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The Effect of Asset Quality on Systemic Risk: The Case of the Egyptian Banks

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ABSTRACT: *This study examined the effect of asset quality on systemic risk of Egyptian banks. The specific objectives determined the effect of asset quality on commercial loans, asset financing, vendor financing of Egyptian banks. The study adopted a descriptive research design approach where the target population included the 10 Egyptian banks for the period 2015-2020. The study used secondary data that was extracted from the websites of the respective commercial banks. The study used panel regression analytical model. The study concluded that asset quality affected commercial loans, asset financing, vendor financing and of Egyptian banks in a positive and significant way. The study recommended that the Egyptian banks should focus on reducing the level of nonperforming loans because when diversifying the loan portfolio where there is a high credit risk. The study recommended that the Egyptian banks to be sure that the collateral is protected and will not deteriorate, this costs the bank money. Lastly, the study recommended banks should develop comprehensive strategic plans detailing on how they will deal with non-performing loans in their occurrence in a systematic way."*

KEYWORDS: asset quality, commercial loans, asset financing, vendor financing, systemic risk**,** Egyptian banks.

INTRODUCTION

In light of the 2007 financial crisis, European banks experienced a notable transformation in the composition of their liabilities, with a notable rise in secured debt and the utilization of collaterals (International Monetary Fund, 2013; European Banking Authority, 2019). This shift was primarily driven by concerns surrounding sovereign risk and the deterioration of bank assets, which adversely impacted the accessibility of unsecured funding markets for banks (Ahnert et al., 2019; Committee on the Global Financial System, 2011; European Systemic Risk Board, 2013; Houben and Slingenberg, 2013). Additionally, the implementation of unconventional monetary policies contributed to an

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increased demand for instruments that could serve as collateral for central bank funding in the euro area (Committee on the Global Financial System, 2013; Rixtel and Gasperini, 2013). Furthermore, the introduction of prudential supervision, which mandated larger reserves of high-quality liquid assets, also played a significant role in driving changes in banks' funding patterns towards collateralized debt (Basel Committee on Banking Supervision, 2019).

The concept of systemic risk refers to the risk of a widespread disruption or collapse of the financial system, rather than the failure of individual institutions. It is a concern because the failure of one institution can have ripple effects throughout the entire system, leading to a domino effect of failures and potentially causing significant economic damage.(Fabrizio Cipollini,2024)

There are two main approaches in the literature to studying systemic risk: the network analysis approach and the micro evidence approach. The network analysis approach focuses on analyzing the joint distribution of losses among all market players and evaluating how the failure of one institution can threaten the viability of its creditors. On the other hand, the micro evidence approach examines the effects of bank-specific variables on systemic risk.

Systemic risk is often compared to a fire alarm. While the concept of a fire is well-defined and firefighters can work to extinguish it, systemic risk is not as clearly defined and can mean different things to different people. Regulators have been criticized for their role in amplifying systemic risk rather than mitigating it.

Different definitions of systemic risk exist in the literature. Bartholomew and Whalen define it as an event that affects the entire banking, financial, and economic system, rather than just a few institutions. Kaufman describes it as the risk of chain reactions that lead to the collapse of interconnected institutions. Borri et al, 2014 define systemic risk as the risk of a collapse of the entire financial system triggered by the default of one or more interconnected financial institutions.(PURITY NGARI,2021)

Overall, systemic risk is a complex and multifaceted concept that encompasses the potential for widespread disruptions in the financial system and requires careful analysis and monitoring to mitigate its potential impact.

Systemic risk in the banking sector can manifest through four channels. Firstly, correlation risk arises when a shock to a correlated asset impairs banks and other nonbank financial intermediaries in the financial system. Secondly, the default risk of one bank can trigger direct and indirect defaults of other banks, known as sequential or contagion risk. Thirdly, the funding illiquidity of one bank can lead to the illiquidity of other banks. Lastly, large asset fire sales by one or multiple impaired banks can trigger a massive sale, causing an abrupt and unanticipated price distortion, known as a downward price spiral, which can severely damage the financial system.

The concept of asset quality refers to the measures taken to minimize risks associated with specific assets, particularly loans granted by banks to businesses and households. It involves analyzing the quality of the bank's customer portfolio, the quantity of deteriorated and doubtful loans, and the expenses for impaired loans in relation to total assets. Asset quality is important for financial analysts

to determine the portfolio of assets that yield the highest returns.(Beltrame, F., Previtali, D., & Sclip, A,2018)

The quality of loans and other assets is a key concern for banks as it directly impacts their income, profit, and risk exposure. Higher credit risk leads to lower asset quality, requiring banks to hold more capital to cover potential losses and book higher provisions. Non-performing loans, where borrowers default on their payments, can significantly impact asset quality. To mitigate losses and maintain soundness, banks need to follow solid lending criteria, actively monitor asset quality, and proactively address non-performing loans.

The assets quality in banks is closely tied to the quality of loans provided by the bank, and this can be measured through non-performing loans (NPLs), which consist of overdue and follow-up loans.

