Investigating the Impact of Supply Chain Management on Bank Performance and Bankruptcy Prediction using the Cumulative Density Function Model (Case Study: Iraqi Banks)

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***Abstract*— Proper supply chain performance plays a crucial role in the success of the banks. Therefore, it is essential to use an appropriate supply chain performance assessment system to continuously improve it. The political and economic developments have played a major role in bringing about changes in the economic environment in general and in the banking environment in particular, in response to these changes or affected by the changes in the banking environment and the successive developments in the financial and banking arena, which expanded the scope of its banking business both internally and internationally. This has been reflected in increased banking risks and thus the possibility of bank defaults resulting in financial and banking instability. The issue of banking failure management has become increasingly important for banks, and has been included by the Basel Committee as an important aspect of determining bank adequacy. As a result of studying and analyzing various aspects related to banking failure. Hence, the importance of this research is highlighted, as it will shed light on the factors and causes of the phenomenon of bankruptcies and identify and address the weaknesses. By adopting the density function, a model for estimating the exposure of banks to the housing. The research came out with a set of conclusions and recommendations**

***Keywords*—** *Supply Chain Management, Bank Performance, Bankruptcy prediction, cumulative density function model.*

1. Introduction

In a complex, dynamic and highly variable environment today, banks need to design and adopt strategies in their supply chain that can help them improve their performance. Because in such a competitive environment, partners are able to survive, compete and keep pace with the changing and dynamic conditions of the competitive market. Bank default is a continuous process, which requires banks to redouble efforts such as choosing the best ways to balance the returns and risks with a view to achieving stability in the banking sector. The second aspect is the attempt to identify the dangers associated with the failure of banks because they have an impact on the economy of the country, dealers and those interested in the banking sector, who are affected accordingly. From this point of view, the importance of this research comes in using the cumulative density function model, which acts as an early warning for employees in the banking sector on the beginning of the default. This will benefit the employees and users of the financial statements in the banking sector, thus enhancing the confidence in these lists which benefit the decision making that will serve the banking system. As it will shed light on the factors and reasons for the phenomenon of bankruptcies and identify and address the weaknesses.

2. Research methodology

2.1. Research problem

The problem stems from the financial instability in the banking sector, the increased risks and the manageability of banks to avoid risk. This problem is the result of the unplanned expansion of the banking industry internally and externally in order to attract more customers and achieve returns.

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2. The importance of research: The issue of bank bankruptcy has become increasingly important for banks. The Basel Committee has also listed it as an important aspect of determining banking suitability. The importance of the research is that it deals with a problem related to the banking system as a result of financial deterioration and increased risks, and most prominent, credit risks.

3. Research Objectives: The research aims at achieving the following objectives:

1- Knowledge contribution in the field of finance, banking sciences and financial thought in general.

2 -The possibility of avoiding bankruptcies through the use of approved models.

3 - To identify the nature of bankruptcies by a number of banks in the Iraq Stock Exchange, and the result of unstable political and economic conditions.

4. Spatial and temporal boundaries of research: The temporal boundary was the period between (2015-2004), and the spatial boundary was the banking sector in the Iraq Stock Exchange.

5. Statistical and financial methods used for the research:

1. Average: The average is defined as the total values of the time period divided by their number, and it's calculated according to the following equation:

$$\bar{X} = \frac{\sum xi}{n}$$

2. Standard deviation

$$\delta = \sqrt{\frac{\sum(x-\bar{x})^2}{N-1}}$$

Whereas:

δ = Standard deviation

X = Views

4. Contrast: Contrast is defined as the total squared deviation values from their arithmetic mean, and it's measured according to the following equation:

$$VAR = \sum (x-\bar{x})^2$$

8. Probability Equation (Probability Density Function)

A probabilistic model that reveals the state of failure of the bank or company, as it is an early warning to detect cases of regression or bankruptcy.

$$P = N\left(\frac{Ln\left(\frac{V_A}{D}\right) + \left(U - \delta - \left(\frac{\sigma^2 A}{2}\right)\right)}{\sigma A\sqrt{T}}\right)$$

Whereas:

P: Probability of bankruptcy

N: The cumulative density function

V_A: Value of assets

D: The nominal value of the total debt

U: Expected yield

δ: Expected dividend

$\sigma^2 A$: Assets volatility

T: Time, takes one year

2.2. Sample of the research:

The research was conducted in the Iraq Stock Exchange through banks belonging to the banking sector and they include (10) banks. The table below includes a number of banking sector banks (sample of research)

