

A Multidimensional Model for Credit Decision Process in Commercial Banks

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ABSTRACT. A multidimensional model for credit decision process is developed. The model is based on the assumption that credit decision is a function of five variables; (a) financial analysis, (b) bank credit policy, (c) economic conditions, (d) legal aspects and international regulations of banks' transactions, and (e) credit analyst personal judgment. The major part of this paper is devoted to discussing the variables involved in the credit decision model. Then the model is presented to show the interaction of these variables and their effect on the credit decision.

Purpose of the Study

Credit is, as the English philosopher John Lock wrote in seventeenth century, "No thing but the expectation of a sum of money within some limited time." Credit analysis, then, is the process of inquiry prior to the loan decision. In this inquiry, the banker does his best to replace emotional feelings such as fears and hopes with reasoned arguments based upon careful study of borrower's financial strengths and weaknesses.⁽¹⁾

This paper is an attempt to develop a multidimensional mode I for credit decision process in commercial banks. The outcome of this model will aid the credit analyst in evaluating a prospective credit risk and help decision makers in managing efficiently the business loan portfolio, especially in today's competition.

Model Development

Five variables have been incorporated into the formulation of the model. These variables are as follows: financial analysis, bank credit policy, economic conditions, legal aspects, and credit analyst judgment.

(1) **Roger H. Hale**, *Credit Analysis: A Complete Guide* (New York: John Wiley & Sons, 1983), p. 1.

The reason for incorporating these five variables into one model is to collect more information to insure fairness and objectivity in determining the borrower's credit worthiness.

Each variable included in this model is described as follows:

1 - Financial Analysis for Credit Decisions

In dealing with financial analysis, it is highly important that the analyst or the lender begins with reliable financial statements. It is generally agreed that the most reliable data consists of financial statements audited by independent, competent certified public accountants. The financial analysis techniques are briefly discussed as follows

Comparison Method of Analysis

Snowdon (1978) concluded that in conducting this type of analysis, financial statements for periods ranging from two to as many years as are available are placed on a comparison form or spread sheet. After the statements have been spread appropriately on the comparison form, the analyst should note changes in the trends or the value of key statement items. It is important to note changes in usually large amounts. Moreover, the channeling of an excessive amount of earnings in fixed assets, slow-moving inventory or uncollectible receivables also is a sign of potential financial trouble ahead.⁽²⁾

Trend Method of Analysis

This method of analysis is based on the premise that if the trend of key statement items can be set forth on a percentage basis for one year to the next, it will give the analyst a much clearer picture of the changing condition of the company. Snowdon (1978) pointed out that The concept of underlying this method is that when the percentages are calculated, they provide a clearer picture of changes than would the value changes alone.⁽³⁾

Common-Size Industry Comparison Method of Analysis

Another technique of analysis is to compare a prospective borrowers' financial statement with the financial statement of the industry in which the company operates.

The theory behind this method is that when the company's figures vary markedly from the industry figures, the analyst should examine them more closely to determine the reason. In applying this method of analysis, the analyst should keep in mind that there are some differences among companies in the same industry. These differences, for example, includes accounting differences, differences in geographic location, variations in customer mix and variations in selling terms. This method of analysis is valuable, however, when used with appropriate reservations and it is attaining acceptance among analysts as a supplement to other analysis techniques.⁽⁴⁾

(2) **David T. Snowdon**, Financial Analysis for Credit Decisions, *The Bankers' Hand book*, (Homewood, Illinois: Bow Jones Irwin, 1979), pp. 583-587.

(3) *Ibid.*, p. 587.

(4) *Ibid.*, p. 593.

Ratio Method of Analysis

The following financial ratios are useful for determining financial strength of the company without attempting all the possible ratios that could be calculated.

