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# Analysis and management of credit risk in Algerian commercial banks: An attempt to develop a practical risk assessment model to improve banking performance

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**Abstract:**

The objective of this work is to propose a practical model, allowing decision makers responsible for granting bank loans within Algerian commercial banks, to determine the credit risks, their nature, weightings and levels, in order to be able to make the right decision on whether or not to grant a loan, and to avoid any losses to the bank.

The proposed model can be applied to all debtors, based on the analysis of a number of financial and administrative variables, the financial situation and the guarantees offered.

**Keywords:** Practical model, Bank credit, Credit risk, Algerian commercial banks

## 1. Introduction

Using credit is a particularly important act in economics. Without credit, the acts of investment and consumption of economic agents cannot develop. To this end, the role of banks in contemporary economies is essential. Thus the quality of the functioning of the banking system in terms of credit management, the diversification of financial portfolios and the modernization of banking services constitute a major challenge in banking activity. Also considering that bank credit is always associated with risk, banks are called upon to find reliable methods to assess the risk on the credits granted, and thereby ensure the profitability of their business. So the risk appears as one of the current challenges of the banker to identify, evaluate and manage it in order to improve the performance of his activity.

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**Research problem:**

How can accounting information be used to build a model to assess credit risk?

**Research hypotheses:**

✓ Financial indicators derived from accounting information provide a practical method for assessing credit risk.

✓ Adopting a practical approach based on accounting information to measure credit risk helps to rationalize the credit granting decision.

**Research objectives:**

The objective of the research is to suggest a practical model that can be applied to calculate credit risk using accounting information.

**Research methodology:**

The research work is an inductive analytical study, which depends on the collection of data, their use to formulate the model to be applied. To this end, we have subdivided our research plan as follows:

**Section 1: Credit risk - definition and assessment**

- ✓ Definition of credit risk
- ✓ Typology of credit risks
- ✓ Assessment of credit risk

**Section 2: Proposed model for measuring credit risk**

- ✓ Credit class weightings
- ✓ Criteria for measuring credit risk levels
- ✓ Practical case

## 2. Credit risk: definition, typology and assessment

Credit risk has been defined in several ways, all of which converge on the same idea. However, its evaluation has given rise to much reflection, particularly in terms of the methods to be used.

### 2.1. Definition of credit risk

Credit risk is defined as the probability that a debtor will be unable to repay a loan granted by a financial institution (Calvet, 1997). Credit risk obviously depends on the quality of the borrower. In

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the case of individuals and small businesses, credit risk is often assessed by analyzing the credit file and taking out guarantees. In the case of loans to large companies, credit risk can be better assessed using ratings from rating agencies.

Credit risk is also defined as: The risk resulting from uncertainty about the ability or willingness of counterparties or customers to meet their obligations. Very prosaically, there is therefore a risk for the bank when it puts itself in a position to expect an inflow of funds from a customer or a market counterparty (Servigny, 2003).

Credit risk is the risk that the debtor will not meet its initial obligation to repay a loan. In fact, as soon as the customer debits his account, the bank is called upon to bear a credit risk. This arises from the fact that the bank collects funds from the public which it must be able to return at any time or in accordance with the withdrawal conditions laid down. Since banks are not immune to economic fluctuations, they must weigh up credit applications carefully to minimize credit risk.

It should be noted that in the credit business, banks are required to respect the "golden rule of banking". This rule, known as the "matching principle", stipulates that: "Banks finance short-term loans with short-term funds and long-term loans with long-term liabilities" (Van Roy, 2005).

If the bank does not take this rule into account in its dealings with customers, it faces credit risk in various forms.

### 2.2. Types of credit risk

Credit risks are multiple and multidimensional, added to the general risks faced by the bank (commercial risks, internal management risks, operational and technical risks, etc.).

Credit risk includes (Sudha Krishnaswami,Paul A Spindt,Venkat Subramaniam, 1999):

- **Counterparty risk:** which is for a bank or company that a counterparty (party to a transaction on the over-the-counter market) does not honour its obligations to them. This is the risk of default by a debtor on which the institution holds a claim or a similar off-balance sheet commitment.

