

Electronic Payment Systems in Iraq and Their Role in Reducing Settlement Risks with a focus on RTGS

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The Central Bank of Iraq relies on a set of electronic systems of expediting the provision of services and ensuring their quality, including the RTGS system, which is the backbone of settlement operations between customers and banks. The RTGS electronic payment system is an essential part of the Iraqi payment system that is concerned with ensuring the immediate effective settlement of high-value payment orders issued by system participants. Despite the great facilities provided by RTGS to settle the payments immediately. The system involves its natural elements of weakness that may lead to the occurrence of risks, and at the same time, it includes power factors that prevent these risks from occurring. It will be a management risk in banks dealing cautiously with the facilities provided by the system without reaching the risk situation. The ability to exploit the strengths inherent in the system to avoid potential risks. The research methodology required five axes. The first axis included the research methodology, while the second axis was exposed to the RTGS system and the relationship between the operation of the system and the occurrence of risks. The third axis was about the role of the RTGS system in reducing settlement risks. The application is the field of the fourth axis, while the fifth axis included the conclusions and recommendations. One of the most important conclusions reached by the research is that the effect of using the RTGS payment system in reducing settlement risks is greater than the effect that leads to its fall. One of the most important recommendations was to work on modernising electronic payment systems in a way that enhances their work, and to accommodate large, diverse and multiple transactions in the economic activity of institutions and banks involved in it, and obligating all banks to join it.

Keywords: *Electronic Payment System, Settlement Risk, Iraq*

Introduction

The payments system in Iraq includes three basic components: the RTGS immediate settlement system, the electronic clearing system, and the government bond deposit system. The RTGS electronic payment system concerned with ensuring the immediate effective settlement of high-value payment orders issued by system participants. It is the most important among those components, especially if we take into account the deteriorating security situation in Iraq throughout that period and the difficulty of transporting large funds, as well as the great advantages provided by the RTGS payment system in reducing settlement risks.

Research Problem

The RTGS system, by its nature, involves elements of weakness that may lead to banking risks in the payments system through the basic tasks of the system's operation to facilitate settlement operations. At the same time, it includes power factors that prevent these risks from occurring—dealing cautiously with the facilities provided by the system without reaching a state of danger, and the ability to exploit the strengths inherent in the system to avoid potential risks.

Research Hypotheses

1. There is a significant relationship between using RTGS payment system and reducing credit risk.
2. There was no significant relationship between the use of the RTGS payment system and the occurrence of credit risk.
3. There is a significant relationship between using RTGS payment system and reducing liquidity risk.
4. There was no significant relationship between the use of the RTGS payment system and the occurrence of liquidity risk.

Research Objective

Due to the significant risks to which banks are exposed in the light of the traditional payment work and the recent experience in using electronic payment systems in Iraq, the research aims to shed light on one of the essential electronic payment systems used in Iraq and its mechanism of work and the extent of its ability to reduce the settlement risks resulting from banking work Mail and address the challenges you face.

The significance of the research

The significance of the research lies in its ability to highlight two main points:

1. Knowing the RTGS payment system, its ability to operate according to the required international rules and standards, and achieving its risk management requirements.
2. A description of the efficiency of the Central Bank of Iraq in managing settlement operations between banks and its impact on reducing risks related to operating the system.

Research Plan

The first axis: research methodology

The second axis: RTGS real-time total settlement system

The third axis: the role of the RTGS system in reducing settlement risks

The fourth axis: the applied side

The fifth axis: conclusions and recommendations

The second axis: RTGS real-time total settlement system

The RTGS Payment System

The Central Bank of Iraq relies on a set of electronic systems for the expediting the provision of electronic payment services and ensuring their quality, including the RTGS system, which is the backbone of settlement operations between customers and banks. Work began with (RTGS) system on August 24, 2006, and the main purpose of this system was to link the Central Bank of Iraq with the Ministry of Finance as well as the main branches of commercial banks to exchange high-value payment orders inside Iraq. The beginning of the application system and the conduct of settlements were made through the participation of only five banks. According to the future plans set by the Central Bank, it will be switched to electronic payment systems. The system is now binding on all banks and branches of foreign banks that have a license to work in Iraq. The number of banks participating in the system has so far reached 65, including the Ministry of Finance, the National Retirement Authority and the Minors' Welfare Service. Among the main features of this system are:

1. It provides a greater advantage for banking safety, considering the activities of this system provide an alternative to manual execution of operations. Thus it reduces the risks arising from a comprehensive settlement of the values of payments between banks, especially those related to credit and liquidity risks.
2. The RTGS system guarantees a final, irrevocable settlement, which is a good feature of high value to the customer.
3. The application of the system increases the speed and shortens the time to execute the payments. The principle of (four eyes) is adopted, which indicates that it is at a high

level of efficiency and transparency. It operates under the management of the central bank only, which means that all the necessary permits to operate the system are provided exclusively by the central bank, as well as the possibility that the system provides for the central bank to monitor bank accounts.

