**An-Najah National University**

**Faculty of Graduate Studies**

# Determinants of Credit Risk in the MENA Region: A Comparative Study Between Islamic Banks and Conventional Banks

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# الإقرار

انا الموقعة ادناه مقدمة الرسالة التي تحمل العنوان:

**Determinants of Credit Risk in the MENA Region: A Comparative Study Between Islamic Banks and Conventional Banks**

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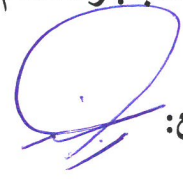

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## Abstract

This thesis investigates the determinants of credit risk in both Islamic banks and conventional banks. It concentrates on the differences of the determinant of credit risk between Islamic and conventional banks in the Middle East and North Africa region (MENA). Banks' specific characteristics and country-level determinants were examined using two models to investigate this study's objectives. The credit risk was measured by the non-performing loans for an unbalanced sample of 197 Islamic and conventional banks in the MENA region for 2010-2018. The results show that bank-specific and country-level factors drive credit risk. The assumptions needed to be fulfilled for OLS were tested, and the model was found to fit the purpose. Using fixed effect panel regression, results showed that return on asset, bank size, capital adequacy, asset quality, inflation, and regulatory quality are the main determinants of the banks' credit risk.

Moreover, the results uncover that Islamic banks in the MENA region face higher credit risk than the conventional banks. There is a positive relationship between asset's poor quality and credit risk, while a negative relationship between bank size, return on asset, capital ratio and credit risk

are observed. For country-level determinants, inflation and regulatory quality as focal determinants have a negative impact on credit risk. The results also show that the bank type's effect is negative on the relationship between asset poor quality and credit risk. It can be concluded that Islamic banks are less affected by asset poor quality than conventional banks. Other bank-specific and country-level independent variables appear to have the same impact on credit risk in both types of banks.

Future research on credit risk determinants may consider the banking system's development and more institutional factors when explaining banks' credit risk in the MENA region. The overall findings indicate that both macroeconomic and bank-specific factors do have significant effects on credit risk.

# Chapter One

# Introduction

## 1.1. Preface

Financial institutions lay at every economy's heart because of their significant contribution to the modern economy that include but not limited to banks, insurance companies, mutual funds, and other financial institutions. In the narrow sense, banking systems are classified into two different types, namely, Islamic banks and conventional banks. However, nowadays, Islamic banking regime is experiencing a remarkable growth worldwide (Gait & Worthington, 2014). The Banking sector is considered one of the most important financial institutions that have the greatest impact on the economy, which the success or failure of the banks performance will affect the overall economy on same countries, and on whole region, such as MENA region whether positively or negatively.

Banks create a connection between multiple parties, like money holders, creditors, and governments. According to Iqbal and Molyneux (2005), different types of banks play four significant roles: first, they presented banks as financial intermediaries that facilitating the moving of funds from depositors at the surplus side to investors who have a deficit side. The process that financial intermediary works on, helps to make development on the economy all that begin by the performance of transferring the savings to investment by removing the existing mismatches between any

party that have surplus to deficit units. The second role is that in addition to banks' primary goal, they provide many financial services and products that add a feature to banks compared to other financial intermediaries. These services include certificate of deposit (CDs), guarantees, payments services, transferring money, online banking, and cards etc. (Iqbal & Molyneux, 2005). Third, banks contain in their balance sheet different kinds of assets and liabilities that regulatory set a rule for them, so that banks have separation features about liquidity, maturity, returns, and risk-sharing to avoid credit risk (Iqbal and Molyneux, 2005). Finally, banks' basic job comes from preparing a stimulus to allot the assets effectively that is being used to upgrade the economy, and to become an intermediary for the arrangement of monetary deficiency and actually required assets between competitors (Iqbal & Llewellyn, 2002). In summary, banks utilize certain evaluations and effective assessments to anticipate the expected credit risk.

These assumptions are reflected in the rate of interest in conventional banks, and fixed profit-sharing rate in Islamic banks, which prompts to credit risk, the most effective threat for banks comes from ineffective management of credit risk, and wrong estimation of expected risk.

Islamic banking is a system framework that works with money which is used according to Islamic Shariah-compliant finance. It involves banking activities and transactions are carried out under the supervision of Islamic laws for banking businesses, which is known as Islamic Sharia Compliance.

Islamic banks earn money by the profit from the buy and sell. Two primary standards of Islamic banking and Sharia-compliant are Profit loss sharing in each financing circumstance and the 'Riba' is forbidden which is the interest amount charged on loan given by the lender to the borrower. The main distinctive feature of Islamic banking is forbids Riba (Interest on loans). Furthermore, Islamic banking laws are strongly against speculations and bets, which are known as ‘Maisir’. Conventional bank is where most people do their banking, because it is the oldest, and most known banking system. Conventional banks earn money by offering loans, and taking a specific ratio of interest on these loans, for instance, mortgage, house-building loan, vehicle loan, business loan, and any other type of loan.

Conventional banks, unlike to Islamic banks impose landing charges extra than common interest rates. Banks also can earn money by lending out money to other banks. Customer deposits provide banks with funds that are used in the lending system. However, banks paid a different interest rate on the money amount they borrow from the interest rate paid to the amount of money they lend.

Previous empirical research analyzed the subject of determinant of credit risk in Islamic bank was presented by (Čihák & Hesse, 2008). Their study has become an essential base for new research, and it was used in a lot of empirical works, such as (Boumediene & Caby, 2009; Hasan & Dridi, 2010; Imam & Kpodar, 2010; Beck , 2010). Following that seminal study also, several other studies Gamaginta & Rokhim, (2011); Pappas, (2016);

Abedifar, (2016); Beck, (2013), have compared the factors effects on the credit risk of conventional, and Islamic banking and the determinant that cause credit risk across different countries, and during different periods.

The most important issue that both conventional, and Islamic banks are dealing with various risks, especially credit risk. Islamic banks are controlled by sharia-compliant, and rules that make obvious differentiation between conventional bank activity and Islamic banks activity. Which is known, there are many differences between conventional banks and Islamic banks in their performance and strategies. Ben Khediri (2015) listed the most apparent differences: firstly, the principle of sharing profits and losses is one of the main essential rules of Islamic finance that all work based on. The balance sheet of Islamic banks can explain that on the asset side (investments) as bank carries the chance of loss that comes from the default of payment, and the profit from these investments, instead of conventional loans, Islamic banks exchange contracts as Murabaha, Ijara, Istisna, Mudarabah, and Musharka that are based on sharing profits and losses against the guaranteed interest from loans. If Islamic banks expose themselves to a bad investment and finance style that caused a collapse or bankruptcy, the losses would be shared with investors (depositors) and the bank's owners.

Second, Islamic work on the rule that all financing transactions must be backed by a real economic trade such as buying and selling involving a tangible asset. Credit is Loans are given from savings, and profit is earned

on it if this amount is invested in any commercial transaction and production activity. Third, sharia compliment based on the prohibition of the Riba (Interest) that is added to money without any right of it. Forth, the prohibition of Gharar, and maysar and finally, the restrictions on the use of Islamic financing. Islamic banks offer restricted kinds of investments to their clients as they do not do anything which incurs a haram profit.

Credit risk is the most important determinant for financial instability and financial inefficiency in the banking sector. Khan and Ahmed (2001), found that the most important risk type caused instability in banks is credit risk, because several economic conditions in the country may cause a financial crisis, this type of risk can destroy a bank or several banking institutions in a specific country or even in a region. Both Islamic and conventional banks faced this problem but the degree of the effect may differ due to differences in business models. When we compared conventional banks with Islamic banks, we found out that both Islamic banks and conventional banks survive from credit risk in different methods. Theoretically, some research suggests that Islamic banking faces more risk than conventional banks, (Ahmed, 2009). This is because the conventional banking system is based on interest, while the Islamic banking system relies mainly on two alternative principles, the first of which is the sharing of profits and losses and the second is the known profit. Consequently, the borrower who does not want higher risks prefers to choose an Islamic bank if he has the opportunity to share the profit and loss with the bank (Hasan

& Dridi, 2010). In addition, Islamic banks may face withdrawal risk if they share their losses with depositors (Ahmed & Khan, 2007). Therefore, Islamic banks rarely have the option to use profit and loss sharing in terms of liabilities, since it significantly increases the credit risk of Islamic banks. On the other hand, other research has shown that conventional banks are more risky than Islamic banks (Zarrouk, 2017), so that Islamic banks mainly relaying on sales-type products, which are much less risky than conventional debt-based products. but there is still a shortage of empirical research about this issue in developing and underdeveloped countries.

Credit risk is a risk that can face the banking system worldwide, including the MENA region, and considered as one of the most serious risks that can affect the banking system. It can be defined as the probability of the debtors inability to fulfill its loan repayment contract. Also credit risk encompasses the incapability of a party to accomplish his commitment on which he agreed while making the contract of loan (Korir, M. 2012). Conferring to Bhatti & Misman (2010), credit risk is present in all domains of banking services which they provide to their customers, especially in loans, and every bank has the distinct intensity of risk based on the techniques or methods they use for handling their risk and also it is based on the form of banking system such as Islamic or conventional banks. Basel Accord, the International Bankers Association, also noted that banks face many types of risk but the largest problem of risk comes from

The development of Islamic banks and the competition with conventional banks in the same country show some attention to Islamic banks' credit risk compared with conventional banks (Elgari, 2003). Conforming to the Bank for International Settlements (2000), credit risk is the fundamental reason for performance instability in the banking sector. Therefore, risk-taking management, especially measuring determinants of credit risk in banking system, is one of the most essential information to manage risk in all bank styles. Pervious empirical studies has worked in compering between the determinants on credit risk in Islamic banking and conventional banking's (Kabi, 2015). Our study differs from previous contributions in that, we test the determinants of credit risk in Islamic bank and conventional banks in the MENA region. The MENA region's choice is justified by the importance of the banking sector as the main source of financing for the economy in general and for investment in particular. To identify the effect of both banks specific which is: bank size, capital adequacy, liquidity, ROA, and asset poor quality, and macroeconomic variable such as GDP, inflation, and regulation quality on the credit risk of Islamic and conventional banks.

## 1.2. Research Gap

As Islamic banks and conventional banks are part of the MENA region's banking system, their performance may affect the banking system's validity, stability, and overall economic development. As a result, the assessment of the determinants of credit risks of Islamic banks, relative to

their conventional counterparts, will help bank managers, investors, regulators and policymakers as they will serve them as guide when developing, reformulating and overseeing the bank existing credit risk managements**.** These techniques can help in minimizing the credit risk. It may cause effective risk management along with determining the fundamental factors creating the credit risk in the banking system of certain areas and also help in improving financial instabilities that may cause a future loss for the banking industry.

Additionally, the information obtained from evaluating bank non-performing loans (NPL) as a proxy to credit risk may help ameliorate risk management by determining and identifying both macroeconomic and bank-specific factors that most affect the banking credit risk. Credit risks are determined by factors such as the economic growth, inflation, regulatory quality, asset quality, return on asset, capital adequacy, liquidity, and bank size.

These factors are studied by different researchers in different countries (Thiagarajan, 2011; Zribi & Boujelbene, 2011; Fainstein, 2011; Salas & Saurina, 2002). This study also try to identify evidence on the impact of the type of bank, Islamic banks or conventional, in overall credit risk determinant. The study covers several Islamic and conventional banks across 12 countries for the period 2010-2018.

Competition between conventional banking and Islamic banking has amplified due to the expansion of Islamic Banks. It has created a threat for

conventional banks as Islamic banks are focus on increasing their market share and accomplishing their target which is also increasing risk. Therefore, the assessment of basic factors for credit risk will benefit both conventional and Islamic bankers to increase their credit risk management techniques to protect them from credit risk by rivalry. Furthermore, Islamic banks have been operational for nearly about 50 years, their activities and outcomes require additional assessment in contrast to conventional banks.

