

National Governance and Non-Performing Loans (NPLs) in the Arab Banking Sector: A Comparative Econometric Study

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Abstract

This study tries to measure and analyze the impact of +/- on non-performing loans (NPLs) in the banking sector, while also examining the extent to which governance indicators can explain changes in the quality of banking assets. To achieve this objective, the study employed the Panel EGLS model with robust standard error corrections (White cross-section), using annual panel data from a sample of 13 Arabic countries during the period 2002-2021. The results demonstrated a statistically significant inverse relationship between governance quality and the NPL ratio, indicating that improved governance contributes to reducing credit risk and enhancing the quality of banking assets. The study also revealed a disparity in governance levels between oil-producing and non-oil-producing countries, with oil-producing countries showing a relative advantage. However, no significant differences were found in NPLs between the two groups or across the time periods (before/after 2011). The results confirmed that the impact of governance is cumulative and institutional in nature, with long-term effects. Accordingly, the study recommends improving state governance frameworks by strengthening the rule of law and contract enforcement, combating corruption and conflicts of interest, raising the effectiveness of government institutions, improving the quality of regulatory frameworks, enhancing transparency and accountability, and reducing political interference, thereby contributing to improving the institutional environment of the banking sector, reducing credit risks, and limiting the accumulation of non-performing loans.

Keywords

National Governance,
Non-Performing Loans,
Voice and Accountability,
Political Stability,
Government Effectiveness,
Regulatory Quality (RQ),
Rule of Law, Control of
Corruption

حوكمة الدولة والقروض المتعثرة في القطاع المصرفي العربي: دراسة اقتصادية قياسية مقارنة

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الكلمات المفتاحية

حوكمة الدولة، القروض المتعثرة،
التصويت والمساءلة، الاستقرار السياسي،
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القانون، السيطرة على الفساد.

الملخص

تسعى هذه الدراسة إلى قياس وتحليل أثر الحوكمة على مستوى الدولة على القروض المتعثرة في القطاع المصرفي، مع دراسة مدى قدرة مؤشرات الحوكمة على تفسير التغيرات في جودة الأصول المصرفية. ولتحقيق هذا الهدف، استخدمت الدراسة نموذج الانحدار الخطي المعمم للبيانات المقطعية (بيانات مقطعية بيضاء)، وذلك باستخدام بيانات مقطعية سنوية من عينة من الدول خلال الفترة 2002-2021. وأظهرت النتائج وجود علاقة عكسية ذات دلالة إحصائية بين جودة الحوكمة ونسبة القروض المتعثرة، مما يشير إلى أن تحسين الحوكمة يساهم في الحد من مخاطر الائتمان وتعزيز جودة الأصول المصرفية. كما كشفت الدراسة عن تباين في مستويات الحوكمة بين الدول المنتجة للنفط وغير المنتجة له، حيث أظهرت الدول المنتجة للنفط ميزة نسبية. ومع ذلك، لم تلاحظ فروق ذات دلالة إحصائية في القروض المتعثرة بين المجموعتين أو عبر الفترات الزمنية (قبل/بعد 2011). وأكدت النتائج أن أثر الحوكمة تراكمي ومؤسسي بطبيعته، وله آثار طويلة الأجل. وبناءً على ذلك، توصي الدراسة بتحسين أطر حوكمة الدولة من خلال تعزيز سيادة القانون وإنفاذ العقود،

ومكافحة الفساد وتضارب المصالح، ورفع فعالية المؤسسات الحكومية، وتحسين جودة الأطر التنظيمية، وتعزيز الشفافية والمساءلة، والحد من التدخل السياسي، مما يساهم في تحسين البيئة المؤسسية للقطاع المصرفي، والحد من مخاطر الائتمان وتراكم القروض المتعثرة..

1. Introduction and Research Problem

The banking sector is a key basics of the economy, as it performs an intermediary role between extra amount and deficit units, therefore contributing to economic activity and financial stability. However, the soundness and resilience of this sector do not depend solely on banks' internal decisions, but are also influenced by the quality of the financial and institutional environment in which they operate. Recurrent global financial crises, beginning with the 2008 mortgage crisis and extending to the crises experienced by major banking institutions, have revealed fundamental weaknesses in corporate governance and supervisory mechanisms, leading to inappropriate financial behavior and flawed credit decisions.

Furthermore, financial systems differ between fragility and relative stability, and between rudimentary and highly developed structures, depending on differences in legal frameworks, levels of corruption, governance effectiveness, and the nature of government, institutional development, and public sector efficiency. Inefficient governance, together with excessive risk-taking, may undermine the stability of the banking system and contribute to economic contraction. Therefore, good governance is essential for strengthening legitimacy and economic policies, and for ensuring sustained economic expansion and long-term sustainable development. International institutions have increasingly focused on the role of national governance in supporting economic progress, reducing corruption, and improving bureaucratic efficiency (Cule and Fulton, 2013). Several international institutions have also indicated that the failure of some developing countries to achieve economic prosperity is attributable to the weak quality of national governance (Ngobo and Fouda, 2012).

Governance affects the business environment by promoting compliance with rules and regulations, supporting economic legitimacy, and improving indicators of stability. Accordingly, improving governance indicators represents an opportunity to enhance economic security and stability, given their impact on the performance of various sectors, particularly the banking sector, which is considered a vital sector in the modern economy (Almaqtari et al., 2022). The banking sector is a key player in the money market and contributes to achieving smooth and sustainable economic development (Kharel & Pokhrel, 2012; Tölö & Virén, 2021). Its stability is also of critical importance due to its role in accelerating and supporting the growth of gross domestic product (Almaqtari et al., 2020).

The stability of the banking sector is largely connected with the quality of bank lending, which in turn is closely linked to credit risk when borrowers fail to meet their obligations to banks (Granja & Leuz, 2024). Non-performing loans, loan loss provisions, and total loans are among the most important indicators of credit risk. The ratio of non-performing loans to total loans affects banks' ability to grant new loans, maintain adequate capital reserves, and achieve profitability (Pop & Cepoi, 2018). Moreover, high levels of non-performing loans may limit the effectiveness of monetary policy transmission and weaken the overall efficiency of the financial system (Mamoon et al., 2025). Although loans represent a fundamental financing instrument, economic fluctuations and weak governance indicators may cause a substantial portion of these loans to become non-performing, thereby depleting bank capital (Almaqtari et al., 2022). This, in turn, weakens the financial strength of banks and negatively affects money market stability and overall economic development (Tölö & Virén, 2021).

Despite the extensive literature on the determinants of non-performing loans, there remains a relative scarcity of studies that examine the six national governance indicators as important institutional determinants that may affect the level of non-performing loans. The relationship between national-level governance and non-performing loans in the banking sector has become a central issue in financial stability research. A broad body of evidence suggests that improvements in governance quality, measured by indicators such as control of corruption, rule of law, regulatory quality, and government effectiveness, are associated with lower non-performing loan ratios across different regions and income groups (Rehman et al., 2025). However, some studies have reported contrasting findings, indicating a positive effect of certain governance dimensions on non-performing loans, as shown in Boudriga et al. (2010), and Goyal et al. (2023).

In light of the above, it is important to re-examine the relationship between institutional quality and non-performing loans in the context of Arab countries, which are characterized by institutional and economic specificities that differ from other environments, particularly in terms of the effectiveness of law enforcement, the efficiency of regulatory frameworks, and levels of transparency. Although the literature emphasizes the central role of institutions in reducing credit risk and enhancing financial stability, empirical findings remain inconclusive. Some recent studies have found a negative relationship between institutional quality and non-performing loans, indicating that improvements in government effectiveness and regulatory quality reduce levels of credit default (Büyükoğlu et al., 2021). By contrast, other studies report different findings, particularly in developing environments, where some institutional dimensions may be associated with higher non-performing loans due to weak institutional implementation or

improved levels of disclosure and supervision Goyal et al., 2023).

The present study differs from prior literature in that it does not limit its analysis to examining governance indicators separately, as has been the case in several previous studies (Rehman et al., 2025; Ghosh et al., 2025; Giammanco et al., 2022; Büyükoğlu et al 2021; Ofria & Mucciardi, 2021; Ozbek et al., 2025; Hakimi et al., 2025). Rather, it constructs a unified composite index of institutional quality based on the six Worldwide Governance Indicators (WGI). This approach reflects the cumulative and interrelated nature of governance dimensions, helps reduce multicollinearity problems, and provides a more stable estimate of the overall effect of institutions on non-performing loans, as emphasized in recent literature (Büyükoğlu et al., 2021).