Bernanke, Lown, and Friedman (1991) argue that non-performing loans, or lower asset quality, can defer economic recovery in economies with bank-based financial systems, as it decreases operating profit margins and erodes the capital base for new loans. Klein (2013) states that non-performing loans can impact the profitability of banks, which is their main source of profit, and ultimately affect the financial stability of the economy. A significant amount of lower asset quality or non-performing loans can lead to bank bankruptcies and economic slowdown (Sarmento, M. L. L. P. R. ,2023) Considering that lower quality assets, often referred to as toxic assets, were one of the main reasons for the 2008 global crisis, measuring non-performing loans, analyzing their effects, and implementing necessary economic policies are of significant importance for the overall economy and the banks themselves.

Out of the 25 fundamental principles established by the Basel Committee on Banking Supervision (BCBS) for the effective supervision of the banking system, seven are related to the asset quality of banks and loan risk management. This indicates that asset quality has become an important aspect for supervisory authorities worldwide (Abata, 2014) The criteria initially published by the BCBS in 2000 under Basel I were later legalized by the European Union through directives on capital adequacy. These criteria have been revised in response to developments in financial markets and the global financial crisis that began in 2007. Lastly, the Basel III criteria were implemented in 2013.

The spread of distress in the financial system gives rise to systemic risk, as spillovers across institutions can occur through direct contractual links, heightened counterparty credit risk, or indirectly through price effects and liquidity spirals. As a result, the measured co-movement of institutions' assets and liabilities tends to exceed levels that can be justified by fundamentals alone. Measures of systemic risk capture the potential for the spreading of financial distress across institutions by assessing this increase in tail co-movement (Adrian & Brunnermeier, 2011, p. 1).

The statement of the problem: emphasizes that lending activities are crucial income sources for commercial banks. The quality of assets, particularly loans, plays a significant role in determining the income generated by banks. The magnitude of loans and the repayment capacity of borrowers in various sectors, such as commercial loans, asset financing, and real estate financing, impact asset quality. The Central Bank of Egypt reported an increase in non-performing loans, particularly in the manufacturing, trade, and personal sectors. This rise in non-performing loans negatively affects the

loan portfolio of commercial banks and, consequently, their lending activities to different economic sectors, which can have an impact on overall economic growth.

Furthermore, understanding the relationship between commercial bank systemic risk and assets quality is important because the banking sector is influenced by business cycles, which, in turn, affect bank lending. Systemic risk refers to the risk of one financial institution's problems spreading to others or the entire financial system. Examining this relationship helps in assessing the overall stability and resilience of the banking sector and its impact on asset quality.

The study aims to answer the following questions:

1. Does asset quality affect systemic risk? The study will investigate the relationship between the quality of a bank's assets (such as loans) and the level of systemic risk in the banking system. Systemic risk refers to the risk of problems in one bank or financial institution spreading to others or the entire financial system.
2. Does asset quality affect asset financing of commercial banks in Egypt? The study will explore how the quality of a bank's assets influences its ability to provide financing for acquiring or financing assets, such as equipment, vehicles, or real estate.
3. Does asset quality affect vendor financing of commercial banks in Egypt? The study will examine the impact of asset quality on the provision of financing by banks to vendors or suppliers, which facilitates the purchase of goods or services by customers.

4- The specific objectives of the study are as follows:

1. To determine the effect of asset quality on systemic risk in commercial banks in Egypt.
2. To evaluate the effect of asset financing on the asset quality of commercial banks in Egypt.
3. To determine the effect of vendor financing on the asset quality of commercial banks in Egypt.

By investigating these relationships, the study aims to provide insights into the impact of asset quality on systemic risk and the effects of different financing activities on asset quality in commercial banks in Egypt.

The conceptual framework: for this study involves three main variables: asset quality, systemic risk, asset financing, and vendor financing. These variables are interrelated and will be examined in the context of commercial banks in Egypt.

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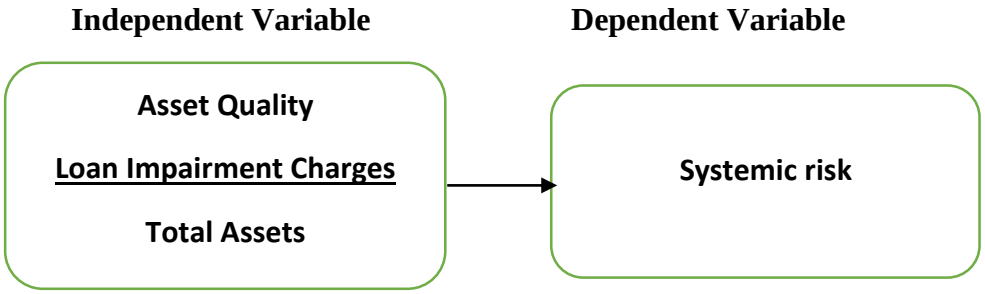

Figure 1: Conceptual Framework

The hypotheses: should include the variables being tested and the expected relationship between them. Based on the information provided earlier, I can help you rephrase the hypotheses as follows:

Hypothesis 1: There is no significant effect of asset quality (measured by ratio of nonperforming loans) on systemic risk (measured by Value at Risk).