As well as, Islamic banks offer the best substitute of profit loss sharing framework in response to the interest-based system of conventional banks. It is necessary to do a comparison of both conventional and Islamic Bank's framework of credit risk assess its basic determinant of credit risk. Though, the framework of Islamic banks is based on Islamic Sharia-compliance which is distinct to regular banks which are founded on interest. It is essential to explore common features of both banking systems to investigate determinant of the credit risk. Due to the above-mentioned aims, the assessment of driving factors is crucial to inspect analytically the effect of determinant of credit risk on banking system in the MENA region.

### 1.3. Research Objectives

This study aims toward the following two objectives:

- To empirically investigate the factors affecting the credit risk of conventional and Islamic banking across different countries. To fulfil

this key objective, this study tends to address the following sub-objectives:

1. To estimate the level of credit risk of conventional and Islamic banking system.

2. To investigate the bank specific characteristics of conventional and Islamic banking system.

3. To link the first two sub-objectives and analyse the nexus between bank specific characteristics and credit risk level of conventional and Islamic banking system across different countries.

    - To empirically examine the moderating role of bank type overall credit risk determinant

1. To estimate the level of credit risk of conventional and Islamic banking system.

2. To analyse the moderating effect of bank type on the relationship between bank specific characteristics and credit risk level

### 1.4. Research Questions

Our study focuses on addressing two key questions:

1. What are the primary determinants of credit risk of banks in MENA region?

2. What is the effect of bank type on the relationship between the determinants identified and the credit risk of banks?

## 1.5. Research significance

The study of credit risk and the determinant of credit risk in Islamic banks and conventional banks are incredibly interesting. This thesis is unique and different from other studies for the following reasons. First, this thesis covers all Islamic banks and conventional banks in the Middle East and North Africa (MENA) region while most other studies discuss the determinants for specific country or few countries. Second, this thesis discussed the potential difference in determinants of the credit risk between Islamic and conventional banks in the MENA region.

This thesis' finding might be used as a directive input in changing the bank's financing system by developing regulatory standards on the lending systems of conventional banks and Islamic banks of the MENA region. This thesis would also initiate the conventional Bank, and Islamic bank credit risk management to give due emphasis on the management of those determinants and provides them with a recognized activity that would enhance their lending system. The reason behind this is that knowing the variables that determine the credit risk would help the bank manager concentrate on the quality of loans and remedial actions.

The current investors could also benefit from this study to define the factors in determining credit risk and envisage benefits expected from their

investment and manage their assets. This study also helps the new investors to be aware of the possible factors that affect credit risk in MENA region Commercial banks and Islamic banks. This information would allow them to make better investment decisions too.

Finally, the study would also contribute to the existing body of knowledge regarding credit risk management and serve as a starting point for other studies, which may focus on similar topics and issues related to credit risk in general and factors that influence the level of credit risk in MENA region banking industry in particular. Thus, it can minimize the literature gap in the study area, particularly in the MENA region.

# Chapter Two

# Study Background

## 2.1 Preface

The banking sector is important for the development of the financial sector, financial market, and expanding new investment for economic growth. As known a different type of challenges and changes face banks like any financial market sectors that may use this obstacle to make development, modification, and enhancement. There are a lot of reasons caused that: the international influence of the banking sector and start operating on a global scale across the country, constantly regularly stiff competition between participants in the banking sector, eliminating the regulation and restriction, the rapid development of banking sector, and related activity and services, demographic trends, and technological changes.

The most significant changes and challenges facing the banking sector are risks in different types, especially credit risk, in order of that credit risk measurement, and identifying the determinant of these risks and the fundamental of the banking sector's work. The proses of measurement, and determining the causes of credit risk should be frequently, appropriate, and exacted. Credit risk can be formed in many banking sector styles and its located in a large amount in financial products and services. For that, there are many definitions and explanations of credit risk, and they all depend on

matching the obligation and determining the possibility of the repayment of the loan by the borrower.

Therefore, credit risk represents the measurement of borrowers' default in payment of the obligation to its lending party. The possibility relies on the analysis of determinants of credit risk in the banking sector. According to Basel (1999a), credit risk is defined as "the potential that a bank borrower or counterparty will fail to meet its obligations following the agreed term." And the Monetary Authority of Singapore (2006) has defined it to be the "risk arising from the uncertainty of an obligor's ability to perform its contractual obligations," where the term "obligor" refers to any party that has either direct or indirect obligations under the contract.

From the importance of credit risk on financial institutions' future, most studies suggest that there are two types of factors that drive credit risk. Many factors affect credit risk. Some of these factors are macro-economic variables like Growth rate in GDP, inflation, regulatory quality, bank type, and other factors are bank-specific variables that affect the bank in a different amount such as bank size, bank profitability, bank liquidity, capital adequacy, and asset poor quality. In addition to all determent that led to credit risk in a bank, the geographical area plays an important role with the effecting determinant for banking risk. Therefore, many studies were conducted across countries and single countries based on examining the determinants of Credit risk. The majority of the studies were inclined regarding developed countries. For that, we selected in our study the

MENA region banking system, and how to face more economical and political conditions and the differential in banks type and its essential role in competition of Islamic and conventional banks.

However, the lending process needs many procedures and credit analysis to ensure the borrowers can pay their pending loans to the lender. Therefore, the credit analysis process takes time to study the situation and the guarantees to control and not always as productive as expected. Moreover, providing loans can cause future problems, especially non-performing loans, commonly known as credit risk) Kharabsheh, B. 2019)

There is no standard definition of Non-performing loans (NPLs) can be explained as the number of loans that the borrower late to repay to the lender and transfer to bad debt. The lender is unable to collect or make scheduled payments for a new period. Generally, it is called when settlements date due more than 90 days and do not commit (Dimitrios, 2016). Non-performing Loans have attracted more concern from previous studies and academics since the increasing rate of non-performing loans is presented as a proxy to measure the credit risk in the banking sector (Adebola, 2011; Barr & Siems, 1994). Generally, NPLs are loans pending in their principal and unearned interest for an extended period over 90 days' inverse to the terms and conditions under the loan contract. In order of that NPLs are presented all loan facility that is not repaid at the specific date. Thus, the amount of non-performing loans measures the banks' credit risk and delivered the quality of bank assets (Tseganesh, 2012). In this

research, non-performing loans will be considered as a measure of credit risk.

Islamic banks can define as one of the banking systems and one of financial institution type that uses Islamic principles to employ economic activities to serve the customer (Hassan, 1993). Islamic banks provided a financial move that compliance with the principles of Shari'ah- complement is known as Islamic law. Like any financial institution in the banking sector, Islamic banking's primary goal is activating that maximize profit to increase shareholders' wealth. As a type of banks, an Islamic bank helps economic development by making fairness shearing in economic and ensure justice in the society including mobilizing savings and try to balance sector in the economy, provide training services, for now, labor to gain experience, besides their charitable aid from it wealth such as Sadiqi hat mean the amount of money given to the needed party as Islamic contribution, and Zakat that mean as current Islamic tax. Another example of Islamic banking fair distribution of wealth is Qard Hasan, which can be defined as interest-free loans from banks' income to needy customers, who repay that principal amount without any interest of fee for a certain period, all that providing Jute's income, wealth distribution, and efficient banking services.

Islamic banks' main goal is to activate the maximum profit and revenue by provides a minimal amount of interest-free alone of its total Islamic financing, establishing a connection with the community and avoiding

unethical activities or transactions such as gambling and payment uncertainty. Accordingly, Iqbal and Molyneux (2005) presented that customers must be sure their fund complies with Shari'ah and earn halal profit from their investment. In order of that, Islamic bank has another main goal besides it maximizing profit for shareholders, is preservation depositors' money according to shariah principle, and to achieve their social role.

both Islamic bank, and conventional banks continues play their role as a financial intermediary in financial sector that it supposed to play for a stable economy (Mejía et al., 2014). Besides their primary role in the market, banks contribute to issuing information in the financial market and addressing asymmetric information problems' adverse selection and moral hazard (Hasan &Dridi, 2010). Moreover, Islamic banks decrease the transaction costs and encourage the flow of cash from big capitalists to minor savers (Mejía et al., 2014). They also manage the further risk of different kinds in banks such as their initial operating investment risk, liquidity issues, credit risk, other chances of risks (Hasan & Dridi, 2010).

Additionally, Islamic banks provide a new contribution to the banking sector by giving alternative Islamic financing methods in business and personal loans. However, Islamic banks differ from conventional competitors in terms of regulation, Islamic low principle, and operations. The main difference between conventional banks, and Islamic banks is that the work activity complies with the principles of Shari'ah, the Islamic low.

The principal concept in Islamic banking and finance is profit-loss sharing models that depend on equal distribution. This could be achieved on Islamic banks' main goal that depends on interest- free financial contracts or transactions against the conventional banks that rely on interest loans. In contrary with conventional banks with a large number of loans and debt that can be defined as future risk, Islamic banks encourage risk-sharing that depend on profit loss- sharing and allocated as asset (Hassan & Dridi, 2010). Islamic banks vary in Islamic financing contracts in profit loss-sharing (Hassan & Dridi, 2010).

The Capital Adequacy and Risk Management guidelines introduced the Islamic Financial Services Board (IFSB) state that the kind, size of financial contract, and term of Shari'ah-compliant instruments don't vary from regular loans issued by conventional banks in credit risk amount. For example, the most used methods of Islamic financing contract in Islamic banking are in the form of Murabahah contracts (that depending on buying and selling the asset and make a profit), and Ijarah (Installments the mortgage then transfer the ownership) for that, credit risk is the primary type of risk that encounters facing the Islamic banks, and this is the same risk that faces conventional banks (Hassan & Dridi, 2010). The main difference between conventional banks and Islamic banks is that the Islamic contact does not allow conventional banks to invest in or fund any types, which depends on an asset, not on debt (Hassan & Dridi, 2010).

Islamic banks also face all other kinds of risks that are faced by the regular conventional banks, for instance, operational risk, solvency risk, market risk, and management risk, etc. However, Islamic banks are facing problems in credit risk as compared to their rival conventional banks. Because Islamic banks are bound to do new investments and schemes which will solely depend on profit loss sharing, so, the profitability in such investments is unreliable. Furthermore, credit risk management is still in progress in the Islamic banking system. (Hassan & Dridi, 2010).

## 2.2 Credit Risk (CR)

One of the most important risk types that face the banking sector is the credit risk. It is commonly known as the probability of default in payment of a loan commitment to the lending party such as Islamic banks and conventional banks. Credit risk also can explain the inability or failure of one party to repay the installment of its obligations to banks as agreed upon signing the contract at a particular time. In other words, Safiullah & Shamsuddi (2018) presented in their study and indicated that credit risk refers to the Late Payment of more than 90 days by the borrower to banks following the stipulated contract. Unlike conventional banks may use the delay of payment as a chance to make a profit that comes from interest charged on delaying. The different financing modes in Islamic banks can give rise to a different credit risk profile because its earnings were previously set. There is no changing of profit presented that agreed on by contract.

The profit-loss-sharing model is introduced due to Islamic transactions in which Riba is banned as Islam has forbidden all kinds of Riba. In conventional banking, we know Riba as "interest.". Riba is termed as charging an additional amount on the actual amount of the loan. And, Riba means increasing the overall amount of loan or loan installments while returning the loan without any right of that (Iqbal & Molyneux, 2005). Riba's term is shown in the Quran to reflect the modern theory of interest. According to the Quran, "taking the additional amount of money without right," which is evident from the allowing credits with interest, is the major motive behind forbidding this action. Charging an extra amount without any privilege is termed as moral degradation, inhumanity, and injustice that is caused by implementing interest to the society (Iqbal & Molyneux, 2005). According to Siddiqi, (2006), that an interest- based loans is not fair to one of the engaged parties both of lender and borrower. Both may face unfairness when preforming interest- based contract.