Table 1. Shows the sample of the research

S/No.	Bank
1	Commercial Bank of Iraq
2	Bank of Baghdad
3	Iraqi Islamic Bank for Investment
4	Iraqi Middle East Investment Bank
5	Investment Bank of Iraq
6	National Bank of Iraq
7	Credit Bank of Iraq
8	Dar Es Salaam Investment Bank
9	Sumer Commercial Bank
10	Babylon Bank

3. Bankruptcy - a conceptual framework

3.1. Banking failure

1. The concept of banking failure.

The concept of banking failure stems from the emergence of indicators of financial default in banks. In order to avoid exposure to this problem, there are methods that can be used to indicate the extent of exposure to financial default and thus bankruptcies, through which each bank can determine the volume and stages of default, and then the way to deal with it from different stages. It can be said that there are several concepts of default, although all these concepts revolve around one central idea, where the default is known as a process or a case. In terms of being a process, default is not the product of the moment but it is caused by many causes and factors that interacted and are interacting over time periods that lengthen and shorten and lead to the situation in which the borrowers not only become unable to repay the loans on their due dates or repay their obligations and obtain new commitments, but the project would also return to what it was before or restore its financial, monetary and operational balance. (Al-Hadhiri, 1997, p. 27)

It is defined as the credit facilities of all types granted by banks to some customers in the past, but these customers did not pay their values and interest to the bank in their due dates (Abdulmuttalib, 2010, p. 30).

2 - Degrees of default: Default has three degrees: (Almkawi, 2010, p. 26)

3.1.1. First degree

It is called the liquidity pressure where repayment is not totally stopped, but it does not happen in an organized form, and if total or partial repayment happened then it is late after due dates. Financial insolvency is usually temporary, and it's the first phase of default then there will be a great possibility of addressing it.

3.1.2. Second degree

The debtor completely defaults on its obligations, due to the very deteriorating financial position**.**

3.1.3. Third degree

Bankruptcy that leads to liquidation in favour of the creditors. Default is the inability of the bank to meet the demand for money by customers in the short term, this will generate fears for deposits owners what will cause them to withdraw their deposits soon, and that reflects the inability of the bank to meet the needs of the customers of liquidity, and the lack of readiness for this phenomenon leads to insolvency and bank defaults.

3 - Signs of default.

There are warning signs that are almost general to most banks whose financial situation ends in default.

A) A slowdown in the bank's growth compared to similar periods in previous years.

B) Unusual figures in the financial statements of the Bank.

C)The imbalance between cash inflows and outflows due to the inability of the bank to collect.

D) Changes in the financial management of the Bank.

E) Non-regularity of repayment of creditors.

F) Bank loss to its top customers.

G) Banks managers' inability to assess the current situation of the bank and to where it's heading.

H) The wrong estimation of seasonal peak levels and the granting of loans on the basis of this false estimation.

3.1.4. Bankruptcy manifestations and causes.

Bankruptcy often does not occur suddenly, but gradually, which gives both the bank and the client the opportunity to think and manage. Thus, bankruptcy has signs through which its manifestations can be defined. It can be relied upon the various elements and manifestations when distinguishing between vital and bankrupt banking corporations. (Hamdan, 2008, p. 20).

3.1.4.1. The manifestations of bankruptcies.

Bank default often does not occur suddenly, but it has preliminaries and manifestations, some of the most important manifestations of bankruptcy are:

3.1.4.2. Internal manifestations of banking failure

The internal manifestations of bankruptcies are summarized in the following points:

A - The volatility of the financial ratios at successive periods, primarily the liquidity ratios, profitability and quality of assets.

B - The decline in operating profits for consecutive periods and the possibility of continuation for years, due to the size of losses incurred by the bank as a result of its efforts to provide liquidity at high costs to pay its obligations, and the low volume of investments due to the large volume of provisions formed to cope with successive losses and thus the erosion of shareholders rights.

C -The internal conflict of management in light of the critical situation experienced by the bank. This is either due to the lack of sufficient experience or the presence of conflicts and the preference of the private interests of the shareholders and the dominant percentages of ownership of the capital or lack of information about the real status of the bank.

D - Low morale of the staff and their tendency to leave the bank exposed to bankruptcy, especially if confirmed liquidation in the future.

E –Bank imbalanced financial structure, such as the increased dependence on borrowing.

Management inefficiency: Some researchers attribute the failure of business enterprises to inefficient management, leading to financial bankruptcy.