The Relative Importance of the RTGS System

Table 1 shows that the RTGS system still holds the largest share in payments and financial settlements during the indicative years that take place through electronic payment systems used by the Central Bank of Iraq, which amounted in the year 2018 to the amount of 3,452,160,461 Iraqi dinars and 44,477,223 dollars as credit transfers, up to 31,361,203,736 Iraqi Dinar, and 549,578,872 in the form of cheques. The table also shows the continuous increase in the number of transfers made according to the RTGS system, as well as the value of transactions over the period 2013-2018.

Table 1 Banks Transfers through Real Time Gross Settlement System (RTGS) for 2013-2018

years	The IQD Transfers Value(Thousands IQD)	No. of Trans	The USD Transfers Value(USD)	No. of Trans.
2013	180,561,559,242	40572	7,285,543,360	9403
2014	199,961,820,465	44779	7,070,243,761	10814
2015	195,758,066,862	46661	6,749,524,791	10489
2016	177,332,311,691	53866	4,363,921,981	10075
2017	160,588,858,061	72036	3,268,683,085	9927
2018	161,812,789,182	56342	4,535,950,683	17772

Source: The Iraqi Central Bank, annual statistical bulletins, Department of Statistics and Research, various issues.

The Role of the RTGS System in Reducing Settlement Risks

The main task of the RTGS system is the immediate settlement of transactions. The length of the settlement period increases the possibility of not completing the settlement process due to the bankruptcy of one of the dealing parts during the process and before its final completion. As it delayed and then the accumulation of transactions at one of the parts would affect the speed of performance. The financial system thus exposed the financial system to danger. The situation may develop further when the entire national economy is exposed to danger, especially when one of the important institutions goes bankrupt. The risks that arise through the electronic payments system are divided into two categories (Roberts, 1999) as follows.

The first: Settlement risk, which is the risk faced by subscribers to the payments system, and arises in the case of the bank's commitment to pay a large value in conjunction with its inability to fulfil these obligations.

The second: Systemic risk, which is the risk that pertains to the system as a whole, and occurs when one of the participants is unable to fulfil his obligations, which affects the other participants negatively. However, it is worth noting that there is a direct relationship between settlement and systemic risks, especially at the local level. It was found that the more accumulated non-settlement obligations in the balances of banks participating in the payments system, the greater the chance of negative impact on the financial system as a whole, either at the international level. The risk is the result of transactions only, especially as it is related to currency exchanges, and this risk arises when there is a discrepancy between the local times of the countries that make the currency exchange process with each other (Fraser, 2008). But the research is concerned with the risks of settlement, and it will be emphasised.

The Relationship between Electronic Payment Systems and Settlement Risks

Settlement risk refers to "financial losses" that the banking system is likely to incur and to be exposed to in the use of modern payment systems" (Angeline, Maresca and Russo, 2001). The settlement risks have resulted from the fact that banks exchange large-value payments on behalf of their clients during the day but do not settle until the end of the day. Here comes the role of the RTGS system in reducing settlement risks, as all payments are high-value and under the system of instant settlement, which is timing its settlement is the most important factor in its settlement. It is settled in real-time through the Central Bank. Bank accounts are calculated in the central bank using settlement operations because they are the only physical asset that is deposited with the central bank by banks, and that is free from risks. Thus, the implementation of the real-time settlement system will have a significant impact on the payments process, which requires the introduction of many adjustments and facing many challenges.

In light of the application of the immediate settlement system, each bank will have to have one settlement account with the central bank. The central bank will certify payment orders and conduct the settlement process only if there is a sufficient account with the withdrawn bank. In the case of a normal payment order, the payment process becomes final and irreversible. Also, the funding provided to the account enables verification of the completion of the payment process and the non-recurrence of it. By having the balance provided by the settlement account at the beginning of the day, the immediate settlement system will give the beneficiary bank confirmation that the payment process has been final and irreversible. This affirmation provides the opportunity to the bank to use the funds obtained in investments in

various fields freely and with confidence and not to fear that these funds are not in their accounts at their final disposal as in the case of not applying the RTGS system. Through all the facilities provided by the RTGS system, it is done Automatically reducing the effects of liquidity problems on the financial and banking system as a whole.