Hussain, and AlAjmi (2012) show in their study that credit risk is one type of risk and the most important that can face Islamic banks, and conventional banks rely on their different financing model, and it needs a comprehensive method in the banking system to determine credit risk. Moreover, Islamic banking may face lower credit risk in using profit-loss sharing (PLS) models in financing contracts because of borrowers' moral behavior associated with the possibility of sharing losses with banks and their tendencies to prohibit Riba explained.

Shariah's-complementary put limitations on the utilization of the conventional banks of credit risk aversion methods, for instance, credit derivatives are prone to increase the threat of credit risk for Islamic banking (Errico & Farahbaksh, 1998). Nonetheless, the connection among borrowers and loan sanction specialists can decrease the data deficiencies and data imbalance, improve the unpropitious decision-making issues, and make it more obvious for borrowers' financial stability, while helping the Risk of insolvency. Additionally, it may have lowered the vulnerability to the Risk of insolvency in Islamic Banks because of borrowers' strict Islamic convictions and faith about the Islamic banking framework, its justice, and demoralization. (Abedifar, 2013; Baele, 2014).

Some analytical researches have ascertained the credit risk faced by the Islamic and traditional banks in past years. The majority of these examinations utilized bookkeeping methods by utilizing straightforward non-performing loan proportion (NPL), which is used as a proxy to measure the credit risk of banks (Jiménez, 2010; Fiordelisi, 2011 Ahmad & Ariff, 2008; Berger & DeYoung, 1997, Das & Ghosh, 2007). A high non-performing loans ratio indicates the increased probability of bank credit risk exposure and insolvency. One of the advantages of the non-performing loans ratio is that it is a proxy measurement of bank credit risk. Later, Beck (2013) used non-performing loans as a proxy for default loans and found that non-performing loans of Islamic banks have a lower value, suggesting lower credit risk facing Islamic Banks than Conventional Banks.

In Islamic banks, we can define credit risk according to financial products. For example, in Murabaha or Ijarah contracts, the risk occurs when there is a possibility that the customer would not make its due payments on time, while in Salam or Istisna, it comes to existence when the producers fail to convey the commodity or the product on the agreed time and standards. However, in Musharaka or Mudaraba, the relation between bank and counterpart is a partnership-based relation rather than creditor-debtor relation, so credit risk occurs when the finance project cannot bear the expected revenue (Akkizidis, Kumar, 2008).

Shortly, we can describe the Islamic financial model in detail; the first model is Al-Murabahah Often called the ‘mark-up,’ Al-Murabahah is similar to the prosses of being an asset resell it back to the customer or back-to-back sales arrangements. It formed on the customer have a desire to buy a specific asset such as a car and willing to request this asset from Islamic banks to buy it for him, and after some time resell the same asset to the customer at a price that included face value of this given asset, any charges or expenses applied for the asset’s acquisition, and an additional pre-agreed reasonable profit. The total price is usually made through a series of installments.

The second model is I-Ijarah which is a funding or operating lease in which customers ask Islamic Bank to take a specific building or any other asset on rent for a specific amount for a certain period. The Islamic bank possesses the ownership and bears all the necessary expenses incurred to become the

owner of the asset. However, the customer needs to pay all the costs that occurred while getting the asset. On the other hand, the customer has to cover all the costs resulting from hiring the asset. If customers ask to buy the same asset, he needs to pay the final price of the asset and then ownership will transfer to him after the decided period.

The third model is Al-Mudarabah is the way of an Islamic partnership agreement between two sides, Islamic bank and Mudareb. In this method, the bank provides financial assistance as an investor which is called Rab-ul-Mall and the other party known as Mudareb will bring his expertise, experience, and management skills for business (Iqbal & Molyneux, 2005). However, the investor will bear the burden of loss (Saeed, 1996),

The final model is Al-Musharakah (partnership), which is also an Islamic financing technique that depends on the profit and loss sharing Framework after the idea of al-moudarabah (Iqbal & Molyneux, 2005). Al-Musharakah implies sharing both profit and capital, and this term is drawn out of the Islamic legitimate word shirkah. In fiqh, shirkah comprise of two kinds: first, shirkat al-Mulk termed as a joint proprietorship or more members in a particular property. This sort of association may emerge through heritage or mutual purchasing. Second, Shirkah al 'and represents a partnership and is started through an agreement. This legal binding for sharing profit and loss goes on for a business reason and may change its forms like a partnership in the venture's capital, partnership in labor and the

management, goodwill partnership, or any mix of these components (Iqbal & Molyneux, 2005).

The main distinctions in credit risk between conventional banks and Islamic banks come to existence from differences in the financial principles as conventional banks work according to capitalism rules Islamic banks work according to Islamic sharia (Van Greuning & Iqbal, 2007).

## 2.3 Islamic versus conventional banks

To list the differences between Islamic banking and conventional banking, especially related to credit risk determinants that come from the difference between the two banking financing models, and it standard in credit risk management. It is clearly explained that Islamic banks work with Islamic law and shariah. Islamic banks' objectives are not the same as the regular traditional banks and that they are assisted by the Sharia'h administrative sheets (SSBs) in their conduct, which is required to comply with their banking obligation in consistence with Islamic strict standards. On the opposite side, the idea of ordinary banks is based on the interest rate and the interest that comes from the delay of installment payment of the loan.

In doubt aside, there is a strong basis for believing that there are main differences between Islamic banking and conventional banking. Zarrouk (2017) recommended that consistent rise in prices and GDP are the essential stimulant for cash flow in traditional economies. Conversely, the need for actual assets and the usage of cash to exchange resources

encourage Islamic economies' development. Also, they see that Islamic banking is more significant in economic improvement than regular banking since it has established features like moral standards and virtues, risk-sharing, and efficient corporate management, Abdel Megeid (2017) recorded that four standards confine the action of Islamic banks. These incorporate the ban on Riba, Speculation (maysir or sharer) and unlawful operations (haram), and the disbursement of Islamic tax (zakat). Likewise, Turk & Sarieddine (2007) discovered that Islamic banks are dependent upon a particular value, intermediary, and scattered business risk on which their businesses are not based.

In Islamic banking, lenders, borrowers, and the bank in general as intermediaries share the profit and also bear the burden of loss during default risk of credit. The bank deals with the investors to utilize their cash to support the borrowers for the loan. The borrower's credit installment to banks and return the given investors surrendered due to risk of non-payment. Furthermore, the use of a security to diminish credit risk isn't accessible in Islamic banks that work under the Profit & Loss - sharing techniques (Sundararajan & Errico, 2002; Cihák & Hesse, 2008). Aggarwal & Yousef (2000), recommend that the most financial investments made by Islamic banks depend on the asset and profit & loss sharing; Mills & Presley (1999); Dar & Presley (2000); Baele (2014) have found similar finding. Rosly & Abu Bakar (2003) clarify that Riba being hidden as credit

financing, a finding repeated in the aftereffects of (Chong & Liu, 2009; Khan, 2010).

Islamic banks, similar to conventional banks, are exposed to other types of risk as well. Sundararajan & Errico (2002) claim that Islamic bank assets and liabilities' characteristics make them exposed to credit risk and other risks. Pappas (2016) Refer to instances of credit risk that bring about the default of installment payment in Islamic banks, including obligation covers on the organizations they put resources into and contracts customized to customer needs. In any case, Dridi and Hasan (2010) recommend that credit risk can be reduced by concentrating on the economy instead of financial advancement.

## 2.4 Determinants of credit risks

### 2.4.1. Bank specific determinants

Previous literature identifies the determinants of credit risk as two types, presented as macroeconomic, and bank-specific risk (Haryono, 2016; Castro, 2012). According to Aver (2008) shows in there study that macroeconomic presented as systematic risk is related to variables such as GDP, inflation, regulatory quality, bank type, and bank-specific risk is related to several banking factors that can be named as unsystematic factors that impact credit risks, which is presented in our study to facilitate the process of measurement credit risk in MENA region, that can be presented

as determents can be generalized in banking system, such as bank size, bank profitability, bank liquidity, capital adequacy, and asset poor quality.

The number of examinations analyzes macroeconomic and bank-related components as driving default factors for default risk in the banking industry. For example, Abdullah (2012); Awojobi & Amel (2011); Ahmad & Bashir (2013); Aman & Zaman (2010); Castro (2013); Bucur & Dramgoirescu (2014); Fainstein (2011), were some researches. For instance, Thiagarajan (2011); Das & Ghosh (2007); Fainstein, (2011); Salas & Saurina (2002);Castro (2013) found that a significant positive relationship between asset poor quality and the level of the non- performing loan. The above literature shows that several macroeconomic and bank-specific variables influence the level non- performing loan. Generally, Bank size, liquidity, capital adequacy, and asset poor quality indicators are important bank-specific factors that were mostly employed in the study related to Credit risk determinants, while GDP growth, inflation, and regulatory quality are some of the most used macroeconomic determinants of credit risk.

#### 2.4.1.1. Bank size

Bank size is one of the determinants that can affect credit risk. We can define the bank size based on the natural logarithm measurement of the value of total assets. That means the total asset is an important factor in determining the bank size and future plan. Banks with higher assets can benefit from economies of scale. According to previous studies that studied

the size of banks as a determinant of credit risk and their effect on the amount of risk, exposure has found a high impact of bank size on credit risk (Ahmad & Ahmad, 2004; How et al., 2004). All that means bank size has a positive relationship with credit risk that is move-in the same direction in affection. However, the greater the size of the bank, the greater of the asset owned that results in high financing that can be issued by banks to the borrower to grow in a market that can have increased the credit risk (Zribi & Boujelbene, 2011; Thehulu & Olana, 2014).

Banks can also use the advantage of their size in the financial market, which large banks can archive extraordinary profit and use their market power. Nevertheless, large banks come along with larger transactions and products are sometimes caused to attract a higher risk to generate higher credit risk (Maudos & Solís,2009). On the other hand, Srairi (2013) find that bank size affects significantly negatively with bank credit risk that more significant the asset of bank have the less credit risk that can be faced by banks, type of bank and its size of the asset can differently be affecting with credit risk, Islamic banks have lower exposure to credit risk than conventional banks. According to Abedifar, et al. (2013); Salas & Saurina (2002); Megginson (2005); Hu et al. (2006); Tehulu & Olana (2014), among others, reported a negative relationship between bank size and bank credit risk.

Previous studies found that larger banks with a higher asset were abler to use diversification methods that carry lower risk. However, De Nicolo

(2001); Rajan & Dhal (2003), found a positive relationship between bank size and credit risk. They explained that the size more it large more the is risk exposure. Banks may have higher credit risk as a result of lower control. Sufian & Noor-Mohamad (2012) examined determinants that influenced banks' performance. This study's empirical findings suggested that NPL and size had a negative statistically significant impact on banks' credit risk. (Awojobi & Amel, 2011) employed panel data to analyze Credit risk determinants and found it had a positive influence on credit risk.

Much previous empirical research takes bank size as an explanatory variable of bank-specific factors. Salas & Saurina (2002) found that bank size has been used to measure banks' credit risk. In order of that, larger banks are considered more careful in diversifying their loans portfolio. Hughes (2001) postulates the assumption that large banks can take advantage of both scale economies and diversification. In his study, DeYoung (2004) found that small banks deal mainly with small companies and limited credit risk.

On the other hand, Large size banks provide uniform products and are more deals of credit than relationship-oriented and also utilize economies of scale and diverseness. Nonetheless, huge banks might be more at stake to fail in big projects (Kane,2010). An investigation of the likelihood of failure in Islamic banks and traditional banks (Pappas et al. 2016) gave another bank size estimation.