Hypothesis 2: There is no significant effect of size (measured by total assets) on systemic risk (measured by Value at Risk).

Hypothesis 3: There is no significant effect of bank type (whether Islamic or Conventional) on systemic risk (measured by Value at Risk).

LITERATURE REVIEW

The theory of systemic risks encompasses both external business environment factors (political, social, economic, legal risks) and banking activities. Collier and Skees (2013) identify price instability, political instability, and natural disasters as key elements of this theory. They argue that these systemic risks are particularly important for non-developed countries, such as developing and emerging economies. Love and Turk Ariss (2014) also find evidence of the transmission of macroeconomic shocks to the credit portfolios of banks.

This theory explains the role and responsibilities of banks in accepting deposits from savings entities and providing funds to those entities for consumption or investment purposes. However, when loans turn bad and become Non-Performing Loans (NPLs), depositors may bear the burden of losing their deposits, except for portions covered under deposit insurance schemes. This has the potential to impact not only specific banks but also the entire banking system and the economy of the country under consideration.

Haldane and May (2011) support the views of Acharya (2009) in their study on systemic risk in the banking ecosystem. They argue that banking crises can be linked to external events that are beyond the control of the banking system. These events, such as recessions, civil unrest, major wars, and environmental catastrophes, have the potential to significantly devalue bank assets and ultimately lead to the failure of the banking system.

Cochrane (2004) also contributes to the theory of systemic risk by emphasizing that indirect damages, regardless of the triggering mechanism, can cause harm to the banking system. He argues that such damages create uncertainty in the system, leading to a tightening of overall credit conditions and subsequent economic dislocations. Cochrane views systemic risk as the transmission of problems from weak institutions to healthy ones in a way that threatens the entire system. He further suggests that systemic risk is the probability or likelihood that economic contractions will cause financial intermediaries, such as banks, to restrict credit to a greater extent than justified by economic fundamentals.

Overall, these studies highlight the interconnectedness between the banking system and external factors, such as macroeconomic conditions and environmental events. They emphasize that systemic risk arises from the potential transmission of problems from one institution to others, leading to a broader impact on the financial system and the economy.

Based on the systemic risks theory, this study aims to explore the relationship between bank asset quality and systemic risk factors. The systemic risks theory suggests that external factors can have a significant impact on the banking system, potentially leading to a deterioration in asset quality and increased systematic risk.

By examining the influence of these specific factors on bank asset quality, this study seeks to contribute to the understanding of how systemic risks can affect the stability and performance of the banking sector.

NPLs are a significant concern for banks as they can lead to reduced profitability, liquidity issues, and even insolvency. When a bank has a high level of NPLs, it may need to set aside more capital to cover potential losses, which can limit its ability to lend money to new borrowers. Additionally, NPLs can damage a bank's reputation and reduce customer confidence in the institution.

To manage NPLs, banks typically have internal policies and procedures in place to identify and monitor loans that are at risk of becoming non-performing. These policies may include regular reviews of borrower creditworthiness, early warning systems to detect potential problems, and strategies for managing and recovering bad debts.

In some cases, banks may also work with borrowers to restructure their loans to make them more manageable and reduce the risk of default. However, if a borrower is unable or unwilling to repay the loan, the bank may need to take legal action to recover the funds, which can be a lengthy and costly process.

Overall, the management of NPLs is an important aspect of banking operations, and banks must have effective strategies in place to identify, monitor, and manage these risky assets.

According to D'Hulster et al. (2014), NPLs can be defined as obligations related to loans and advances that are over 90 days past due and when the banks consider the borrower unlikely to pay or when another type of obligation is past due by more than 90 days. This definition aligns with the Financial

Soundness Indicators (FSIs) of the International Monetary Fund (IMF), which categorize NPLs as positions that are non-performing and past due on principal or interest by over 90 days.

However, Jain (2007) suggests a more detailed definition of NPLs by providing five instances. The first category includes advances where interest or installment payment of principal remains overdue for more than 90 days in relation to a term loan. The second instance refers to a loan account that remains "out of order" for more than 90 days in relation to an overdraft or cash credit.

These definitions highlight the different scenarios in which a loan or advance can be classified as non-performing, emphasizing the importance of timely payments and the assessment of the borrower's ability to repay. Banks use these definitions to identify and manage NPLs effectively, as they have significant implications for the financial health and stability of the institution. (Nikolaidou, E., & Vogiazas, S. ,2017).

In addition to the previous categories, the third category of the definition of NPLs, as suggested by Jain (2007), includes bills that remain overdue for more than 90 days, specifically in the case of bills purchased and discounted. It also encompasses cases where interest or installment payments of principal, or both, remain overdue for two harvest seasons for short-term crop loans and one harvest season for long-term crop loans, in the case of advances granted for agricultural purposes. The final category includes any amount that is overdue for more than 90 days in respect of other accounts.

Based on these definitions, it can be concluded that NPLs, also known as Non-Performing Assets (NPAs), encompass all categories of bank loans where interest or principal, or both, have remained unpaid for over 90 days. However, loans that have been recovered through efforts such as the sale of obligors' securities or loans that have been restructured are excluded from this definition (D'Hulster et al., 2014).