The study also makes an additional contribution by adopting a comparative analysis that accounts for the structural differences between oil-exporting and non-oil countries in the Arab region, as well as by examining the temporal effect of the political and economic transformations associated with the post-2011 events, which constituted a major turning point in the institutional environment of several Arab countries. The nature of the relationship between institutional quality and non-performing loans is expected to vary according to the nature of the economy, whether rentier or diversified, as well as across time periods before and after 2011, due to changes in levels of political stability, institutional efficiency, and governance frameworks. Accordingly, this study seeks to provide a more comprehensive and dynamic analysis of this relationship, thereby contributing to filling an important gap in the literature, which has often overlooked the comparative and temporal dimensions in analyzing the relationship between institutions and credit risk in the Arab region

2. Literature Review

2.1 National Governance: Concept and Indicators in the Business Environment

The Worldwide Governance Indicators are based on multiple and diverse data sources produced by more than 30 think tanks, international organizations, non-governmental organizations, and private firms

around the world. These data reflect the views of tens of thousands of survey respondents and experts, and are aggregated into six main dimensions of governance covering more than 200 economies over

the period 1996–2024. These indicators are known as the Worldwide Governance Indicators (WGI), and consist of the following: (world bank,2025)

- **Voice and Accountability (VA):** measures perceptions of the extent to which citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and freedom of the media.
- **Political Stability and Absence of Violence/Terrorism (PV):** measures perceptions of the likelihood that the government may be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism.
- **Government Effectiveness (GE):** measures perceptions of the quality of public services, the quality of the civil service and its degree of independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.
- **Regulatory Quality (RQ):** measures perceptions of the government's ability to formulate and implement sound policies and regulations that enable and promote private sector development.
- **Rule of Law (RL):** measures perceptions of the extent to which agents have confidence in and abide by the rules of society, particularly the quality of contract enforcement, protection of property rights, the effectiveness of the police and courts, as well as the likelihood of crime and violence.
- **Control of Corruption (CC):** measures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as the capture of the state by elites and private interests.

In the same context, several definitions of governance have been proposed. The United Nations Development Programme defines national governance as the exercise of administrative, political, and economic authority to manage a country's affairs at all levels. The World Bank views governance as the process and institutional framework through which a state makes decisions

and exercises authority (World Bank, 1999). The International Monetary Fund defines governance as the improvement of public resource management, the support of development, and the maintenance of a stable economic and legal environment that enables the private sector to operate efficiently (IMF, 2005). Identically, Kaufmann et al. (2011) say that national governance represents the process through which authority is exercised on behalf of citizens in managing the social and economic resources of the state, within the framework permitted by existing traditions, laws, and institutions.

Based on the above, national governance can be defined as the constitutional and institutional framework through which political, economic, and administrative authority is exercised by formal and informal institutions with the aim of achieving sustainable development. Accordingly, good governance contributes to creating a sound business environment, enhancing economic transparency, and strengthening legitimacy, the rule of law, justice, and market openness. It also provides a fair regulatory framework that supports transparency and accountability policies, leading to a better business environment and more stable economic activity (Avram et al., 2015). Governance is also considered a fundamental driver of economic and social development (Rachisan, 2017).

Therefore, a sound national governance structure should be capable of coordinating economic interactions among the various actors in the business environment. According to Tseko & Wahua (2023), national governance explains between 39% and 73% of performance, compared with internal governance structures, which explain only between 4% and 22%. These figures indicate that national-level governance has a substantial influence on the business environment. It is not merely a set of statistical indicators, but rather a reflection of deeper institutional frameworks that determine the degree of stability in the environment in which financial institutions operate. For example, weak rule of law may undermine anti-corruption efforts and increase legal uncertainty, thereby negatively affecting the business environment and increasing the credit risks faced by banks.

2.2 Non-Performing Loans in the Arab Banking Sector: Concept and General Trend

Non-performing loans are defined as loans in which the borrower fails to repay the principal or interest for a period that typically ranges between 90 and 180 days (Farne & Vouldis, 2024; Alandejani & Asutay, 2017). In simpler terms, they are loans that cease to generate income and become a burden on banks (SenGupta, 2020), meaning that the lender is unable to obtain a return on its investment (Szarowska, 2018). Non-performing loans are generally associated with the nature of banking activity, which is based on accepting deposits and re-lending them. Banks grant loans to creditworthy borrowers and expect them to repay the principal and interest within a specified period (Tölö & Virén, 2021). However, unexpected financial or economic circumstances, such as death, wars, or bankruptcy, may lead to loan default, creating financial pressures that may mark the beginning of a banking crisis.

According to the Bank for International Settlements (BIS), assets are classified into five main categories: pass, special mention, substandard, doubtful, and loss. The last three categories are classified as non-performing loans (SenGupta, 2020). The ratio of non-performing loans to total loans (NPLs) is widely used as an indicator for assessing the soundness of the banking sector. Despite continuous regulatory efforts to control bank lending activities, non-performing loans remain a major concern for both domestic and international supervisory authorities (Szarowska, 2018).

However, in the Middle East and North Africa region, non-performing loan levels exceed the global average, and their impact is not limited to asset quality, but also extends to bank profitability and solvency (Alnabulsi et al., 2022). Moreover, over the past two decades, the banking sector in the region has faced loan default problems due to difficult economic conditions, rising unemployment rates, increasing public debt, and weak gross domestic product growth. These factors have negatively affected banking activity and increased credit risk (Jabbouri & Naili, 2019; Naili & Lahrichi, 2022).

Nevertheless, non-performing loans in Arab banking systems have increased through several waves, most notably during the global financial crisis of 2008 and

later during the COVID-19 pandemic. In addition, several Arab countries experienced economic and political pressures after 2011, which contributed to increased credit risk and changes in banks' behavior and non-performing loan trends. Touny & Shehab (2015), covering the period 2000–2012, showed that the impact of crises, unemployment, and deteriorating economic conditions on non-performing loans was high in countries such as Egypt and Tunisia, while it was relatively lower in oil-producing Gulf countries.

Ahmed et al. (2024) also showed that the rise in non-performing loans in the Arab banking sector over the past three decades was associated with major waves, including the post-1990s wave, the post-2008 global financial crisis wave, and the COVID-19 pandemic wave. The latter caused economic contraction, declining productivity, and the closure and bankruptcy of many firms in the service and production sectors, particularly small and medium-sized enterprises, which constitute an important pillar of Arab economies. In this context, Al-Hassan et al. (2022) pointed out that the COVID-19 pandemic, coinciding with the shock of falling oil prices, led to a decline in economic activity and the quality of banking assets in the GCC countries. It also created pressures on corporate performance and their credit relationships with banks, with the possibility of a delayed rise in non-performing loans after the end of support measures and credit deferrals.

In the same context, Naili & Lahrichi (2022), in a study covering several non-Gulf Cooperation Council countries in the Middle East and North Africa, namely Egypt, Jordan, Tunisia, and Morocco, found that non-performing loan levels in the study sample were higher than the global average during the period 2000–2019. This indicates the need for countries in the region to improve the characteristics of their banking sectors by addressing weak economic conditions, integrating effective prudential tools to reduce credit risk, and adopting macroeconomic policies that promote growth, reduce unemployment and corruption, and support institutional quality.

2.3 Non-Performing Loans and Institutional Governance Indicators in the Banking Sector: International and Regional Evidence

The level of non-performing loans is of central importance in assessing financial stability, as it represents a key indicator of the efficiency of resource allocation and the level of credit risk in the banking sector. It also reflects asset quality and banks' ability to manage risk (SenGupta, 2020). In this context, the relationship between national governance and non-performing loans has become a central theme in the financial stability literature. Most studies indicate that improvements in governance quality, measured by indicators such as control of corruption, rule of law, regulatory quality, and government effectiveness, are associated with lower levels of non-performing loans through enhancing supervisory efficiency and reducing opportunistic behavior in lending (Rehman et al., 2025; Ghosh et al., 2025; Giammanco et al., 2022; Büyükoğlu et al., 2021; Ofria & Mucciardi, 2021; Ozbek et al., 2025; Hakimi et al., 2025). This relationship is more evident in developing economies, where institutional fragility amplifies credit risk and weakens the soundness of the banking sector (Ghosh et al., 2025; Goyal et al., 2023).

At the micro level, Klein (2013) explains that the growth of non-performing loans is associated with poor management and moral hazard, both of which are influenced by the quality of the institutional environment. Strong institutions, in terms of political stability, control of corruption, and regulatory quality, contribute to improving resource allocation and enhancing investment and productivity, which in turn positively affects credit quality and reduces default (Epaphra & Kombe, 2017; Mohammadi et al., 2017).

