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Analysis of the Credit Portfolio Concentration and the Tools to Limit Its Risks: An Applied Study on the Iraqi Commercial Banks (2010-2019)

Nibras Fadhil Abdullah
Candidate Student, Department of Economics, College of Administration and Economics, MUSTANSIRIYAH UNIVERSITY, BAGHDAD, IRAQ.
Email: nibrasfadhil7@gmail.com

Prof. Dr. Waheeda Jebr Khalaf
Department of Economics, College of Administration and Economics, MUSTANSIRIYAH UNIVERSITY, BAGHDAD, IRAQ.
Email: dr_wahada@Uomustansiriyah.edu.iq

Abstract

The study aims to identify the risks of banking concentration and the methods used to reduce the level of banking concentration in the credit portfolio in Iraqi commercial banks and to measure the degree of concentration using the Hirschman-Herfindal index. Concentration risk is one of the most important risks facing the bank's management when granting loans and resulting from the concentration of the bank's dealings with a single borrower, a particular economic sector, or certain geographic areas that are sensitive to single economic factors, which exposes the bank to significant losses. It was found that there is a general tendency of the Iraqi commercial banks to follow the policy of concentration in the credit portfolio (whether it is a sectoral concentration or a structural concentration, or a focus on the level of the five largest banks in the country) in order to achieve the greatest return regardless of the degree of risk to which the bank is exposed or may The study recommended the need to reduce the level of concentration in the credit portfolio of commercial banks and to diversify the portfolio to reduce the risk rate, in addition to encouraging competition between private commercial banks by creating appropriate conditions such as allowing government institutions to deposit with them because they have an important role in Enhancing the citizen's confidence in them and benefiting from the advanced banking services provided by private commercial banks.

Keywords: Portfolio, Credit, Risks, Commercial Banks, Concentration Risk.

1. Introduction

Credit portfolio expresses the composition of the banking credits in a clear and blunt/straight/frank way, as the bank management work on diversifying its assets in a specific way, and the nature of the banking work dictates dealing with risks, for the existence of an effective time period between the emergence of the credit and its fulfillment, and the risks of credit are considered the most important as the risk of credit concentration emerge as a result of a discrepancy between concentration and diversification, as these risks increase in case of a rise in the intensity of credit concentration, and decreases when credit diversification rises, which is considered a reverse state to credit concentration. These demands set restrictions to credit concentrations and achieve some sort of balance between concentration and diversification.

The safety of credit portfolio contributes to achieving high returns to the bank with the least possible levels of risk accompanied to decisions for granting credit by using the strategy of diversifying its credit portfolios to include a large number of customers of big and low-value operations instead of its concentration on a specific category of the sector where there is a possibility of the occurrence of huge losses, based on the characteristics of risk diversification that limits the vibrations that occur in the returns of the credit portfolio, or any partial disability in the field of cash flow resulting from the customers' inability to payback the commitments and interests at their due date, and the final outcome of diversification enables the bank to preserve the distinctive feature and quality of the fiduciary assets and the returns of the portfolio. Upon that, the credit concentration will affect the mechanism of how credit is granted. Therefore, it is possible that it would lead to a rapid change in the loaning policy and the risk control systems.

With that in mind, this research attempted to provide a set of indicators to measure the credit risk, first: measure the individual concentration risk regarding the hirings for one client and the related parties to it using either of two methods (Method of modified particles and the individual concentration index). Second: Sectoral concentration indicator, which measures concentration from the total hirings of the bank relative to the 20 sectors. Third: Gini coefficient (G), which is a measure of the lack of equality in general. However, it can also be used to identify the concentration and diversification of the credit portfolio.

The research also attempts to determine the convenient ways to limit the risk of credit concentration by diversifying the loaning portfolio or specification or restriction and insurance as well as addressing coverage and risk transference which the bank is exposed to another party by using a systematic method, and that is done directly by selling the asset(loan) or conducting a securitization procedure to a part of his loaning portfolio, or in an indirect way by conducting a coverage procedure with other parties.