It is true that there is a general consensus in the literature on the measurement of NPLs. The most commonly used measure is the ratio of Non-Performing Loans (NPLs) to Gross/Total loans. This measure is used by several researchers, including Park (2012) and Makri et al. (2014). The ratio of NPLs to Gross/Total loans provides an indication of the proportion of loans that are not being repaid as agreed, relative to the total amount of loans made by the bank.

Castro (2013) also uses a similar measure to assess credit risks (NPLs). The measure is the ratio of the aggregate nonperforming loans in a bank's balance sheet to the total gross loans. This measure provides an indication of the level of credit risk that a bank is exposed to, as it reflects the proportion of loans that are not being repaid as agreed.

the use of the ratio of NPLs to Gross/Total loans is a widely accepted measure for assessing the level of credit risk in a bank's loan portfolio. It provides a simple and straightforward way to monitor the performance of a bank's loan portfolio and to identify potential risks to the bank's financial stability. (Nkusu, M. ,2011)

The systemic risk theory posits that society functions like a human body, where a dysfunction in one organ or institution can have a ripple effect on the entire system. This theory suggests that any

disruption in political, economic, social, or environmental institutions can negatively impact the functioning of society as a whole, including the financial sector and the banking industry. (CSR. ,2017).

The origins of the systemic risk theory can be traced back to the general system theory proposed by biologist Ludwig Von Bertalanffy. In the 1970s, the rise of systems theory prompted social scientists to view organizations as open systems that interact with their environment. It became evident that changes in the environment could have a significant impact on open systems such as the banking system. (Meuleman, E., & Vander Vennet, R. ,2020).

Therefore, when there are changes in the business environment factors, it is expected that these changes will also affect open systems like the banking system. This implies that disruptions or crises in other sectors can potentially lead to systemic risks in the financial sector, potentially impacting the stability and functioning of the banking industry.([1] Ayomi, S., Sofilda, E., Hamzah, M., & Ginting, A. ,2021).

The literature on systemic risks theory can be divided into two strands. The first strand focuses on the belief that challenges faced by a specific financial institution, particularly a bank, such as liquidity issues or low-quality assets, can have a ripple effect on the entire banking system. This, in turn, can impact other economic fundamentals. Scholars like Acharya (2009) have explored this perspective, highlighting how problems within one bank can potentially lead to systemic risks that affect the broader financial system.(Borri, N., Caccavaio, M., Di Giorgio, G., & Sorrentino, A. ,2014).

The second strand of the literature suggests that banking system issues, such as banking crises, can be attributed to macroeconomic conditions. Factors like price instability (inflation, interest rates, and exchange rates), political instability, and environmental risks (such as natural disasters) are considered influential in this regard. Researchers such as Love and Turk Ariss (2014), Collier and Skees (2013), Collier et al. (2011), and Haldane and May (2011) have examined the relationship between macroeconomic conditions and banking system vulnerabilities.

The corruption is expected to have a negative impact on bank asset quality. This is because significant levels of corruption within a country can lead to the approval of inappropriate loans, insider credits, and/or insider-related credits. When corruption is widespread, it weakens corporate governance within banks and compromises regulatory authorities. This, in turn, increases the likelihood of higher non-performing loans (NPLs). (Giulio Velliscig, Josanco Floreani and Maurizio Polato ,2021).

The presence of corruption can make loan recovery exercises extremely difficult. Law enforcement agencies and the judiciary, which are responsible for enforcing loan recovery and resolving legal disputes, may be compromised by corruption themselves. As a result, they may contribute to the problem rather than offering solutions.

The relationship between corruption and bank asset quality highlights the importance of strong corporate governance and effective regulatory oversight in maintaining the health and stability of the banking sector. Efforts to combat corruption and improve transparency and accountability within the

banking system are crucial for reducing the risks associated with corruption and enhancing bank asset quality.

Intense political instability can have significant negative consequences for bank asset quality. Banks typically provide loans based on the assumption that the political environment will remain stable throughout the loan period. This stability is crucial for ensuring stable cash flows to the borrowing entities and the consumers of final products.

However, when there is political instability, interruptions occur in society and economic activities are particularly affected. This can disrupt the production processes of firms and hinder the consumption of final products, ultimately impacting the cash flow of economic units. As a result, borrowers may struggle to generate the expected cash flows to repay their loans, leading to an increase in non-performing loans (NPLs) and a deterioration in bank asset quality.

The financial intermediation theory of banking, systemic risk theory, and credit-default theory all support the notion that major and prolonged political instabilities, such as civil conflicts, unstable governments, terrorism, and similar incidents, can interfere with both production processes and consumption patterns. This disruption in economic activities can have a cascading effect on the banking sector, increasing the likelihood of loan defaults and negatively impacting bank asset quality.

Therefore, it is crucial for banks to assess and manage the risks associated with political instability when making lending decisions. This includes considering the potential impact of political risks on the cash flow generation capacity of borrowers and the overall stability of the banking system.

The underpinning theories of financial intermediation theory of banking, credit-default theory, and systemic risks theory all suggest that environmental risks can have an impact on bank asset quality. Some studies have found positive associations between environmental risks and credit riskiness, while others have found negative associations.

