ISSN 2090-3359 (Print)
ISSN 2090-3367 (Online)

Advances in Decision Sciences

Volume 28
Issue 3
September 2024

Published by Asia University, Taiwan and Scientific and Business World

Mitigating Financial Crimes: How Anti-Money Laundering Mechanisms Shape Bank Outcomes

Anas AlQudah
Department of Banking and Finance,
Yarmouk University, Jordan
***Corresponding author** Email: anas.qudah@yu.edu.jo

Natli Mazhar Al Zoubi
Department of Banking and Finance,
Yarmouk University, Jordan
Email Nataliemazhar@gmail.com

Lara Al Haddad
Department of Banking and Finance,
Yarmouk University, Jordan
Email: Lara.haddad@yu.edu.jo

Received: February 8, 2024; First Revision: April 22, 2024;
Last Revision: September 14, 2024; Accepted: October 29, 2024;
Published: April 30, 2025

Abstract

Purpose: This study examines the influence of anti-money laundering (AML) mechanisms on the financial performance of Jordanian banks, alongside assessing how macroeconomic and financial factors—such as inflation, GDP, bank size, quick ratio, and financial leverage—affect performance dynamics.

Design/methodology/approach: Using a descriptive-analytical approach, the research analyzes data from 12 Jordanian banks listed on the Amman Stock Exchange (ASE) from 2007 to 2021. Given the unbalanced nature of the panel data, fixed-effect models were employed to evaluate the relationship between AML indices, key bank performance metrics, and broader economic variables.

Findings: The results demonstrate a significant negative relationship between AML intensity and bank performance, indicating that stringent AML enforcement can impose short-term financial burdens. In contrast, liquidity (as measured by the quick ratio) and bank size positively and significantly impact profitability. Inflation was also found to significantly increase bank performance. Meanwhile, financial leverage displayed a negative but statistically insignificant influence on performance. These findings collectively illustrate the complex interplay between compliance obligations, operational characteristics, and macroeconomic conditions in shaping bank outcomes.

Research limitations/implications: The study focuses exclusively on Jordanian banks, and caution is advised when generalizing the findings to banks operating under different regulatory frameworks or economic systems.

Practical implications: The findings suggest that banks must carefully balance regulatory compliance costs with operational resilience strategies. Policymakers should consider frameworks that support banking sector stability without imposing excessive burdens on institutions, particularly smaller banks.

Social implications: Effective AML measures not only protect financial institutions but also foster public trust and contribute to the overall health of the financial system.

Originality/value: This paper provides comprehensive empirical insights into the intertwined effects of AML compliance and macro-financial factors on banking sector performance within an emerging market context.

Keywords: Anti-Money Laundering, Bank Performance, Financial Crime, Jordan.

JEL Classification: G21, G28, K42, M48, O16

1. Introduction

Money laundering, a long-standing concern in the global financial landscape, originated from the clandestine activities of criminals who accumulated substantial wealth through prostitution, extortion, gambling, and bootlegging, especially in the U.S. during the 1920s and 1930s. Field Le Khac, et al. (2009) articulated that money laundering seeks to obscure the illicit roots of money, making it appear legitimate. It involves multifaceted transactions designed to conceal the source of assets, enabling them to masquerade as fair commercial proceeds (Naik et al., 2002). This process allows criminals to maintain their income sources and has evolved into an internationally recognized crime (Hopton, 2009).

While authors' interpretations may differ slightly, two salient features always surface: the illicit origin of the money and the camouflage mechanism. An intriguing yet unproven theory suggests that the term "money laundering" may have roots in the practices of the notorious Prohibition-era mobster Al Capone, who allegedly used laundromats as fronts to legitimize his illegal earnings (Oulahan & Lambert, 1967).

As society evolved, so did the intricacy of money concealment practices, bolstered by sophisticated legal and business tactics to maintain the money's "invisibility." The urgency to counter these practices can be evidenced by international efforts like the World Bank's strategies and global accords, which strive to stifle or slow the flow of illicit money into burgeoning markets. Still, the initial steps for many criminal organizations involve routing their illegal earnings back home—a stage often deemed preliminary due to the heightened risk of detection (Villányi, 2021).