- **Liquidity risk:** arises when the customer finds itself in a situation of illiquidity (temporary or cyclical). This is known as non-payment risk.

- **The risk linked to the activity of the applicant's structure:** this is the risk linked to a fall in sales, the consequences of which are felt above all in terms of profitability and then liquidity if the fall is long-lasting.

- **Sector risk:** linked to the business sector.

- **Financial risk:** linked to macroeconomic financial crises.

- **Operational risk:** relates to organizational risks associated with the way a credit institution operates. It has been shown that financial crises, especially in our countries, have been caused by failures or shortcomings in the banking supervision system.

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- **Political risk:** linked to the likelihood that changes in legislation or regulations will reduce the rate of return expected by investors.

### 2.3. Assessing credit risk

The credit market is the first financial market that totals all direct credit, but it also includes the counterparty risks generated by derivative transactions (Jose A Lopez , Marc Saidenberg, 2000).

For banks, each new credit transaction changes the institution's exposure. To protect themselves, they are required to finance short-term loans with short-term funds, and long-term loans with long-term liabilities.

When it comes to individuals or small businesses, credit risk is often assessed on the basis of an analysis of their credit file, and then counterbalanced by taking out guarantees.

Banks use a number of methods to assess this risk, both traditional and new:

#### 2.3.1. The financial analysis approach

Financial analysis is the main tool for making an initial assessment of a counterparty. All risk-taking requires in-depth knowledge of the counterparty and its ability to meet its commitments. This approach is based on a financial analysis of the credit applicant.

The financial analysis of counterparties (companies in general and SMEs in particular) is based on three main areas: business profile; analysis of financial equilibrium and risks; and profitability analysis (Kay, 2004).

✓ **Business profile**

The bank must identify all the activities carried out by the counterparty applying for credit. This involves understanding the products and services it offers, its customers and the markets they serve.

✓ **Risk analysis**

Risk analysis is a fundamental step for the bank's financial analyst. The analyst must have sufficient knowledge of the counterparty and monitor its various risks in order to prevent any deterioration that could jeopardize the bank's business. The main risks to be analyzed are presented later, particularly in relation to SME customers. These risks are: operating risk and financial risk.

✓ **Profitability analysis**

The final stage in the financial analysis of a counterparty is the profitability analysis. This is based on a study of the profit and loss account, which covers the institution's income and expenses.

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### 2.3.2. The rating approach

Rating is an American term meaning "evaluation" or "rating". It is defined as: "a process for evaluating the risk attached to a debt security, summarized in a rating, enabling a classification to be made on the basis of the particular characteristics of the security offered and the guarantees offered by the issuer" (Godlewski, 2004).

The main quantitative criteria for rating an issuer are (Schreiner, 2003):

- ✓ Cash flows and future income;
- ✓ Short-, medium- and long-term liabilities;
- ✓ Capital structure, including leverage;
- ✓ The situation of the company and the country of residence;
- ✓ The company's business activity and market positioning;
- ✓ Management quality.

There are a large number of rating agencies, including four of the most widely recognized, namely: Moody's, Standard and Poors, FitchRatings and DBRS (Saunders A, Allen L, 2002).

### 2.3.3. The VaR (Value at Risk) approach

VaR is a simple tool that makes it easy to interpret a level of risk. To measure the proportion of threat, a certain level of probability based on statistics is required, which does not always reassure investors. VaR is defined as a technique that determines a maximum potential loss as a function of time and a degree of confidence (Demazy, 2001).

In other words, VaR provides the ability to visualize:

| | |
|---|---|
| We are X% sure | X% → Confidence level |
| That we won't lose more than V | V → Value at Risk |
| In the next T days | T → Time horizon |

### 2.3.4. The RAROC approach

RAROC is a method for optimizing capital allocation. It is a very effective tool for measuring banking performance. Many performance evaluation techniques have a theoretical aspect, whereas RAROC has a very practical approach. This indicator is appreciated because it corresponds exactly to the requirements of the new prudential regulations (Anandarajan M , Lee P, Anandarajan S, 2001).

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"Risk Adjusted Return On Capital is a measurement tool used by banks and financial institutions to make ex-post performance comparisons or ex-ante resource allocation choices between investments, products or divisions with different risk and profitability profiles" (Demazy, 2001).