The positive associations have been documented in studies such as Collier et al. (2013), which found a positive association between environmental risks and loan losses. This is consistent with prior research by Collier et al. (2011), which argues that environmental risks can lead to an increase in the proportion of restructured loans, which are considered bad loans.

On the other hand, some studies have found negative associations between environmental risks and credit riskiness. For example, Klomp (2014) found that environmental risks can lead to a decrease in credit riskiness, as banks may be more cautious in lending to sectors that are particularly vulnerable to environmental risks.

Overall, the relationship between environmental risks and bank asset quality is complex and can depend on a variety of factors, including the specific type of environmental risk, the industry sector, and the regulatory environment. It is important for banks to carefully assess and manage the risks associated with environmental factors when making lending decisions, in order to maintain the health and stability of their loan portfolios and the overall banking system.

The high levels of non-performing loans (NPLs) in banks in Egypt have been identified as a significant factor contributing to the demise of these banks. When the NPLs are high, the assets set aside as provisions for these loans may not be sufficient to protect the bank against the risk of default on loan payments. This can weaken the bank's financial position and jeopardize its ability to meet its obligations.

The inclusion of non-performing assets in a bank's loan portfolio can have several negative effects on the bank's operations. Firstly, it can impact the operational efficiency of the bank. Dealing with NPLs requires additional resources and efforts from the bank, such as increased monitoring, collection efforts, and legal actions. This diverts resources and attention away from other productive activities, affecting the overall efficiency of the bank's operations.

Secondly, non-performing assets can affect the profitability of the bank. When loans are not repaid, the bank loses out on the expected interest income and may also incur additional costs related to the recovery or write-off of these loans. This can lead to a decline in profits and erode the bank's financial stability.

Furthermore, non-performing assets can also impact the liquidity and solvency of the bank. As the bank's assets become tied up in non-performing loans, it may face difficulties in generating sufficient cash flows to meet its obligations, including the repayment of its own debts. This can strain the bank's liquidity position and put its solvency at risk.

Overall, the high levels of non-performing loans in banks in Egypt have significant implications for their stability, profitability, liquidity, and solvency. It is crucial for banks to effectively manage and reduce their NPLs through proactive measures such as improved credit risk assessment, effective loan recovery strategies, and strong corporate governance practices.

The studies mentioned provide insights into the relationship between different types of loan products and bank asset quality.

You are correct in stating that declining bank asset quality can be a sign of problems within the banking system and can potentially lead to a financial crisis if not effectively managed. When a bank's asset quality deteriorates, it can have negative implications for its profitability.

As you mentioned, non-performing assets (NPAs) can lower a bank's profitability. NPAs generate lower interest income compared to performing assets, and there is also the risk of not recovering the principal amount of the loan. This can result in reduced earnings for the bank and hinder its ability to generate profits.

Furthermore, a bank's deteriorating asset quality can have broader negative effects on the economy and society. It can slow down economic growth as banks may become more cautious in lending, leading to a decrease in credit availability for businesses and individuals. This, in turn, can hamper investment, entrepreneurship, and overall productivity.

Moreover, a decline in asset quality can also impact social welfare. When banks face financial difficulties due to poor asset quality, they may need to implement cost-cutting measures, which can include reducing staff, limiting lending, or increasing fees. These actions can have adverse effects on employment, access to credit, and overall financial stability within the country, affecting the well-being of individuals and businesses.

In summary, deteriorating asset quality in banks not only affects their profitability but can also have wider implications for economic growth, productivity, and social welfare. It is crucial for banks and regulatory authorities to closely monitor and manage asset quality to mitigate the risks associated with declining asset quality and maintain a stable and healthy banking system.

The statement you mentioned highlights that changes in asset quality and capital in the Indonesian banking industry do not necessarily correspond to an increase in profitability. While profitability is an essential aspect for banks, it may not always align directly with changes in asset quality and capital.

Asset quality and capital are crucial elements for banks in managing credit risk and enhancing profitability. Maintaining a high-quality asset portfolio, with a lower proportion of non-performing assets, can contribute to better risk management and reduce potential losses. Adequate capital levels provide a buffer against unexpected losses and support the bank's ability to generate profits.

However, the relationship between asset quality, capital, and profitability is complex and can be influenced by various factors. Changes in asset quality and capital may not always translate into immediate improvements in profitability, as profitability depends on several other factors such as operating efficiency, interest rate environment, loan pricing, and market conditions.

Profitability ratios, such as return on assets (ROA) and return on equity (ROE), are commonly used to assess a bank's ability to generate profits. A higher rate of return indicates better performance and profitability. However, it is important to note that profitability ratios can fluctuate over time due to various factors, and the absolute level of profitability may vary across banks and industry sectors.

In summary, while asset quality and capital are important elements for banks to manage credit risk and enhance profitability, changes in these factors may not always directly correspond to changes in profitability. Profitability is influenced by multiple factors, and the relationship between asset quality, capital, and profitability can be complex. Monitoring and managing all these aspects are crucial for banks to ensure sustainable and profitable operations.