The research also aims to measure and analyze the degree of banking concentration in the Iraqi commercial bank for the duration (2010-2019). As the research will attempt to answer the following questions: Although the Iraqi commercial banks did diversify their loaning portfolio, do they still suffer from the risks of credit concentration, whether on the sectoral level or the structural level or on the level of credit concentration of the limited number of banks and what are these levels of concentration.

The main conclusions of this research are that there is credit concentration on the sectoral level through pooling community services sector on the majority of granted credit and also the credit concentration on the structural level in the Iraqi commercial bank. During the duration of the study, it shows through the acquisition of the loans and advances section on the larger percentage of the credit, in addition to the continued dominance of the governmental commercial banks on the larger percentage of the credit in comparison to other banks. The study has also recommended the necessity to work on reducing the level of concentration in the credit portfolio of the commercial banks to reduce the level of high risk that it faces and to work on diversifying the credit portfolio on all sectoral and structural levels. To work on encouraging competition among governmental and private banks.

2. Concept and Types of Banking Concentration Risks

2.1. Concept of Banking Concentration Risks

Credit Concentration Risk is defined as the result of the bank's reliance in their practice on credit and the usage of their money in sectors or very limited activities or limited resources to obtain finance or other required services to maintain their activity (Flayyih & Flayyih, 2019). Moreover, the credit risks resulting from the lack of existence of a well-diversified credit portfolio expresses risks of excessive exposure to a client himself or an industrial sector, or a certain geographical region.

Based on the Basel Committee that is concerned with the supervision and the monitoring of the banking work (BCBS), the risks of concentration are defined as the possibility of facing one of the risks or a group of the risks with the potential of the possibility of losses severe enough to threaten the safety or the bank capability to continue its operations or its intrinsic activities or main ones. (Nwanna, 2019).

There is also who defined the risks of concentration as a banking system that describes the level of the risk in the bank’s portfolio that emerged from concentrating on a party, sector, or one country. This risk arises from the observation that the most concentrated portfolios are the least diversified. Subsequently, the returns on these assets are more bonding. (Al-Karasneh, 2013).

So, the credit risks are a possibility of the borrower’s inability to pay back his loan and its interests according to the agreed terms when granted the credit, which means that the payment may be delayed or never paid eventually, and this results in problems in internal cash flow to the bank, which will affect the bank's liquidity. Despite the technological advancement and the innovations banks are adopting, the credit risks still represent a major cause of bank failures, and the reason for that is more than 80% of the bank's budget is connected to this outcome of the risks. (lhlebæk et al., 2003)

2.2. Types of Banking Concentration Risks

2.2.1 **Risks of Individual Concentration; Single–name concentration:**

On the level of customers and parties connected to them (concentration of the one client (customer)), this results in the bank directing credit to one client considering the magnitude of his position and refraining from offering it to other clients. (Al-Ghandour & Hassan, 2019).

2.2.2 **Risks of Sectoral Concentration:**

This happens as a result of large exposure to the individuals' sector or to connected economic sectors. As borrowers differ in the degree of sensitivity to general risks, not to mention some of the companies, do not care about the economic circumstances that they operate in, and as a result, the borrowers struggle to pay back. Therefore, the realistic assessment to stumble is considered critical to measure credit risk (Skridulyte & Freitakas, 2012).

The process of fractionalizing the loan portfolio into several types according to the type of the loan, whether it's industrial, real state, or consumer loans. When the fractionalizing process becomes complicated, the bank can identify the sector of concentrations. Although this method is considered simple, the benefit from the fractionalizing process of the credit portfolio is completed when the bank expands the range of the fractionalization into more categories. For example, the division of borrowers according to the sector, geographical region, collateral, type of facilitation. (Altameemi & Flayyhi, 2021).

2.2.3 **The Concentration in the Components of the Credit Portfolio:**

If the components of the credit portfolio were connected in-between each other in a large way, then any risk that affects one of them affects the rest of the elements, and that happens if the management had devoted her full attention to a certain economic activity or a certain economic sector or focused on a certain type of the credit types in a specific way, for the purpose of avoiding these risks, bank management must distribute credit risks through following the policy of diversification which is a simplified way means distributing credits into several divisions. (Maseer & Flayyih, 2021).