They introduced that Islamic banks' all funds’ assets, resources, and capital are lower than of traditional banks. Cihák & Hesse (2008) report that as Islamic banks become broader, they soak up more default risk than traditional banks.

### 2.4.1.2. Bank profitability

Bank profitability allocates as one of the most important banks' specific determinants that can affect banks' credit risk, both Islamic and Conventional, to a different degree. Shortly bank profitability can define as an essential index of bank credit risk. It represents the rate of return a bank has generated from using the deposit resources at its control to produce and sell services for activating profit. However, some previous studies found that profitability in research and analysis doesn’t affect banks' credit risk overall (Waemustafa & Sukri, 2015). Other researchers who identify the bank's specific factors such as profitability and macroeconomic can’t determine the banks' credit risk and found no difference in terms of credit risk between Islamic banks and conventional banks.

On the other hand, Kabir (2015) found by comparing credit risk in Islamic and conventional banks and exploring the most factor effect and caused a difference in credit risk in a bank, that a negative relationship between return on an asset that presented as the measurement of profitability in banks (ROA) and non-performing loan (NPL) the proxy of credit risk. Bank Profit was considered an excellent demonstration of effective management, accomplishment, and investor's behavior. Louzis et al.

(2012); Chaibi & Ftiti (2015) Reported a negative connection among profitability and non-performing advances that implies there is a move in an alternate system. The more profit banks can gain, the less credit risk they can face. These studies attributed the negative effect on the bad quality of management.

In order of the great emphasis on measuring and studying NPL levels due to its negative relationship with banks' total profitability and, consequently, affects banks' lending behavior (Kingu, 2018). According to Fell (2018), a higher NPL ratio in the European area may impact individual banks' perception of risk-taking to decrease lending ratio through periods of high credit risk in conventional banks. Low NPL ratios convince the bank to give more credit and enhance the trust of depositors toward the bank (Christaria, Kurnia, 2016)

#### 2.4.1.3. Bank liquidity

Bank liquidity is allocated as the amount of money in banks that are not used in issuing loans to browsers that can be named non-working money from other customer deposits presented as saving. Also, Liquidity can be defined in banks' case as the ability to meet its financial obligations as they come due at the needed amount. Bank most mange the liquidity by matching the asset with short term investment to have liquidity in banks for future investment.

Loaning investments are generally done for long-term assets, however, they finance its advances with short-term liabilities. Thus, banks' most challenges are to guarantee their liquidity under all reasonable and cases. As known, the higher the liquidity, the lower the possibility of default risks. Islamic bank's action relies upon all tasks that align with Shariah. It is not easy to have investment opportunities and attract many customers to present for them loan (Hasan & Dridi 2010). Bank liquidity is one of the determents of credit risk Safiullah & Shamsuddin (2018) found that if the bank has a high liquidity, it will face a lower credit risk. In order of that, credit risk has a negative relationship with liquidity.

Pappas et al. (2016) found that Islamic banks have to save higher liquidity than conventional banks. Olson & Zoubi (2008) find that higher liquidity refers to the banks' management style, not because of limited investment opportunities in the market. However, Islamic banks look to have greater liquidity inactivity to cover expected deposit withdrawals since they depend on long-term financing contrasted with conventional banks. Islamic banks need more quick assets since they are restricted in utilizing the loaning market as a liquidity source in certain crises (Bashir, 1999).

#### 2.4.1.4. Capital adequacy ratio

Another determining factor assessed as a significant factor that influences the default risk in banks is Bank capital. This variable has been utilized practically in past investigations managing default risk determinants and utilizing capital sufficiency as a substitute. The capital adequacy ratio

(CAR) or Capital proportion is an estimation of a bank's accessible capital termed as a degree of a bank's default of non-payment. This estimation is to decide the level of credit risk impact from the capital. Capital proportions manage the measure of a bank's capital corresponding to the assessment of the risk it is taking.

The idea is that the capital adequacy ratio is that most banks must ensure that a proportion of their risk exposition is covered by constant capital. The different types of Banks should keep at least a base capital proportion of 8%. In reality, this proportion of 8% addressed as the risk-weighted assets should be covered by continually or near-steady capital. Completely 50% of the administrative capital should fall into the level 1 guideline, which considers simply the equity capital, so the level 1 proportion should be in 4%. The risk-weight measure considers the general risk of different kinds of loaning.

The capital adequacy ratio, also known as the capital-to-risk assets ratio (CRAR), is used to protect depositor's money in banks and provide the needed stability and efficiency of banks' financial systems. Misman et al. (2015), Through their investigation of the determinant of default risk, discovered that capital proportion shows predictable outcomes paying little heed to the models and assessment techniques. Any deterioration in financing quality results in an increase in provisions for losses and an increase in the implicit credit risk. Capital adequacy negatively affects

credit risk. Also, Bitar et al. (2017); Safiullah & Shamsuddin (2018); Trad et al. (2017) said that Capital adequacy has a negative relationship with credit risk (Shingjergji 2013).

Any misrepresentation in the quality of financing outcomes may impact by an increment in loss and an increment in the implied credit risk. Capital sufficiency adversely influences credit risk. Another examination on the "effect of bank-related factors on NPLs " and found that the capital adequacy ratio has a negative yet irrelevant relationship with non-performing loan, and on the opposite side, return on equality and loan to asset proportion has a critical negative impact on NPLs. The investigation clarifies that an increment of the CAR will cause a decrease in the NPLs ratio.

A high capital adequacy ratio helps banks increase their ability to take in financial shocks, including the expected and the actual large losses from giving loans to borrowers (Blum, 2008). Diamond (1984) s Recommended that a more capital proportion results in an increased level of control and a decreased likelihood of social conformity risk. Then again, a high capital proportion executive’s greater ability to anticipate risk. Pappas et al. (2016) utilize this proportion to estimate the default risk, default risk is contrarily identified with the capital proportion. They insist that credit risk in Islamic banks is required to be lower than Sharia'h law commands asset-based financing as opposed to credit-based financing.

Conversely, Sundararajan & Errico (2002); Johnes et al. (2014) proposes that Islamic banks may display a higher credit risk as a result of their framework of banks. That is, losses are given to contributors. The ethical risk inferred might be higher. Due to this, requirement of investing capital will increase. This might be relieved to the degree that contributors can draw their assets back (Obaidullah, 2005). At last, Archer & Karim (2006) contend that an Islamic bank's framework will increase the estimation of its common shares, in this way capital to asset ratio will increase.

#### 2.4.1.5. Asset Poor Quality

Asset quality factor that measures and presented the type of asset that banks have and who they can invest in a way to control the degree of default a loan or lease, in addition to the measure of its marketability. An asset quality rating demonstrates the assessment of credit risk identified with specific assets, like a security or stock portfolio. The level to which the investment director controls and notices the credit risk vigorously impacts the rating given. Furthermore, because asset quality is a determinant of credit risk that significantly impacts liquidity and expenses, investigators try hard to ensure they issue the exactly feasible assessments. After all, their declaration can significantly affect a banking system or portfolio's overall condition for years to come.

That is, asset quality is a measure of the credit risk exposure by pricing the asset at banks or other financial institutions that can offer in the market to

sell the loan or lease to another party, which can be an important determinant of credit risk banks.

It tends to be estimated the ratio of loan loss provisions to total assets. This variable was utilized by Safiullah & Shamsuddi (2018); Abedifar (2013): Ahmad & Ahmad (2004), who propose that this proportion shows the number of assets that will be used to cover credit risk. An additional provision for risk of non-payment will be required if a bank is anticipating higher. Abedifar (2013) adds that a higher proportion would expand the bank's insolvency risk. In any case, this might be unclear whether higher non-performing loans will show the non-performing loans and pre-build reserves of the bank or not.

Degradation of quality of assets is a more significant issue for the bank if these are being used for this framework of covering non-payments debts by using these assets. Banks required to identify this problem at an early stage to take protective measures as It is a typical reason for bank failure (Swamy, 2012). Asset poor quality leads to non-performing loan that can harm a banks' monetary position adversely and also impact banking activity (Lafuente, 2012). Salas & Saurina (2002); Castro (2013) found that there is a positive relationship between asset quality and the level of non-performing loan. Changes in the degree of asset quality straightly impact the volume of the estimated loan loss provision Prakash & Poudel (2013). When the bank's estimation for loan loss provision is high, it implies high risk related to credit portfolio and anticipating high credit loss. In another

word, the degree of asset quality and provision of loan loss provision moves positively together in the same direction (Ganic 2014).

#### 2.4.1.6. Bank type

The fundamental role of both conventional and Islamic banks is to deal with the various type of risks. The type of banks significantly assesses the determining the credit risk factor. The main difference between Islamic banking and conventional banking as it is interest-free that depending on profit-loss sharing. Islamic banking work under shariah complementary principles Islamic low, while conventional banks depend on the regular system, and they have different credit risk profiles.

An Islamic bank is managed by the government, central bank, and also shariah supervisory board that regulate the banking operations and also keep a check on their implementation of rules given by the board. The Central bank gives numerous guidelines which are customized for Islamic banks. For example, the base capital requirements are higher to set up an Islamic bank than the conventional banks. The purpose of this is to utilize the many kinds of the venture like purchasing the item and exchange it at a different price for revenue purposes. Islamic banks have a larger number of expenditures than conventional banks as they need to settle more taxes and commencement costs since it is resource-based banking. The bank has to possess the products that are further sell-out which in the end are paid by the customer, although it expands the expense. Ahmad & Ahmad (2004), found that the determinant of an Islamic bank is different from

conventional banks. How et al. (2004) said that conventional banks have a lower credit risk than Islamic banks, small Islamic banks are more financially stronger as compare to Small commercial banks. Enormous business banks are monetarily more grounded than huge Islamic banks; little Islamic banks are monetarily more grounded than huge Islamic banks. But large Islamic banks are weak as compare to large commercial banks in terms of financial soundness.

### 2.4.2. Macro variables

#### 2.4.2.1. Gross domestic product (GDP) Growth

One of the macroeconomic variables that impact credit risk in the banking system, GPD growth allocated an important determinant variable of banks' credit risk, probably consequently to the increase in debt rates.

Using this variable, we can analyze the impact of macroeconomic conditions on the NPL (Rajhi & Hsairi, 2013). Gross domestic product is directly connected with lower bank stability (Abedifar et al. 2012). An ascent in GDP development in the economy can be clarified as an increment inefficiency. The growth rate of real GDP is used in this thesis; its purpose is to demonstrate a clear picture of the financial condition throughout the country. An increase in production is termed as an increase in GDP growth of the economy. There is a negative effect of real per capita GDP on the credit risk of the bank, but it is considered a common indicator for economic growth and

it also shows the effect of technology used in banking and the likelihood of cross banks (Demirguc-Kunt & Huizinga 1998).

A higher GDP indicates the increase in purchasing power and borrowers' ability to pay their loans without any dealing or default. Additionally, customers have the facility to expand their funds and savings. It has a negative connection with credit risk, addressed by the loan loss provision.

#### 2.4.2.2. Regulatory quality

The financial sector is highly regulated due to its importance to the financial economy in setting roles and controlling the industry (Okafor, A., & Fadul, J. 2019). Regulatory risk can be seen as any change in regulation that could significantly impact the financial sector's activities in general and the banking sector specifically, (Gentzoglanis, 2014). The regulation quality of the banking sector is related to credit risk and banks' performance overall. As an example of the regulatory quality and risk-taking, the way banks are exposed to regulatory risk is that their operating license faces different changes such as withdrawal of the permit or the authorities' operating conditions negatively impacting the business's value. The regulatory quality could also lead to an unpredictable hike in the cost of capital or minimum capital base. The impact of regulatory quality on a bank could be severe. It can be a determinant of banks' credit risk in a different type of Islamic and conventional banks. Additionally, not fully comprehending regulatory expectations has led to the difficulty to measure the relationship with NPL.