The settlement risks include two main types of risks, namely credit and liquidity risks, each of which can be explained as follows.

Credit Risk

Credit risk means “the possibility of banks being exposed to losses resulted from the failure to pay the customer or delaying the payment of financial commitments.” (Shen, 1997). It arises “when one of the parties has to pay money or he has to hand over assets before he receives the corresponding assets or money that he exposes to a Possible loss.” (Islamic bank, 2000). Although credit risks have a clear impact on most commercial transactions, their impact is less severe in payment systems, because the expansion of credit here is not intentional, and if this is done it will be for a very short time not to exceed one day. By working according to the payment system mechanism, credit risk arises from two sources :

- A. Financial Risks: It is the result of the possibility of non-payment or late payment due to financial conditions that are mainly the result of a lack of liquidity.
- B. Work Risks: It is the possibility that the bank will not pay due to circumstances related to the bank's activities and management.

It can be Distinguished between two Types of Credit Risks (Shen, 1997)

- A. First Payer Risk: These risks may be exposed to who pays first when it is likely that he will not receive it from the other counterpart at all.
- B. Receiver risk, which occurs when the recipient assumes that the payments received have become final before they are actual. In this case, only the recipient becomes effectively, the first driver and bears the risk of the driver first (Time Lag). It is observed in RTGS that the recipient risks are the most common, and the reason for this is the large number of institutions that use the system indirectly without participating in it. The reason for this is the time lag that occurs in the settlement of payments. This is the period between the time the bank that the institution deals with receives payments, and the time the recipient's bank announces it. As it is common for any bank to inform its customers about any transfers of funds made after one day delay in the case of the active payment system, however, we find that many indirect users assume that the payment order is settled on the day the order comes (Solid Financial Shape).

Liquidity Risk

What is meant by liquidity risk here is the inability of the customer's bank that is part of the payments system and managed by the central bank to execute payment orders, even though the customer's bank is in a strong financial condition (Solid Financial Shape). However, the inability to pay its clearing obligations is due to different reasons (Al-Husseini & AL-Durri, 2003) beyond its control, such as the occurrence of temporary problems in communication between banks or their branches for various reasons. It is also noted that in the usual cases in which no type of payment system has been adopted, especially in the short term, the temporary lack of liquidity .It may not cause significant difficulties, but in the case of using the payment system (RTGS), the immediate liquidity at the time of settlement is significant and crucial (since total clearing systems require the availability of too much money - liquid - for immediate payment). Therefore, we find that the liquidity risk in the payment system (RTGS) is the most effective, although there is liquidity risk in all payment systems.

On the other hand, we find that the liquidity risk under the payment system (RTGS) sheds light on an important fact that has a clear impact on the stability of the banking sector as a whole, namely that all participants in the system are exposed (Exposed) to the liquidity risk to which any banking or financial institution participating in the system. This is due to the fact that the liquidity risk is a systematic risk and that the lack of liquidity in the liquidity of one participant, even for a short period of time, could lead to a series of liquidity shortages for the partners who considered that late cash payments are part of their liquidity. Therefore a series of Reactions of other partners may lead to a short-term systemic decline in liquidity with financial institutions operating under this system.

The Third Axis: Settlement Risk Management in RTGS System

RTGS settlement risks include, as mentioned, both credit and liquidity risks, and there are two approaches to dealing with both settlement and credit risks. The first and approved approach to credit risk reduction is the DVP method Delivery-versus-Payment. As for the second, approved approach to reduce liquidity risk, the central bank is to provide liquidity during the settlement period. The following shows the two approaches:

Payment Method for DVP Delivery in Credit Risk Management

The basic rule of the RTGS system is that all settlement orders for payments in a transaction are realised immediately and completely at the same time, at which point it is very self-evident that the implementation of the DVP approach will reduce the credit risk inherent in the completed transactions. Note that the application of the "DVP" method of payment in capital market transactions, it is based on the hypothesis that "the connection between the RTGS system and the immediate paper-based security settlement system has been stabilised

to ensure that the partial purchase will be paid at the same time that the partner is delivered the securities he has been entrusted with." (Al- Bahtiti, 2007).

Although the "DVP" payment method will reduce the risk of credit, it is not possible to avoid the cost of its implementation, because the "DVP" payment method requires three conditions (Al- Bahtiti, 2007).