2. 3 Requirements for Measuring the Risks of Credit Concentration

The measurements of concentration have varied greatly, and some of them are Lorenzo Curve and kay, Shannon entropy, Gini coefficient, Herfindahl- Hirschman …etc., but the last is considered the most important one of these measurements considering the specialties they possess, which has made it the most used one in scientific research that discussed concentrations in general and credit concentrations in specific, and the characteristics that this index possesses expresses the concentration of the banking industry as a whole(RASHID et al., 2021) and Herfindahl- Hirschman index can be measure with the following equation (Battal & Al-Dulaimi, 2018):

$$HHI = \sum_{i=1}^{n} \left(\frac{Xi}{X}\right)^2$$

As: Xi: the value of the credit facilitations granted by the bank (i)

X: Group of credit facilitations granted by the bank, and after that:

n: Number of economic sectors or the number of industries or number of funded geographical regions.

2.3.1. **Measuring Individual Concentration Risks:**

Measuring individual concentration risks with respect to hirings for one client and connected parties using one of the two following methods:

A. Granularity Adjustment: According to this method, the individual credit concentration is measured using granularity adjustment (GA), and that is to estimate the capital needed requirements to meet the risks of concentration in only the companies loans portfolio, and that is according to the following formula (Mohammed et al., 2021) (Mhaibes, 2018):

GA = EAD * Herfindahl – Hirschman Index *C (1)

Whereas:

Exposure At Default (EAD): represents the bank's total hirings for the companies only (including small and medium enterprises) and without excluding allotments.

Herfindahl– Hirschman Index: This index measures the number of clients with respect to the bank's total number of hirings. This percentage ranges between **zero,** "referring to the lowest level of concentration," and one correct."

B. Individual Concentration Index (ICI): the individual concentration index is calculated using the Hervandal index (IV), Herfindahl (HI), and the adjustment factor(AF), according to the following formula (Al- Mamluk, 2020):

$$ICI = HI \ * AF = \frac{\sum_{i=1}^{1000} x^2}{[\sum_{i=1}^{1000} x]^2} * \frac{\sum_{i=1}^{1000} x}{\sum_{i=1}^{1000} y} * 100$$
$$= \frac{\sum_{i=1}^{1000} x^2}{\sum_{i=1}^{1000} x \Sigma \, y} * \ 100$$

Whereas:

X: Represent the total number of bank's hirings for each client or clients connected within the biggest 1000 clients in the segmentation portfolio, and the companies included are the small and medium enterprises (Al-Janabi & Mhaibes, 2019).

YΣ: Represents the total number of hirings in each of the companies and segmentation portfolios as long as it is not reduced with any tool of the risks reducing tools (No collateral is taken into consideration).

2.3.2 **Sectoral Concentration Index**

Banks must use the method of the sectoral concentration index (SCI) to measure the risks of concentration on the level of economic sectors, to estimate the requirements of the capital needed to meet this type of risks, and the range on which the sectoral concentration index is calculated is the bank's total hirings in companies for the twenty sectors. The sectoral concentration index (SCI) is calculated according to the following formula (Saad & Ibrahim, 2020):

$$SCI = \frac{\sum_{i=1}^{20} x^2}{[\sum_{i=1}^{20} x]^2} * 100$$

Whereas:

X: Represents the value of private hirings in every sector of the sectors.

2.3.3 **Gini Coefficient (G):**

Gini Coefficient is mostly used as a measurement for inequality in general. However, it can also be used to determine the concentration and diversification of credit portfolio, as the Gini Coefficient calculates to bank b in time t as the following:

$$G(x) = 1 - \tfrac{2}{n} * \sum_{j=1}^{n} vj - \tfrac{1}{2}$$

Whereas:

$$vj = \sum_{i=1}^{j} x\hat{\ } i$$

Where xˆI represents the relative exposure share to the credit portfolio (Hammoud, 2019)

2. 4 Tools to Limit the Risks of Credit Concentration

The risks of credit concentration emerge as a result of a discrepancy between concentration and diversification, as these risks arise in the case of an increase in the limit of credit concentration and decrease when credit concentration increases which are considered the reverse state of credit concentration. This is predicated on setting limits for credit concentrations and achieving a type of balance between concentration and diversification (Ali, 2015).