Idowu and Obasan (2012) provide a detailed examination of the phases of money laundering, breaking it down into three stages. In the initial or "placement" stage, the launderer introduces illicit wealth into the banking system. This introduction might involve breaking down large sums into smaller, less noticeable amounts or buying financial instruments. Once inside the financial system, the "layering" stage begins, where many transactions occur to obscure the money's origin. Nance (2018) explains that the concluding "integration" stage involves reintroducing the funds into the economy, allowing investments in assets or ventures.

However, the intergovernmental Financial Action Task Force (FATT) identifies several detrimental economic repercussions stemming from AML, including alterations in money demand and the amplification of prudential risks (Levi & Reuter, 2011). This backdrop lays the foundation for our study, accentuating the crucial linkage between anti-money laundering (AML) and bank performance—a pivotal addition to the extensive discourse on corporate misconduct causes and ramifications.

Banks, the bedrock of economies, profoundly shape nations' trajectories (Condosta, 2012). With the Jordanian banking sector boasting a market share of 33% of Jordan's economy, its susceptibility to money laundering is palpable. However, the rising global focus on money laundering intricacies and determinants necessitates a rigorous exploration of the relationship between AML initiatives and the financial performance of Jordanian banks.

The overarching question driving this study is:

> *What links Anti-Money Laundering (AML) endeavors to the Financial Performance (FP) of Jordanian banks?*

As money laundering increasingly tarnishes the financial landscape—a natural extension of organized crime—the criticality of AML regulations has surged. This study will dissect the relationship between AML risks and Jordanian banks' performance, seeking to discern AML's direct implications. Given the scant literature on this nexus, our research aspires to offer insights beneficial to banks and policymakers, potentially sculpting regulations that curtail financial duress.

In a world where the repercussions of money laundering are glaringly evident, assessing its ramifications on bank performance becomes indispensable. This study seeks to craft a gamut of recommendations to alleviate money laundering incidents, offering insights into Jordan's legal posture vis-à-vis this criminal phenomenon. Addressing these challenges, this study investigates the multiple factors influencing bank performance. In addition to examining the direct impact of AML regulations, it explores how macroeconomic conditions (inflation and GDP growth) and internal financial metrics (bank size, quick ratio, and leverage) also affect performance. The study develops six hypotheses to comprehensively capture the dynamics influencing Jordanian banks' financial outcomes. Our objectives encompass:

- Investigating the influence of AML on Jordanian banks' performance,
- Scrutinizing the effects of various economic and financial variables, such as Inflation and GDP, on bank performance, and
- Presenting actionable insights contributes to Jordan's safer, more resilient banking landscape.

The structure of this research encompasses six distinct sections. The initial section offers a broad overview of the study. Here, readers will encounter a concise introduction, a description of the problem under investigation, the primary objectives of the research, its significance, and the contributions it hopes to make. The second section delves into the core concepts, highlighting the importance, foundational principles, and processes related to anti-money laundering. Furthermore, it touches upon various dimensions of bank performance and probes the relationship between these and anti-money laundering. The third section offers a comprehensive assessment of past research that explored the nexus between bank performance and anti-money laundering within the financial realm. The subsequent section elucidates the research's population, the sample selection criteria, the data collection techniques, and the specific model under consideration. The fifth section delves into the empirical findings stemming from the research model. Concluding the research, the sixth section presents the study's key findings and offers recommendations based on these insights.

2. Literature Review and Theoretical Framework

The importance and impact of anti-money laundering (AML) mechanisms on banking outcomes have been rigorously examined in various countries and contexts. The body of evidence from numerous

researchers illuminates the multiple dimensions of this issue, particularly in countries with diverse financial systems(Al Qudah, et al., 2025; Guidara, 2022; Prendi et al., 2023; Sonsuphap, 2022).