Nevertheless, the relationship between governance and non-performing loans are not entirely linear. Some recent studies indicate a positive relationship between governance quality and non-performing loans (Nguyen, 2025; Ghosh et al., 2025). This may be explained by the fact that improvements in government effectiveness, particularly in developing or transition economies, do not necessarily lead to an immediate decline in non-performing loans. Moreover, they may strengthen banking supervision mechanisms and expand disclosure and transparency requirements, thereby revealing non-performing loans that were previously hidden or unrecorded. Accordingly, the observed increase in non-performing loans under improved governance may

reflect better measurement and disclosure quality rather than an actual deterioration in credit asset quality.

In addition, the active role of government in supporting development lending and financing productive sectors may increase credit risk levels in the short term, particularly in low- and middle-income countries. This may explain the positive relationship reported in some recent studies (Ghosh et al., 2025).

Furthermore, the literature indicates that the effect of certain governance dimensions, particularly control of corruption, on non-performing loans is complex and non-linear. Morakinyo et al. (2010) found a positive and significant effect of control of corruption on the growth of non-performing loans, a finding also confirmed by Gjeçi & Marinč (2018), who reported a positive and statistically significant relationship between control of corruption and default levels. However, these studies show that this effect remains conditional on the nature of the institutional environment, particularly legal origin and the type of financial system, whether bank-based or market-based. Moreover, the spread of administrative corruption, including within the banking sector, leads to a deterioration in loan quality, as some bank officials may grant credit based on bribes or personal relationships, thereby exacerbating default risk. Accordingly, control of corruption is among the most influential governance indicators in explaining the behavior of non-performing loans.

Moreover, with regard to voice and accountability, the literature suggests that its relationship with non-performing loans is not unidirectional, but rather characterized by a clear duality. On the one hand, improvements in this indicator strengthen institutional oversight and limit political interference in lending decisions, thereby reducing resource misallocation and improving asset quality. This is consistent with the theoretical argument advanced by La Porta et al. (2002), and is supported by the findings of studies such as Boudriga et al. (2010), Lee et al. (2020), and Goyal et al. (2023).

However, recent literature suggests that improvements in voice and accountability may be associated with an apparent increase in non-

performing loans as a result of enhanced transparency and disclosure. In low-accountability environments, some banks tend to conceal credit losses or delay their recognition, whereas stronger social and media oversight increases pressure on banks to disclose their true financial conditions. In this context, Barth et al. (2006) show that monitoring by the private sector and the media improves disclosure and reduces credit-related corruption. Recent studies also indicate that rising non-performing loans in this case may reflect improved measurement and disclosure rather than an actual deterioration in credit quality (Salas et al., 2024; Rehman et al., 2025).

Furthermore, regarding the rule of law, many studies confirm that this dimension represents a fundamental pillar in reducing non-performing loans. Its role is not limited to being a punitive mechanism; rather, it constitutes an institutional infrastructure that strengthens credit discipline and reduces problems of adverse selection and favoritism (Ozili, 2021; Rehman et al., 2025). The quality of contract enforcement also contributes to reducing the phenomenon of strategic borrowers, thereby enhancing the soundness of the banking sector. However, some studies report regionally mixed findings. Rachid (2019) showed that the rule of law may be associated with higher non-performing loans in the Middle East and North Africa, while contributing to their reduction in Central and Eastern European countries. This reflects differences in institutional structures and levels of financial development across regions.

As for political stability, the literature also reports mixed findings. While some studies show that political stability contributes to reducing non-performing loans by lowering uncertainty and stimulating investment, other studies indicate a positive relationship (Lee et al., 2020; Ozili, 2024). This may be explained by the phenomenon of fragile stability, whereby prolonged stability without effective accountability may create close relationships between banks and political elites, encouraging the granting of high-risk loans that are temporarily concealed and later emerge as non-performing debt when economic shocks or institutional reforms occur. This argument is supported by the findings of Hakimi et al (2025) in the Maghreb countries.

In the Gulf context, political stability combined with oil revenues plays a different role, as it increases government spending and enhances banking liquidity, thereby raising credit demand and sometimes encouraging credit expansion with relaxed creditworthiness standards (Espinoza & Prasad, 2010). This may contribute to higher non-performing loans over the medium term.

In the same context, recent studies show that oil price shocks are a crucial factor in explaining the fluctuations in non-performing loans (NPLs), especially in oil-dependent countries. A study by Rehman et al. (2025) demonstrated that higher oil prices lead to a decrease in NPLs by boosting government revenues, improving liquidity levels, and supporting economic activity, while lower prices generate stronger negative effects due to reduced revenues and increased financial pressures. Furthermore, a study by Fajariyanto & Wasiaturrahma (2024) indicates that the impact of oil and gas price shocks is not limited to direct channels but extends indirectly through macroeconomic variables such as growth, inflation, and government spending, as well as through institutional factors. Based on this, it can be hypothesized that state governance and NPLs differ depending on whether a country is an oil producer or importer. Therefore, the second hypothesis of this study is:

H1; The level of state governance and NPLs differs depending on whether a country is an oil producer or an importer, according to the type of country (oil-producing/non-oil-producing) among the Arab countries in the study sample

. It can be argued that the effects of state governance and non-performing loans are not constant over time, but rather can change significantly during periods of economic shocks and political transitions. In this context, the events of 2011, particularly in the Middle East and North Africa region, represent a significant institutional turning point, leading to fundamental changes in the governance environment, levels of political stability, and regulatory and supervisory frameworks. Consequently, the level of state governance and non-performing loans is expected to differ between the periods before and after 2011. The literature supports this argument, indicating that periods of political instability and institutional reforms directly affect

the quality of banking assets through multiple channels, including increased uncertainty, shifting public policy priorities, and weakened regulatory bodies Ghosh et al (2025). Other studies also show that political transitions can lead to a rise in non-performing loans (NPLs) in the short term due to disruptions in economic activity, a deteriorating business environment, and increased credit risk (Ozili, 2021). Conversely, institutional reforms following these transitions may improve governance quality and enhance transparency and accountability, leading to a reduction in NPLs in the medium and long term (Rehman et al., 2025; World Bank, 2022). However, this improvement may be accompanied by an apparent increase in default rates due to stricter disclosure requirements and the exposure of previously hidden NPLs. Therefore, we hypothesize the following:

H2: The level of state governance and NPLs differed among the Arab countries in the study sample before and after 2011.

Moreover, the literature also indicates that the impact of state governance on non-performing loans is not only direct but also interactive, depending on the economic and institutional context (Ghosh et al., 2025; Ozbek et al., 2025). This impact varies according to oil price shocks, particularly in rentier states, due to their effect on liquidity and financial stability (Goyal et al., 2023; Fajariyanto & Wasiaturrahma., 2024).

Political transformations also play a role in strengthening or weakening the effectiveness of governance (Ozili, 2021). It is worth noting that while governance contributes to reducing non-performing loans (NPLs) in stable environments, it may increase them as a result of improved transparency and disclosure (Barth et al., 2008; Boudriga et al., 2010). Therefore, understanding the relationship requires analyzing the interactions between governance and economic and time factors rather than studying them in isolation (Ghosh et al., 2025; Goyal et al., 2023). Thus, we will hypothesize the following:

H3 "The impact of national governance on Non-Performing Loans (NPLs) varies in the presence of two moderating variables (Country Type and Time Period); the interaction between governance and

these variables explains the variations in banking asset quality".

3. Research Method

3.1 Data and Sample:

This study relies on annual secondary data in the form of panel data, covering a group of Arab countries from 2002 to 2021. This type of data allows for simultaneous cross-sectional and time-series analysis, enabling a more accurate examination of variations between countries and changes over time. The study sample includes a group of Arab countries classified as oil-producing and non-oil-producing: Algeria, Morocco, Tunisia, Libya, Egypt, Jordan, Palestine, Saudi Arabia, the United Arab Emirates, Bahrain, Kuwait, Lebanon, Oman, and Qatar. These countries were selected based on the availability and continuity of data related to the study variables, including governance indicators and non-performing loans. The study data was obtained from reliable international and official sources. The governance indicators were derived from the World Bank's World Governance Indicators (WGI) database, while data on non-performing loans and capital adequacy were collected from reports by central banks and official financial institutions in the countries under study, ensuring data reliability and consistency. For econometric analysis, a composite governance index was constructed, integrating the six dimensions of the WGI. This approach mitigates the problem of multicollinearity among variables, improves the efficiency of statistical estimation, and provides a more comprehensive representation of governance quality as an overall variable reflecting the country's institutional environment. The data also cover a significant analytical period encompassing two key phases: pre-2011 and post-2011. This approach aims to capture the structural changes associated with the political and economic transformations that the region experienced during this period.