Basel committee's report in 2003 summarized the causes for the failure of banks lies in the insufficiency of the management and credit monitoring, and the adoption of credit portfolios of high risks to achieve high-profit rates, not to mention not following the rules and banking customs when granting credit or concentration in granting credit or concentrating in giving credit whether qualitative or geographical, as well as the existence of political pressures on the banks to grant credit that surpasses the allowed limit by the central bank beside other risks connected to banking activity such as the risks of interest prices and the risks of the market and the risks of conversion…etc. (Al-Taei, 2012). Banks could also reduce credit concentration risks using a set of tools and methods representing in the following:

2.4.1 Diversify the Loan Portfolio:

The bank's active and continuous management and follow up to its portfolios in which enables it to create adjustments and diversify its new activities, with the purpose of treating and correcting any already existing big concentrations or avoiding what might appear of it in the future, and diversifying achieves high interest to banks through diversifying loans on different types of borrowers and economic sectors and several geographical regions. Diversification is considered one of the most important methods to control the risks of credit concentration, as the concentration on granting loans to certain economic sectors might lead to the stumbling of these loans in the light of economic circumstances such as inflation financial recession, so banks have to resort to following a geographical and sectoral diversification when granting loans, in the aim to diversify risks on several sectors as well as different geographical regions, because the risk might show up in a certain sector or a certain region, and diversification is considered a traditional method to limit the risk of concentration. (Vinoth et al., 2021).

2.4.2. Limitation:

Because of unexpected changes in the circumstances of financial companies, industries, and geographical regions, it has become a must to set systems to determine credit ceiling for all types of loans, as the bank can determine the credit ceiling in different ways, levels, and conditions. The main reason for this goes back to determining the bank's exposure to losses resulting from granted loans to one customer or multiple customers where their financial circumstances are connected to each other (MHAIBES & MAHMOOD, 2020).

2.4.3 Insurance:

Represented by the bank's demand from the customer to provide collateral for the bank against the risks of not paying back for the insurance company, so if the customer didn't pay back at the due date, the back is entitled to obtain the appropriate collateral from the insurance company (Salman et al., 2021)

2.4.4 Coverage:

Represented by the transference of risks that the bank is exposed to by other party using a systematic method, which is a direct way through selling the asset (loan) or conducting a securitization procedure to a part of his credit portfolio, or in an indirect way through conducting a coverage procedure with other parties like buying credit derivatives, obtaining collateral and guarantees. Coverage procedures and transferring the risks are used as a method to control the risks of the volatility of interest prices and the prices of the conversion rates, and the shortage of liquidity in banks. Moreover, Basel committee II stated in its decisions several conducts to limit credit concentration, most importantly: Set a credit ceiling for one client ranging between (10%-25%) of the paid capital. The committee also recommended that the percentage not exceed 25%, with the aim of determining the banks' ability to give large loans to one party, in which it avoids large exposure to risks.

2.4.5 Capital Buffer:

The bank could keep an extra capital above the minimum limit for monitored capital in the framework of the first pillar of the decision of the Basel Committee II, and that is to face the periods of crises and the occurrence of losses resulting of credit concentration and adopting credit portfolios of high risks. In the case of usage of this money, it is rebuilt from the profits achieved, which will lead to reducing distributed profit (Al-Ghandour & Hassan 2019).

From what's previously stated, it is clear that there are several tools and methods to limit and reduce the risk of concentration in the loans portfolio, and the bank's reliance on it will reduce the risks to its lowest levels.

