchange ( PXE). *Research Journal of Finance and Accounting , 6* (10).

10. Luminita, T. (2010). The causes of insurance companies bankruptcy In romania. *Romanian Economic and Business Review , 5* (3).

11. MEDJOUB, A., & HOUAS, A. (2020). A comparative study between Altman, Kida and Sherrod's model in predicting the financial failure of listed companies in Amman Stock Exchange. *Economic and Management Research Journal , 14* (03).

12. Morten, R. A. (2011). Applying Altman's Z- Score to the Financial Crisis –An empirical Study of Financial Distress on olso Stock Exchange. *Master thesis in Financial Economics .* Norwegian School of Economics.

13. OHLSON, J. (1980). Financial ratios and the probabilitistic of bankruptcy. *Journal of accounting Reasearch , 18* (1).

14. Oniga, A. (2016). Classic insolvency Prediction Models Tested on Romanian Insurance companies. *European Scientific Journal , 12* (13).

15. Roger, M., & others. (s.d.). Insurance Failure ,institue of actuaries , , , , . USA, www.actuaries .com: university of Texas.

16. Sufian, R. A.-M., & Suleiman, D. A. (2018). Validity of Altman Z- Score Model to predict Finantial Failure : Evidence From Jordan. *International Journal of Economics and Finance , 10* (8).

17. Sumaira, S. A., Elisabete, G. S., & Zélia, S. (2019). Do Traditional Financial Distress Prediction ModelsPredict the Early Warning Signs of Financial Distress? *journal of Risk and Financial Management , 12* (55).

18. *www.alliance.dz.*

19. *www.cash-assurances.dz.*

20. *www.ccr.dz.*

21. www.CAAT.dz.