2.1. *Global Perspectives on Anti-Money Laundering Mechanisms*

Idowu and Obasan (2012) were pioneers in assessing the implications of AML policies on Nigerian banks. They discovered a robust relationship between bank performance and the enactment of comprehensive AML regulations, underscoring the detrimental impact of money laundering on the broader economy. Meanwhile, Birindelli et al. (2014) delved into the operational consequences, information utilization, and regulatory advancements of AML practices in Italian banks. Their findings clarified the call for increased regulatory support to bolster AML infrastructure within the Italian banking sector.

Kemal (2014) critically assessed Pakistan's AML laws and found a notable reduction in money laundering in the financial sector attributed to enhanced employee training. However, the influence of customer record-keeping rules on money laundering was minimal, especially in low-income nations. On a related note, Esoimeme (2016) analyzed Germany's approach to balancing AML and counter-terrorist financing mandates with financial inclusion for immigrants, recommending risk-oriented screening techniques and effective management of migrant banking.

The intricate connection between financial penalties and banking outcomes was probed by Köster and Pelster (2017). Their findings revealed a negative correlation between financial penalties and banks' pre-tax profitability. Conversely, there was a positive correlation between financial liabilities and buy-and-hold returns. Addressing the challenge of illicit wealth outflows from Pakistan, Khan et al. (2018) highlighted stable nations with robust financial sectors as the primary destinations for laundered money. They advocated for the State Bank of Pakistan to adopt more strategic anti-laundering policies.

From a legislative standpoint, Cotoc et al. (2020) gauged the efficacy of AML efforts in Romania and other European nations. They underscored the pivotal role of laws and regulations in detecting and thwarting money laundering. Enforcement capabilities emerged as crucial in these endeavors. A subsequent study by Altunbaş et al. (2021) explored how AML interventions by U.S. authorities affected bank risk, finding a noticeable surge in risk across multiple metrics. Their research further proposed that AML authorities target banks with influential CEOs, especially when governance structures are lean and lack independence.

2.2. *Middle Eastern Perspectives on Anti-Money Laundering Mechanisms*

A deep dive into Jordan's AML regulatory landscape by Abu Olaim and A. Rahman (2016) found that the Arab Spring profoundly influenced the country's crime rates and money laundering activities. The aftermath witnessed heightened regulatory adherence but also a rise in customer dissatisfaction. Similarly, Truby (2016) chronicled Qatar's strides in aligning with the Financial Action Task Force (FATF)

guidelines, which evidenced substantial legislative advancements from 2008 onwards in combating money laundering and terrorist financing.

A universal observation was the minimal levels of AML transparency across both conventional and Islamic banking institutions. Transitioning to the role of Islamic banks, Alnasser Mohammed (2021) concluded that AML policies might inadvertently hamper Islamic bank performance, potentially stymying economic growth.

Naheem (2015) twin studies shed light on the legislative trajectories of Bahrain and Morocco. While Bahrain's AML/CTF framework was evolving positively, facilitating better reporting within its financial institutions, Morocco succeeded in building a robust AML/CTF legislative foundation. Lastly, Shbeilat and Alqatamin (2022) emphasized the importance of forensic accountancy in the battle against money laundering. Their findings championed the effectiveness of forensic accounting techniques but highlighted significant barriers impeding the broader adoption of this profession.

2.3. *What distinguishes this study from other previous studies?*

This literature review underscores the multi-dimensional nature of AML mechanisms and their varied implications across global and regional banking sectors. However, most existing studies discuss the efficiency and effectiveness of applying anti-money laundering rules in Western countries, especially in the countries of the Middle East.

This study is unique because it uses descriptive, correlation, and regression analysis on the panel data and the annual reports of Jordanian banks from 2007 to 2021. It does not use questionnaires to find results. It also examines how the impact of anti-money laundering has changed in light of economic and political changes in the region.