5. The Results: Credit Concentration of Iraqi Commercial Banks for the Duration (2010-2019)

5.1 Sectoral Concentration:

We notice from table (1) that the sector of community services has acquired the largest percentage of the total credit granted by the Iraqi Commercial Banks, although this percentage continued to decline from (49.8%) In 2010 to(36.9%) in 2019 (Al-Tameemi & Abd-Alghafur, 2020), this clearly shows the dominance of the community services sector over the cash credit that Iraqi Commercial Banks offer. Followed by each of these two, the sector of construction as it recorded the highest percentage to it in the year 2014 that reached (26%) and the sector of commerce restaurants and hospitality that has recorded its highest percentage in 2012 that reached (20.4%), due to the establishment of security and the encouragement of tourism in the country, as for the other sectors such as industry, agriculture, and others, they have recorded percentages less than the total granted credit. Still, these percentages are considered of low influence on the financing the needed economic growth regarding the large development projects the country needs at the current time and near future, and this points to that Iraqi Banks rely a lot on granting commercial, building, and construction loans considering the collateral these sectors can provide compared to other sectors (Ashoora & Ismael, 2020). On the other hand, the true nature of the economic activity that these activities dominate (building, construction, restaurants, hotels, and commerce) and the limitations of another activity (industrial and agricultural and others) that contributed to the formation of a map of sectoral distribution of banking credit in Iraq.

Table (1) The sectoral distribution of cash credit in the Iraqi banking sector for the duration of (2010-2019)

Years	Construction	Outside world	community services	Finance and insurance	Transportation, storage, and transportation	Trade, restaurants, and hotels	Water, electricity, and gas	manufacturing industry	Mining	agriculture and fishing
2010	18.50	0.10	49.80	1.80	1.70	18.40	0.30	4.60	0	4.90
2011	20.70	0.00	38.20	0.60	4.40	17.00	0.40	12.30	0	6.40
2012	22.40	0.50	37.60	0.80	6.60	20.40	0.60	5.20	0	6.00
2013	25.90	0.70	34.90	2.30	8.10	16.20	0.40	5.50	0	6.00
2014	26.00	0.10	35.80	3.10	6.30	14.30	2.80	5.80	0.10	5.70
2015	22.80	0.10	38.90	3.60	5.90	14.20	2.20	6.50	0	5.50
2016	21.30	0.08	39.02	2.26	7.46	15.2	3.93	5.00	0	05.7
2017	20.78	0	38.19	2.76	6.96	16.07	6.04	4.56	0	4.59
2018	25.34	0.10	35.89	3.00	4.99	15.51	5.20	4.64	0.23	5.10
2019	23.8	0	36.9	2.00	4.9	18	3.6	5.6	0	5.2

Source: From the work of the researcher based on:

Iraqi Central Bank, department of cash and financial stability, financial stability report 2016, page 11; Iraqi Central Bank, department cash and financial stability, financial stability report 2019, page 13

Form (1) the sectoral distribution of cash credit in the Iraqi banking sector in the duration (2010-2019) shows

Source: from the work of the two researchers, based on the table (1).

5.2 Structural Concentration

The Iraqi commercial banks are working on offering diverse services to different economic sectors to be able to practice its different activities whether they are represented by financing the buying of fixed assets or currently traded ones or to facilitate the operations of payment and import or finance its short-term expansion needs, and all these services fall under the concept of cash credit.

As for the distribution of the credit facilitations according to their category, we notice through table (2) the acquisition of the loans and advances section on the majority of the granted credit by the Iraqi commercial banks, for the great importance it has in the longevity of the bank and enabling it to achieve its goals that it set for long-term, and it's considered one of the most fertile assets of the bank for the appealing returns it generates when managed efficiently and responsibly, but at the same time, it is considered one of the least traded assets, liquidity wise, as it is not possible to turn it into money until its due date. As it recorded (7407000) million Iraqi Dinars in 2010 and increased to reach (35410267) million Iraqi dinars in 2019, because of the support of the Central bank of the commercial banks, to invigorate the country's economic development process, followed by a section of current accounts-overdraft- and usually this type of credit is given to finance the working capital, so it's short-term and doesn't exceed a year unless the client renews it again (Abdul Rahman et al., 2021). As it reached (1609000) million Iraqi dinars in 2010, and kept increasing during the study period till it reached (2408755) million Iraqi dinars in 2019, afterward, the section of overdue debt comes, it's the money that was late or stumbled into being paid in its due date because of economic or political factors, followed by Discounted-Bills section and some of it is instruments, bills of exchange, and a letter of exchange; the last is considered a global tool to equalize debts and its importance come from the ease of transferring the money via discounting it in banks (Amin, 2006), and as clear in the following table:

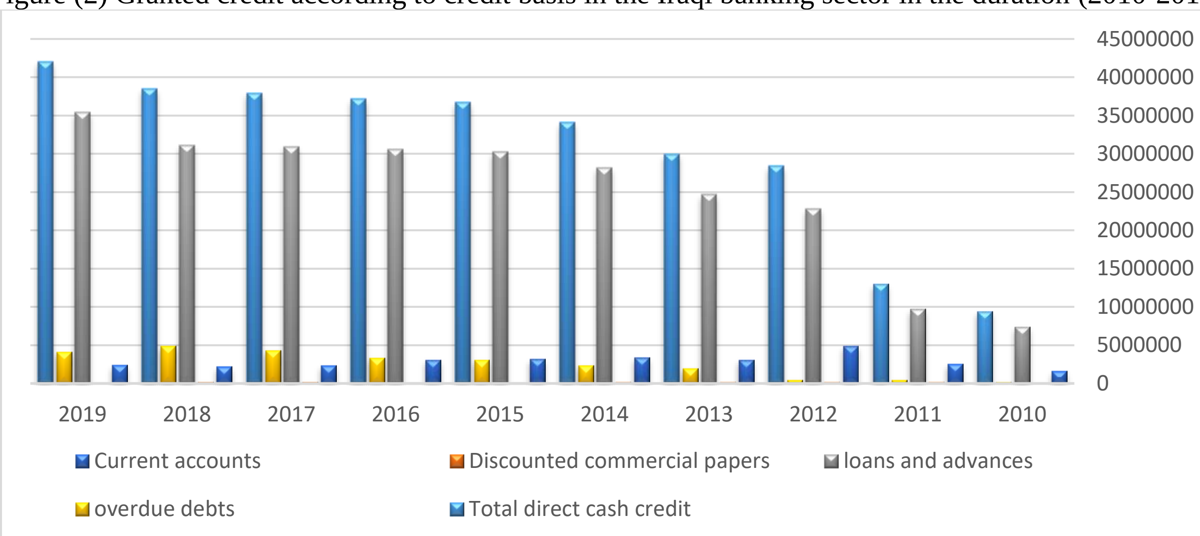
Table (2) Granted credit according to credit basis in the Iraqi banking sector in the duration of (2010-2019)

years	Total direct cash credit	overdue debts	loans and advances	Discounted commercial papers	Current accounts
2010	9413000	275000	7407000	122000	1609000
2011	12994000	459000	9743000	194000	2598000

2012	28438688	497870	22850336	191357	4899125
2013	29952012	1994459	24700569	181923	3075061
2014	34123067	2361133	28195535	185310	3381089
2015	36752686	3079653	30297202	153858	3221973
2016	37180123	3346490	30612337	154033	3067263
2017	37952829	4340568	30967053	295405	2349803
2018	38486947	4880628	31128596	283912	2193811
2019	42052511	4147527	35410267	85962	2408755

Source: Iraqi Central Bank, The General Directorate of Statistics and Research, the annual economic report of the Central Bank, multiple years.

Figure (2) Granted credit according to credit basis in the Iraqi banking sector in the duration (2010-2019)