3.2 Variables Definitions

3.2.1 The independent variables:

The World Bank's Worldwide Governance Indicators (WGI), which reflect the quality of a country's institutional, political, and legal environment. These indicators comprise six key dimensions: (1) participation and accountability, (2) political stability and absence of violence/terrorism, (3) government

effectiveness, (4) regulatory quality, (5) rule of law, and (6) anti-corruption. These indicators can be categorized into three main frameworks. Participation and accountability, and political stability, represent the institutional framework, while government effectiveness, regulatory quality, and rule of law represent the political and regulatory framework. The anti-corruption indicator is a cross-cutting variable that reflects the interaction of institutional and political aspects. (Sinoi, 2025). Given the potentially high correlations between these indicators (multicollinearity), a composite governance index was constructed to express the overall level of governance quality, by combining the six indicators into one index, in line with a number of recent studies that sought to reduce the dimensions of governance into a single overall index to avoid problems of statistical duplication and improve the efficiency of estimation (Büyükoğlu et al., 2021). Although the literature has addressed governance through its individual dimensions, this approach may not reflect its integrated nature. Therefore, using a composite index is more appropriate, as it combines the various dimensions into a single measure that reflects overall institutional quality. This approach also helps avoid the problem of multicollinearity resulting from high correlation between the indicators, improves the accuracy of the estimation and the efficiency of the model, and enhances the clarity of interpreting the results. Adopting a composite governance index aligns with recent trends in applied literature that emphasize measuring institutional quality as a holistic concept, particularly in comparative and cross-country studies, where the relative weights of governance dimensions vary from country to country (Büyükoğlu et al., 2021).

3.2.2 Dummy Variables:

The study employs dummy variables to capture structural and temporal differences within the sample, as follows:

The dummy variable for oil-producing countries (OIL): This variable is set to (1) if the country is an oil-producing country and (0) if it is a non-oil-producing country. This measure assesses the impact of the nature of the economy (rentier versus diversified) on non-performing loans.

However, the dummy variable for the time period (POST2011): This value is set to (1) for the period

following 2011 and (0) for the period preceding 2011. This measure assesses the impact of the political and economic transformations associated with the Arab Spring on the banking sector.

3.2.3 The Dependent Variable is Non-Performing Loans (NPLs):

Furthermore, NPLs are among the most important indicators used to measure asset quality in the banking sector, reflecting the level of credit risk and the efficiency of loan management. This variable is measured as the ratio of NPLs to total loans, which indicates the borrowers' ability to repay and the level of credit default within the banking system. High values for this indicator indicate a deterioration in asset quality and an increased likelihood of incurring bank losses, while low values reflect an improvement in the quality of the loan portfolio. This measure has been widely adopted in applied literature as a key indicator of credit risk, as in the studies of Epure & Lafuente (2015); Majani (2022); Umar et al. (2022); Mahyoub & Said (2021); Kumar (2019); and Salas et al. (2024). Accordingly, the ratio of non-performing loans to total loans is used as a quantitative measure of credit risk and asset quality in the standard model for this study.

4. Data Analysis and Results:

4.1 Constructing the Composite Index (Factor Analysis / PCA / KMO)

The Exploratory Factor Analysis (EFA) results for the six worldwide governance indicators demonstrate high statistical efficiency in constructing the Composite Governance Index (WGI). The Kaiser-Meyer-Olkin (KMO) measure of 0.792 indicates sampling adequacy for the 280 observations, supported by the statistical significance of Bartlett's Test of Sphericity ($p < 0.001$). The extracted factor accounts for approximately 70.52% of the total variance, with an Eigenvalue of 4.231, confirming the robust explanatory power of the model. Furthermore, all indicators exhibited high factor loadings ranging

from 0.384 to 0.972, and communalities exceeding 0.84. These findings validate the internal consistency and structural integrity of the composite index, ensuring its reliability as a representative measure of institutional governance within the studied context.

Table 1: Factor Analysis for the Composite Governance Index (WGI)

Indicators of Governance	Reliability / Validity	Communalities	Factor Loading	Indicators of Governance
X1: Voice and Accountability	KMO: 0.792	0.887	0.384	X1: Voice and Accountability
X2: Political Stability and Absence of Violence	Bartlett's Sig: 0.000	0.844	0.620	X2: Political Stability and Absence of Violence
X3: Government Effectiveness	Variance: 70.52%	0.926	0.958	X3: Government Effectiveness
X4: Regulatory Quality	Eigenvalue: 4.231	0.910	0.951	X4: Regulatory Quality
X5: Rule of Law	Sample Size (N): 280	0.945	0.972	X5: Rule of Law
X6: Control of Corruption		0.936	0.965	X6: Control of Corruption

4.2 Descriptive Statistics

Moreover, before proceeding with the standard estimation and testing of the study hypotheses, descriptive statistics for the study variables are presented and analyzed to provide an initial understanding of the characteristics of the data used. These statistics contribute to clarifying the general features of the variables through measures of central tendency (such as the arithmetic mean) and measures of dispersion (such as the standard deviation), in addition to minimum and maximum values. This

analysis also helps reveal the degree of homogeneity or variability of the data between countries and over time, and identifies any outliers that may affect the results of the standard estimation. Therefore, descriptive statistics represent a fundamental step that paves the way for a deeper understanding of the relationships between the variables and supports the selection of the appropriate statistical method for testing the study hypothe

Table 2: Governance and Non-Performing Loans

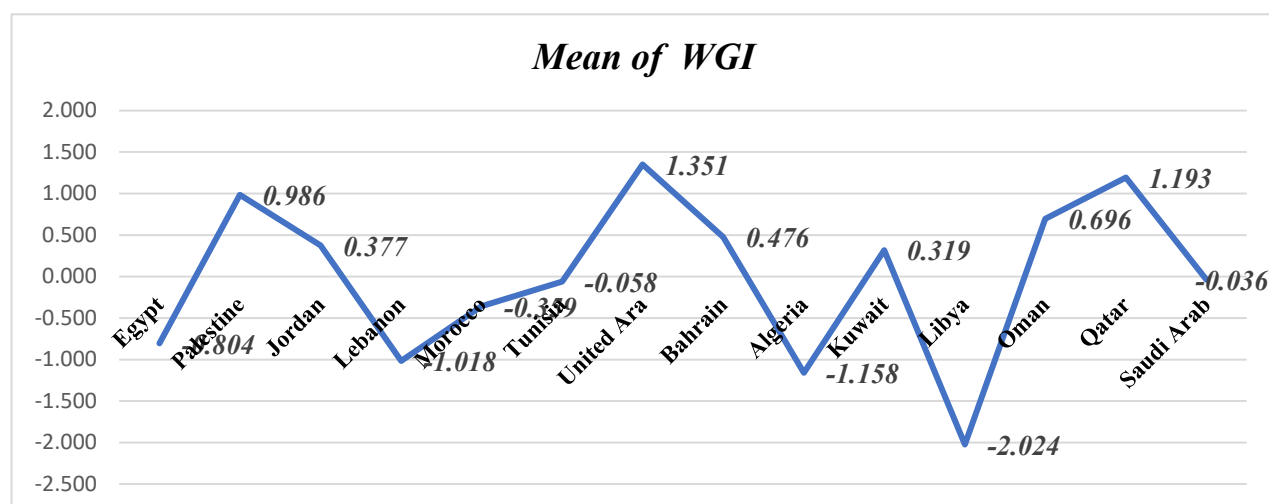
Variable	Mean	Median	Mode
Governance (WGI)	0.000	0.112	2.964-
NPL (y1)	7.352	5.000	2.000

However, the descriptive statistics indicate a moderate overall institutional environment and notable credit risk in the Arab banking sector, where the governance score (WGI) centers around a mean of 0.000 and a median of 0.112, despite a highly negative mode of -2.964 showing severe institutional weakness in certain contexts, while the Non-Performing Loans (NPL) ratio exhibits an average of 7.352% with a median of 5.000% and a frequent

lower bound (mode) of 2.000%, reflecting considerable variations in asset quality across different banks and nations. This finding is consistent with the study by Albaity et al. (2021), which clarified that the average non-performing loan ratio in the region usually ranges between low and medium levels, while some countries record very high rates reaching more than 18% or even 30% in certain cases, compared to other countries that maintain low rates not exceeding (2%).