2.4. *Theoretical Framework*

Money laundering is a multifaceted crime rooted in the concealment of illicitly obtained money, aiming to make it appear legitimate proceeds. Historically, money laundering activities can be traced back to criminal endeavors in the U.S. during the 1920s and 1930s (Le Khac et al., 2009). While its origins might be contentious, the mechanics behind the crime are well-defined. Money laundering involves intricate transactions that obscure the illegal sources of money, allowing it to blend seamlessly into legitimate financial systems (Naik et al., 2002). Two intrinsic elements define this crime: the illicit origin of funds and the techniques used to disguise this origin (Hopton, 2009).

Money laundering methods have evolved over the years, growing in complexity. Contemporary techniques now use advanced legal and business strategies to better obscure money's origin (Stessens, 2000). For a clearer understanding of this evolution, one should break down the stages of money laundering. Idowu and Obasan (2012) categorize these stages into three distinct phases:

- Placement: This initial phase involves injecting illicit money into the banking system. Standard techniques include breaking down large amounts into smaller, less noticeable sums or buying financial instruments that can later be cashed without suspicion.
- Layering: Once illicit money enters the banking system, it undergoes numerous conversions to distance itself from its source. These conversions can involve transferring the money between different accounts, changing its form, or moving it across borders.
- Integration: In this final stage, the laundered funds are reintroduced into the economy, making it difficult to trace them back to their illicit origins. Often, this reintroduction involves investments in legal businesses or the purchase of assets (Nance, 2018).

However, these stages do not operate in isolation. They are deeply intertwined with the global financial system, especially banks. As institutions entrusted with safeguarding a nation's financial assets, banks play a pivotal role in facilitating or hindering money laundering. Recognizing this, international bodies like the Financial Action Task Force (FATT) have identified several economic repercussions tied to inadequate anti-money laundering (AML) measures in banks, including unpredictable shifts in money demand and the exacerbation of prudential risks (Levi & Reuter, 2011).

In the context of Jordan, where banks constitute a significant portion of the nation's economy (Condosta, 2012), understanding the relationship between AML and bank performance is crucial. Specifically, this theoretical framework seeks to:

- Highlight the Relationship: Investigate the nexus between rigorous AML measures and the financial health of Jordanian banks. It proposes that effective AML mechanisms can bolster a bank's reputation, reduce regulatory penalties, and improve overall financial performance.
- Incorporate External Variables: Recognize the influence of external economic and financial variables on bank performance. Factors such as inflation rates and GDP growth can indirectly impact the efficacy of AML measures and, by extension, the bank's performance (Vaithilingam & Nair, 2007).
- Recommendation for a Resilient Banking Landscape: By understanding the intricate relationship between AML and bank performance, this framework aims to provide insights that can guide the formulation of policies. These policies can fortify the Jordanian banking sector against money laundering threats, ensuring its stability and resilience.

Money laundering, as the primary method of sanitizing illicit cash, invariably engages formal financial entities, especially banks. Multiple avenues facilitate this laundering, from leveraging import and export sectors to directly utilizing financial institutions (Aluko & Bagheri, 2012). When banking overseers and regulators, such as financial institutions, enact rigorous anti-money laundering (AML) policies, they inadvertently bolster sound governance practices pivotal for the sustainability and growth of these economically vital entities. Notably, foundational AML protocols, such as 'know your customer' and upholding internal checks, seamlessly align with timeless principles that underpin prudent banking management, oversight, and regulation (Idowu & Obasan, 2012).

Furthermore, AML does not just safeguard institutions—it catalyzes economic growth. Jarrow (2014) posits that AML mechanisms can spur international trade and foster sustained financial inflows. A bank that mitigates money laundering operations stands a better chance of efficient performance. Money laundering presents a dual threat to financial institutions. On the one hand, it can coincide with employee fraud, eroding institutional integrity. On the other hand, the bedrock of robust financial entities is customer trust. Institutional deceit jeopardizes this trust, especially in burgeoning economies, posing significant risks to investors and depositors (Meles et al., 2016).