Type of ratios	Purpose of the ratio
(1) <i>Profitability Ratios:</i>	Credit analyst is concerned with profitability ratios in order to determine the fitness of the company for survival.
A. Return on Equity = $\frac{\text{Net Income}}{\text{Owner's Equity}}$	This ratio measures the degree in which management is able to employ the investor's capital in a profitable way
B. Return on Assets = $\frac{\text{Net Income before Taxes}}{\text{Total Assets}}$	This ratio represents what the fundamental operations of the business earned as a return on investment. According to many analysts, this ratio is the most effective measure of management's performance.
C. Net Margin = $\frac{\text{Net Income}}{\text{Total Sales}}$	This ratio reveals the profit earned on sales and is, therefore, a measure of the overall efficiency of the business.
(2) <i>Leverage Ratios</i>	The lower this ratio is, the more "buffer" there is available to creditors if the company becomes insolvent This ratio has a very definite effect on company's ability to obtain additional financing. When the company is highly leveraged, future growth through debt financing may not be possible.
A. Debt/Equity = $\frac{\text{Total Liabilities}}{\text{Owner's Equity}}$	
B. $\frac{\text{Cash Flow}}{\text{Total Liabilities}}$	This ratio is important because cash from operations is the main source for payment of debts. Many lenders consider that total long-term liabilities should not exceed four times gross cash flow.
(3) <i>Liquidity/Ratios:</i>	This ratio measures the quantity of current assets available to pay the current liabilities.
A. Current Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$	
B. Quick Ratio = $\frac{\text{Cash} + \text{Marketable Securities} + \text{Net Receivables}}{\text{Current Assets}}$	This ratio measures the quantity of Quick Assets available to pay the current liabilities.
(4) <i>Performance Ratios</i>	Each industry has performance ratios in terms of the efficient use of assets. For example, in the airline industry, one ratio used to measure operating efficiency is the revenue passenger load- factor. This ratio is found by dividing the number of revenue passenger-miles flown by the number of available seat miles flown. Another efficiency measure is total operating expenses per available seat-mile. As analysts, you are advised to develop your own performance ratios to cover the industries in which you are interested. ⁽⁵⁾

When financial statements are analyzed by computing ratios, the analyst must determine whether the ratios are good, bad or just average. In making such a decision, the analyst may compare the ratios of the company under review with standard ratios acquired from past experiences, or with ratios of a selected group of competitive companies in the same industry.

Jasper Arnold in his article "How to Negotiate a Term Loan" (1982) emphasized the following financial ratio: "Another key balance sheet variable is the company's margin of safety (i.e., the extent to which it is leveraged). To the banker, a company with a total liabilities to equity ratio of 1 to 1 can suffer 50% deterioration in asset value and still repay the loan. If leverage is at a 3 to 1 ratio, however, creditors can only tolerate a 25% shrinkage in a net value."⁽⁶⁾

(5) Roger H. Hale, *op. cit.*, p. 97.

(6) Jasper H. Arnold, How to Negotiate A Term Loan, *Harvard Business Review*, (March-April 1982), p. 132.

Financial ratios should be used with reservations because they cannot be expected to provide adequate assurance of creditworthiness. This is due to the fact that these ratios are based on historical data. They are representative of future events only to the extent that the past is indicative of the future.

Cash Flow Analysis

Recently, credit analysts, financial writers and accounting policy makers have come to view cash flow information as a better yardstick for measuring debt and dividend-paying ability. They believe that cash flow information is more appropriate than accrued accounting profit in evaluating the company's performance. Hale (1983) emphasized this point as follows: "Cash flows are more important than earnings. The principal reason is that earning can be manipulated by management's choice of accounting policies, whereas cash flow cannot be changed by any accounting policies"⁽⁷⁾.

The Financial Accounting Standard Board (FASB) in the United States also has emphasized the importance of information on cash flows to the credit analyst-"the greater the amount of future net cash inflows from operations, the greater the ability of the enterprise to withstand adverse changes in operation conditions".⁽⁸⁾ Cash from operations represents the normal source of repayment of debt. Negative cash from operations is normally a serious indication of financial problem. Accordingly positive cash from operations is an important requirement for normal lending.

2- Bank Credit Policy

Recently, greater percentage of banks have established a credit policy to provide standards and guidelines for credit decisions: Gilpatrick and Ronald (1981) indicated that credit policy should strive to maximize the profitability of lending activities within the risk constraints acceptable to the bank⁽⁹⁾ The following areas should be covered in any statement of credit policy.