Abata (2018) suggests that loan products such as commercial loans and asset financing have a positive influence on asset quality. This implies that banks offering these types of loans may experience better asset quality, potentially due to the higher creditworthiness and lower default risk associated with these loan products.

On the other hand, Izundu, Nwakoby, and Adigwe (2017) found that micro loan products have a positive but insignificant effect on bank asset quality. This suggests that while micro loans may contribute positively to asset quality, the impact may not be statistically significant, indicating that other factors may also play a role in determining asset quality.

Sola et al. (2012) argue for a positive linear relationship between vendor financing products and bank asset quality. Vendor financing refers to loans provided by banks to customers for the purchase of specific goods or services from pre-approved vendors. The study suggests that banks offering vendor financing may experience better asset quality, potentially due to the close relationship between the loan and the underlying purchase, which can enhance creditworthiness and reduce default risk.

Vithessonthi, Schwaninger, and Müller (2017) propose that a relatively large share of loan products to the manufacturing sector can improve asset quality for commercial banks. This indicates that banks with a significant exposure to the manufacturing sector may have better asset quality, potentially due to the stability and profitability of this sector.

Overall, these studies highlight the importance of considering different loan products and their specific characteristics when analyzing their impact on bank asset quality. Different loan types may have varying effects, and factors such as creditworthiness, default risk, and sector-specific considerations can influence the relationship between loan products and asset quality.

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According to Fred Sporta, (2018),The non-performing assets ratio is an essential indicator when determining how financial crises affect the asset quality of financial institutions, particularly commercial banks, in Kenya. The non-performing assets ratio is a measure of the proportion of loans that are not being repaid on time or are in default. A higher non-performing assets ratio indicates a higher level of credit risk and can negatively impact the asset quality of banks.

The study you mentioned highlights the negative impact of non-performing assets on the asset quality of Kenyan commercial banks. The study analyzed 38 commercial banks over an eleven-year period and found a positive association between non-performing assets and asset quality. The study also emphasized the importance of capital sufficiency and financial success in mitigating the risk of financial distress.

The findings of the study have significant implications for financial institutions, including commercial banks, and policymakers. It underscores the importance of implementing appropriate norms and controls to manage credit risk and prevent non-performing loans. By doing so, banks can protect their asset quality and ensure the safety of depositor funds. Policymakers can also use these findings to develop regulations and policies that promote sound credit risk management practices.

Measuring Variables and Developing Hypotheses

This research tries to test the effects asset quality on the systemic risk of the 9 Egyptian banks listed in the Egyptian Exchange during the period from 2011 to 2022. This has been applied using multiple regression according to panel analysis techniques.

Table (1) shows the characteristics of research variables, as follows:

Table (1): The research variables

Variable	Calculation	Sign
Systemic Risk	= Value at Risk (90%)	VAR_90
Systemic Risk	= Value at Risk (95%)	VAR_95
Systemic Risk	= Value at Risk (99%)	VAR_99
Asset Quality	= Nonperforming loans/ Total loans	NPL
Bank Size	= Bank total assets	SIZ
Bank Type	= 1 (for Islamic) and = 0 (for Conventional)	ISL

This paper aims at testing the following hypotheses:

1- There is no significant effect of asset quality (measured by ratio of nonperforming loans) on systemic risk (measured by Value at Risk).

1- There is no significant effect of size (measured by total assets) on systemic risk (measured by Value at Risk).

1- There is no significant effect of bank type (whether Islamic or Conventional) on systemic risk (measured by Value at Risk).

The following tables illustrate the descriptive statistics of the research variables and correlation coefficients between independent variables, as follows:

Table (2): Descriptive statistics of independent variables

	VAR_90	VAR_95	VAR_99	NPL	SIZ	ISL
Mean	3.303241	4.231599	5.973228	10.42281	6701734.	0.326087
Median	2.552332	3.265607	4.607201	4.901607	3684232.	0.000000
Maximum	23.10166	28.84819	39.62888	56.26080	31712403	1.000000
Minimum	1.027340	1.317392	1.861540	0.752073	1105389.	0.000000
Std. Dev.	2.996441	3.760850	5.196485	14.03888	6859687.	0.471348
Skewness	4.253875	4.181188	4.101156	2.367953	1.853599	0.741982
Kurtosis	24.75802	24.04247	23.26659	7.366988	5.438291	1.550538
Jarque-Bera	2092.207	1965.407	1832.381	159.0810	75.47289	16.49518
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000262
Sum	303.8982	389.3071	549.5370	958.8983	6.17E+08	30.00000
Sum Sq. Dev.	817.0581	1287.103	2457.314	17935.20	4.28E+15	20.21739
Observations	92	92	92	92	92	92