- A. The payment systems for both processes must be RTGS.
- B. All different payment systems must have interconnected business times.
- C. Both the interlocking institutions in the transaction must send payment orders within the period of the overlapping operations. At that point, it is necessary to harmonise the size of the communication and information capacities of both the payment systems and the users. On the other hand, there is another possible cost in the way DVP making, because working in this way does not impose with different amounts of lack of liquidity in the payments system, but this deficiency may lead to disruptions in settlement of payments in related systems. If a large number of payment orders are deferred in RTGS due to liquidity shortage, for example, the settlement of payments in the system will become slow and may stop completely, thus interrupting the work of the system of immediate interconnected settlements. Therefore, it is imperative that before working with the method of payment "DVP", its costs and gains should be considered carefully.

Liquidity Supply throughout the Day by the Central Bank

The implementation of the RTGS payments system guarantees the minimum settlement risks due to the following considerations:

- A. As a result of their interest in the statutory effect of liquidity deficit and their desire to avoid it, central banks provide the payments system with the necessary liquidity during the settlement time.
- B. In many cases, the central bank allows the member bank of the system to possess negative balances in its accounts at the central bank during the day when payments are settled in the form of an overdraft.
- C. Because most payment orders are executed as quickly as possible under the RTGS system as soon as they arrive at the system, the continuous feeding of the system to ensure the smooth flow of the system with the liquidity it needs will reduce the risk of liquidity.
- D. Collateralised loans are cheaper for banks than settlement balances, and short-term government bonds offered as collateral have positive and guaranteed returns, which is not available in settlement balances (Al- Bahtiti, 2007).

On the other hand, we find that the aforementioned cannot be considered a reliable base, as banks' exposure to liquidity risk is not completely excluded. This is due to the fact that many banks, without taking into consideration the potential risks, consider that the economy in the quantities of assets held as collateral is no less important than the economy in its settlement balances. But banks ignore an important fact, which is that secured loans are usually cheaper than settlement balances, but they will be more costly if the interest gained on the guarantee is less than other types of assets such as corporate bonds or consumer loans.

It is evident that one of the essential elements to reduce liquidity risk, or even get rid of it, is the availability of high liquidity for all members involved in the payment system (RTGS), whether this liquidity is in the form of cash or reserve balances. As long as they are used for liquidation purposes, provided that the liquidity held does not achieve income benefits, and that keeping it does not lead to a cost to the bank. In other words, the cost of the funds held and the income from them must be compared before being used for liquidation purposes. Taking into consideration the achievement of a balance between the liquidity risk and the reduction in the cost of liquidity, provided that one does not overwhelm the other or neglect one of them for the other's account, bearing in mind that getting rid of liquidity risk once and for all is often very expensive.

The Mutual Effect between Credit Risk and Liquidity

Although credit risk is usually a minimum in networked systems, it is the greatest common denominator in all payment systems, and not only that, we find that credit risk is the primary source of all settlement risks. If the impact of credit risk recedes, liquidation and liquidity risks are not automatically eliminated. If we assume that a bank has a temporary deficit or shortage of liquidity, but it has a strong financial position, will it face a problem in filling this deficit or shortage? Certainly not, because he will be able and easily to obtain one-night loans from other banks by guaranteeing his financial position, and therefore the bank will also be able to fulfill its obligations, avoid liquidity risks or exclude them permanently, and thus not be subject to liquidation.

But what must be wary of it is the total dependence on the supply of liquidity during the day by the central bank, sometimes overdraft is not guaranteed, and then the central bank itself is exposed to credit risk. Especially in the case of borrowing banks' default, due to the fact that central banks may sometimes face a trade-off between reducing the liquidity risk in payment systems or increasing their credit risk.

And if the temporary lack of liquidity is unacceptable in a networked system, in which the liquidity data does not appear until the end of the day, then the matter becomes more dangerous in the payment system (RTGS) because the settlement time. Here is immediate and does not delay until the end of the day, thus the liquidity deficit at any time during Today, it

may either lead to a slowdown in the system and reduce its efficiency, or it may lead to the collapse of the entire payment system (Fuefine & Stehm, 1996).

There is no doubt that the Central Bank when it acts as a settlement bank, the risk of settlement decreases for two reasons as follows.

The first: The payments are settled by the central bank money, and thus the credit risks of the parties involved in the settlement bank are removed.

The second: Central banks can provide banks with additional liquidity in exchange for adequate guarantees if their liquidity is not sufficient to settle their payments. Therefore, the Central Bank provides credit facilities as part of the payment services, especially concerning large-value balance transfer systems to facilitate the flow of adjustments to the payments system.