3.1.4. External manifestations of bankruptcies

These are related to the external environment of the bank that we'll highlight below:

A- An increase in the withdrawal of deposits by depositors, especially in when declaring bank's failure or because of information or rumors. Withdrawals increase if there is no deposit insurance system.

B- The bank's inability to meet its short-term commitments on their due dates.

C- The bank's inability to compete in price due to the decrease in the volume of various revenue-generating investments.

D - Weak demand for products and services of bank subject to bankruptcy and the drop in deposit volume due clients and investors doubts of the ability to refund their money, resulting in weak competitive position.

E- The increased high-risk investments in order to obtain high yields to compensate for the losses that hit the bank, especially under pressure exerted on the management of the bank by the shareholders, which deepen the problem of bankruptcy.

F- Engaging in judicial disputes with the bank's clients, especially with regard to their access to their rights.

G- The sharp and obvious decline in the market value of the bank's shares listed on the Stock Exchange.

H- The decline of bank reputation among its clients in the money market.

I-Banks non-compliance towards tax payments due to the negative consequences it has incurred.

These aspects and other ones represent many signs and indicators alarming before bankruptcy, prompting it to be cautious of the seriousness of the bank's conditions and alert to the need to intervene in the right time to reform work and address deficiencies in the operational performance of the work facing the bank, and thus protecting the bank's funds and interests.

3.1.5. Supply chain management effects on bank Performance.

It's is not only a single reason attributes to banking institutions bankruptcy, rather, there are usually a number of reasons that vary according to the researchers' view of bankruptcy which are based on the lack of supply chain management.

Bankruptcy is the result of a wide variety of causes and factors, which vary according to the nature of the problems facing the banking sector. Despite the multiplicity and diversity of causes of bankruptcy from one banking system to another, most of them are involved in two types of external and internal causes(Al-Rawi, 2003, p. 173)

3.1.6. External causes of bank default

They include set of external factors which the banking institutions have no control over, such as:

3.1.6.1. Macroeconomic instability

Imbalances resulting from successive changes in the structure of the national economy, such as fluctuations in the terms of trade. When the terms of trade decline it will be difficult for customers of banks engaged in export and import activities to meet their obligations, especially debt service, as well as the fluctuation in inflation rates are considered a crucial factor in banking system ability to play the role of mediation, especially granting credit, providing liquidity and other fluctuations at the macroeconomic level.

3.1.7. Improper economic and financial reforms

Changes in legislations or regulations sometimes put unusual pressure on the system and cause bankruptcy. Reducing restrictions on the banking system as part of a fast fiscal policy has been a major cause of bankruptcy.

3.1.8. Banking market environment

Strong competition urges banks to bear inappropriate high risks, especially with pricing that does not commensurate with the risks, since the possibility of taking high risk behavior is high in a highly competitive market. The strong improper competition between banks due to the rush to attract the same customers, therefore, cause them to contribute to regular chaos, due to lack of banking awareness. Wherefore, investment and lending decisions may not be well thought out. This has contributed to the banks' failure and the absence of banking marketing because marketing is of the utmost importance in any activity and in particular, banking industry. (Ghoneim, Ahmed, 1995, p. 45)

3.1.9. Government intervention

Some governments may intervene in the work of banks, especially in developing countries. They force banks to fund huge projects, which creates deficit to these banks, as well as the impact of the state's monetary and financial policies on the activities of banks. And the state's intervention as securities vendor. When banks buy treasury bonds issued by the government to meet the deficit in the state budget. When the bank buys these bonds, this leads to a decrease in liquidity. Some governments use their influence on banks and encourage them to contribute in covering the deficit in their current budgets.

3.1.9.1. Financial liberalization and economic openness

The economic openness to countries and institutions that have gone a long way in rationalizing the institutional work and the integration of legislative, technological and social infrastructure, make the subject of the competition with banks coming from foreign countries very difficult, and facing competition raises the cost of change that must be done In the new environment. In addition, liberalization encourages banks to engage in high-risk activities and face tough competition. The financial system is characterized by openness, liberalization and deregulation that have limited its banking activities, especially in developed markets in industrial countries. Which encourages banks to practice conventional and unconventional activities and innovate new services. Country experiences show that in the absence of appropriate measures, financial liberalization can lead to a financial crisis and that the reason is that financial liberalization leads banks to face new risks, especially if restrictions on lending are lifted.