## 3. Proposed credit risk assessment model

This model is a combination of two approaches, the financial analysis approach and the rating approach. In order to evaluate the creditworthiness of potential borrowers using qualitative and quantitative indicators, our credit risk analysis will use the 5 C's of Credit - Character, Capacity, Capital, Collateral and Conditions - to identify the strengths and weaknesses of each borrower's application. Indeed, each lender places a different weight on each factor depending on the borrower and the contextual details of the loan, so the model includes a subjective element.

This part of the research is devoted to the presentation and analysis of the proposed model for assessing the credit risk associated with the granting of bank credit through the weighting of credit classes relating to each risk measurement criterion, while determining the possible relationships between the various variables concerned, based on major groups, each of which is subdivided into sub-groups as follows:

### 3.1. Credit class weightings

They are made according to the following criteria:

- **Activity-related criteria:**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| **The customer's personality and reputation** | **5** | |
| Customer's previous transactions and regularity of their repayments | | 1 |
| The customer's place in the market | | 1 |
| Length of activity (over 3 years) | | 1 |
| Size of the establishment | | 1 |
| No previous complaints | | 1 |
| **Nature and quality of product** | **5** | |
| Durable or investment product | | 5 |
| Non-perishable product | | 4 |
| Relatively perishable product | | 3 |
| Perishable product | | 2 |
| **Product demand** | **5** | |
| Marketing throughout the national territory | | 1 |
| High sales volume | | 1 |
| The product is necessary | | 1 |
| The product is subject to development and innovation | | 1 |

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| | | |
|---|---|---|
| Good distribution network | | 1 |
| **Degree of competition** | **5** | |
| Very strong competition | | 1 |
| Strong competition | | 2 |
| Medium competition | | 3 |
| Limited competition | | 4 |
| No competition | | 5 |
| **Total** | **20** | |

- **Efficiency & Profitability Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| **Technical efficiency** | **5** | |
| Sales To Asset Ratio ($\frac{3}{2}$ times = 1 point) | | **2** |
| Sales To Working Capital Ratio (1 time = 1 point) | | **3** |
| **Sales efficiency** | **6** | |
| Inventory Turnover Ratio (2 times = 1 point) | | 3 |
| Accounts Receivable Turnover Ratio (1 time = 1 point) | | 3 |
| **Profitability** | **9** | |
| Return On Assets (5% = 1 point) | | 3 |
| Return On Equity (5% = 1 point) | | 3 |
| Return On Sales (5% = 1 point) | | 3 |
| **Total** | **20** | **20** |

- **Liquidity & Ability Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| Accounts Payable Turnover Ratio (1 time = 1 point) | 5 | 5 |
| Current Ratio (1 time = 1 point) | 5 | 5 |
| Quick Ratio (1 time = 1 point) | 5 | 5 |
| Cash Ratio (1 time = 1 point) | 5 | 5 |
| **Total** | **20** | **20** |

- **Solvency Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| Equity To Assets Ratio (20% = 1 point) | 5 | 5 |
| Liabilities To Equity Ratio ($\frac{1}{2}$ time = 1 point)/ More than 2,5 times = 0 point | 5 | 5 |

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| | | |
|---|---|---|
| Long-Term Debt to Long-Term Capital Ratio (20% = 1 point) | 5 | 5 |
| Long-Term Debt to Equity Ratio ($\frac{1}{2}$ time = 1 point)/ More than 2,5 times = 0 point | 5 | 5 |
| **Total** | **20** | **20** |

- **Guarantee Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| Cash assets | 4 | 4 |
| Value stability | 4 | 4 |
| Possibility of identifying risks linked to its market value | 4 | 4 |
| Speed of asset liquidation | 4 | 4 |
| Adequacy | 4 | 4 |
| **Total** | **20** | **20** |

**Therefore, the credit risk measurement criteria are:**

| | |
|---|---|
| Activity criteria | 20 |
| Administrative criteria | 20 |
| Financial criteria | 20 |
| Solvency criteria | 20 |
| Guarantee criteria | 20 |
| **Total** | **100** |