The Fourth Axis: The Applied Side

Emphasis will be placed on this axis on measuring settlement risks, which we have previously identified with two types of risks, namely credit and liquidity risks, to know the effect of using the electronic payment system, specifically the RTGS system to reduce settlement risks, and there are many methods used to measure those risks. We will use in each measurement one of the methods with reference to the other methods.

First: Measuring Credit Risk

The primary goal of managing assets and liabilities is to reach an optimisation case in the relationship between profitability and risk. They are the main variables that the bank's management relies on making decisions, given that each bank has its utility function that reflects its preferences related to profitability and risk. As each level of compatibility between the assets and liabilities generates a certain amount of profitability, but in return, it exposes the bank to a certain level of risk. It is very appropriate to consider the size of the assets in any bank is a function of the size of the risks to which it is exposed and the profits it gets. Consistent with this approach, one of the most important methods used in measuring risks, especially credit risks, is the one that uses the size of assets in banks, and in particular, the effect of the concentration of assets on credit risk, and this can be illustrated by the following:

Concentration Ratio CR_k

Banking concentration is defined as "the sum of market shares represented by total assets, deposits or credit facilities of the three largest banks in the banking sector of a country" (Nicola, 2001). The CR_k concentration indicates the degree to which a group of companies

dominates a particular industry or a group of banks over the entire banking sector. In the Iraqi banking sector, where government banks dominate all activities, including those related to the confidence that the citizen attaches to the government sector. As a result of the expansion of its work due to the expansion of its branch network spread throughout all of Iraq, as well as easy access to its services. And its developmental role directed by the government and clearly by increasing the credit it provides to the various economic sectors and to all segments of society compared to the banks of the private sector, and do not forget about banking awareness of government banks through the different visual and audio means of communication.

The simplicity in the calculation and the need for limited data make CR_k become one of the most used methods for measuring concentration in the banking sector. The following figure reflects the mathematical formula for the concentration ratio (Repkova, 2012).

$$CR_k = \sum_{i=1}^k S_i$$

Whereas:

CR = Concentration Ratio.

S_i = market share of bank i

k = total number of banks

The value of CR ranges between zero and one, and the closer you get to zero, this means that the concentration percentage is low with a large number of banks. Whereas if you approach one, this indicates a high concentration in credit despite the few banks.

The Herfindahl-Hirschman Index: HHI

This indicator is defined as the sum of each bank's share of the total assets of the entire banking sector. This indicator is the most widely used to measure the concentration of credit because it is characterised by the use of more data than the CR indicator, which increases its reliability. It often serves as a benchmark for evaluating other concentration indicators. The concentration in the payment and settlement systems can be calculated according to the Herfindal Hirschmann's index by the following formula (Ahmed, and, Rashid, 2015).

$$HH_i = \sum_{i=1}^n S_i^2$$

Whereas:

HH_i = Herfindal Hirschmann index

S_i = relative importance (market share) of the bank.

n= The total number of banks.

The value of the index H H H i _i ranges from (0-10000-0) and is explained as follows:

If the value is less than 1000, it indicates that there are no concentrations (perfect competition).

If the value is between 1000-1800, it indicates moderate concentrations (monopolistic competition).

If the value is greater than 1800, it indicates a high concentration level (complete monopoly). Based on the above, the HH_i index takes all the banks in the banking sector when calculating the competition, as it differs from the previous CR_k index, which takes only the big banks. As for the relative importance, or the market share of banks, it can be calculated as in the following formula:

$$RII = \sum \frac{W}{AN} \times 100$$

$$RII = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5 \times n} \times 100$$

Whereas:

RII = Relative Importance Index

n = the number of banks included in the account.

Relative importance takes all values between zero and one.

$$0 \leq RII \leq 1$$

The relative importance of the bank increases as it approaches one, and Table (2) shows the mechanism for calculating the relative importance of assets in the banking sector:

Table 2: Mechanism for calculating the relative importance of assets in the banking sector

	Year 2015 (Trillion dinars)	Year 2014 (Trillion dinars)	Changing rate%	relative importance%	
				2015	2014
Total assets	222.9	226.8	1.7-		
Assets of government banks	200.5	204.5	2-	90	90.2
Assets of private banks	22.4	22.3	0.4	10	9.8

Source: The researcher's work based on the data provided in:

The Iraqi Central Bank Research, various issues, annual statistical bulletins, Department of Statistics and research, different issues.