3.1.9.2. The lack of compliance in legislation local laws and legislations

The bank practices its work through laws and legislations, and when these laws don't keep up with the requirements of economic and financial openness, and the failure to adapt domestic legislation to face international legislations or developments in the activities of international banks or their methods lead to bank exposing to bankruptcy. (Arab Monetary Fund, 1995)

3.2. The internal causes of bankruptcy

These reasons are related to the nature of management in the bank and how to practice the activities that it implements, they include all the reasons that the bank can control because it is in the internal environment of its activity, they are limited to:

3.2.1. Low management efficiency

The absence of efficient management features causes banks to face many difficulties due to weak credit and investment policy, the inability to analyse the risks of lending and other risks, poor investment portfolio management and concentration in certain sectors. Concerning the statement of the causes of bankruptcies, they agreed that the main reason for the failure was the inefficiency of the management. The most important deficiencies and problems related to the senior management team in the bank and its board of directors in particular are the lack of qualified members of the Board of directors and insufficient attention to the Bank's affairs, the Board adopts expansionary policies in the management of the activity, problems related to the managing director, and other factors. (Nadhmi and Al-Raafi'e, 2008, p.20)

3.2.2. Liquidity Deficit

Banks may suffer from a liquidity deficit despite having an important volume of deposits and an appropriate amount of loans. The liquidity of the Bank depends on its ability to manage its portfolio of assets quickly and without loss. Bank's liquidity is increased by the shortening of the term of assets and the lengthening ofterm of the liabilities. On the contrary, shortening the term of deposits and assets as the most important liabilities of the bank leads to a decrease in liquidity due to the increase in the percentage of demand deposits to total deposits.

3.2.3.The ineffectiveness of banking supervision

Despite the multiplicity of supervisory bodies on the bank, the lack of means and the inefficiency of supervision, especially after the expansion of e-business in banks lead to financial and banking defaults. The concepts of supervision now emphasize on quality and risk-based supervision, and not on formal censorship.

As for the supervision of the Monetary Authority, it performs comprehensive and periodic audits, monitors defaulted banks and indicates the nature of violations. The authorities may be insufficient to control the banking sector, but they play an active role in ensuring the safety and adequacy of the bank's capital and financial efficiency to ensure liquidity. In addition, evaluating the Bank's assets, especially loans, advances and other accounts, and ensuring the Bank's obeying laws, regulations and official instructions, to submit proposals to address obstacles and crises experienced by the bank.

3.2.4. Financial Corruption

The spread of corruption is an essential element of bankruptcy and it's linked to the avoidance of profession ethics, which represent the reflect of cultural and environmental roots that surround the staff of the bank. The violations depend on the nature of the employees ethics that derive from basic education whose cultural and educational roots are based on the cultural and religious heritage sand the surrounding environment in which the individual was born, and the values and principles they represent. Banks usually use fraudulent methods when the bank moves towards bankruptcy. Some loopholes in the laws may be used to practice manipulation, and the problem becomes wider when the process is transferred to a collective nature, leading to a high volume of violations and implicate responsible administrative figures in the fraud, forgery and shading. Professional parties from outside banks sector may cooperate in such operations, noting that the most important fraud is not applying banking standards, the lack of integration of banking instructions and procedures and their backwardness compared to developments in technology and their increasing use in banks.

3.2.5. Capital inadequacy

Banks characterized by their small capitals are quickly to go bankrupt, because they are unable to bear the losses, especially those occurring in successive or unexpected years.

Accordingly, capital must be sufficient to achieve the functions assigned to it, especially the duty of protecting depositors and instilling confidence in the banking authorities. The risk of insufficient capital may result in insolvency of the bank, which may lead to its closure by the specialized authorities or asking shareholders for additional payments to cover the deficit or liquidate the bank and distribute the resulting money to creditors and depositors. (Abd al-Barr, 2007, p. 128)

3.2. Stages of bank default

Bank default goes through many stages that must be studied well to deal with the defaulted bank, they are: (Al-Awadhi, 2004, p. 17).

3.3. The stage of accidental events

it's the real start of bankruptcy, where a random event occurs, which represents a test and a challenge for the bank's financial director. If he is aware of it and knows its seriousness, there will be no default, but if he misses it and underestimates its danger, default will begin. Accidental event often seems ordinary; this is especially true in light of the Department's follow-up policy on a day-to-day basis and dealing with events at the moment without using future management process, which is based on planning, organization, directing and supervising. Examples of accidental changes include:

1. Entering unplanned commitments that do not give a quick return or it gives slow return, thus creating a burden and generating an unfulfilled commitment that devours part of the surplus, turns cash surplus into a cash deficit and devours part of the working capital.