### 3.2. Criteria for measuring credit risk levels

Considering that a score of 50 points or less out of a full score of 100 points corresponds to the "Very high risk" level, we divide the other possible credit risk levels in relation to the possible sum values, which are all more than 50, according to risk groups, each with a range of 10 points, as follows:

| Level | Degree | Risk |
|---|---|---|
| 1 | Over 90 | Very low |
| 2 | 80-89 | Low |
| 3 | 70-79 | Acceptable |
| 4 | 60-69 | Relatively high |
| 5 | 50-59 | High |
| 6 | Under 50 | Very high |

### 3.3. Practical case

A private micro-company specializing in the manufacture and marketing of pharmaceutical products has obtained a long-term loan from the Bank for Agriculture and Rural Development

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(BADR), amounting to 900,000 Algerian dinars (DZD). After reimbursing 300,000 DZD of the amount of this loan, the company defaulted on payment and requested the rescheduling of the rest of the debt. The company also obtained another short-term loan of 700,000 DZD of which it repaid 450,000 DZD and defaulted on the rest of the credit amount.

The company's financial position and activities are summarized in the following tables:

**Table 1 : Balance sheet of the company for 2 exercises**

| Designation | Exercise | | Designation | Exercise | |
|---|---|---|---|---|---|
| | 2020 | 2021 | | 2020 | 2021 |
| | Assets | | | Liabilities And Shareholders' Equity | |
| Fixed assets | 1 273 970 | 1 344 810 | Share capital | 2 000 000 | 2 000 000 |
| Investments | 460 000 | 460 000 | Reserves | 184 000 | 230 000 |
| Inventory | 462 300 | 579 370 | Retained net surplus | 397 440 | 305 670 |
| Accounts receivable | 578 220 | 701 385 | Provisions | 69 000 | 115 000 |
| Notes receivable | 623 300 | 234 600 | Other non-current liabilities | 1 150 000 | 920 000 |
| Cash assets | 161 000 | 128 800 | Other debts | 1 610 000 | 575 000 |
| Cash at bank | 2 040 940 | 758 000 | Suppliers | 119 600 | 396 635 |
| Debtor accounts | 105 800 | 130 640 | Notes payable | 341 090 | 172 500 |
| Prepaid expenses | 165 600 | 377 200 | | | |
| **Total** | **5 871 130** | **4 714 805** | **Total** | **5 871 130** | **4 714 805** |

**Source :** Accounting and finance department of the company 2022

**Table 2 : Income statement of the company for 2 exercises**

| Designation | 2020 | 2021 |
|---|---|---|
| Purchases | 1 614 600 | 1 389 200 |
| Cost of goods sold | 1 387 360 | 1 272 130 |
| Sales | 2 044 700 | 2 051 600 |
| Gross profit | 657 340 | 779 470 |
| Tax charges | 259 900 | 473 800 |
| Net profit | 397 440 | 305 670 |

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**Source:** Compiled by ourselves from the company's accounting records

**Important remarks:**

✓ The customer's personality and its reputation in the market are good;

✓ The company's product requires special preservation standards;

✓ The product is of very high degree of commercialization throughout the country;

✓ Market competition is limited for this product;

✓ The guarantees offered consist of immovable property belonging to the company, equivalent to 150% of the amount of the initial loan.

✓ As we didn't have the net credit sales amount, we were obliged to use the net sales amount.

**Financial analysis of company data:**

**1- Technical efficiency ratios**

$$\text{Asset Turnover} = \frac{\text{Net Sales}}{\text{Average Total Assets}} = \frac{995\ 000}{\frac{5\,871\,130 + 4\,714\,805}{2}} = 0{,}19 \text{ time}$$

$$\text{Working Capital Turnover} = \frac{\text{Net Sales}}{\text{Working Capital}} = \frac{\text{Net Sales}}{\text{Current Assets} - \text{Current Liabilities}} = \frac{995\ 000}{2\,909\,995 - 1\,144\,135} = 0{,}56 \text{ time}$$