First: Measuring the Concentration in the Assets of the Banking Sector

Table 3 shows the assets of government banks for the period (2018-2018) in million dinars.

Table 3 Government bank assets for the period (2013-2018) million dinars

		2013	2014	2015	2016	2017	2018
1	AL rafidain Bank	93,214,633	103,470,830	104,937,416	106,121,544	37,572,287	41,283,544
2	Al-Rashid Bank	53,750,608	58,689,966	61,615,280	61,289,756	63,050,445	19,225,542
3	Agricultural Bank	2,698,950	2,706,774	2,592,767	2,544,343	2,494,394	2,748,089
4	The Industrial Bank	918,716	374,237	383,686	412,029	454,382	758,950
5	real estate bank	2,194,556	2,159,613	2,050,686	2,265,342	2,539,467	3,502,343
6	Iraqi Trade	32,252,853	3,714,5914	28,956,509	24,970,935	25,039,292	27,366,735
	Total	185,030,316	204,547,334	200,536,344	197,603,949	131,150,267	94,885,203
	Private banks	18,636,471	19,170,308	18,874,102	18,098,782	17,616,854	19,023,267
	Foreign banks	1,505,102	1,677,755	2,107,985	2,220,379	2620317	3601241

Source: Annual statistical releases, Central Bank of Iraq, Department of Statistics and Research, various issues

It is noted from the table, the difference in the size of assets between government and private banks, both local and foreign. It will be appropriate to focus on the measurement and analysis on the impact of concentration on the assets in the government banking sector to reduce risks or exposure to them by applying the following mathematical formula:

$$HH_i = \sum_{i=1}^n S_i^2$$

We get the results of the concentration of assets in the banking sector for the period of 2013-2018, as in Table 4.

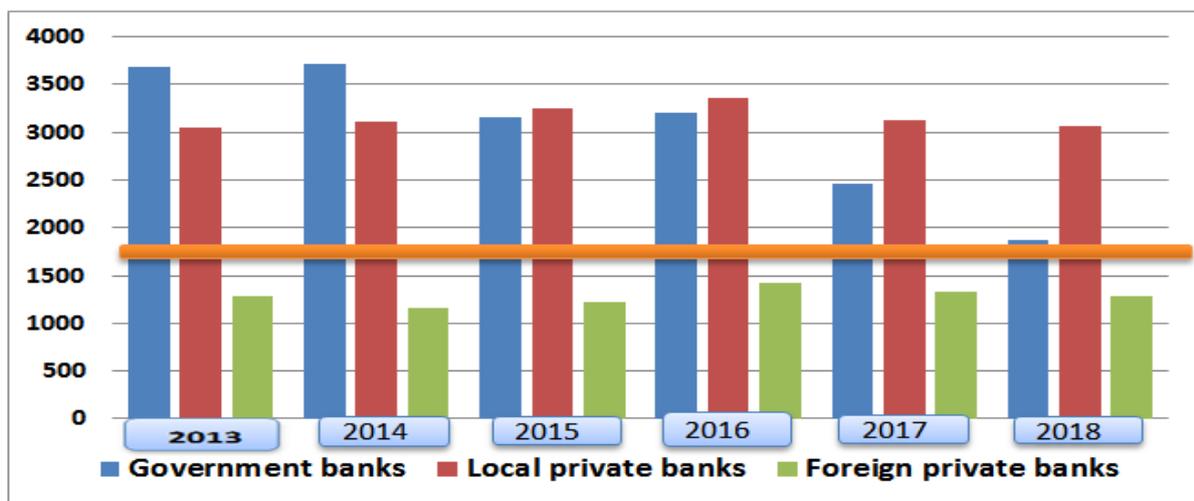
Table 4: Concentration of assets for the five largest banks for the period (2013-2018)

	2013	2014	2015	2016	2017	2018
Government banks	3689	3714	3156	3200	2463	1873
Local banks	3048	3108	3255	3367	3122	3064
Foreign banks	1285	1158	1222	1430	1334	1287

Source: From the work of the researcher, based on the data provided in Table 3

Table 4 shows that the degree of credit concentration of the five largest government banks ranged between 3689 points in 2013 and 1873 points in 2018, indicating a continuous decline in the concentration of assets in the government banking sector, which is an appropriate condition. The banking sector has moved from a state of the total monopoly of banking operations to government banks to a monopolistic competition with the private banking sector. While the foreign banking sector has remained remote, and the concentration in assets in the government banking sector, which represents the largest proportion of assets in the sector. The banker did not exceed the checkpoint of 1800. As shown in Figure 1, which expresses the state of stability in the banking sector, and avoids the state of risk due to the ability of the banking sector to deal with the changes taking place, and do not forget the guarantees provided by the Central Bank to settle payments under the RTGS system, and other payment systems. Figure 1 shows the levels of concentration in the assets of government banks and the domestic and foreign banking sector during the period (2013-2018).