### 2.4.2.3. Inflation

The implementation of the inflation rate in our analysis allows us to see whether the banking system regulation affects banks' risk. Inflation can influence expenditures as well as revenues of any institution such as the banking framework. As indicated by (Bourke 1989), if the theory of quick increment in wages and other non-interest costs comparative to inflation is held constant, CPI (Consumer Price Index) is utilized as an independent variable to estimate the credit risk in the banking system Firmansyah (2014), study tested the impact of macroeconomic and bank-specific variables on NPL. According to the results, GDP and inflation negatively affect NPL. Wiryono & Effendi (2018), also tested the impact of macroeconomic variables found that inflation is negatively and significantly affect NPL. But Havidz & Setiawan (2015), presented that the effects of inflation and return on assets are an insignificant relationship with NPL.

## 2.5 The Model of the study

Based on previous discussion, the model of the study is presented in Figure 2.3.1.

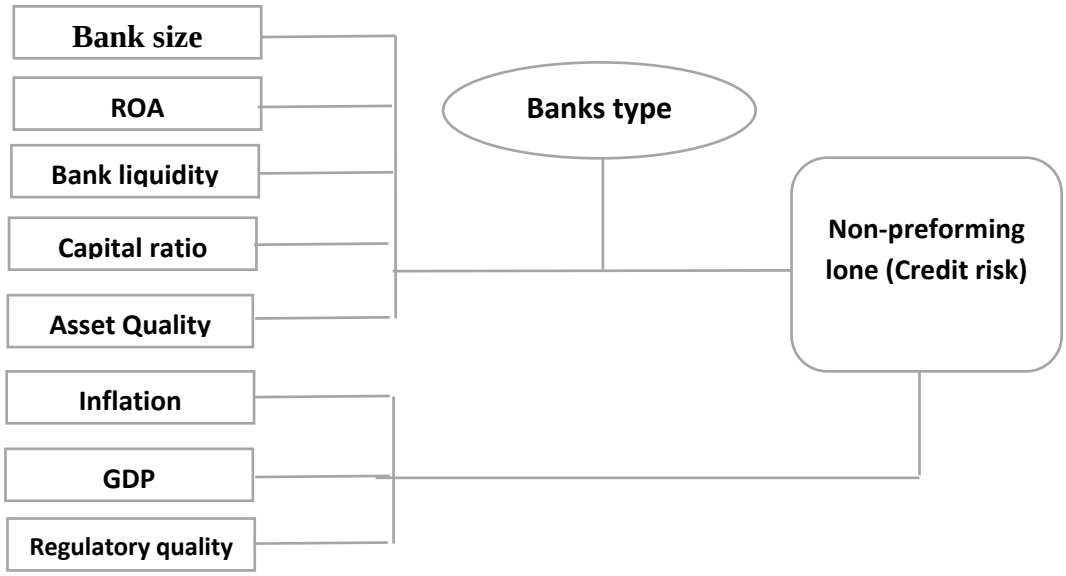


**Figure 2.1:** Credit Risk Model

## 2.6 Hypotheses of the study

According to the explanation mentioned above and previous discussion of empirical findings and theoretical underpinnings, the hypotheses were developed in line with the determinant of credit risk. These hypotheses about MENA region non-performing loan factor are as following hypotheses have been designed:

Hypothesis 1: The relationship between bank size and NPL is negative.

Hypothesis 2: The relationship between a bank's profitability and NPL is positive.

Hypothesis 3: The relationship between Bank liquidity and NPL is positive.
Hypothesis 4: The relationship between Capital ratio and NPL is negative.
Hypothesis 5: The relationship between Asset Poor Quality and NPL is positive.

Hypothesis 6: The relationship between Inflation and NPL is positive.

Hypothesis 7: The relationship between GDP and NPL is negative.

Hypothesis 8: The relationship between Regulatory quality and NPL is positive.

Hypothesis 9: The type of bank affects the NPL where Islamic banks are expected to have lower level of NPL than conventional banks.

Hypothesis 10: The type of bank moderates the relationship between bank size, profitability, liquidity, capital ratio, and asset poor quality from one side and NPL from the other.

**Table 1: Variables predicted effects on NPL**

| **Variable** | **Expected sign/hypothesis** | **Previous studies** |
|---|---|---|
| Size | Negative | (Srairi,2013; Abedifar, et al. 2013) |
| Bank Profitability | Negative | (Louzis et al. 2012; Chaibi & Ftiti 2015) |
| Bank liquidity | Positive | (Olson & Zoubi 2008) |
| Capital ratio | Negative | (Bitar et al. 2017;Safiullah & Shamsuddin 2018 |
| Asset poor Quality | Positive | Salas &Saurina 2002; Castro 2013) |
| inflation | Negative | (Wiryono and Effendi 2018) |
| GDP | Positive | (Abedifar et al. 2012). |
| Regulatory quality | Negative | (Okafor, A., & Fadul, J. 2019). |
| type of banks | Negative | (How et al. 2004) |

# Chapter Three

# Methodology

## 3.1. Methodology

This section is going to discuss the choice of econometric models and legitimizes the assessment techniques applied to address the research hypothesis. This section will also determine the chosen sample, the information gathered and the variables decided and to measure these variables' impact.

Our study investigates the determinant of credit risk in both Islamic and conventional banks in the MENA region by employing a panel data fixed-effect model. The credit risk determinant proxy in this study is NPL. While the study measures the effects of banks specific variables including Capital Adequacy Ratio (CAPITAL RATIO), Bank size (BANK SIZE), Bank Profitability (ROA), Bank liquidity (LIQUIDITY), Asset poor Quality(ASSET POOR QUALITY), and macroeconomic factors including GDP growth (GDP), Inflation rate (INFLATION), and regulatory quality (REQULATORY QUALITY). Finally, a moderating variable namely type of the bank (ISLAMIC) is used.

The study will investigate the determinants in two different scenarios: first, the impact of variables on all types of banks, and second, the moderating effect is added. This step is taken to present comparable results amongst the

different banking systems, which would produce more straightforward, broader and more understandable findings

## 3.2 Sample selection and data sources

This research investigated the determinants of credit risk, focusing specifically on the comparison between determinants of credit risk in Islamic and conventional banks. In this thesis, a quantitative analysis is used to understand and generalize explanatory variables' impact on credit risk. The analysis used a sample containing data across banks and over time (panel data); using data sets of both dimensions led to more precise results (Bayrakdaroğlu, Ege & Yazıc, 2013). Panel data analysis is widely used in economic studies because it provides flexibility in analyzing quantitative data (Semykina & Wooldridge, 2010). Panel data covers broad and complex problems and allows for studying the phenomena' dynamics better than simple time or cross-sectional data. Furthermore, panel data analysis is usually used to increase observations when data are unavailable and the data size is small.

A sample comprising only banks of different types was used in this analysis. The data is obtained from the BankScope database, which provides both financial statement data on firms and the market value of shares for quoted firms in a wide range of countries. The BankScope database is widely used and considered a significant source for data in finance literature. For many other economic studies, this database provided detailed balance sheet information and income statement data for banks and

financial institutions. Data on macroeconomic factors used in this thesis is obtained from the World Bank Open Data.

The final sample of this thesis, after considering missing data, consists of unbalanced panel data for (197) banks across 12 countries in the MENA region (The United Arab Emirates, The Kingdom of Bahrain, The People's Democratic Republic of Algeria, The Arab Republic of Egypt, The Republic of Iraq, The Islamic Republic of Iran, The Hashemite Kingdom of Jordan, The State of Kuwait, The State of Palestine, The State of Qatar, The Kingdom of Saudi Arabia, The Republic of Tunisia ) our study differs from previous contributions in that we test the hypothesis of determinants of credit risk on a panel of countries in the MENA region. The MENA region's choice is justified by the importance of the banking sector as the main source of financing for the economy in general and for investment in particular, this region accounts for 45% of total Islamic banking assets worldwide. In addition, all major Islamic banks are grouped in this part of the world to make easy to compare with conventional bank. for the period 2010-2018 after the financial crisis and to avoid the structural break. The total bank year observations used are (2250).

## 3.3 Variable’s measurement

Several variables are arising from theoretical analysis. Theoretical and empirical studies have demonstrated several different measures for these credit risk determinants. The selection of variables and their measurement is usually achieved according to previous empirical studies', using the variables proposed and adopted mainly by prior empirical literature to

explain the credit risk determinants. Sometimes, the presence of a specific reliable data set obtainable to the researcher limits options and forces them to choose a particular measure of the variable and not others.

### 3.3.1. Dependent Variable

There is no common agreement on whether the non-performing loan is the appropriate measure of credit risk in banks. Therefore, many authors have tested the determinants of credit risk in bank using different proxy for credit. Following Ahmad & Ahmad (2004), the following proxy was employed to represent bank credit risk: non-performing loan ratios.

**Credit Risk (CR):** The ratio of the non-performing loans (**NPL)** for a particular year divided by the total assets in that year.

### 3.3.2. Bank specific characteristics

The first group of explanatory variables apparent in almost all credit risk determinants studies is the size of the bank. Measuring the size as the natural logarithm of asset is used commonly in most studies of similar character (Ahmad & Ahmad, 2004). The next determinant of credit risk is bank profitability proxied by return on asset (ROA). Bank profitability is measured as the net income divided by the total assets. Liquidity is the argumentative variable and one of the most extensively used determinants of credit risk. To present the liquidity variable on banks' credit risk, liquidity is measured as total loans divided by total deposits.

The other determinant of credit risk is the capital ratio (CAR). The bank capital ratio is measured as total equity to total assets. The final explanatory

variable that is used as a credit risk determinant is the bank asset poor quality. Measured as Loan loss provisions divided by total loans. Following is a summary of bank specific characteristics:

- **Bank Size (BS):** Measured as the natural logarithm of total assets.
- **Bank Profitability (BP):** Measured as return on assets by taking the percentage of net profit after tax to total assets.
- **Bank liquidity (BL):** Measured as total loans divided by total deposits.
- **Capital Ratio (CR):** Measured as total equity to total assets
- **Asset poor Quality (AQ):** Measured as Loan loss provisions divided by total loans

### 3.3.3. Country level characteristics

From a global perspective, this study on credit risk determinant has three country-level variables: regulatory quality, GDP growth, and inflation. These macroeconomic variables are retrieved from one database, the World Bank Open Data. Inflation is a macro variable used in Frank & Goyal (2009), and the measure used is the percentage change of annual consumer price index obtained from the World Bank database. In many studies in credit risk, GDP growth was used (Ha, J, Kose, M. A., & Ohnsorge, F. 2019). The data source for GDP growth is the gross domestic product's annual growth, also obtained from the World Bank data. The final variable is regulatory quality, added to control for cases where the poor quality of country rules motivates some clients to falsify a default situation.

- **GDP growth (GDP):** Measured as the percentage change in real gross domestic products
- **Inflation rate (INF):** Measured as the yearly inflation rate.
- **Regulatory quality:** Measured the government's ability to formulate and implement sound policies and regulations that permit and promote private sector development.

### 3.3.4. Moderating Variable

The moderating variable of this thesis is the type of bank. This variable is measured as a dummy variable as follows:

- **Type of the bank:** Measured as dummy variable equal 1 if the bank is Islamic, 0 otherwise.

  Table 2 presents the variables of this thesis along with the measurement of each variable.