In conclusion, this theoretical framework provides a lens to view the interconnected dynamics of money laundering, AML measures, and bank performance. It emphasizes the importance of robust AML systems in ensuring the legality of banking operations and their overall financial success, especially within the Jordanian context.

According, we can set these hypotheses:

H0. AML has a statistically significant impact on bank performance.

H1. Inflation has a statistically significant impact on bank performance.

H2. GDP has a statistically significant impact on bank performance.

H3. There is a statistically significant impact between Bank Size and Bank Performance.

H4. There is a statistically significant impact between Quick Ratio and Bank Performance.

H5. There is a statistically significant impact between Bank Leverage and Bank Performance.

3. Data and Methodology

3.1. The Sample

This research explores the impact of money laundering on Jordanian banks and the effectiveness of anti-money laundering measures. The population for this study consists of banks listed on the Amman Stock Exchange (ASE). From this population, the study sample specifically focuses on Jordanian commercial banks, excluding international and Islamic banks.

Three primary reasons guided this selection:

- Regulatory Variances: Islamic banks operate based on Shariah law principles, which diverge from conventional banking practices. Foreign banks, meanwhile, may be influenced by their home country's regulations, which are distinct from Jordanian standards. Including such banks might skew the findings due to these differing operational guidelines.

- Risk Exposure Differences: Islamic banks, with their profit-and-loss-sharing models, have unique risk profiles, especially concerning credit and interest rate risks. Foreign banks' global operations also introduce varied risk exposures. If included, these differences could confound the analysis.
- Data Consistency: Acquiring and comparing data from Islamic and foreign banks can pose challenges because of different reporting requirements. To ensure data consistency, these banks were left out of the sample.

The final dataset encompasses 12 commercial banks, covering 2007 to 2021. All analyzed banks follow fiscal years commencing on January 1 and concluding on December 31. Table 1 breaks down the study's sample selection.

Table 1: The sample selection

Banks listed in (ASE)	**Population**
All banks	21
Foreign banks	5
Islamic foreign banks	1
Islamic Jordanian banks	3
Final sample: Commercial banks	12

Source: Central Bank of Jordan (https://www.cbj.gov.jo/)

3.2. Sources of Data Collection

The Anti-Money Laundering Index (AMLI) data was sourced from the Basel Institute on Governance Database. However, data from 2007 to 2012 was unavailable from this source. The analysis included these years to establish trends and provide context for the subsequent years.

The linear interpolation method was employed to address the missing AMLI data for 2007-2012. This method assumes a gradual progression of AMLI values during the missing years based on historical and subsequent trends observed in the dataset. Due to its simplicity and reliability, linear interpolation is a widely accepted approach for handling missing time series data in financial research.

The imputation of missing AMLI data introduces a limitation to the study. While the interpolation method ensures continuity and enables comprehensive analysis, the findings for the earlier years (2007-2012) should be interpreted cautiously. This limitation acknowledges the potential impact on the reliability and validity of the study's conclusions.

Data on macroeconomic variables will be derived from the World Bank database (http://www.worldbank.org/). In contrast, data specific to Jordanian banks will be collected from the annual reports of banks listed on the Amman Stock Exchange (ASE) (https://www.ase.com.jo/en). All financial data will be represented in the Jordanian dinar (JOD).

3.3. *Variables in the Study*

The research aims to gauge the impact of AML on the performance of Jordanian banks. To ensure representativeness, a sample typical of all banks has been chosen. Annual reports provide the data for the variables used in the study's model. Below are the defined study variables:

This research aims to assess the impact of AML practices on the financial performance of Jordanian banks. To ensure the findings are representative, we have selected a sample typical of the entire banking sector. The study's model uses data from annual reports, and we defined a series of variables to structure the analysis.

The study's dependent variable is financial performance (FP). Researchers measure it as the return on assets (ROA) over a set period, not as a long-term performance indicator (Cohen, et al., 1995). This metric shows how well a bank uses its assets to generate profit over the analysis period.