Table 3: Worldwide Governance Indicators (WGI) by Country (2002-2021)

Country	Mean of WGI	Std. Deviation
Egypt	-.8035933-	.26528829
Palestine	.9857261	.69380015
Jordan	.3770731	.40626641
Lebanon	-1.0177945-	.36533275
Morocco	-.3589868-	.09865643
Tunisia	-.0584500-	.24365817
United Ara	1.3510956	.20683324
Bahrain	.4762730	.24893701
Algeria	-1.1577487-	.12418463
Kuwait	.3193616	.33094841
Libya	-2.0238951-	.69868063
Oman	.6962411	.18853214
Qatar	1.1932809	.26037576
Saudi Arab	-.0357845-	.15686395
Total	.0000000	1.00000000



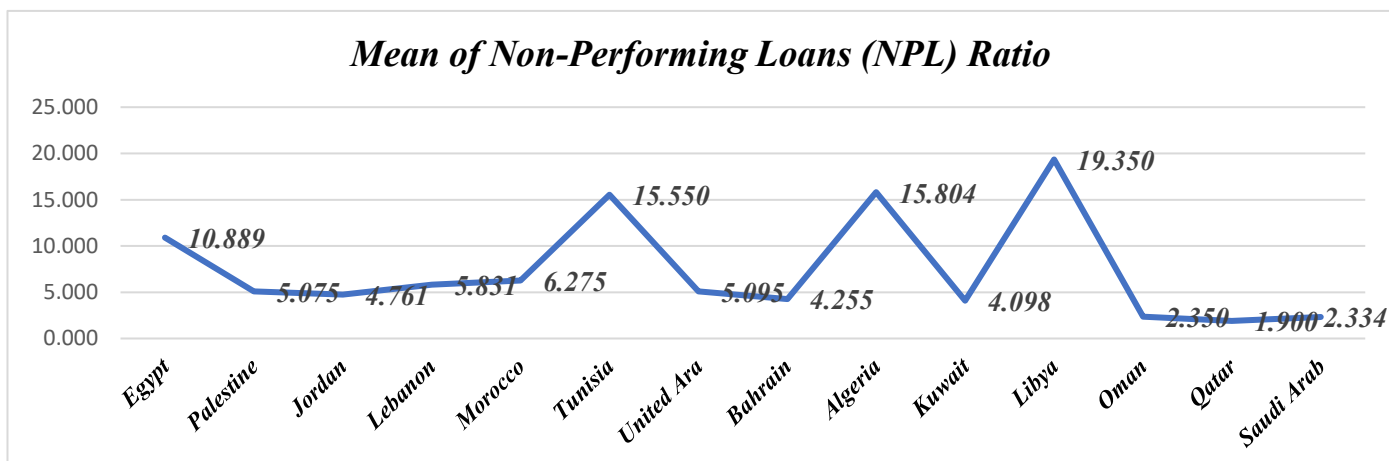
However, the Worldwide Governance Indicators (WGI) data for the 2002-2021 period reveals a wide disparity, with an overall sample mean of 0.000 and a standard deviation of 1.000. The United Arab Emirates and Qatar lead the rankings with high positive means of 1.351 and 1.193, respectively, whereas countries like Algeria (-1.157) and Libya (-2.023) record the lowest levels with negative values reflecting significant institutional challenges and fragility. Furthermore, the standard deviation

highlights noticeable internal volatility, with dispersion peaking in Libya (0.698) and Palestine (0.693), while nations like Morocco (0.098) demonstrate greater stability and consistency in their indicators over the past two decades. The variation in governance indicators reflects the difference in institutional quality between countries, where positive values indicate strong governance, while negative values and high volatility reflect clear institutional weakness (Kaufmann et al., 2011).

Table 4: Non-Performing Loans (NPL) Ratio by Country (2002-2021)

Country	Mean	Std. Deviation
Egypt	10.8889	3.93908
Palestine	5.0750	2.73074
Jordan	4.7612	.84416
Lebanon	5.8305	4.32298
Morocco	6.2750	1.14104

Tunisia	15.5500	1.66938
United Ara	5.0945	1.28831
Bahrain	4.2550	1.65862
Algeria	15.8035	3.83368
Kuwait	4.0975	2.60745
Libya	19.3500	1.89945
Oman	2.3500	.58714
Qatar	1.9000	.30779
Saudi Arab	2.3340	.80799
Total	7.3515	5.90430



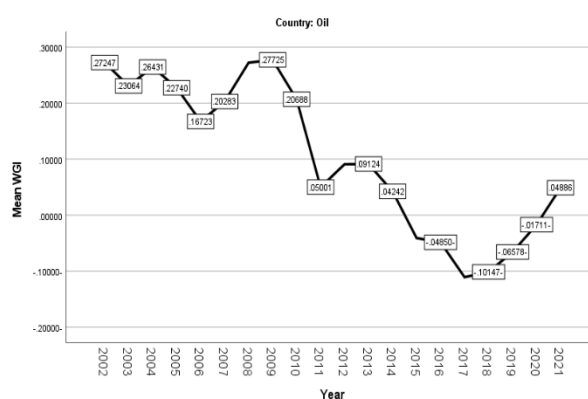
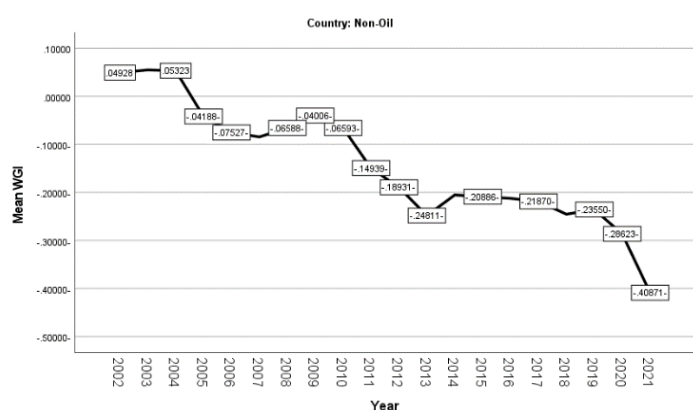
The Non-Performing Loans (NPLs) ratio data for the 2002-2021 period reveals a broad disparity among Arab countries, with an overall sample mean of 7.35% and a high standard deviation of 5.90%. Libya (19.35%), Algeria (15.80%), and Tunisia (15.55%) record the highest levels of credit risk and deterioration in banking asset quality, reflecting the severe impact of economic and political challenges

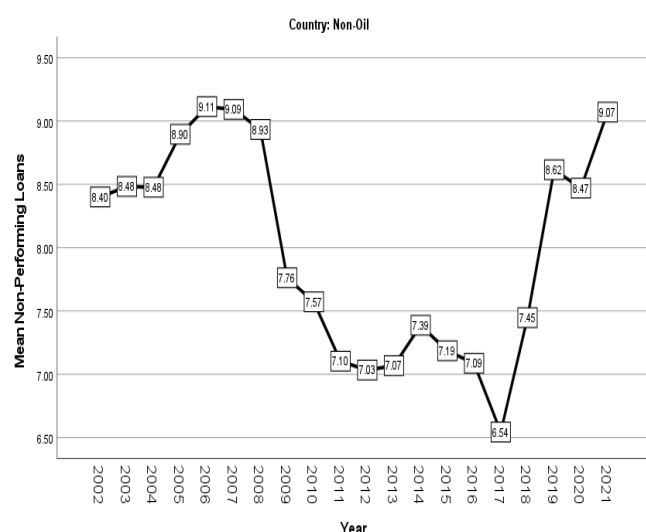
as well as business environment vulnerabilities on their credit portfolios. In contrast, the Arabian Gulf countries specifically Qatar (1.90%), Saudi Arabia (2.33%), and Oman (2.35%) successfully maintain the lowest NPL ratios, demonstrating the resilience of their financial systems and the effectiveness of their credit risk management. Meanwhile, internal dispersion metrics show that Lebanon exhibits the highest volatility (4.32%), mirroring

the acute banking crisis and exceptional fluctuations experienced by its financial structure over the past two decades.