**Table 2: Summary of variable measurement**

| Measure | Definition | Equation | References |
|---|---|---|---|
| Non-preformin g loan | non-performing loans divided by the total assets | $= \frac{\text{Total non} - \text{perform}}{\text{Total asset}}$ | Garcia-Herrero (2006) Ramlall (2009) Ahmad and Ahmad (2004), Madura (1994) Hassan (1993). |
| Bank Size | The natural logarithm of asset | $= Log\ (asset)$ | How (2004), Shahid & Abbas (2012), Waemustafa & Sukri (2015) |
| Bank Profitabili ty | Return on assets by taking the percentage | $= \frac{\text{net profit after tax } ion}{Total\ Assets}$ | Trad et al. (2017) Bitar et al. (2017) |

| | | | |
|---|---|---|---|
| | of net profit after tax to total assets | | Kabir et al. (2015) |
| Bank liquidity | Total loans divided by total deposits | $= \frac{\text{Total loans}}{Total \text{ Deposits}}$ | Safiullah & Shamsuddin (2018) Kabir et al. (2015) |
| Capital Ratio | Total equity is divided by total assets. | $= \frac{\text{Total equity}}{Total\ assets}$ | Trad et al. (2017) Miah & Uddin (2017) Bitar et al. (2017) |
| Asset quality | Loan loss provisions divided by total loans | $= \frac{\text{Loan loss provisions}}{Total \text{ loans}}$ | cihák & Hesse (2010) How et al. (2004) |
| GDP growth | Measured as the percentage change in real gross domestic products | $= \frac{\text{GDP2} - \text{GDP1}}{\text{GDP1}}$ | Ahmad and Ahmad (2004), Madura (1994) Hassan (1993). Trad et al. (2017) Shahid & Abbas (2012) |
| Inflation rate | Measured as the yearly inflation rate. | $= \frac{(\text{Ending CPI} - \text{Begi}}{\text{Beginning C}}$ | Ahmad and Ahmad (2004), Madura (1994) Hassan (1993). Trad et al. (2017) Shahid & Abbas (2012) |
| Regulatory quality | Measured as ability of the government to formulate and implement sound policies and regulations that permit | Word Banks Open Data | |

| | | | |
|---|---|---|---|
| | and promote private sector development. | | |
| bank type | Measured as Dummy variable equal 1 if the bank is Islamic, 0 otherwise | = 1 Islamic banks<br>= 0 conventional banks | |

## 3.4 Estimation models

The simplicity of the analysis is one of the most important advantages in which static analysis estimate the relationship and the influence of a variable (independent) on another variable (dependent), considering that all other variables are constant. Static analysis studies the economic phenomenon more clearly, considering the previous, current, and future values of the variable. Another advantage of this analysis is that it provides results in the long term. It generates a picture of the results that happened on average for the given analysis period, regardless of the results in the short term.

The liner fixed-effect model was used to test the effect of the determinants on credit risk in banks. The static panel data models were estimated with a static, fixed effect model as used by (Ahmad & Ahmad 2004; Madura et al. 1994; Hassan 1993). Therefore, the first estimation was the fixed-effect model, which usually has the following general form:

$$y_{i,t} = \beta x_{i,t} + \alpha i + \varepsilon_{it}$$

The dependent variable (i.e., NPL), $\alpha i$ is the changing intercept. $\beta$ is the standard coefficient (slope or sensitivity of Y to changes in X), and $x_{i,t}$ are the dependent variables. Since panel data was used, each observation was indexed by i and t, representing the entity (i.e., bank) in a period t (the time dimension 2010-2018). Furthermore, $\varepsilon_{it}$ is the residual error of the firm i observed at the time t.

More precisely, according to the above-cited literature, the model considered is the following:

$$NPL = \boldsymbol{a}\mathrm{i} + b(BANK\ SIZE) + b(ROA) + b(LIQUIDITY) + b(CAPITAL\ \ RATIO) + b(ASEET\ POOR\ QUALITY) + b(GDP\ GROWTH) + b(INFLATION) + b(REGULATION\ QUALITY) + b(ISLAMIC) + \varepsilon$$

In Model 2, we incorporate a criterion of interaction to analyze the effect of the independent factors on the credit risk for Islamic and conventional banks and the determinant factors in connection to each other. In the initial step, every independent factor is multiplied by the Islamic indicator variable to create a interaction indicator variable. The coefficients of the new connection factors catch every independent factor's impact when the Islamic indicator is equivalent to one. A positive coefficient would show that an additional unit of an autonomous variable offers more to the NPL of Islamic banks than traditional banks. A negative coefficient would demonstrate less impact on Islamic banks' NPL comparative with

traditional banks. White robust changes were made to the standard errors of the regressions to minimize heteroscedasticity.

The second model showed the interaction terms for all firm-specific independent variables: capital-asset ratio, liquidity, bank size, bank profitability, and poor asset quality as following:

$$NPL = \boldsymbol{a}0 + b(\,BANK\ SIZE) + b(ROA) + b(LIQUIDITY\,) + b(CAPITAL\ RATIO) + b(ASSET\ POOR\ QUALITY\,) + b(BANK\ SIZE) * islamic + b(ROA\ \,) * islamic + b(LIQUIDITY) * islamic + b(CAPITAL\ RATIO) * islamic + b(\,ASSET\ POOR\ QUALITY\,) * islamic + b(GDP\ GROWTH\,) + b(INFLATION\,) + b(REGUALITY\ \ QUALITY\,) + b(BANK\ TAYP) + \varepsilon$$

The choice of research models used depends on the questions to be answered and the proposed research problem. The research questions are answered by the fixed effect model to estimate the panel data models. Many previous studies indicated the fixed nature of credit risk, (Clarke, Crawford, Steele, & Vignoles 2010). Previous studies also used the ordinary least square (OLS) (Baum. 2007; Ahmad & Ahmad 2004; Madura et. al. 1994; Hassan 1993).

To determine the effect of explanatory variables on credit risk, static analysis, in particular the fixed-effect model, was used as a data analysis technique to investigate how explanatory variables explain the different exposure of credit risk between Islamic and conventional banks with the

various hypothesized determinants of credit risk namely, bank size, asset quality, bank profitability, bank liquidity, capital ratio, GDP, INF,and Regulatory quality.

# Chapter Four

# Results and Discussion

## 4.1 Introduction

This chapter begins with a descriptive analysis of the data. A correlation analysis is then presented, followed by the empirical results obtained from estimating determinants of credit risk in Islamic and conventional banks in the MENA region using static regressions, as explained in chapter 3. The results are discussed and compared to previous research about credit risk presented in chapter 2. The dependent variable is the credit risk using one proxy, NPL of banks. The explanatory variables of credit risk are bank size, bank profitability, bank liquidity, asset quality, GDP growth, inflation and regulatory quality.

## 4.2 Descriptive statistics

Descriptive statistics are a logical starting point when analyzing data since they provide a first impression and useful information for further interpretation. The detailed summary statistics for the final sample includes 2552 observations for the period 2010- 2018 from 12 countries in the MENA region. Due to missing values, the number of observations included in estimation is less than the total number of observations obtained initially.

Table 3 presents the descriptive statistics of bank-specific variables and country-level variables used in the model for the whole sample.

**Table 3: Descriptive statistics**

| Variable | Mean | Median | Maximum | Minimum | Std. Dev. | Observations |
|---|---|---|---|---|---|---|
| NPL | 0.046 | 0.026 | 1.151 | 0.000 | 0.066 | 1554 |
| BANK SIZE | 21.100 | 21.186 | 27.339 | 13.422 | 2.285 | 2555 |
| ROA | 0.012 | 0.014 | 0.450 | -0.506 | 0.045 | 2546 |
| ASSET POOR QUALITY | 0.107 | 0.054 | 1.000 | 0.000 | 0.163 | 1884 |
| LIQUIDITY | 2.849 | 0.729 | 632.114 | 0.000 | 19.403 | 1674 |
| CAPITAL RATIO | 0.309 | 0.167 | 1.000 | -0.684 | 0.286 | 2549 |
| ISLAMIC | 0.215 | 0.000 | 1.000 | 0.000 | 0.411 | 2555 |
| GDP GROWTH | 0.032 | 0.029 | 0.196 | -0.074 | 0.034 | 2555 |
| INFLATION | 0.050 | 0.032 | 0.366 | -0.024 | 0.062 | 2555 |
| REGULATORY QUALITY | 0.025 | 0.076 | 1.317 | -1.709 | 0.700 | 2555 |

A brief discussion for the table above will be done by comparing the results of the mean of the factors, I found with previous studies done in the MENA region. The mean of the bank size I found in this study has increased compared to the study of Mousa & Zaiani (2018) They found a mean of 15.8767, and DESSIE, T. (2016) found a mean of 22.33, where the results illustrate mean of 21.100. A profitability means of 0.012 has been found, but comparable variable for MENA is absent. Asset poor quality has a mean value of 0.107 compared to 0.5267 for (Mousa & Zaiani 2018). The capital ratio was found to have mean of 0.309 against 0.1795 for (Mousa & Zaiani 2018) ,and 0.11372 for (DESSIE, T. 2016) . Country-level factors like GDP, inflation, and regulatory quality have almost the same mean values of inflation and higher in GDP and regulatory rate of 0.032 and .050 and 0.025 respectively comparing to 0.019 and 0.0516 and 0.0161for (Mousa & Zaiani 2018), and .090 and 0.127 for (DESSIE, T. 2016). However, what can be seen is the significant mean of Islamic bank

indicator of 0.215 in our study of the MENA region over the period 2008-2018. The table also reveals the high percentage of missing values for the NPL variable.

### 4.3 Correlation Matrix

A matrix of correlation coefficients between each variable (dependent and independent variables) used in the regression analysis is reported in the Table 4. **NPL** is a non-preforming loan, which is the proxy for credit risk used as the dependent variable. **BANK SIZE** is bank size; **ROA** is the return on asset, which is the proxy for banks' profitability. **ASSET POOR QUALITY** is the asset poor quality of banks asset. **LIQUIDITY** represents the liquidity of banks. **CAPITAL RATIO** is the capital ratio of banks. **ISLAMIC** is the bank type, which is a dummy variable. **GDP GROWTH** is the growth of GDP. **INFLATIO** is the country inflation. **REGULATORY QUALITY is** regulatory quality.

**Table 4: Correlation Matrix**

| Correlation | NPL2 | BANK SIZE | ROA | ASSET POOR QUALITY | LIQUIDITY | CAPITAL RATIO | GDP GROWTH | INFLATION | REGULATORY QUALITY |
|---|---|---|---|---|---|---|---|---|---|
| **NPL** | 1.000 | | | | | | | | |
| **BANK SIZE** | -0.265 | 1.000 | | | | | | | |
| **ROA** | -0.315 | 0.112 | 1.000 | | | | | | |
| **ASSET POOR QUALITY** | 0.421 | -0.214 | -0.101 | 1.000 | | | | | |
| **LIQUIDITY** | 0.129 | -0.292 | -0.038 | -0.012 | 1.000 | | | | |
| **CAPITAL RATIO** | -0.002 | -0.335 | 0.204 | 0.334 | 0.090 | 1.000 | | | |
| **GDP GROWTH** | -0.077 | 0.099 | 0.109 | -0.102 | -0.068 | 0.001 | 1.000 | | |
| **INFLATION** | 0.042 | -0.073 | 0.041 | 0.062 | -0.006 | -0.246 | 0.029 | 1.000 | |
| **REGULATORY QUALITY** | -0.090 | 0.103 | -0.029 | -0.093 | -0.087 | 0.220 | 0.107 | -0.659 | 1.000 |

The correlation matrix for the variables reported was used to examine the correlation among dependent and independent variables and between the independent variables themselves. The matrix provides a one-to-one relationship between variables and explains the type and degree of relationship. The sign of some coefficients in the regression output is different than the characters in the correlation matrix. This difference occurs since the relationship between variables in this matrix is not conditional on other explanatory variables in the regression, significantly when explanatory variables are correlated.

The results indicate a negative relationship between NPL and two country level explanatory variables (i.e., regulatory quality and GDP growth). The correlation is 9 % and 7.7%, respectively, when GDPG value and regulation quality of country increase the NPL deceased, which means the region's regulations affects the borrowers' ability to meet her obligation. However, NPL is also negatively correlated with three bank-specific variables (i.e., bank size, ROA, and Capital ratio). The correlation is -26.5%, -31.5%, and -0.2%, respectively. Similar results are found in past studies (Ahmad & Ahmad 2004; Aldoseri 2012).