Figure 1. Concentration level in the assets of the banking sector



Source: Table data (4)

Second: The Concentration of Transactions in the RTGS System

Table 5 shows that bank transfers through the real-time total settlement system for the years (2015-2018).

Table 5: Banks Transfers through Real Time Gross Settlement System (RTGS) for (2015-2018)

	The IQD Transfers Value(Thousands IQD)	No. of Trans	The USD Transfers Value(USD)	No. of Trans.
2015	195,758,066,862	46661	6,749,524,791	10489
2016	177,332,311,691	53866	4,313,921,981	10075
2017	160,588,858,061	72036	3,268,683,085	9927
2018	161,812,789,182	56342	4,535,950,683	17772

Source: Annual statistical releases, Central Bank of Iraq, Department of Statistics and research, various issues

From Table 5, the concentration ratio of the RTGS system for the Iraqi dinar and the dollar can be calculated using the Herfindal Hirschman index using the following formula (Ahmed, & Rashid, 2015).

$$HH_i = \sum_{i=1}^n S_i^2$$

Whereas:

HH_i = Herfindal Hirschmann index

S_i = The relative importance of banking transactions

n = The total number of the bank

The results can be placed in Table 6.

Table 6: Ratio of Concentration in RTGS System for Iraqi Dinar and Dollar

	2015	2016	2017	2018
<i>Concentration ratio in the RTGS system for Iraqi Dinar</i>	396	403	411	450
<i>Concentration ratio in the RTGS system for Dollar</i>	1,736	1,712	1,681	1,198

Source: The researcher's work based on the data provided in Table 5

It is noted from the table that the RTGS system has witnessed a continuous but simple increase in the concentration index of the Iraqi dinar since 2015. As it increased from 396 in

2015 to 450 points in 2018, indicating that there is no concentration in the RTGS system with transactions in the Iraqi dinar. On the contrary, the foreign currency concentration index has continuously decreased over the period 2015-2018, from 1736 in the year 2015 to 1198 points in the year 2018. These numbers are considered within the safe concentration limits that make the banking sector free from risks, the most important of which is credit risk.

Second: Liquidity Risk

Determination of Liquidity Indicators

Liquidity risk can be measured according to four indicators: liquid assets to short-term liabilities; liquid assets to total deposits; liquid assets to total assets; or, cash credit to deposits. Basel recommended the approved liquidity coverage standard consists of two indicators as follows.

A) The liquidity coverage ratio (LCR), in which banks are required to maintain an adequate amount of high-quality liquid assets (1) to enable them to face stressful situations for not less than 30 days, which prevents financial insolvency problems from occurring in the short term. It is worth noting that the Central Bank of Iraq had started applying LCR starting in 2017, but by 80%, then this percentage was raised to 90% in the year 2018, in the hope that the plant will be implemented in full in subsequent years.

B) The ratio of stable funding available, NSFR, expresses the ratio between the bank's funding sources (liabilities) and the uses of these sources (assets). This ratio reflects the bank's ability to provide the liquidity needed to meet its obligations in the medium term, not in the short term, as is the case in LCR, 100%.

Table 7 shows the foundations laid by the Central Bank to apply the ratios of both LCR and NSFR during the period 2017-2019.

Table 7: Application of LCR and NSFR ratios by banks.

	2017	2018	2019
LCR	80%	90%	100%
NSFR	100%	100%	100%

Source: Central Bank of Iraq, Financial Operations and Debt Management department

Measuring liquidity risk

A) Using LCR liquidity coverage ratios.

Table 8 shows the monthly LCR coverage values for the year 2018.