The Anti-Money Laundering Index (AMLI) measures a country's money laundering risk. It is a globally recognized tool. Anti-Money Laundering (AML) practices are assessed using the AMLI (Beekarry, 2011). Also, the study includes last year's return on assets (ROA_{it-1}). It is the ratio of net income to net assets from the year before. They calculate the bank's net income by net assets (Jewell & Mankin, 2011). This past performance indicator provides context for current financial outcomes.

The study model also integrates several control variables, which capture broader economic influences. Inflation (INF) measures the effect of price level changes on banks. It reflects the devaluation of money due to rising prices (Barro, 1996). Gross Domestic Product (GDP) is the total market value of goods and services produced in the economy over a set period. It is essential for shaping economic health (Abdalla Abu Olaim & Rahman, 2016; Arrow, et al., 2012; Barro, 1996).

Also, the quick ratio (QR) tests a bank's ability to meet its current liabilities. It measures liquidity and resilience (Wijaya & Sedana, 2020). Bank size (BS) is a control to spot differences in bank performance. It is often measured by a bank's revenue (Al-Manaseer, et al., 2012). Lastly, the financial leverage ratio (LEV) measures a bank's ability to manage debt. This inclusion further contextualizes financial performance (Ingves, 2014).

These variables provide a model to understand AML's effect on Jordanian banks' performance. It considers direct AML impacts, past performance, and external economic factors.

Table 2 outlines the key variables in the study along with their measurement methods and symbols, providing a structured framework for analysis.

Table 2. Measurement of variables used in the research model

NO	Variables	Measurement	Measurement Symbol
1	Financial Performance (FP)	Return on Assets	ROA
2	Anti-Money Laundering (AMLI)	Anti-Money Laundering Index	AMLI

3	Inflation (INF)	Consumer Price Index	CPI
4	Gross Domestic Product (GDP)	Constant Price	CP
5	Quick Ratio (QR)	(Current Assets – Inventory) / Current Liabilities	(C.A. – Inv. /CL)
6	Bank Size (BS)	Revenue	Rev.
7	Financial Leverage Ratio (LEV)	Total Debt/ Total Equity	TD/TE

Source: Principles of Managerial Finance Global Edition 14th by Zutter and Smart (2019).

3.4. *Model Robustness*

Before conducting the regression analysis, all variables in the dataset underwent an Augmented Dickey-Fuller (ADF) test for stationarity. The test results indicated that financial performance (FP), leverage (LEV), revenue (REV), quick ratio (QR), the Anti-Money Laundering Index (AMLI), inflation (INF), gross domestic product (GDP), were non-stationary in their level forms, as indicated by p-values exceeding 0.05 at conventional significance thresholds. Exceptions to this pattern appeared only in a few subsamples. Consequently, alternative and potentially more traditional techniques, such as differencing, were employed to transform the non-stationary variables. This precautionary measure ensures that spurious regression is not an issue, as noted by Wong and Yue (2024). The results of the ADF test are summarized in Table 3.

Table 3. Augmented Dickey-Fuller (ADF) Test Results

Variable	Level Form (p-value)	Stationarity at Level?	First Difference (p-value)	Stationarity at First Difference?	Conclusion
FP	0.382	No	0.003	Yes	I(1)
LEV	0.476	No	0.012	Yes	I(1)
QR	0.412	No	0.007	Yes	I(1)
AMLI	0.539	No	0.001	Yes	I(1)
INF	0.622	No	0.004	Yes	I(1)
GDP	0.583	No	0.009	Yes	I(1)

Note: Null hypothesis: Unit root exists (non-stationary). Rejected at 5% significance level after first differencing.
Source: Author's calculation based on the collected dataset.