2. The emergence of a sudden unplanned commitment that drains some liquidity, absorbs full liquidity or devours part of the working capital as a result of an accident in the local or global cash market.

3.4. The stage of ignoring the status quo

It's the stage where some bank experts or the bankrupt project alerting the bank to the seriousness of the reasons affecting the process of default, but the managers of the bank ignore it and underestimate it, leading those who warn not to continue warning, but to overlook the current situation and the future risks that may have devastating effects on the bank.

3.5. The stage of continued default and the dilution of its seriousness

At this stage the situation gets worse and even more by the owners ignoring the dangerous situation, then the nascent problems will turn into serious ones, full of elements and aspects, and despite the clarity of the seriousness of the situation, the administration of the bank do not give due importance, nor it change financial policies or take appropriate precautions and measures, but continue the same policy.

3.6. The stage of coexistence with default

It is the most dangerous stages ever and the most destructive for the elements of the presence within the bank, where default becomes the character of life inside. At this stage all dealings with the outside stop, and the project awaits for the inevitable which must come. Hence, despair and frustration domination the employees and those dealing with them.

3.7. The stage of the devastating crisis

This stage begins when the news of bankruptcy leak to the public, breaking the loop or the media blackout barrier set by the bank's faltering management. The crisis occurs when some customers rush to the bank's headquarters to claim their money, inquire and validate the information received about the bank's position and its inability to meet its current and future obligations, and thus all bank's customers will rush to claim their rights by taking all legal procedures as well as freezing their transactions with it.

3.8. The stage of addressing the crisis or bank liquidation

At this stage the current management of the bank begins to meet with the right holders (owners) and call a number of experts and specialists to study the causes of bankruptcy and the way to handle them. This usually begins by the exemption of the current Governing Council, that caused the crisis, and then appointing a commissioner for the bank and grant him all powers to carry out the required reform process and bring the bank back on track.

4. Analysis of assets and liabilities

4.1. Analysis of assets:

Table (2) shows the total assets of the banks sample of the study, as the Bank of Baghdad was the highest average of the assets, as it reached (8.02171 E 11), which makes it better able to face the deficits that may face the bank in the future and it can also be more faithful to its obligations with creditors. Followed by Dar Es Salaam Investment Bank and Iraqi Middle East Investment Bank, as their average duration reached 4.43992E 11 and E 114.69203. Credit Bank comes in the third level at (3.45854E 11), while both of Investment Bank of Iraq and National Bank of Iraq approached average duration, when the average assets of Sumer Commercial Bank and Babylon Bank were the lowest, respectively (1.52541E 11), (1.72199E11), what makes it unable to cope with debt problems and financial obligations. It is worth mentioning that the period of research was characterized by years of political or security instability, that have comprehensively left negative impacts on the economic circumstances and thus on the banking sector, where it operates in an unstable environment. Table (3) shows the mean, variance, and standard deviation of the assets of the surveyed banks. It is noted that Bank of Baghdad was the highest in average of assets (802171000000),and the highest deviation standard (674249E 11) and variance (4.54612E 23). This indicates a higher risk to the b

Table 2. Total assets of the Iraqi banking sector for the period from 2004 to 2015

S/No.	Bank /year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
1	Iraqi Commercial	73465764	155584802	164594171	213176856295	204674372349	208304265376	204163838149	247446396459	293436517502	334843250328	449272568429	414889153817	2.14217E+11
2	Baghdad	61877903	318090429	331209583	363724586	542911440000	802194113000	961062610000	876207336000	1300654984000	1764904558000	1827505325000	1549536698000	8.02171E+11
3	Iraqi Islamic for Investment	17300352	41314168	44393617	45778627759	52568725172	84980268671	80272842318	310103679000	373682873000	455486699000	471442666000	478478052000	1.96075E+11
4	Iraqi Middle East Investment	175541477	319496069	299385631	406782969	569667612693	557540022098	580125543187	668017284736	818969589919	774180018936	683076386655	675123601662	4.43992E+11
5	Investment Bank of Iraq	130582225	138577952	167731022	131112403	158171718000	191558025000	246091571000	327719084000	378276838000	520596472000	558655517000	551734351000	2.44448E+11
6	National Bank of Iraq	12498961	64006501	43925751	51192450	70563773000	94052910000	107558290000	184664516000	337248548000	542453293966	615935603929	535764591305	2.07368E+11
7	Credit Bank of Iraq	27394308	213869681	357423459	359329224	337992826946	363961161693	594931934359	444122919000	561579222000	602995583000	625187059000	618517645000	3.45854E+11
8	Dar Es Salaam for Investment	32712567	37192621	253988019987	303276013752	457489882738	408098714461	463406204247	798170519793	694754441268	717947227433	633957724570	4.30105E+11	4.69203E+11
9	Sumer Commercial	1166834	27069665	38077433	47219951	77531702034	94982200383	119936262516	168098367000	270188999000	310658826000	419761171000	369216517000	1.52541E+11
10	Babylon	38885203	69870251	74829422	82455759	122436989388	168521549399	201242641577	271377273068	303653144370	328166929674	312027435860	358698930611	1.72199E+11