Table 8: LCR monthly liquidity coverage ratios for the year 2018

Date	Value of LCR	Date	Value of LCR
31/01/2018	2081%	31/07/2018	839%
28/02/2018	592%	31/08/2018	839%
31/03/2018	662%	30/09/2018	406%
30/04/2018	3309%	31/10/2018	503%
31/05/2018	555%	30/11/2018	467%
30/06/2018	1237%	31/12/2018	477%

Source: Annual statistical releases, Central Bank of Iraq, Department of Statistics and research, various issues

Table 8 shows that the banking sector in Iraq, with all its governmental and private banks (local and foreign), has achieved a high percentage of liquidity in comparison with the LCR ratio set by Basel III, at the level of the months of the year. It is also noted that the monthly average of this ratio reached 997%, which is much higher than the prescribed limit of 100%. As shown in Table 8, the banking sector achieved in April high percentages of liquidity coverage LCR amounted to 3309%, and this may be due to the entry of some newly established banks to the banking sector and the impact of that to increase his assets. While the table shows that the lowest rate of liquidity coverage ratio LCR was in September of 406%, nevertheless this ratio is still very far from the minimum set by Basel III, which is 100%.

The above shows that the Iraqi banks succeeded in achieving the liquidity coverage ratio LCR as a whole banking sector, and there are certain that some banks could not meet the requirements for covering liquidity individually. However, it can overcome the state of liquidity shortage within the work as a partner in the banking sector as a whole, as electronic payment systems, especially the RTGS system, were able to make the banking sector as a whole work as unified storage of liquidity, which is an important guarantee to reduce liquidity risk.

B) Using the available stable funding ratio NSFR

Table 9 shows the values of the available stable funding percentages NSFR for the year 2017 and 2018.

Table 9: Available stable funding ratios for NSFR for the year 2017 and 2018.

Date 2017	Value of LCR	Date 2018	Value of LCR	Average growth
Quarter 1	%270	Quarter 1	579%	%214.1
Quarter 2	%323	Quarter 2	348%	%93.9
Quarter 3	%311	Quarter 3	320%	%2.8
Quarter 4	%285	Quarter 4	318%	%10.1

Source: Annual statistical releases, Central Bank of Iraq, Department of Statistics and research, various issues

From Table 9, the Iraqi banking sector has achieved high levels of net stable or available funding ratios NSFR during the seasons of the years 2017 and 2018. These ratios are much higher than the ratios set by Basel decisions. This indicates a state of high financing capacity owned by the banking sector. This also means that what is available from the banking sector is much more than the required financing, and the banking sector as a whole is able to finance the asset side with a small percentage of what the sources of funds in the opponents' side.

The Fifth Axis: Conclusions and Recommendations

First: The Conclusions

1. The continuous decline in the degree of credit concentration of the five government banks over the years 2013-2018 indicated a health condition prevailing in the Iraqi banking sector. The essential features of which are the transformation of the banking sector from a state of monopoly to banking operations with government banks to a state of monopolistic competition with the private banking sector.
2. The concentration in assets in the government banking sector, which represents the largest proportion of assets in the banking sector, did not exceed the barrier of 1800, but a few, which is an indication of the state of stability in the banking sector.
3. In light of the guarantees provided by the Central Bank to settle payments under the RTGS system of immediate payments, and other payment systems, the banking sector was able to deal positively with the variables in the credit, and to avoid falling into risks, specifically credit risks.
4. The Iraqi banking sector as a whole succeeded in achieving the liquidity coverage ratio LCR, as electronic payment systems, especially the RTGS immediate settlement system, made the banking sector as an entire work as unified storage of liquidity, which is an important guarantee to reduce liquidity risk.
5. The banking system in Iraq has a high level of liquidity, and it is able to grant it protection against natural and even artificial crises resulting from withdrawals that it may be exposed to, and thus a greater ability to overcome the risks it is exposed to through the liquid stocks available to it.

6. The banking system in Iraq has a lot of idle funds, which affects the competitiveness of banks and the banking sector as a whole.

Second: The Recommendations

1. Continuing to reducing the discrepancy in the concentration of assets between government banks for the account of the domestic and foreign banking sector because of its profound impact in increasing competition in the banking sector and working to activate the role of private banks in providing the basic requirements for development.
2. Working to modernise electronic payment systems in a way that enhances their work, and to accommodate the large, varied and multiple transactions in the economic activity of the institutions and banks involved in it, and obligating all banks to join it.
3. Linking the comprehensive banking systems in banks with the electronic payment systems used by the central bank, especially the RTGS system, to avoid errors and reduce risks.
4. Activating the supervisory role of the Central Bank on banks, and taking advantage of the advantages provided by the RTGS system, especially concerning liquidity and credit monitoring, and monitoring the application of legal and normative rules.
5. Adopt optimisation in the use of idle funds in banks to achieve profits and increase the competitiveness of banks and increase their assets, taking into account the risks resulting from the excessive expansion in the granting of credit.



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