Table 5: Governance and Non-Performing Loans by Country Type

Country Type	Variable	Mean	Median	Mode
Non-Oil (0)	Governance (WGI)	-0.1389	-0.2831	-1.7607
	NPL (y1)	7.9776	5.7700	5.0000
Oil (1)	Governance (WGI)	0.1027	0.3730	-2.9640
	NPL (y1)	6.8887	3.8200	2.0000





Furthermore, statistical results- table 5- reveal structural disparities; oil-exporting countries (1) recorded a higher mean for Governance at 0.10 compared to -0.14 for non-oil countries, while non-oil countries exhibited higher Non-Performing Loans with a mean of 7.98 versus 6.89 for oil countries, noting greater data dispersion in oil-exporting countries (standard deviation of 1.13 for Governance and 6.60 for NPL). More specifically, the results indicate that non-oil-producing countries

absorb economic shocks, despite experiencing a temporary decline after 2011 due to political shocks and oil price volatility. Nevertheless, these countries regained some of their institutional stability by 2021 as a result of improved economic conditions and higher oil revenues. These findings are consistent with World Bank indicators (Kaufmann et al., 2011) and IMF reports, which confirm the existence of structural differences between oil-producing and non-oil-producing countries in the Middle East and North Africa region (IMF, 2022). As for non-performing loans (NPLs), the highest levels were recorded during 2006 and 2007, then trended downward during the period 2008–2017, reaching a low of an average of 6.54%, before gradually rising again to 9.07% in 2021. This trajectory can be explained by the initial rise resulting from credit expansion and weak lending standards prior to the

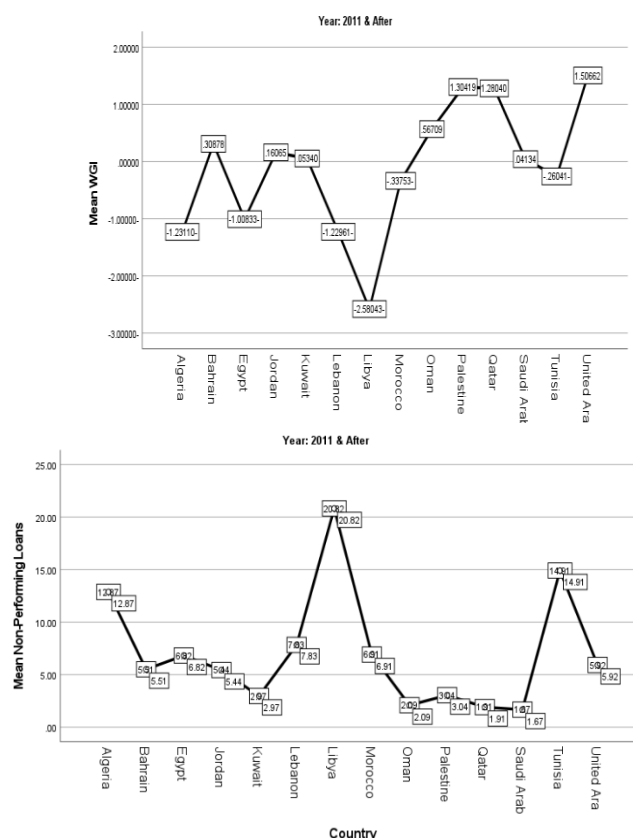
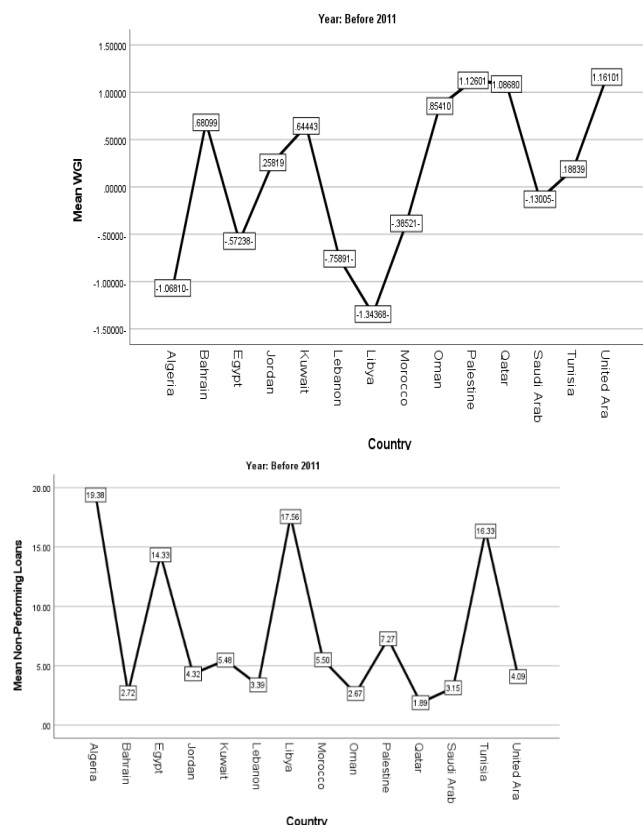
began with a moderate level of governance during the period 2002–2004. However, this level was unsustainable, as weak institutional structures and these countries' reliance on less resilient economic sectors led to a gradual deterioration in governance until it entered negative territory by 2021 (-0.0408). In contrast, oil-producing countries performed relatively better, maintaining moderate levels of governance for a longer period thanks to abundant financial resources and their ability to

2008 crisis, while the subsequent decline is attributed to banking reforms and improved economic growth. The renewed rise after 2017 reflects the impact of the economic slowdown and the repercussions of the COVID-19 pandemic (Klein, 2013; IMF, 2022).

In oil-producing countries, the lowest levels of non-performing loans were recorded in 2002, then gradually rose to 8.50% in 2009, affected by the global financial crisis and the decline in oil prices, before heading towards a gradual decline to reach 7.39% in 2020 and 7.10% in 2021. This decline is attributed to the improvement in oil revenues and the continued government support for the banking sector, reflecting the close relationship between the quality of banking assets and the volatility of oil prices (Espinoza & Prasad, 2010; IMF, 2023).

Table 6: Governance and Non-Performing Loans by Period (Pre/Post 2011)

Period	Variable	Mean	Std. Deviation
Before 2011	WGI	0.1244	0.8327
	NPL	7.7201	6.1861
2011 & After	WGI	-0.1018	1.1108
	NPL	7.0499	5.6658



The results in table 6 indicate a structural shift, where the period before 2011 recorded a higher mean for Governance at 0.12 compared to the period from 2011 onwards at 0.10- and Non-Performing Loans also recorded higher levels before 2011 with a mean of 7.72 versus 7.05 for the second period, noting higher data dispersion in Governance after 2011 with a standard deviation of 1.11. More specifically, as illustrated in Figure, the results indicate a clear disparity in governance levels among Arab countries before and after 2011. This can be explained by differences in the quality of institutions and the distribution of power within each state. Prior to 2011, the decline in governance in countries like Libya and Algeria reflects weak institutional effectiveness and a lack of accountability. A World Bank report confirms that power imbalances and the presence of exclusionary and controlling practices lead to weak public policies and a decline in the quality of governance (World Bank, 2017). In contrast, the high

levels of governance in countries like the UAE, Qatar, and Oman are attributed to the institutions' ability to achieve coordination and stability in policymaking and implementation—essential elements for improving governance effectiveness. (World Bank, 2017). Following 2011, Libya experienced a sharp decline in governance as a result of the Arab Spring uprisings. Political instability weakened state institutions and diminished their ability to enforce the law, negatively impacting all dimensions of governance (World Bank, 2017). In contrast, some Gulf States maintained relatively high levels of governance thanks to institutional stability and the continuity of public policies.

Moreover, regarding non-performing loans (NPLs) in Arab countries before and after 2011, Figure indicates that the variation in their levels is largely linked to the quality of governance and political and economic stability. Before 2011, the high NPL levels

in countries such as Libya, Algeria, Tunisia, and Egypt reflected the ineffectiveness of the institutional and regulatory environment. Global governance data shows that low indicators of the rule of law and regulatory effectiveness are associated with higher credit risk and a deterioration in the quality of banking assets (World Bank, 2024). In contrast, the low NPL levels in the Gulf Cooperation Council (GCC) countries reflect strong banking supervision and highly efficient regulatory frameworks, which limit the accumulation of risks within the banking sector. After 2011, the political instability associated with the Arab Spring led to a significant increase in NPLs, particularly in Libya and Tunisia, as a result of declining economic activity and increased uncertainty. World Bank reports indicate that political and economic shocks negatively impact the quality of banking assets through channels of weak growth and increased overall risk (World Bank, 2021). Accordingly, the results confirm that non-performing loans are closely linked to the quality of governance and economic stability, which are among the most important structural determinants of the stability of the banking sector in developing economies.