Legal Considerations. The bank's legal lending limit and constraints should be set forth in order to avoid violation of banking laws and regulations.

Delegation of Authority. Each individual authorized to extend credit should know precisely how much and under what conditions he may commit the bank's funds. These authorities should be approved by the board of directors and kept current at all times.

Pricing Policy. No written credit policy would be complete without guidelines for the pricing of various types of credit. Without such a written policy confusion and inconsistency would result. The establishment of loan pricing, policy is influenced by many factors such as desired profit, governmental regulations and marketing strategy. Hancock (1982) stated that the overall bank marketing objectives, short term as well as long, have the broadest influence on the pricing decision. Pricing decisions which

(7) **Roger H. Hale**, *op. cit.*, p. 6.

(8) **Cornelius J. Casey** and **Norman J. Bartczok**, Cash Flow It's not the Bottom Line, *Harvard Business Review*, (July-August, 1984), p. 62.

(9) **Ralph Gilpatrick** and **T. Ronald Casper**, Bank Credit Policy, *Bank Credit*, Edited by Herbert V. Prochnow (New York: Harper & Row Publishers, 1981).

overlook such typical objectives as the bank's geographic strategy, target segment's product mix, promotional programs and competitive goals are quite likely to be ineffective"⁽¹⁰⁾

Type of Credit Extension. One of the most important parts of a loan policy is determination of which types of loans are acceptable and which are not.

Loan Standards. Standards for acceptable loans should be specified. The general standards for a credit policy are as follows:

- The bank should not concentrate its loans in any industry. Bank management objective is diversification of risk with adequate profitability.
- All commercial borrowing customers of the bank should maintain account relationships, and others should encourage to do so.
- Quarterly financial statements should be required on all major loans.
- When periods of tight money occur, the bank will give priority to the legitimate credit requirements of its existing customers, while at the same time discouraging credit for speculative ventures.⁽¹¹⁾

3 - Economic Conditions

Credit decisions depend on two types of information-timely information about the borrowers and economic forecasts. Thus, the credit analysts should go beyond the traditional credit information and deal with information about changes in economic conditions and their likely effect on the ability of business borrowers to repay their debts. It is obvious that loan losses are common when an accelerating inflation is followed by recession. The credit analyst should not ignore the link between loan losses and business cycle.

Inflation and Credit Decisions

Conventional financial statements often fail to adequately account for the impact of inflation. These statements are not adjusted to reflect the decline in the purchasing power of the monetary unit and so these statements may imply certain facts that are inconsistent with reality. For example, the historical income statement creates artificial or illusory profit. This means that the credit analyst must consider the effect of inflation on the income statement, the balance sheet, and the statement of changes in financial position of the bank customers. This effect could be shown by restating historical financial statements (unit of money statements) using specific price-level indexes or general price-level indexes. As a result of considering of the impact of inflation on the historical financial statements, ratios measuring liquidity, capital adequacy, asset efficiency, and profitability are changed. Given the importance of financial statements and ratios in determining credit extension, restated financial statements, and supplemental inflation-adjusted reports could well influence the credit decision.

(10) **Roger. A. Hancock**, A Model for Pricing Bank Services, *The Bankers' Magazine* (September-October; 1982), p. 50.

(11) **Edward A. Jasser Jr.** and **Hubert C. Mott**, Establishing Credit Policy-Criteria and Concepts, *The Bankers' Handbook*, 1979. p. 551.

Inflation affects prices of loans. It is found that the lending officers with access to inflation-adjusted information consistently recommended a higher price for the loan.⁽¹²⁾

4- Legal Aspects of Bank Loans

The loan officer must be familiar with various laws and legal principles which regulate and govern the bank's authority to make a loan. Understanding international and local laws is necessary to help loan officers make a legal credit decisions..