3.5. *Cointegration Test*

Look for possible lasting equilibrium relationships between the discussed variables once the Johansen cointegration test has been conducted. These relationships don't have to be directly between financial performance (FP) and any of the Anti-Money Laundering Indexes (AMLI), nor between FP and inflation (INF); instead, as associations of cointegration, they signal longer-term changes in both variables. Some pairings, such as FP and gross domestic product (GDP), did show cointegration, indicating stable long-term associations. Other combinations of variables, particularly those involving one financial performance indicator with either Leverage or Quick Ratio, did not possess the cointegration property at all. This implies a lack of consistent long-term equilibrium relationships between these pairs. In light of these findings, to ensure that non-cointegrated variables are stationary and to remove spurious relationships, first-differencing was carried out according to the recommendations of Wong and Pham (2025).Table 4 details the exact results of this same type of analysis.

Table 4. Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Trace Statistic	5% Critical Value	Max-Eigen Statistic	5% Critical Value	Cointegration?
None	98.21	95.75	42.56	40.08	Yes
At most 1	56.02	69.82	28.17	33.87	No
At most 2	27.85	47.86	14.24	27.58	No

Source: Author's calculation based on the collected dataset.

3.6. *Data Transformation*

We constructed new variables as follows:

$\Delta LEV = LEV_t - LEV_{t-1}$;

$\Delta QR = QR_t - QR_{t-1}$;

$\Delta REV = REV_t - REV_{t-1}$;

$\Delta AMLI = AMLI_t - AMLI_{t-1}$;

$\Delta INF = INF_t - INF_{t-1}$;

$\Delta GDP = GDP_t - GDP_{t-1}$.

These transformed variables were used in both correlation and regression models to ensure robustness.

3.7. *Model Specification*

The fixed-effects (FE) model was selected based on the Hausman test, which confirmed a correlation between individual effects and regressors. The regression equation is specified as:

$$FP_{it} = \alpha + \beta_1(\Delta AMLI_{it}) + \beta_2 (\Delta LEV_{it}) + \beta_3(\Delta QR_{it}) + \beta_4(\log REV_{it}) + \beta_5(\Delta INF_{it}) + \varepsilon_{it}, \quad (1)$$

where $\mathbf{FP_{it}}$ represents the Financial performance (ROA) of bank **i** at time **t**, $\Delta\mathbf{AMLI_{it}}$ represents the Differenced Anti-Money Laundering Index for bank **i** at time **t**, $\Delta\mathbf{LEV_{it}}$ represents the Differenced leverage of bank **i** at time **t**, $\Delta\mathbf{QR_{it}}$ represents the Differenced quick ratio for bank **i** at time **t**, $\mathbf{logREV_{it}}$ represents the Log of revenue (bank size) of bank **i** at time **t**, $\Delta\mathbf{INF_{it}}$ represents the Differenced inflation rate of bank **i** at time **t**, and $\boldsymbol{\varepsilon_{it}}$ represents the error term for bank **i** at time **t**.

3.8. *Summary of Methodological Adjustments*

In alignment with best practices (Cheng, et al., 2021; Wong & Yue, 2024), our methodology:

- Applies rigorous unit root testing (ADF);
- Utilizes first-differencing for I(1) variables without cointegration;
- Maintains model robustness via Durbin-Watson diagnostics; and
- Ensures compliance with statistical standards to prevent spurious regression.

This meticulous approach offers a statistically robust foundation for analyzing the relationship between AML practices and bank performance in Jordan.

4. Results

4.1. *Correlation Analysis*

Table 5 displays the correlation matrix for the transformed (stationary) variables. As anticipated following first-differencing, the correlations depict the relationships between the changes in variables rather than their levels, thereby reducing the risk of spurious results.

Table 5. Correlation Matrix (First-Differenced Data)

Variable	ΔFP	ΔLEV	ΔQR	ΔAMLI	ΔINF	ΔGDP
ΔFP	1.000	-0.211	0.288	-0.246	0.199	-0.173
ΔLEV	-0.211	1.000	-0.143	0.094	-0.062	0.038
ΔQR	0.288	-0.143	1.000	-0.127	0.119	-0.094
ΔAMLI	-0.246	0.094	-0.127	1.000	-0.173	0.211
ΔINF	0.199	-0.062	0.119	-0.173	1.000	-0.186
ΔGDP	-0.173	0.038	-0.094	0.211	-0.186	1.000

Source: Author's calculation based on the collected dataset.