4.3 Study Model:

Based on previous literature and the theoretical framework, the standard study model will measure the impact of governance quality on non-performing loans, taking into account structural differences between oil-producing and non-oil-producing countries, as well as time-related changes related to the period before and after 2011. To achieve this, interactive variables were included to test whether the impact of governance differs according to the nature of the economy and the time context.

$$NPL_{it} = \beta_0 + \beta_1 Govit + \beta_2 Dcountry_{,i} + \beta_3 Dtime_{,t} + \beta_4 (Govit \times Dcountry_{,i}) + \beta_5 (Govit \times Dtime_{,t}) + \epsilon_{it}$$

Where,

NPL_{it} : represents the non-performing loans of country i in year

$Govit$: represents the level of governance of country in year t

$Dcountry$: is a dummy variable representing whether the country is oil-producing or non-oil-producing

$Dtime$: is a dummy variable representing the period before and after 2011

ϵ_{it} : ϵ_{it} represents the margin of error

4.4 Estimation Method:

To test the research hypotheses and analyze the relationship between governance quality and non-performing loans, a Panel Data Model was employed. This model combines temporal and cross-sectional dimensions, enhancing the efficiency of the estimation and mitigating the problem of subtle variations between countries. Furthermore, this framework allows for the analysis of the interactive effects between governance and the nature of the economy (oil/non-oil), as well as the temporal changes associated with the period before and after 2011.

4.5 Unit Root Tests:

Before estimating the standard model, the stability of the study variables was tested using unit root tests for the panel data to avoid spurious regression and ensure the reliability of the results. The Levin, Lin & Chu (2002) and Im, Pesaran & Shin (2003) tests were used to measure the degree of integration of the variables (Baltagi, 2008).

Table 7: Stationarity and Panel Unit Root Test (2002-2021)

Variable	Levin-Lin-Chu (LLC)	Im-Pesaran-Shin (IPS)	Integration Order
NPLs – Level	-1.32852	0.37255	—
NPLs – First Difference	-6.22895**	-6.22895**	I(1)
Gov_Score – Level	-0.66526	0.27467	—
Gov_Score – First Difference	-4.03098**	-5.97186**	I(1)

The results of the Panel Unit Root tests, utilizing the Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS) criteria, indicate that the primary variables, NPLs and Governance Score, are non-stationary at their levels. For NPLs, the LLC and IPS statistics were -1.32852 and 0.37255, respectively, while for Gov_Score, they were -0.66526 and 0.27467, respectively. These results indicate that the null hypothesis of a unit root cannot be rejected at the 5% significance level. However, after taking the first difference, both variables achieved stationarity, with the LLC and IPS statistics for NPLs reaching -6.22895 and -6.22895, respectively, and those for Gov_Score reaching -4.03098 and -5.97186, respectively, all statistically significant at the 5% level. Therefore, both variables are integrated of order one, **I(1)**. This finding confirms that the variables share the same order of integration, supporting the application of a **panel cointegration test** to examine the existence of a long-run equilibrium relationship between NPLs and Governance Score before proceeding with long-run econometric estimation.

4.6 Hypotheses Testing:

4.6.1 Hypothesis 1 (H1): The Structural Differences Hypothesis:

There are statistically significant differences in the levels of Non-Performing Loans (NPLs) and worldwide governance between oil-exporting and non-oil Arab countries, resulting from variations in their economic and financial structural frameworks.

In addition to presenting descriptive statistics for the study variables, a comparative analysis of the means of the main variables between oil-producing and non-oil-producing countries was conducted to reveal structural differences between these two groups. A t-test was used to measure the significance of the differences in means, providing a statistical indicator to determine whether the differences between the two groups are statistically significant. The following table presents the means of the variables, the t-statistic, and the significance levels (p-value), allowing for an assessment of the nature of the differences between the countries under study.

Table 8: Summary Statistics and Mean Comparison

Variable	Non-Oil countries co (N=119)	Oil- countries (N=161)	t-statistic	p-value
Governance Score (WGI)	0.1389-	0.1026	2.122-	**0.035
NPLs Ratio (Y1)	7.9776	6.8887	1.603	0.110

The summary statistics and independent samples t-test reveal a significant disparity in governance quality between the two sub-groups. Oil-exporting Arab countries exhibited a positive mean governance score (0.1026), whereas non-oil countries showed a negative mean of (-0.1389), representing a statistically significant difference at the 5% level (p=0.035). This means that oil resources do not necessarily lead to governance deterioration, but they can contribute to its improvement in the presence of strong institutions and effective management of oil rents. This aligns with the findings of the study by (Liou & Musgrave, 2014), which indicated that the impact of natural resources on institutions is not inevitably negative but depends on the institutional context, as oil revenues can support political stability and enhance the state's capacity to develop its institutions. It also aligns with the results of the study by (Bergougui & Murshed, 2020), which showed that the quality of the rule of law can transform oil

resources from a source of institutional weakness into a factor supporting governance, so that the so-called "resource curse" disappears in countries with strong institutions, according to the study (O'Connor et al., 2018). These institutional improvements may have a positive reflection on financial stability and the banking sector, by reducing credit risks and improving asset quality (Almulla et al., 2025). It can also be noted that the improvement of governance in oil-producing countries contrasts with the results reached by numerous studies, for example, the study (Mukhamediyev et al., 2025; Asiamah et al., 2022) which indicated that reliance on natural resources, and in particular oil exports, reduces transparency, increases corruption rates, and decreases the effort to build strong institutions, which is reflected in weak resource allocation, according to the results of a study (Çiçekçi & Gaygısız, 2023).

Regarding the Non-Performing Loans (NPLs) ratio, although non-oil countries reported a higher average

(7.97%) compared to oil-exporting countries (6.88%), the difference was not statistically significant ($p=0.110$). These findings highlight a relative institutional advantage for oil-exporting nations, while suggesting that both groups face comparable challenges in banking asset quality. And this is consistent with (Naili & Lahrichi (2022; Goyal et al., (2023). They indicated that developing countries and countries in the Middle East and North Africa have the highest rates of non-performing loans, which is due to greater sensitivity to economic shocks or weakness in institutional quality, especially in non-oil countries. On the other hand, the literature shows that oil-producing countries may face what is known as "rent-related volatility," where oil revenues lead to a short-term liquidity abundance in the banking system, but may encourage lending expansion without adequate risk assessment, leading to a higher probability of default during economic slowdowns. The results of the study by Espinoza &

Prasad (2010) confirmed that banks in oil-producing countries, especially GCC countries, are directly affected by oil price fluctuations, which is reflected in the quality of their credit portfolios.

4.6.2 Hypothesis 2 (H2): The Temporal Differences Hypothesis

There are fundamental differences in the volume of Non-Performing Loans (NPLs) and national governance (WGI) in Arab banks between the two periods (pre-2011 and post-2011), reflecting the impact of the political and economic instability witnessed in the region.

The sample was divided into two periods (before and after 2011) to test the impact of institutional transformations, using a t-test to compare averages of governance and non-performing loans.

Table 9: Summary Statistics and Mean Comparison

Variable	Pre-2011 (N=126)	Post-2011 (N=154)	Mean Difference	t-statistic	p-value
Governance Score (WGI)	0.1244	0.1018-	0.2262	1.946	*0.053
NPLs Ratio (Y1)	7.7201	7.0499	0.6701	0.936	0.350

The mean comparison between the two periods highlights the impact of the political and economic shifts in the Arab region. The average governance score decreased from (0.1244) pre-2011 to (-0.1018) in the post-2011 period, a difference that is statistically significant at the 10% level ($p=0.053$). This decline reflects the institutional environment's sensitivity to the instability following 2011. The declined in governance quality in the post-2011 period can be explained by previous studies confirming that periods of political instability, especially in the aftermath of major shocks, lead to a decline in the quality of governance as a result of weakened institutions, increased levels of corruption, and uncertainty (Acemoglu et al., 2012;, 2018; Bhattacharyya & Hodler, 2014; Kaufmann et al., 2011). Regarding the Non-Performing Loans (NPLs) ratio, a slight decrease was observed from (7.72%) to (7.04%); however, this difference lacked statistical significance ($p=0.350$). These results suggest that changes in banking asset quality were

not driven by temporal factors alone, but rather by the interaction between governance and country-specific characteristics, as explored in the subsequent interaction model. This result is consistent with the (Salas et al, 2024) which indicated that the impact of governance on non-performing loans is stable over different time periods, meaning that institutional factors are the most important determinant of the size of non-performing loans.

4.6.3 Hypothesis 3 (H3): The Direct and Moderating Effect Hypothesis

National governance quality has a statistically significant negative impact on the volume of Non-Performing Loans (NPLs) within the Arab banking sector; however, this direct effect is significantly moderated by the structural nature of the economy (oil-exporting vs. non-oil countries) and temporal variations (pre- and post-2011 periods).