5 - Judgment and Credit Decision

The initial impression of the loan officer and his judgment are essential variables in credit decision. An article by Edmonds (1981) presented a good discussion on the role of judgment in the lending decision. One of Edmond's important ideas are presented below:

The individual exercises the representative ness and availability strategies (judgment strategies) in conjunction with a base of information commonly referred to as "knowledge structures". Knowledge structures are theories or beliefs about entities, objects, or events. Over the years, individuals establish knowledge bases through which stimuli are filtered when judgments are being formulated. Without knowledge structures, even simple business decisions would be impossible to make. For in stance, an evaluation of a current ratio would be impossible without some belief about what constitute an appropriate relationship between current assets and cur rent liabilities. Knowledge structures are only useful if they are accurately formulated and appropriately applied, otherwise, they will act as hindrance to the exercise of sound judgment. The failure to adjust knowledge structures leads to errors in judgment. For example, credit officers who move from one region to another, or even change areas of specialization within the bank are subject to errors in judgment, if they do not adjust their existing knowledge structures.⁽¹³⁾

Making the Credit Decision

In making credit decisions, the loan officer faces three alternatives; refusal of the applicant's request, approval of the request with modified terms, and approval of the request as received.

The analysis of the financial information and the economic conditions, the understanding of the bank's credit policy and the credit legal aspects and principles will aid the loan officer to formulate his judgment and select the appropriate. alternative. Accordingly, credit decision (CD) is the dependent variable that depends on five variables: (a) financial analysis (FA), (b) bank credit policy (CP), (c) economic conditions (EC), (d) legal aspects and principles (LA), and (e) credit analyst personal judgment (PJ). The credit decision model which incorporates the above mentioned five variables can be expressed mathematically as follows:

(12) **William C. Handorf** and **Charles L. Martin**, Inflation Accounting and Commercial Lending, *The Bankers' Magazine* (November-December, 1982), pp. 22-75.

(13) **Thomas P. Edmonds**, Judgment and the Lending Decision, *The Bankers' Magazine* (November-December, 1981), pp. 47-48.

$$CD = FA + CP + EC + LA + PJ$$

The following are other factors which should be taken into consideration in making sound credit decisions:

Bankers have been cautious in dealing with borrowers, and tailer restrictions on business loans and credit facilities. Arnold (1982) pointed out that the scope and severity of these restrictions depend on many' factors such as high business risk and excessive leveraging. He states: "A company can harm its balance sheet and will face bank restrictions by excessive leveraging or by financing fixed assets by short-term loans, both of which reduce its working capital and liquidity."⁽¹⁴⁾

There are many social and economical factors which should be taken into consideration when making credit decisions. These factors include many areas such as financing of projects for business and industry necessary for economic development and improvement of the quality of environment. Bank's participation in economic development creates a good image for this bank.

There are general rules that have found to be helpful in making credit decisions. Some of these rules, as stated by Hale (1983), are listed below:

- Quality of credit is more important than exploiting new opportunities. Put simply by a wise old banker, "any fool can lend money, but it takes a lot of skill to get it back".

- Every loan should have two ways out that are not related and exist from the beginning.

- If you do not understand the business, do not lend to it.

- It is your decision, and you must feel comfortable with it according to your own judgment.

- Collateral security is not a substitute for repayment. Collateral does not make a bad loan good, but makes a good loan better.

- Where security is taken, a professional and impartial view of its value and marketability must be obtained.

- Do not let poor attention to detail and credit administration spoil an otherwise sound loan.

- If a borrower wants a quick answer, it is no. Anyone who rushes you into a lending decision should be told this principle.

- See where the bank's money is going to be spent.

- Think first for the bank. Risk increases when credit principles are violated; If in doubt, ask yourself: "Would I lend my own money?"⁽¹⁵⁾

(14) **Jasper H. Arnold**, *op cit.*, pp. 132-133.

(15) **Roger H. Hale**, *op. cit.*, pp. 213-218.