**2- Sales efficiency ratios**

$$\text{Inventory Turnover} = \frac{\text{Net Sales}}{\text{Inventories}} = \frac{2\,051\,600}{579\,370} = 3{,}54 \text{ times}$$

$$\text{Receivables Turnover} = \frac{\text{Credit Sales}}{\text{Average Accounts Receivable}} = \frac{2\,051\,600}{\frac{1\,201\,520 + 935\,985}{2}} = 1{,}92 \text{ times}$$

**3- Profitability ratios**

$$\text{Return On Assets} = \frac{\text{Net Profit}}{\text{Average Total Assets}} = \frac{305\,670}{\frac{5\,871\,130 + 4\,714\,805}{2}} = 5{,}78\%$$

$$\text{Return On Equity} = \frac{\text{Net profit}}{\text{Shareholders' Equity}} = \frac{305\,670}{2\,535\,670} = 12{,}05\%$$

$$\text{Return On Sales} = \frac{\text{Net Profit}}{\text{Net Sales}} = \frac{305\,670}{2\,051\,600} = 14{,}90\%$$

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**4. Liquidity & Ability ratios**

$$\text{Accounts Payable Turnover} = \frac{\text{Total Purchases}}{\text{Average Accounts Payable}} = \frac{1\,389\,200}{\frac{460\,690+569\,135}{2}} = 2{,}69 \text{ times}$$

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} = \frac{2\,909\,995}{1\,144\,135} = 2{,}54 \text{ times}$$

$$\text{Quick Ratio} = \frac{\text{Current Assets} - \text{Inventories}}{\text{Current Liabilities}} = \frac{2\,909\,995 - 579\,370}{1\,144\,135} = 2{,}04 \text{ times}$$

$$\text{Cash Ratio} = \frac{\text{Absolute Liquid Assets}}{\text{Current Liabilities}} = \frac{886\,800}{1\,144\,135} = 0{,}78 \text{ time}$$

**5. Solvency ratios**

$$\text{Equity To Assets Ratio} = \frac{\text{Shareholders' Equity}}{\text{Total Assets}} = \frac{2\,535\,670}{4\,714\,805} = 53{,}8\%$$

$$\text{Liabilities To Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Shareholders' Equity}} = \frac{2\,179\,135}{2\,535\,670} = 0{,}86 \text{ time}$$

$$\text{Long-Term Debt to Long-Term Capital Ratio} = \frac{\text{Long Term Debt}}{\text{Shareholders' Equity} + \text{Long Term Debt}} = \frac{920\,000}{2\,535\,670 + 920\,000} = 26{,}6\%$$

$$\text{Long-Term Debt to Equity Ratio} = \frac{\text{Long Term Debt}}{\text{Shareholders' Equity}} = \frac{920\,000}{2\,535\,670} = 0{,}36 \text{ time}$$

**Based on the above data, the weightings for this risk are as follows:**

- **Activity criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| The customer's personality and reputation | **5** | 3 |
| Nature and quality of product | **5** | 3 |
| Product demand | **5** | 4 |
| Degree of competition | **5** | 4 |
| **Total** | **20** | **14** |

- **Efficiency & Profitability Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| **Technical efficiency** | **5** | |
| Asset Turnover Ratio | | 0.13 |
| Working Capital Turnover Ratio | | 0.56 |
| **Sales efficiency** | **6** | |
| Inventory Turnover Ratio | | 1.77 |
| Receivables Turnover Ratio | | 1.92 |
| **Profitability** | **9** | |

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| | | |
|---|---|---|
| Return On Assets | | 1.16 |
| Return On Equity | | 2.41 |
| Return On Sales | | 2.82 |
| **Total** | **20** | **10.77** |

- **Liquidity & Ability Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| Accounts Payable Turnover Ratio | 5 | 2.69 |
| Current Ratio | 5 | 2.54 |
| Quick Ratio | 5 | 2.04 |
| Cash Ratio | 5 | 0.78 |
| **Total** | **20** | **8.05** |

- **Solvency Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| Equity To Assets Ratio | 5 | 2.69 |
| Liabilities To Equity Ratio | 5 | 1.72 |
| Long-Term Debt to Long-Term Capital Ratio | 5 | 1.33 |
| Long-Term Debt to Equity Ratio | 5 | 0.72 |
| **Total** | **20** | **6.46** |

- **Guarantee Criteria**

| Criteria | Standard degree | Relative weight |
|---|---|---|
| Cash assets | 4 | 3 |
| Value stability | 4 | 3 |
| Possibility of identifying risks linked to its market value | 4 | 3 |
| Speed of asset liquidation | 4 | 3 |
| Adequacy | 4 | 4 |
| **Total** | **20** | **16** |

| | | |
|---|---|---|
| **Overall total** | **100** | **55,28** |

- **Decision Analysis**

Granting credit to the company is not the right decision because the company is at the **fifth level** of the model where **the risks are high**.