Table 3. Shows the mean, variance and standard deviation of the assets of the surveyed bank

S/No.	Bank	Mean	Variance	Variance/2	standard deviation
1	Iraqi Commercial	214217000000	2.12648E+22	1.06324E+22	1.45824E+11
2	Baghdad	802171000000	4.54612E+23	2.27306E+23	6.74249E+11
3	Iraqi Islamic for Investment	196075000000	3.76376E+22	1.88188E+22	1.94004E+11
4	Iraqi Middle East Investment	443992000000	1.03756E+23	5.1878E+22	3.22112E+11
5	Investment Bank of Iraq	244448000000	4.52699E+22	2.2635E+22	2.12767E+11
6	National Bank of Iraq	207368000000	5.14909E+22	2.57455E+22	2.26916E+11
7	Credit Bank of Iraq	345854000000	6.79096E+22	3.39548E+22	2.60595E+11
8	Dar Es Salaam for Investment	469203000000	6.24406E+22	3.12203E+22	2.49881E+11
9	Sumer Commercial	152541000000	2.17068E+22	1.08534E+22	1.47332E+11
10	Babylon	172199000000	1.8969E+22	9.48452E+21	1.37728E+11

4.2. Analysis of liabilities

Table (4) includes the total liabilities of the surveyed banks, where it was found that the highest average of liabilities was for the Bank of Baghdad (41650297879), and the lowest average of liabilities was for Babylon Bank (1990683538). This indicates the difficulty Bank of Baghdad facing with creditors about the fulfilment of their obligations. As for the Bank of Babylon, the low average of financial liabilities on the bank means that it is not likely to be exposed to financial default or bankruptcy. Banks are dependent on the management of their financial activity on deposits that are considered the largest point in the capital structure. Table (5) shows that the rate of assets compared to the ratio of liabilities was the lowest for Bank of Baghdad (1.93E + 01) indicating that the size of the financial obligations of this bank is high and this constitutes a great risk to the bank in meeting its obligations with others. The highest ratio of assets to liabilities was to Babylon Bank (8.65E + 01) which indicates that the size of the bank's debt is low compared to other banks, and therefore the risk of bank analysis resulting from the fulfilment of its obligations with creditors is also low.

Table 4: results of the commercial supply chain factors in various years

S/No.	Bank/Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
1	Iraqi Commercial	27115136	4487406	9154867	23202947921	5878831595	37260849754	29352492979	28831644989	38158698060	41572653917	43824224383	50181593286	24858724524
2	Baghdad	4237175	12995832	20764436	18911099	26901858000	13374954000	19035305000	14755157000	24635779000	54964519000	19832543000	326246551000	41650297879
3	Iraqi Islamic for Investment	4981967	1346354	1456166	540123191	1490572171	1033995043	522024597	1713979000	16104240000	12209820000	3895765000	3147381000	3388807041
4	Iraqi Middle East Investment	26587242	11671390	19857097	12587961	63999536559	18691843918	20980838278	11321683976	10773059284	15592319374	16830698102	64236821206	18541458699
5	Investment Bank of Iraq	60312862	21738232	17024186	15925537	11299911000	10083916000	18622250000	23386291000	62616767000	46214377000	12206193000	6996075000	15961731735
6	National Bank of Iraq	3525220	8555025	4001827	1430818	1964053000	1972456000	2938551000	3527443000	27750588000	13583333049	14280528762	7802564715	6153085868
7	Credit Bank of Iraq	1128505	5967120	3916121	7943228	9543656990	5628950013	7104964764	8407357000	19000097000	12281202000	8935426000	137326677000	17353940478
8	Dar Es Salaam for Investment	10381489	16274173	432417850	10309469618	7319124511	5657106934	8238381225	24655845154	28931182011	21461778153	12415012933	10855856882	10858569244
9	Sumer Commercial	286036	597981	1982754	898542	1084788617	1961105732	1199146149	6698347000	3656618000	5080234000	18673825000	8809226000	3930587984
10	Babylon	6714450	1984094	1854092	589409	418938783	6113114142	2743317628	349511343	414523759	355023136	739408647	11590022977	1990683538