Credit Review and Follow-up

Review of credits after the loan has been made is generally a more effective control. Sufficient investigation and credit analysis is normally performed at the inception of the loan. Deterioration and weakness, if any, tend to develop after the loan is made. Thus, continued review is required so that detection of these weaknesses can be made at an early stage. Alexander (1978) stated that "a banker with a watchful eye can often help a business customer steer clear of financial difficulty before it begins, thus holding problem loans to a minimum"⁽¹⁶⁾.

in reviewing credits, the loan officer will watch for events and signs which cause a problem loan to develop. These events, as discussed by Alexander (1978) are as follows:

- Major problems can develop in a business when a change in management occur or changes in the personal habits of current management.
- Changes in industry trends may directly affect a thriving business, so that it can no longer be profitable.
- Deterioration in the overall economy can turn a good loan into a weak one.
- Rapid expansion (without planning) in a business often leads to problems.
- A company's delay in furnishing its financial statements could be a signal to existence of problems.
- Any significant change in the level of balances a company is keeping should alert the lender to a potential problem.⁽¹⁷⁾

Hassan (1983) pointed out that a system for detecting loan problems could be established by forming a section that dedicates its time and special attention to monitoring these loans. The main function of this section is to give assistance and consultation on special attention credits over a predetermined amount.⁽¹⁸⁾

The following figure presents a model for credit decision process with all Variables involved in this process, as previously discussed.