It should also be noted that the financial situation of the customer is below average, and if the guarantees were not sufficient, the risk would have been higher, this forces the bank to review its policy on the criteria for granting credit.

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## 4. Conclusion

The proposed model accurately measures the credit risks, it can be considered as an effective tool to measure the risks and rationalize the credit decision, and therefore the research hypotheses are verified.

Based on the above, we conclude the following:

- One of the shortcomings with which the credit services are confronted in the banks is the absence of specific standards making it possible to objectively measure the credit risks;

- The proposed framework fulfills the requirements for measuring bank credit risk, and provides a solid and reliable basis for determining the relative risk weighting of credit applicants;

- The proposed framework for measuring credit risk represents a guide for bank management, in order to identify the financial situation of credit applicants;

- The hypotheses of the proposed research framework are based on imposing the development of the accounting organization for the credit risk measurement process on a fair and realistic basis, which makes it possible to achieve the objectives of growth and development of the bank and strengthens the pillars of its existence and continuity.

**Recommendations**

The need to apply the proposed framework to achieve the following objectives:

- Increase the efficiency and effectiveness of the reports on which the credit department depends when making the appropriate recommendation regarding the decision to extend credit;

- Achieve the requirements of transparency, objectivity and fairness for the banking service when deciding to grant credit;

- The need to develop the organization and performance of accounting in order to correctly and realistically reflect the financial situation of institutions applying for credit;

- The need to build on the framework proposed as a guide for bank management in credit control while working to develop it so as to achieve the growth and development objectives of the bank, as well as to strengthen the pillars of its stability and increase the efficiency of its performance.

## 5. References

1. Anandarajan M , Lee P, Anandarajan S. (2001). Bankruptcy prediction of financial stresses firms: an examination of predictive accuracy of artificial neural network. international journal of intelligent systems in accounting, 10(2), 19.

2. Calvet, H. (1997). Les établissements de crédit : Appréciation, évaluation et méthodologie de l'analyse financiére. Paris: Economica.

**P-ISSN: 2204-1990; E-ISSN: 1323-6903**
**DOI: 10.47750/cibg.2023.29.04.002**

3. Demazy, M. (2001). Value at risk et contrôle prudentiel des banques : l'approche des modèles internes de gestion des risques. Louvain-la-Neuve/ Belgique: Bruylant-Academia.

4. Godlewski, C. (2004). Modélisation de la prévision de défaillance bancaire : une application aux banques des pays émergents. Finance 0409026, University Library of Munich, Germany, 1-35.

5. Jose A Lopez , Marc Saidenberg. (2000). Evaluating credit risk models. Journal of banking and finance, 24 (1-2), 151-165.

6. Kay, G. (2004). credit risk modeling and evaluation: An introduction. credit risque; models and management, 212.

7. Saunders A, Allen L. (2002). Credit Risk Measurement: New Approaches to Value at Risk and Other Paradigms. New York: John Wiley & Sons, Inc.

8. Schreiner, M. (2003, Septembre). Les vertus et faiblesses de l'évaluation statistique (crédit scoring) en microfinance. Microfinance Risque management, pp. 1-47.

9. Servigny, A. d. (2003). Le risque crédit : nouveau enjeux bancaires (Vol. 2 eme). Paris: Dunod.

10. Sudha Krishnaswami,Paul A Spindt,Venkat Subramaniam. (1999, March). Information asymmety , monitoring and the placement structure of corporate debt. (Elserviers, Éd.) Journal of financial economics, 51 (3), 407-434.

11. Van Roy, P. (2005). Credit rating and the standardised approach to credit risk in Basel II. european central banque . Allemagne: ECB Working Paper No 517.