As the bank size, ROA, and Capital ratio become higher, the NPL will decrease. That indicates the more the assets, capital, and income of banks the more stable the bank is and hence the credit risk become less. On the other hand, NPL is positively correlated with the rest of the variables. Positive correlations between NPL and other explanatory variables range

from 42.1% (with poor asset quality), representing the strongest positive relationship with NPL. More asset poor quality of banks contains more NPL in banks that increase the credit risk amount. Liquidity is correlated with NPL by 12.9% meaning that if the liquidity in bank is high, the credit risk is also higher. A correlation of 4.2% with inflation indicates the increase in inflation rate will increase the opportunity of credit risk similar to finding from (Ahmad & Arif 2004; Ahmad & Ahmad 2004).

The correlation coefficients between NPL and its determinants vary within the interval -31.5% to 42.1%. Correlations between credit risk determinants themselves were reasonably small, except for the inverse correlation between inflation and regulatory quality, which has a higher value (-65.9%). The relatively low correlation coefficients thus do not indicate multicollinearity problem. For instance, Gujarati, (2009) articulated that collinearity is predicted to be “severe and harmful” when the correlation coefficient between two inputs variables exceeds (80%).

## 4.4 Regression results

Panel data illustrate the impacts of variables for different banks and during time stages. Fixed effect models are used based on Hausman test. Panel data methods with the fixed effects estimator can be used to control for variables that are common to all firms or to all periods but not included in the regression (Torres-Reyna, O. 2007).

### 4.4.1. Model 1

The results of the regression for Model 1 are presented in Table 5 for credit risk using non-performing loan (NPL) as a proxy for the dependent variable.

**Table 5: Multiple regression results using fixed-effects model**

| **Dependent Variable: NPL2** | **Model 1** | | |
|---|---|---|---|
| Variable | Coefficient | t-Statistic | Prob. |
| BANK_SIZE | -0.016*** | -4.657 | 0.000 |
| ROA | -1.335 *** | -4.077 | 0.000 |
| ASSET_POOR_QUALITY | 0.358*** | 5.269 | 0.000 |
| LIQUIDITY | 0.000 | -0.672 | 0.502 |
| CAPITAL_RATIO | -0.057 *** | -2.628 | 0.009 |
| BANK TYPE | 0.008*** | 3.343 | 0.001 |
| GDP_GROWTH | 0.002 | 0.041 | 0.967 |
| INFLATION | -0.035 ** | -2.073 | 0.038 |
| REGULATORY_QUALITY | -0.007 ** | -2.023 | 0.043 |
| C | 0.411 | 5.271 | 0.000 |
| R-squared | 0.829 | | |
| Adjusted R-squared | 0.796 | | |
| Durbin-Watson stat | 0.922 | | |
| F-statistic | 25.086 | | |
| Prob(F-statistic) | 0.000 | | |
| Method: Panel Least Squares | | | |
| Cross-section fixed (dummy variables) | | | |
| Total panel (unbalanced) observations: | 1267 | | |
| White cross-section standard errors & covariance (d.f. corrected) | | | |

- Note: Superscripts *, ** and *** statistically significant at 0.10, 0.05 and 0.01 levels, respectively.

The regression results indicate the relationship between the dependent and independent variables hence can predict the influence of bank-specific and macroeconomic factors on non-performing loans (NPL) that presented the proxy of credit risks of the bank. The model is well fitted with 82.9% ability to determine the factors influencing the bank's credit risk, while the adjusted R square is 79.6%. With reasonable judgments of R-square and adjusted R-square, independent variables have remarkable ability to influence the dependent variable. Econometric test of autocorrelation, Durbin Watson approaches to one which indicates that an autocorrelation problem exists. Robust standard errors are used to overcome the problems of autocorrelation and heteroscedasticity. The model was statistically significant at the 1% level since the probability of F-statistic have been 0.000, which postulates the significant of the model.

Coefficients of bank-specific factors were all statistically significant except liquidity, and on the other hand, the macroeconomic factors coefficients are statistically significant except GDPG. Table 5 presents the regression of bank-specific factors that determine the credit risk in addition to the macroeconomic (country-level) determinants. The first column includes the coefficients of each factor, the second column present the t-statistic and last column include the significance level of each variable. Asset poor quality has a positive significance level with coefficients of 0.358. Banks size, return on asset, capital ratio, inflation, and regulatory quality negatively impact non-performing loans (NPL) with coefficients -0.016, -1.335, -

0.057, -0.035 and -0.007%, respectively. Other factors don’t have an impact on NPL i.e., liquidity and GDP growth.

Bank size has a consistently negative relationship with NPL. The same outcomes are accounted for by (Ferhi & Chkoundali 2015; Thiagarajan 2011; Zribi, and Boujelbene 2011; Das & Ghosh 2007; Misman 2012). Cihák and Hesse, (2008) locate that small Islamic banks are more financially stable than small conventional banks. The regression coefficients for size show that, for both Islamic and conventional banks, an increment in bank size expands the risk of credit risk. In any case, the logit coefficient exhibits unit increments in size that improves the probability of a bank having a low credit risk. Once more, this is valid for both Islamic and conventional banks.

For return on asset, banks with high profitability have less motivation to advance loans to hazardous borrowers. The goal was to test whether the high rate of return on the asset would lead to less NPL. We find that there is a reliably negative relationship between ROA and NPL for banks that have high yields of profit with less potential to create revenue. And also play the policy of safe by less involving in risky activities Messai & Jouini (2013). This is based on our assumption that the return from the assets has a negative relationship with NPL that highly profitable banks manage the risk with high proficiency. Additionally, shows a crucial negative relationship recommends that banks that don't depend on fees or commission will have a lower risk of credit risk. This could be because of

experience in the nonconventional actions of banks. Čihák & Hesse (2010) as well as discover proof of a negative connection among ROA and NPL.

For liquidity variable, Wagner (2007) states that liquidity provokes banks to take part in a hazardous loaning framework. Gatev et al. (2007) show that increase in liquidity during the peak of credit risk and causes banks to support draw-downs of credit responsibilities. Proof showing a positive relationship between liquidity and credit risk in conventional banks is given by (Imbierowicz & Rauch 2014). Additionally, Islamic banks keep up high liquidity because of the restricted alternatives accessible for financing on the lookout. In an study of Gulf Cooperation Council banks (Olson and Zoubi 2008) contend that the purpose for higher liquidity is an administrative choice instead of an absence of venture openings subsequently, the positive relationship may show that administration sustains the higher liquidity in reply to a higher credit risk. Nonetheless, this investigation didn't uncover any huge impact on liquidity variables.

Also, the relationship between asset's poor quality and NPL is positive and very significant. The banking hypothesis offers various potential descriptions for this. We can describe this relationship as the level of asset quality loan loss provision of loan moves together positively (Ganic 2014). Poor-quality asset results in non-performing credits that can adversely harm a banks' monetary position that also affects banking activities, Lafunte (2012) it upsets the presentation and endurance of banks (Mileris, 2012). It is estimated or demonstrated by the measure of NPLs to Gross advances.

Changes in the level of asset quality straightly impact the volume of provision for credit risk (Prakash & Poudel 2013). When the bank's provision for credit risk is high, it implies high risk related to credit portfolio and anticipating high credit loss.

Also, capital adequacy has a negative relationship with NPL, this outcome consents to our assumption relationship. The outcomes concerning the capital adequacy variable outline the impacts of capital creation on banks' credit risk levels. Capital adequacy (CAR) addresses the method bank's accessible capital is computed as a percentage of assets of banks. CAR has a negative coefficient in the estimation of credit risk determinants. That banks with strong financial structure are ready to take more risk, while as banks are still junior institutions they are more sensitive toward risk. as expected, the effect of Capital Adequacy ratio on credit risk ratio of MENA region is negative. The result of the regression output adhered to studies Hyun & Zhang (2012) found that an increase in lending rate for business entities' ability to borrow, which decreases the amount of loan and then reduce NPLs.

For macroeconomic variables inflation show a negative significant relationship with NPL. This research result is Consistent with the result of Nkusu (2011), in his study on banking sectors of emerging markets found that higher inflation can enhance the loan payment capacity of borrower by reducing the real value of outstanding debt and this will result on the negative relationship between inflation and non-performing loans. Wiryono

& Effendi (2018) tested the impact of macroeconomic variables and banks specific on NPL of IBs in Malaysia found that inflation are negatively and significantly affect NPL. Al-Wesabi & Ahmad (2013); Nursechafi & Abdul (2014); Kabir (2015); Haryono (2016), It has uncovered that the inflation rate has a negative relationship with the credit risk. The inflationary pressing factor from the expense side is a major source in price determination. The organization uses this condition by expanding the costs of products and services. This may expand the organization's income, which can bring about the organization's capacity to reimburse bank advances or financing, which causes a reduction in the risk of credit risk in Islamic banking.

In other hand, we found that regulatory quality has negative relationship with NPL. Regulatory quality catches the impression of the capacity of the Government to form and execute sound strategies and guidelines that allow private area improvement. As our assumption, the outcome found that there is a negative relationship with the regulatory control quality of the bank with NPL. It means more the Government regulate the banking the more the borrowers will repay the loan that will lower the credit risk. Our analysis indicates that Islamic banks exhibit higher credit risk than do conventional banks since the coefficient of the dummy variable ‘Islamic’ is positive.

### 4.4.2. Model 2: interaction indicator variables

A regression with cooperation indicator factors was used to notice contrasts in the determinants of credit hazard levels among Islamic and conventional banks. We run this analysis to find out the moderating role of the bank type. The results are presented in Table 6.

**Table 6: Regression analysis using type of bank effect**

| **Dependent Variable: NPL2** | **Model 2** | | |
|---|---|---|---|
| Variable | Coefficient | t-Statistic | Prob. |
| BANK_SIZE | -0.017*** | -5.362 | 0.000 |
| ROA | -1.233*** | -4.283 | 0.000 |
| ASSET_POOR_QUALITY | 0.569*** | 7.533 | 0.000 |
| LIQUIDITY | 0.000 | -0.573 | 0.567 |
| CAPITAL_RATIO | -0.052 | -1.580 | 0.114 |
| BANK_SIZE* BANK TYPE | 0.000 | 0.050 | 0.961 |
| ROA* BANK TYPE | 0.169 | 0.501 | 0.616 |
| ASSET_POOR_QUALITY* BANK TYPE | -0.416*** | -3.983 | 0.000 |
| LIQUIDITY* BANK TYPE | -0.021 | -1.512 | 0.131 |
| CAPITAL_RATIO* BANK TYPE | -0.077 | -1.594 | 0.111 |
| BANK TYPE | 0.051 | 0.300 | 0.764 |
| GDP_GROWTH | 0.017 | 0.426 | 0.670 |
| INFLATION | -0.032** | -1.975 | 0.049 |
| REGULATORY_QUALITY | -0.008** | -2.996 | 0.003 |
| C | 0.399 | 5.493 | 0.000 |
| R-squared | 0.850 | | |
| Adjusted R-squared | 0.821 | | |
| Durbin-Watson stat | 0.845 | | |
| F-statistic | 28.591 | | |
| Prob(F-statistic) | 0.000 | | |
| Method: Panel Least Squares | | | |
| Cross-section fixed (dummy variables) | | | |
| Total panel (unbalanced) observations: | 1267 | | |
| White cross-section standard errors & covariance (d.f. corrected) | | | |

- Note: Superscripts *, ** and *** statistically significant at 0.10, 0.05 and 0.01 levels, respectively.