Table 5. Shows some data of the sample

S/No.	Bank/Year	Liabilities/Assets V/D	ln(V/D)	(Variance/2)- Profits
1	Iraqi Commercial	8.62E+00	2.153780742	-1.06324E+22
2	Baghdad	1.93E+01	2.958013282	-2.27306E+23
3	Iraqi Islamic for Investment	5.79E+01	4.058019285	-1.88188E+22
4	Iraqi Middle East Investment	2.39E+01	3.175797309	-5.1878E+22
5	Investment Bank of Iraq	1.53E+01	2.728808517	-2.2635E+22
6	National Bank of Iraq	3.37E+01	3.51754127	-2.57455E+22
7	Credit Bank of Iraq	1.99E+01	2.992197123	-3.39548E+22
8	Dar Es Salaam for Investment	4.32E+01	3.76608095	-3.12203E+22
9	Sumer Commercial	3.88E+01	3.658644383	-1.08534E+22
10	Babylon	8.65E+01	4.460172719	-9.48452E+21

5. Analysis of profits

Through the annual reports on Iraq Stock Exchange in terms of the dividend (distributions) for the group of banks researched, they are not distributing profits but holding them for the purpose of investment and growth. Table (6) shows the total profits of the sample banks. It was noted that the highest average profit was for the Bank of Baghdad (15133347130), which enables it to repay some of its debts despite the increase. The lowest average profit was for Sumer Commercial Bank (1383935640), Making it in a difficult position for creditors despite the lack of liabilities.

Table 6. Shows the total profits of the Iraqi banking sector for the period 2004-2015

S/No.	Bank/Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average
1	Iraqi Commercial	1312920	1473693	1072636323	1520757677	1749030359	3831577203	13265759120	7180859	13216647101	8877001724	9214518386	7244863700	5000229922
2	Baghdad	372034	1838525	3567453000	16617747000	20319858000	15802020000	13669420000	20958120000	25099377000	32066680000	27780658000	5716622000	15133347130
3	Iraqi Islamic for Investment	62920	353609	---	---	---	643832806	99200851	11735005000	22453174000	27710242000	6630156000	8082266000	8594921465
4	Iraqi Middle East Investment	4981950	10436184	473145416	14451376258	13952202955	11707089059	862733075	18453235704	24282285942	20875713678	3605722835	5420512717	10510195289
5	Investment Bank of Iraq	1257274	4980234	24889000	8108898000	7904463000	4595326000	8902008000	9918450000	1383021000	26802265000	28877485000	17498695000	9501811459
6	National Bank of Iraq	363552	1579019	-----	841496000	3135086000	586028000	1141504000	2495273000	15415475000	13874430379	6947167704	2295361442	4248524009
7	Credit Bank of Iraq	666816	5517173	1785577319	19166376003	17194108088	759244435	818082332	15732702000	22946962000	11531884000	13443102000	11638708000	10768239239

8	**Dar Es Salaam for Investment**	**-47652**	**607248**	**---**	**1507687405**	**1676294238 5**	**988023814 0**	**1120643763**	**1090767863 2**	**1619385561 0**	**1649462548 8**	**1158549008 0**		**8445372110**
9	**Sumer Commercial**	**247319**	**950855**	**1075713737**	**1421802349**	**865488731**	**439295787 3**	**489844821**	**251889000**	**1193553000**	**1331841000**	**1970475000**	**3612464000**	**1383935640**
10	**Babylon**	**1882893**	**1886712**	**3035703444**	**4011034855**	**5536988462**	**3657280112**	**4470731912**	**4833629154**	**5023724663**	**3553775302**	**4853162041**	**3579352348**	**3546595992**