Table (3): Correlation coefficient between independent variables

	NPL	TA	ISLAMIC
NPL	1.000000		
TA	-0.256699	1.000000	
ISLAMIC	-0.029707	-0.271718	1.000000

7. Testing Hypotheses

7.1: Determinants of VAR_90 using Panel Regression

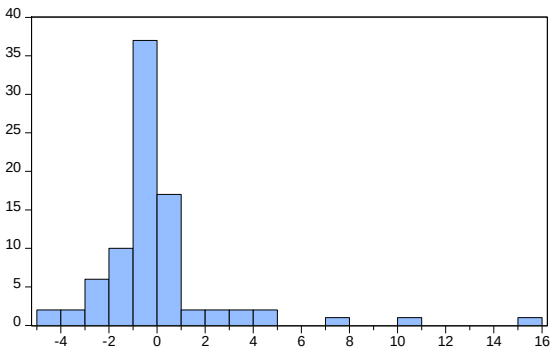
The following outputs illustrate the determinants of VAR_90, according to OLS technique, as follows:

Dependent Variable: VAR_90
Method: Panel Least Squares
Date: 10/17/23 Time: 10:32
Sample (adjusted): 2011 2021
Periods included: 11
Cross-sections included: 9
Total panel (unbalanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	3.107882	0.622633	4.991517	0.0000
NPL	0.090078	0.021668	4.157255	0.0001
SIZ	-4.60E-08	4.88E-08	-0.942128	0.3489
ISL	-1.259252	0.661303	-1.904199	0.0604

R-squared	0.241237	Mean dependent var	3.383970
Adjusted R-squared	0.213135	S.D. dependent var	3.098189
S.E. of regression	2.748261	Akaike info criterion	4.905729
Sum squared resid	611.7879	Schwarz criterion	5.020677
Log likelihood	-204.4935	Hannan-Quinn criter.	4.951965
Durbin-Watson stat	1.326433		

This means that VAR_90 is affected by each of NPL and ISL at p-value of 0.10 and explanation power of 24.1%. Jarque-Bera test indicates the normality of data probability distribution, as follows:



Series: Standardized Residuals
Sample 2011 2021
Observations 85

Mean	4.75e-16
Median	-0.340261
Maximum	15.41895
Minimum	-4.892212
Std. Dev.	2.698738
Skewness	3.094691
Kurtosis	16.65470
Jarque-Bera	796.0220
Probability	0.000000

A robustness check has been conducted using panel data analysis according to GMM technique and provides the following outputs:

Dependent Variable: VAR_90
Method: Panel Generalized Method of Moments
Date: 10/17/23 Time: 10:36
Sample (adjusted): 2011 2021
Periods included: 11
Cross-sections included: 9
Total panel (unbalanced) observations: 85
2SLS instrument weighting matrix
Instrument specification: C NPL TA ISLAMIC
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	3.107882	0.622633	4.991517	0.0000
NPL	0.090078	0.021668	4.157255	0.0001
SIZ	-4.60E-08	4.88E-08	-0.942128	0.3489
ISL	-1.259252	0.661303	-1.904199	0.0604

R-squared	0.241237	Mean dependent var	3.383970
Adjusted R-squared	0.213135	S.D. dependent var	3.098189
S.E. of regression	2.748261	Sum squared resid	611.7879
Durbin-Watson stat	1.326433	J-statistic	1.61E-28
Instrument rank	4		

This means that VAR_90 is affected by each of NPL and ISL at p-value of 0.10 and explanation power of 24.1%.

7.2: Determinants of VAR_95 using Panel Regression

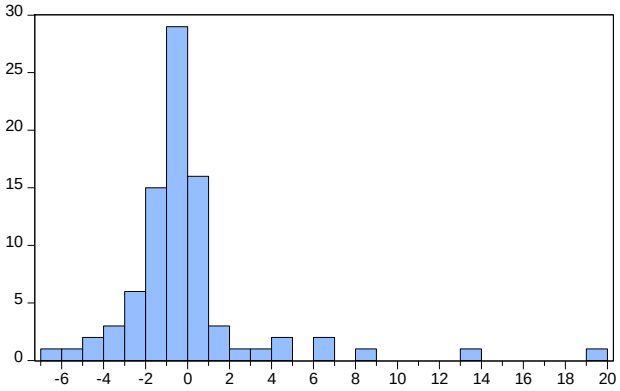
The following outputs illustrate the determinants of VAR_95, according to OLS technique, as follows:

Dependent Variable: VAR_95
Method: Panel Least Squares
Date: 10/17/23 Time: 10:39
Sample (adjusted): 2011 2021
Periods included: 11
Cross-sections included: 9
Total panel (unbalanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	3.990972	0.780135	5.115745	0.0000
NPL	0.113459	0.027149	4.179147	0.0001
SIZ	-5.81E-08	6.12E-08	-0.949631	0.3451
ISLA	-1.603798	0.828588	-1.935580	0.0564

R-squared	0.243824	Mean dependent var	4.331883
Adjusted R-squared	0.215817	S.D. dependent var	3.888546
S.E. of regression	3.443466	Akaike info criterion	5.356750
Sum squared resid	960.4543	Schwarz criterion	5.471698
Log likelihood	-223.6619	Hannan-Quinn criter.	5.402985
Durbin-Watson stat	1.337056		

This means that VAR_95 is affected by each of NPL and ISL at p-value of 0.10 and explanation power of 24.4%. Jarque-Bera test indicates the normality of data probability distribution, as follows:



Series: Standardized Residuals
Sample 2011 2021
Observations 85

Mean	-3.71e-16
Median	-0.417402
Maximum	19.09537
Minimum	-6.149525
Std. Dev.	3.381417
Skewness	3.034042
Kurtosis	16.14988
Jarque-Bera	742.8328
Probability	0.000000

A robustness check has been conducted using panel data analysis according to GMM technique and provides the following outputs:

Dependent Variable: VAR_95
Method: Panel Generalized Method of Moments
Date: 10/17/23 Time: 10:40
Sample (adjusted): 2011 2021
Periods included: 11
Cross-sections included: 9
Total panel (unbalanced) observations: 85
2SLS instrument weighting matrix
Instrument specification: C NPL TA ISLAMIC
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	3.990972	0.780135	5.115745	0.0000
NPL	0.113459	0.027149	4.179147	0.0001
SIZ	-5.81E-08	6.12E-08	-0.949631	0.3451
ISLA	-1.603798	0.828588	-1.935580	0.0564

R-squared	0.243824	Mean dependent var	4.331883
Adjusted R-squared	0.215817	S.D. dependent var	3.888546
S.E. of regression	3.443466	Sum squared resid	960.4543
Durbin-Watson stat	1.337056	J-statistic	1.42E-28
Instrument rank	4		

This means that VAR_95 is affected by each of NPL and ISL at p-value of 0.10 and explanation power of 24.4%.

7.3: Determinants of VAR_99 using Panel Regression

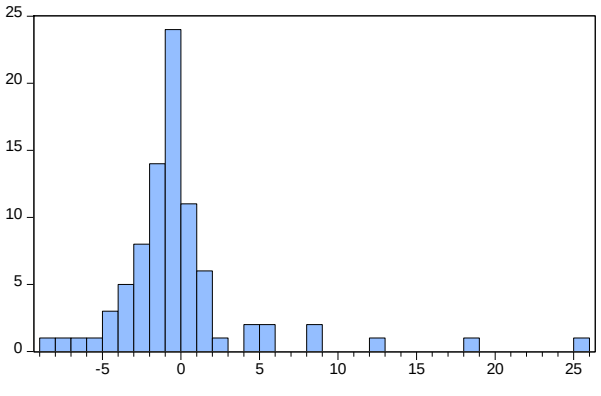
The following outputs illustrate the determinants of VAR_99, according to OLS technique, as follows:

Dependent Variable: VAR_99
Method: Panel Least Squares
Date: 10/17/23 Time: 10:41
Sample (adjusted): 2011 2021
Periods included: 11
Cross-sections included: 9
Total panel (unbalanced) observations: 85

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	5.647680	1.076024	5.248655	0.0000
NPL	0.157322	0.037446	4.201321	0.0001
SIZ	-8.08E-08	8.44E-08	-0.957415	0.3412
ISL	-2.250176	1.142854	-1.968910	0.0524

R-squared	0.246498	Mean dependent var	6.110199
Adjusted R-squared	0.218590	S.D. dependent var	5.372899
S.E. of regression	4.749502	Akaike info criterion	5.999872
Sum squared resid	1827.179	Schwarz criterion	6.114820
Log likelihood	-250.9946	Hannan-Quinn criter.	6.046108
Durbin-Watson stat	1.349137		

This means that VAR_99 is affected by each of NPL and ISL at p-value of 0.10 and explanation power of 24.6%. Jarque-Bera test indicates the normality of data probability distribution, as follows:



Series: Standardized Residuals
Sample 2011 2021
Observations 85

Mean	-1.53e-15
Median	-0.613886
Maximum	25.99244
Minimum	-8.508287
Std. Dev.	4.663918
Skewness	2.966756
Kurtosis	15.60334
Jarque-Bera	687.2631
Probability	0.000000

A robustness check has been conducted using panel data analysis according to GMM technique and provides the following outputs:

Dependent Variable: VAR_99
Method: Panel Generalized Method of Moments
Date: 10/17/23 Time: 10:42
Sample (adjusted): 2011 2021
Periods included: 11
Cross-sections included: 9
Total panel (unbalanced) observations: 85
2SLS instrument weighting matrix
Instrument specification: C NPL TA ISLAMIC
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	5.647680	1.076024	5.248655	0.0000
NPL	0.157322	0.037446	4.201321	0.0001
SIZ	-8.08E-08	8.44E-08	-0.957415	0.3412
ISL	-2.250176	1.142854	-1.968910	0.0524

R-squared	0.246498	Mean dependent var	6.110199
Adjusted R-squared	0.218590	S.D. dependent var	5.372899
S.E. of regression	4.749502	Sum squared resid	1827.179
Durbin-Watson stat	1.349137	J-statistic	1.35E-28
Instrument rank	4		

This means that VAR_99 is affected by each of NPL and ISL at p-value of 0.10 and explanation power of 24.6%.

CONCLUSIONS

So, results indicate the significance of the effects each of NPL and ISL on each of the dependent variables VAR_90, VAR_95 and VAR_99. So, for NPL and ISA, we reject the null hypothesis and accept the alternative one. IN addition, results don't support any significant effect of SIZ on any of the dependent variables. So, for SIZ, we accept the null hypothesis and reject the alternative one.

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