As the table above shows, the regression results demonstrate the connection between the dependent and independent factors and the moderator variable that influences the relationship between dependent and independent factors. The type of bank is required to have the task of deciding credit risk. Islamic and conventional banks include the non- preforming loan (NPL) and the level of this impact.

As shown in the model, we included the type of bank as a moderator variable to identify how determinants of credit risk influence Islamic bank differently than conventional banks. This model is well fitted with 85% of R-square and the adjusted R square is 82.1% meaning an increase in the ability to determine the factor that influences the credit risk of the bank. This model was also statistically significant at the 1% level since the probability of F-statistics have been 0.000.

This model can explain the determinants of credit risk and the difference between Islamic banks' determinants and conventional banks determinants. Three coefficients of bank-specific factors are significant in this model with a sign similar to that of the first model. The macroeconomic factors of inflation and regulatory quality are also significant with negative relationship to NPL. The moderating effect of bank type only affects the asset poor quality variable. Asset poor quality effect on NPL is lower for Islamic banks than conventional banks. The remaining bank specific variables are not different between the two types of banks. The asset poor

quality factor in this regression is negatively and statistically significant under the Islamic factor coefficient with -0.416 .

Also, AbdKarim, Chan, & Hassan (2010) shows in his research that bad assets incur a negative relationship with non-performing loans .

The relationship between asset poor quality and NPL is negative and significant. The banking theory provides many possible descriptions for the level of asset quality and loan loss provision as they both affect the findings adversely in the negative direction. This confirms the findings with (Abdullah, 2012). The influent of Islamic factors on the regression to asset poor quality is a much more serious problem for conventional banks unless the mechanism in conventional bank ensures that chose a best asset to work with.

We can explain the relationship under Islamic moderating as the higher non-performing loans, higher asset poor quality leads to higher non-performing loans which cause lower return on capital and return on asset, thus, if asset poor quality is lower, the non-performing loans will also be lower that will lead to a high return on capital and asset. Poor asset quality leads to nonperforming loans that can seriously damage a banks' financial position having an adverse effect on the bank's operations. In comparison with the first model and the interaction of Islamic moderator we found that both of Liquidity, capital ratio, and ROA as bank-specific factor, and GDP growth as macroeconomic factor have no effect on NPL such as (Suryanto, 2015).

As for macroeconomic factor Inflation and regulatory quality under the moderation of Islamic interaction have a negative impact on non-performing loans (NPL) of -.032 and -0.008 respectively. while a inflation rate harms the financial health of the debtor; finally, in the recovery phase of the loan, there is a negative connection between the inflation rate and NPLs. It was not different in the first model results in which there were also negative relation in inflation and NPL and creditors disability to repay the loan. Hugh inflation leads to an increase in the interest rate that reduces the capacity of the borrower to repay the loan. Thus, it can be concluded that, the macroeconomic variables were relatively stable over the sample periods as compared to bank specific variables with the exception of some instability on inflation rate. The Islamic indictor interaction with all firm specific independent variables indicating that Islamic have lower effect by asset poor quality than conventional banks. The asset poor quality ratio interaction with bank type is negative and significant at 1 percent.

# Chapter Five

# Conclusions

## 5.1. Conclusion

This thesis considered the credit risk and variables to determine its level in Islamic and conventional banks in the MENA region. Further, the study clarifies the impact of the type of banks, Islamic versus conventional, on the non-performing loan ratio, the proxy of credit risk; that is the primary concern of this thesis. Our research examines whether there is an impact of the independent variables on the credit risk of Islamic banks different from conventional banks.

Numerous researchers have studied the Islamic banking business model and how it differs from that of conventional banks. This thesis makes significant contributions in different areas. **First**, for Islamic banks and conventional banks in the MENA region, this study provides information that improves on these banks' managerial capabilities to position themselves against credit risk better to protect from the surrounding circumstances and the lack of future funds sources and provide clear identification for the determinants of credit risk to help managers and decision-makers to build appropriate strategies which will help to make more informed decisions and finding better exploits for determinants' impact on banks credit risk. **Second**, this thesis provides information on Islamic and conventional bank financing risk. This information could help

banks provide and develop financial products that can meet Islamic and conventional clients' needs by explaining the determinants of credit risk and default probability in the future. **Finally**, this thesis contributes to the existing literature by investigating the determinants of credit risk in the MENA region and compare between Islamic banks and conventional banks in the degree of credit risk impact, which is considered a relatively marginalized region since most of the studies focus on the developed countries. This thesis adds a moderating variable to capture the effect of type of bank on non-performing loan credit risk. Therefore, this study could be the basis for future research on credit risk, which could be improved by adding more explanatory variables to the regressions.

The results of this study strongly support the empirical studies and hypotheses. Generally, the results support the determinants of credit risk (non-performing loans) and provide empirical evidence that only one of the determinants of credit risk, namely assets poor quality, is affected by bank type in the MENA region. Credit risk depends on both bank-specific characteristics and the macroeconomic factor in which a bank operates. The data are panel and comprise 197 banks located in the MENA region during the years from 2010-2018. Banks credit risk had a proxy namely; non-preforming loans and certain bank-specific factors relevant for explaining credit risk are used as independent variables.

### 5.1.1. The main findings

The main reason was to analyze the different determinants of the credit risk in both the Islamic and conventional banking framework and to evaluate the importance of the explanatory variable that is discussed previously. Moreover, the regression has shown that asset poor quality has a significant positive impact on non-performing loans. Liquidity and GDP growth has also effect on the ratio of non-performing loans. Return on assets had the expected negative signs. Bank size negatively impacted non-performing loans in both models.

The bank capital ratio significantly negatively affects NPL in model 1 but insignificant in Model 2. The inflation and regulatory quality have strong negative impacts on non-performing loans as macroeconomic variables in both models. The second model that uses the interaction of banks type found that asset poor quality interaction variable has a negative sign with non-performing loans indicating a lower effect of this variable on Islamic banks than conventional banks.

This thesis provides empirical evidence on credit risk of banks in the MENA region. This important topic since the credit risk in banks greatly affects investment decisions and risk-taking of future financing opportunities. The study's intensification and research on the bank's system in developing economies like the MENA region is necessary to recognize the actual differences in NPL determinants between Islamic and conventional banking and how it can differ in credit risk. However, future research needs to consider the banking system's development when

explaining the MENA region's credit risk to understand the credit risk in this region better.

Also, other variants, such as country political stability can be included since it could impact the credit risk on the banking system. Based on this research, we must consider all the variables that can influence Islamic and conventional banks and suggest further research on the impact of other bank specific and macroeconomic factors on credit risk.

## 5.2. Recommendations

Following are the recommendation for the stakeholders that are based on the findings of this thesis:

a. Banks in the MENA region are required to analyze the effect of inflation while giving loans, because in the period of expecting higher inflation it will result a lower the credit risk that face banks.

b. In this examination, capital adequacy has a negative relationship to (NPL) the proxy of credit risk. However, banks need to increase their capital by channelizing the funds by issuing more shares to the current and prospective shareholders. As highly capitalized banks are right in absorbing more losses.

c. This study examined bank-specific and macroeconomic determinants of the credit risk of MENA region conventional banks and Islamic banks using secondary data of selected variables. Thus, future research is recommended to expand this scope to substantiate and triangulate secondary data by primary data such as interviewing.

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**جامعة النجاح الوطنية**

**كلية الدراسات العليا**

# محددات مخاطر الائتمان في منطقة الشرق الأوسط وشمال إفريقيا: دراسة مقارنة بين البنوك الإسلامية والمصارف التقليدية

**إعداد**

**رنا قشتم**

**إشراف**

**د. إسلام عبد الجواد**

**قدمت هذه الأطروحة إستكمالا لمطلبات الحصول على درجة الماجستير في التمويل في كلية الدراسات العليا جامعة النجاح الوطنية، نابلس، فلسطين.**

**2021**

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**إعداد**

**رنا قشتم**

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**د. إسلام عبد الجواد**

## الملخص

تهدف هذه الرسالة إلى التحقيق في محددات مخاطر الائتمان في كل من البنوك الإسلامية والبنوك التقليدية وكذلك تقديم أدلة جديدة وإلقاء الضوء على الفروق في محددات مخاطر الائتمان بين البنوك الإسلامية والبنوك التقليدية في منطقة الشرق الأوسط وشمال أفريقيا. (MENA). تم فحص الخصائص الخاصة بالبنك، وكذلك المحددات على مستوى كل دولة ، لتقديم أدلة جديدة على دور محددات مخاطر الائتمان في هذه المنطقة. تم فحص نموذجين لتحقيق الأهداف السابقة. تناولت هذه الرسالة مخاطر الائتمان من خلال القروض المتعثرة في البنوك الإسلامية والتقليدية في منطقة الشرق الأوسط وشمال إفريقيا تتكون العينة من 197 بنكا اسلاميا وتقليديا في الفترة 2010-2018. تظهر النتائج أن مخاطر الائتمان مدفوعة بعوامل خاصة بالبنك وعلى مستوى الدولة. تم اختبار الافتراضات التي يجب الوفاء بها عن طريق OLS ووجد النموذج مناسبًا للغرض. أظهرت النتائج باستخدام الانحدار الخطي التأثير الثابت لكل من، العائد على الأصول ، وحجم البنك ، وكفاية رأس المال ، وجودة الأصول ، والسيولة المصرفية ، والتضخم ، والجودة التنظيمية ، والتأثيرات المحلية الإجمالية، ونوع البنك سواء اسلامي او تقليدي على مخاطر الائتمان لدى البنوك بشكل عام.

تكشف النتائج أن البنوك الإسلامية في منطقة الشرق الأوسط وشمال إفريقيا تواجه مخاطر ائتمانية أقل من البنوك التقليدية في منطقة الشرق الأوسط وشمال إفريقيا. بينما توجد علاقة إيجابية بين الأصول الرديئة ومخاطر الائتمان ، بينما توجد علاقة سلبية بين حجم البنك والعائد على الأصول

ونسبة رأس المال مع مخاطر الائتمان. من جهة أخرى. بالنسبة للمحددات على مستوى الدولة ، وجد أن الناتج المحلي الإجمالي يؤثر بشكل إيجابي على مخاطر الائتمان المصرفي على المدى الطويل ، في حين أن التضخم والجودة التنظيمية كعامل محوري لهما تأثير سلبي على مخاطر الائتمان في البنوك دون تأثير نوع البنك على العلاقة. تظهر النتائج أيضًا أنه في النموذج الآخر الذي يعتمد على تأثير نوع البنك في التعرف على محديدات مخاطر الائتمان ، حيث ان له علاقة سلبية بين الأصول الرديئة ومخاطر الائتمان. يمكن الاستنتاج أن البنوك الإسلامية لها تأثير أقل على مخاطر الائتمان من البنوك التقليدية في منطقة الشرق الأوسط وشمال إفريقيا. علاوة على ذلك ، تستخدم البنوك في منطقة الشرق الأوسط وشمال إفريقيا مزيجًا من الموارد الداخلية والخارجية للأموال. بالإضافة إلى ذلك، يبدو أن المتغيرات المستقلة الخاصة بالبنك والمستوى القطري تساهم في تحديد تأثير مخاطر الائتمان في البنوك.

توصي الدراسة بإجراء مزيد من البحث حول منطقة الشرق الأوسط وشمال إفريقيا باستخدام مزيد من التفاصيل في قياس الوكلاء لمخاطر الائتمان في البنوك. بالإضافة إلى مراعاة تطور النظام المصرفي بانواعه المختلفة عند شرح مخاطر الائتمان في منطقة الشرق الأوسط وشمال إفريقيا. وإضافة المزيد من العوامل الاساسية كمحددات لمخاطر الائتمان. تشير النتائج الإجمالية إلى أن كلاً من عوامل الاقتصاد الكلي والعوامل الخاصة بالبنك لها تأثيرات ذات دلالة إحصائية على مخاطر الائتمان.