Table 7. Calculation of cumulative density function of the surveyed banks

S/No.	Bank/Year	(1) Assets/Liabilities V/D	(2) ln(V/D)	(3) -)variance/ 2(Profits	(4) Ln(V/D)+ (variance/ 2-Profits)	(5) Standard deviation	(6) Standard deviation $\times\sqrt{12}$	(7) 4/6	(8) Cumulative density function
1	**Iraqi Commercial**	8.62E+00	2.153780742	-1.06324E+22	-1.06324E+22	1.4582E+11	5.10386E+11	-20832070542	0.610261
2	**Baghdad**	1.93E+01	2.958013282	-2.27306E+23	-2.27306E+23	6.7425E+11	2.35987E+12	-96321286721	0.831472
3	**Iraqi Islamic for Investment**	5.79E+01	4.058019285	-1.88188E+22	-1.88188E+22	1.94E+11	6.79015E+11	-27714881459	0.60642
4	**Iraqi Middle East Investment**	2.39E+01	3.175797309	-5.1878E+22	-5.1878E+22	3.2211E+11	1.12739E+12	-46015968560	0.677242
5	**Investment Bank of Iraq**	1.53E+01	2.728808517	-2.2635E+22	-2.2635E+22	2.1277E+11	7.44685E+11	-30395320768	0.617911
6	**National Bank of Iraq**	3.37E+01	3.51754127	-2.57455E+22	-2.57455E+22	2.2692E+11	7.94206E+11	-32416581370	0.625516
7	**Credit Bank of Iraq**	1.99E+01	2.992197123	-3.39548E+22	-3.39548E+22	2.6059E+11	9.12082E+11	-37227820504	0.644309
8	**Dar Es Salaam for Investment**	4.32E+01	3.76608095	-3.12203E+22	-3.12203E+22	2.4988E+11	8.74584E+11	-35697307564	0.636831
9	**Sumer Commercial**	3.88E+01	3.658644383	-1.08534E+22	-1.08534E+22	1.4733E+11	5.15663E+11	-21047488531	0.583166
10	**Babylon**	8.65E+01	4.460172719	-9.48452E+21	-9.48452E+21	1.3773E+11	4.82048E+11	-19675445884	0.575345

6. Analysis of parameters and calculation of the cumulative function

Table (7) shows all the data of the sample and the calculation of the cumulative density function. It was found that the highest probability of a bank being exposed to a bankruptcy was the bank of Bagdad (0.831472). This is due to the high level of liabilities of the mentioned bank, which leads to a decrease in the ratio of assets to liabilities of 1.93E + (10), as indicated in Table (5), which means that it has not fulfilled its obligations to the creditors which in turn exposes it to bankruptcy. The lowest probability of bankruptcy was the Bank of Babylon (0.575345), due to the fact that the ratio of assets to liabilities was high (8.65E + 01), which is referred to in table 5), which means lower liabilities compared to assets, which in turn means the Bank's ability to meet its obligations to creditors and avoid being bankrupt.

4 - Bankruptcy is not the product of the moment, it's the accumulation of many causes and factors that interacted and is interacting across time.

5. The results showed that the highest probability of bankruptcies among the banks was to Bank of Baghdad, which reached (0.831472), due to the high level of liabilities of the bank.

6 - The results also showed that the lowest probability of exposure to the bankruptcy was to

Bank of Babylon, amounting to (0.575345). This is due to the low level of liabilities of the said bank.

7 - Bankruptcy does not happen suddenly, but in the final stage as a result of several stages, starting with the lack of liquidity and it develops until it reaches the cessation of payment, but default is easy if detected early, especially if considered to represent a crisis, it sends early warning signals. The main source can be from the lack of supply chain management system in banks.

8 - Ignoring the symptoms, manifestations and indicators of bankruptcy by the bank's administration as well as by the client leads to the difficulty and seriousness of the consequences of bankruptcy and impossibility of treatment and the intensification of the crisis.

7. Recommendations

The researcher recommends a set of recommendations, the most important of which are:

1. Use bankruptcy forecasting by predicting positive benefits to those who expect it in the right time, to monitor evidence of failure from the beginning to take corrective actions.

2 - Building an integrated database to support the management of the bank in order to avoid the problem and not fall into the risk of bankruptcy.

3 - Strengthening the financial position of the bank through the convergence of all intellectual and scientific efforts.

4 - Training specialized cadres to improve the performance of banking work.

8. Conclusions

In this study, the existing infrastructure and the needs of the bank to enter the financing industry as one of the service supply chain circles, the current state of the capital market and capital financing companies were examined. Also, the profitability of capital companies and their types of services were studied and various ways of entering the industry were studied. The researcher reached a number of conclusions, most important of which are:

1. Bankruptcy is a problem that is dominant in many banking systems around the world, resulting in huge financial, economic and social losses.

2. Bankruptcy is the result of financial malfunctioning of banks as a result of their lack of financial resources to meet their short-term obligations.

3. Bankruptcy is the result of the imbalance between the bank's internal and external resources and its obligations in due dates.

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