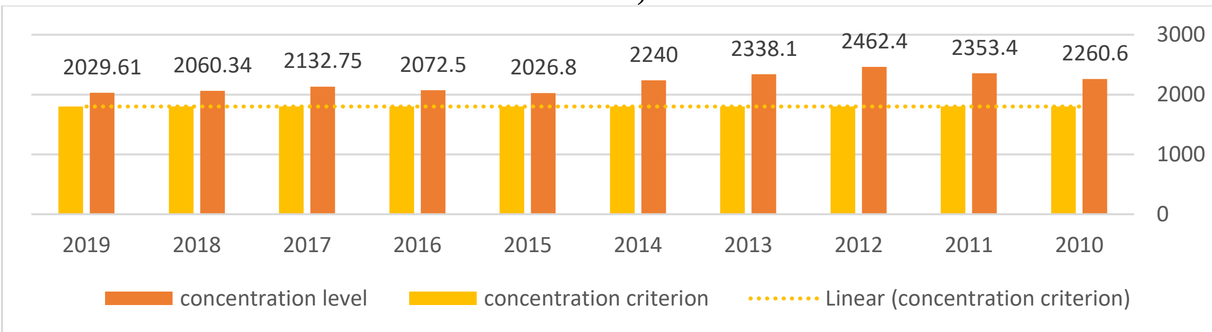
Source: from the work of the two researchers based on the data from table (2).

5.3: Credit concentration to the largest 5 Iraqi commercial banks

The governmental banks continued to dominate the larger percentage of the credit provided by the banking sector, as the percentage of the offered credit from the largest five governmental banks has reached (80.2%) of the total cash credit for the market share of the government banks to be high, the degree of credit concentration for the largest five banks in 2019 has reached (2029.61) points, lower than the year 2018 where it reached (2060.34) points, because the value of this indicator ranges between (zero) as a minimum till (10000) as a maximum, and based on that, the highest concentration point was in the year 2012 where it reaches (2462.4) points.

The credit concentration in governmental banks reveals its influence in dominating the banking sector. This is a natural result of its network of branches that are spread all over Iraq, the easy accessibility to its services, and its clear developmental role through increasing the credit it provides compared to the banks in the private sector, not to mention the banking awareness for the governmental banks via different visual and audio means of communication and the services they provide even to retirees by giving them advancements, as its shown in the following shape (Salman, 2019)

Figure (3) The credit concentration to the largest five Iraqi commercial banks for the duration (2010-2019)



Source: from the work of the two researchers, based on the Iraqi Central Bank, department of cash and financial stability 2019, page 17.

6. Conclusions

The importance of the purpose of credit stands out considering it's the backbone to any bank, and it manifests the main purpose of any bank as a financial mediator between savers and investors, and from it, the return of credit activity is achieved, as this activity represents the mainstream of revenue for any bank regardless of how diversified or varied its other activities. With this in mind, credit holds the biggest stake and the most important of an investment portfolio, as it seeks to achieve higher returns with a minimal degree of risk.

Hence, the importance of the study boils down to the discussion of the topic related to the concentration of the credit facilitations portfolio with respect to Iraqi commercial banks and the risks related to it, and how to limit it, as the loans portfolios in the banks hold an important position within the items of the financial institution because all the efforts and decision of the management targets in the first place to build a good loans portfolio that achieves high returns to the banks with the least possible levels of risk where the bank's capital is distributed amongst different types of loans differing in the size of risks accompanied to it. In the light of the results of the data and information analysis that has been relied on on through the results of the analysis done using Hershman index (HHI), there is a general orientation for Iraqi commercial banks during the study in following the policy of concentration in the credit portfolio, to achieve a high return regardless of the degree of risks the banks are exposed to, or that might cause stumbling in paying back.

There were several conclusions reached first: There is a credit concentration on the sectoral level through the pooling of the community services sector on the majority of granted credit by the Iraqi commercial banks during the study period. Second: There is credit concentration on the structural level in the Iraqi commercial banks showing through the acquisition of the loans and advancements section over most of the credit, which is because this section is considered one of the most private assets if the bank for the returns it can generate if managed efficiently. Third: Governmental banks continue to dominate the larger percentage of credit compared to the other banks, and the study recommended the necessity to work on reducing the level of concentration in credit portfolio to the commercial banks on all sectoral and structural levels. To work on encouraging competition between private and governmental commercial banks by preparing the proper circumstances such as allowing governmental associations to deposit in private banks and this process not to be limited to governmental banks, as for the important part it has in enhancing the citizen's trust in it and the benefit of the developed banking services provided by private commercial banks.

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