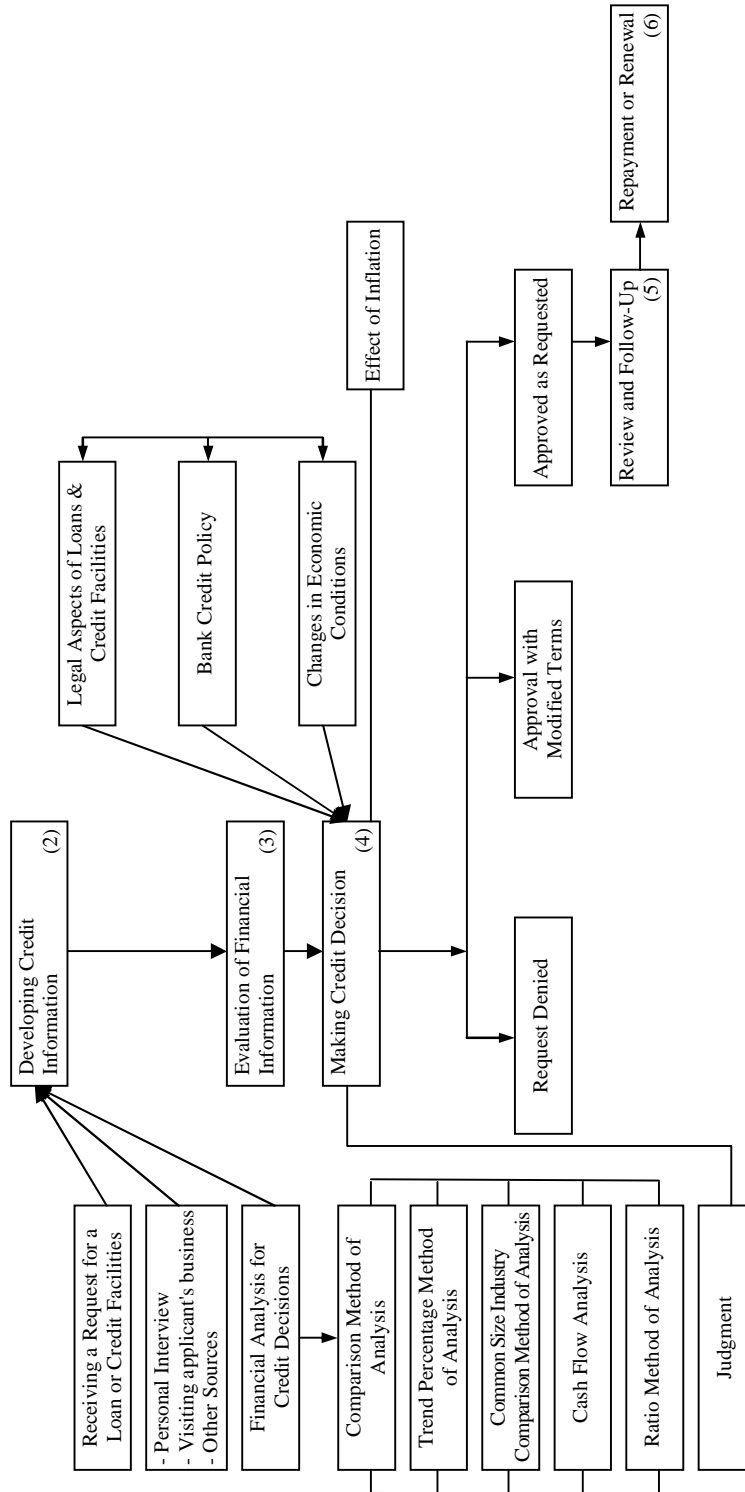
Conclusion

This paper presents a discussion of one of the most important responsibilities of bank management-the extension of credit. A multidimensional model for credit decision process is developed to show the interaction of all variables involved in this process. Credit decision is a function of many variables. These variables are: Financial analysis, bank credit policy, legal aspects and principles, the condition of the economy and the influence of economic changes, and credit analyst personal judgment.

(16) **William Alexander**, Handling Problem Loan, *The Bankers' Handbook*, 1979, pp. 602-604.

(17) *Ibid.*, pp.602-604.

(18) **Mark S. Hassan**, Special Attention for Problem Loans, *The Bankers' Magazine* (April, 1983), pp. 60- 63.



A Model for Credit Decision Process

Credit decision can not be made solely of basis of analytic techniques of financial statements, but it is also subjected to many constraints and restrictions due to comply with bank credit policy, banking control laws and international credit regulations, and the economic conditions. Business is not done in a vacuum. Therefore, a banker must always take into account the various economic influence that may affect a prospective borrower, such as economic values of the product and business cycle fluctuations. Moreover, the common sense of the lending officer and his judgment play a great role in making credit decisions.

The outcome of this model would include the following information on a would be borrower:

- 1 - Character, ability, and experience of management.:
- 2 - Profitability, leverage; and liquidity of the company.
- 3 - Trend percentages for the key items in the financial statements. for many years.
- 4 - Cash flow from operations, cash flow/total liabilities ratio, and future cash generating ability of the company.
- 5 - The stage of business cycle and the influence of economic changes on the success or failure of the loan.
- 6 - The condition of the industry and the market in which the company sells.
- 7 - Credit policy of the bank which might have restrictions on the credit decision.
- 8 - Legal considerations which regulate and govern the credit decision.
- 9 - Forecasting of financial statement data.
- 10 - Pricing policy of the bank which includes the guidelines for pricing the loan under consideration.
- 10 - Pricing policy of the bank which includes the guidelines for pricing the loan under consideration.
- 11 - The impression of the credit analyst on the sincerity, integrity and capability of the borrower which helps him formulate his judgment.

Although the variables of credit decision are listed separately in the above summary, their potential interaction should be analyzed and considered in making the credit decision.

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نموذج الائتمان في البنوك التجارية

سليمان عطية

كلية الإدارة الصناعية - جامعة الملك فهد للبترول والمعادن
الظهران - المملكة العربية السعودية

المستخلص: تهدف هذه الدراسة إلى وضع نموذج لمعرفة المتغيرات المتعددة التي تؤثر على عملية اتخاذ قرار الائتمان في البنوك التجارية، ويبين هذا النموذج أن قرار منح التسهيلات الائتمانية للوحدات الاقتصادية يعتمد على خمس متغيرات وهي كما يلي:

- ١- التحليل المالي للقوائم المالية للوحدة الاقتصادية.
- ٢- السياسة الائتمانية للبنك.
- ٣- الوضع الاقتصادي والتضخم.
- ٤- القيود القانونية لعملية الائتمان.
- ٥- الحكم الشخصي وتقديرات المسؤولين عن قرار الائتمان في البنك التجاري.

ويرجع السبب في دمج هذه المتغيرات في نموذج واحد إلى جمع معلومات مالية واقتصادية وقانونية تكون كافية وملائمة لاتخاذ قرار الائتمان المناسب وبشكل يضمن تحقيق الربحية للبنك، وتقليل عنصر المخاطر في منح الائتمان والحفاظة على أموال المودعين.