Table (10) presents the results of estimating two models for measuring the impact of governance on non-performing loans. The first model (Model 1)

tests the direct impact of the WGI (Worldwide Governance Index) according to hypothesis (H1), while the second model (Model 2) incorporates a three-way interaction ($\text{WGI} \times \text{Oil Dummy} \times \text{Period Dummy}$) to analyze the conditional impact of governance based on the nature of the country (oil-

producing/non-oil-producing) and the time period (pre-/post-2011), in accordance with hypothesis (H3). The table also presents statistical fit indicators and the Hausman test to determine the most appropriate model.

Table 10 : Pedroni Panel Cointegration Test Results (2002–2021)

Test Statistic	Statistic	p-value	Decision
Panel PP-Statistic	-2.3798	0.0087	Reject H_0
Weighted Panel PP-Statistic	-2.4375	0.0074	Reject H_0
Group PP-Statistic	-2.8843	0.0020	Reject H_0
Other Pedroni Statistics	—	> 0.05	Do not reject H_0

Note: H_0 : No cointegration. $p < 0.05$ indicates statistical significance at the 5% level.

The Pedroni panel cointegration test provides evidence of a long-run equilibrium relationship between Governance Score (X_WGI) and NPLs (Y1). The Panel PP-statistic, Weighted Panel PP-statistic, and Group PP-statistic are statistically significant, with p-values of 0.0087, 0.0074, and 0.0020, respectively. Accordingly, the null hypothesis of no cointegration is rejected based on these statistics, indicating that the two variables share a long-run relationship. Although some of the

remaining Pedroni statistics are not statistically significant, the consistent significance of the PP-based statistics provides sufficient evidence in support of panel cointegration. Therefore, the analysis can proceed to the estimation of the long-run relationship using the variables in levels, subject to the appropriate panel estimation methodology.

Table 11: Panel Regression Results

Independent Variables	Model (1): Direct Effect (H1)	Model (2): Interaction Effect (H3)
Governance Score (X_WGI)	*-1.084 (0.508) **	—
Oil Dummy (D1)	—	-
Period Dummy (D2)	—	*-0.625 (0.283) **
Interaction ($\text{WGI} \times \text{D1} \times \text{D2}$)	—	0.104 (0.289)
Constant (C)	7.352 (0.141)*	7.665 (0.200)*
Observations	280	280
R-squared	0.848	0.848
Adjusted R-squared	0.840	0.839
F-statistic	105.417***	98.233***

Hausman Test	$\chi^2(1) = 6.518, p = 0.011 \rightarrow$ FE	$\chi^2(2) = 17.610, p < 0.001 \rightarrow$ FE
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The panel regression results presented in Table 10 indicate a negative effect of governance quality on non-performing loans (NPLs) in the Arab banking sector. Based on the Hausman specification tests, the Fixed Effects (FE) model was selected for both specifications. For Model (1), the Hausman test produced $\chi^2(1) = 6.518$ with $p = 0.011$, while for Model (2), the test produced $\chi^2(2) = 17.610$ with $p < 0.001$. Since both probability values are below the 5% significance level, the null hypothesis supporting the Random Effects specification is rejected, and the Fixed Effects model is preferred for both models.

In Model (1), which examines the direct effect hypothesis (H1), the coefficient of the Governance Score (X_WGI) is -1.084, with a standard error of 0.508, and is statistically significant at the 5% level. This result indicates a significant negative relationship between governance quality and non-performing loans, suggesting that improvements in governance quality are associated with lower levels of NPLs in the Arab banking sector. This finding supports the disciplinary and monitoring role of effective governance mechanisms in reducing credit risk and improving the quality of banking assets. It is broadly consistent with previous studies examining the relationship between governance and banking risk, including Büyükoğlu et al. (2021), Rehman et al. (2025), Giammanco et al. (2022), and Ofria and Mucciardi (2021). However, the finding differs from some studies that reported positive relationships for specific governance dimensions, such as Nguyen (2025). Such differences may be attributable to variations in governance measurement, institutional environments, and economic contexts.

Regarding Model (2), which examines the interaction hypothesis (H3), the coefficient of the period dummy (D2) is -0.625 and statistically significant at the 5% level, indicating a significant difference in the level of NPLs between the two periods specified in the model. In contrast, the Oil Dummy (D1) is not separately estimated under the Fixed Effects specification. This is expected when the classification of countries as oil-producing or non-oil-producing remains constant over time, since

Fixed Effects models cannot separately identify the effects of time-invariant variables. The three-way interaction term ($WGI \times D1 \times D2$) has a coefficient of 0.104, with a standard error of 0.289, and is statistically insignificant ($p = 0.720$). Therefore, the results do not provide sufficient statistical evidence to support H3. In other words, there is no statistically significant evidence that the effect of governance quality on NPLs differs systematically according to the combined oil-producing status and time-period conditions represented by D1 and D2.

Both models are statistically significant overall, with an F-statistic of 105.417 for Model (1) and 98.233 for Model (2), both significant at the 1% level. The models report an R^2 of 0.848, while the adjusted R^2 values are 0.840 and 0.839, respectively, indicating a high explanatory capacity with respect to the variation in the dependent variable. Overall, the findings provide support for the direct-effect hypothesis (H1), whereas they do not provide sufficient statistical support for the interaction hypothesis (H3). The selection of the Fixed Effects specification based on the Hausman tests further supports the appropriateness of controlling for unobserved, time-invariant heterogeneity across the countries included in the panel.

5. Conclusion

This study aimed to measure and analyze the impact of state governance indicators (WGI) on non-performing loans (NPLs) in the Arab banking sector. It also examined whether there were differences in governance levels and NPLs between oil-exporting and non-oil-exporting countries, both before and after 2011. The study relied on annual secondary data in the form of panel data for the period 2002–2021, using the Panel EGLS model with robust standard error correction. The descriptive analysis revealed a significant disparity in governance levels among countries. The United Arab Emirates and Oman recorded the highest average governance index scores, while Libya and Algeria recorded the lowest. Regarding credit risk, Libya, Algeria, and Tunisia had the highest NPL ratios, reflecting the poor quality of banking assets in these countries. The

results also revealed statistically significant differences in governance quality between oil-exporting and non-oil-exporting countries. Oil-exporting countries achieved a positive average governance index score compared to a negative average for non-oil-exporting countries. Conversely, the difference in non-performing loan ratios between the two groups was not statistically significant, despite non-oil-producing countries recording relatively higher levels. Similarly, the results did not reveal any substantial differences in governance levels or non-performing loans between the periods before and after 2011. At the econometric level, the study found a significant negative impact of governance quality on non-performing loans, confirming the effective role of governance in mitigating credit risks and enhancing the quality of banking assets. However, the interaction effects between governance and the dummy variables (country type and time period) were not statistically significant, although their direction was consistent with theoretical expectations. This is attributed to the cumulative and institutional nature of governance's impact, which transcends the short-term effects associated with structural or time-related differences. Accordingly, the study confirms that improving governance quality is a crucial factor in enhancing financial stability and reducing non-performing loans in the Arab banking sector. Based on the study's findings, the following recommendations are made:

1- Strengthening the Rule of Law: Improving the speed and effectiveness of enforcing contracts, guarantees, and creditor rights, thereby reducing bank losses when borrowers default and encouraging more secure lending practices.

2- Combating Corruption: Strengthening oversight of conflicts of interest, bribery, and favoritism in economic and credit decisions, while activating

independent reporting and investigation mechanisms to limit the granting of financing on non-credit-based grounds.

3- Enhancing Government Effectiveness: Improving coordination among government agencies, the central bank, and regulatory bodies, and clearly defining responsibilities, thereby expediting responses to banking defaults and preventing the accumulation of risks.

4- Improving Regulatory Quality: Developing banking laws and regulations according to clear and stable standards, and obligating banks to apply unified standards for credit risk management, rating, and provisioning, with periodic reviews of the effectiveness of these rules.

5- Enhancing Accountability and Freedom of Expression: Ensuring the independence of oversight and reporting channels, and providing sufficient access to information related to the financial sector, thereby increasing accountability and early detection of unsound lending practices.

6. Enhancing political stability: Reducing political interference in economic and banking decisions, and establishing institutional mechanisms that

ensure the continuity of banking policies and rules even during periods of instability.

Declaration on the use of AI-assisted tools

The authors declare that AI-assisted tools were used solely to improve the readability, clarity, and language of this manuscript. No AI tools were used to generate the study's content, ideas, analysis, arguments, or theoretical contributions. All AI-assisted edits were reviewed, verified, and revised by the authors, who retain full responsibility for the accuracy and integrity of the manuscript.

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