Note: Values are based on first-differenced data to ensure stationarity and prevent spurious correlations. Δ indicates first difference.

The correlation analysis reveals that changes in the Anti-Money Laundering Index (ΔAMLI) exhibit a moderate negative relationship with changes in bank performance (ΔFP), indicated by a correlation coefficient of -0.246. This suggests that the tightening of AML controls may initially exert downward pressure on profitability, likely influenced by increased compliance costs and operational adjustments. Conversely, the quick ratio (ΔQR), which indicates a firm's liquidity position, positively correlates at 0.288 with ΔFP. Enhancements in liquidity positions correspond to stronger performance for banks. Furthermore, inflation (ΔFP) is recorded at 0.199 with ΔINF, demonstrating margin expansion effects for banks in this region over the past year. Although the strengths of these correlations provide insights, they suggest potential relationships that warrant further in-depth analysis.

4.2. *Regression Analysis*

Table 6 reports the results of the fixed-effects regression model, using the first-differenced variables to ensure stationarity and robustness.

Table 6: Regression Results (Fixed Effects Model — Corrected)

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Intercept	0.034	0.018	1.89	0.059
ΔAMLI	-0.372	0.097	-3.84	0.0003
ΔLEV	-0.021	0.014	-1.50	0.134
ΔQR	0.193	0.061	3.16	0.002
log(REV)	0.104	0.041	2.53	0.013
ΔINF	0.287	0.120	2.39	0.018
R-squared	0.462			
Adjusted R-squared	0.448			
F-statistic	17.58			0.000

Durbin-Watson	2.28			

Source: Author's calculation based on the collected dataset
Note: Model based on first-differenced variables for robustness and alignment with stationarity requirements. Significance level: $p < 0.05$.

The regression analysis confirms that the Anti-Money Laundering Index (ΔAMLI) significantly negatively affects bank performance, indicated by a coefficient of -0.372 and a highly significant p-value of 0.0003. This result reinforces observations from the correlation analysis, suggesting that while stringent AML measures are crucial for compliance and financial integrity, they may impose considerable short-term costs on banks, consequently reducing profitability. The quick ratio (ΔQR), which reflects the liquidity position of banks, shows a positive and statistically significant relationship with financial performance, with a coefficient of 0.193 and a p-value of 0.002, highlighting the importance of effective liquidity management in supporting bank profitability. Similarly, bank size, measured by the logarithm of revenue, demonstrates a positive effect on performance, as larger banks likely benefit from economies of scale that help mitigate compliance costs. The coefficient for bank size stands at 0.104 with a p-value of 0.013, underscoring its significance. Inflation (ΔINF) also exhibits a positive impact, with a coefficient of 0.287 and a p-value of 0.018, indicating that banks may experience improved margins in inflationary environments due to widening interest rate spreads. Conversely, changes in leverage (ΔLEV) present a negative coefficient of -0.021; however, this effect is statistically insignificant, as reflected by a p-value of 0.134, suggesting that variations in leverage played a limited role in influencing bank performance during the study period. These findings align well with the initial correlation insights and provide a robust understanding of the factors shaping bank performance in the context of AML compliance and macroeconomic dynamics.

4.3. *Model Robustness*

The Durbin-Watson test was conducted on the residuals of the regression model to detect autocorrelation and validate the reliability of its results. A Durbin-Watson statistic close to 2.28 and a p-value reaching up to 0.92 were produced in the tests. Both numbers fall within an acceptable range, with no evidence of significant autocorrelation in the model residuals. The absence of serial correlation indicates that the regression assumptions regarding errors are satisfied. This supports the credibility of the model's estimates. The result reinforces the validity of our end product and provides even greater assurance that the conclusions drawn from regression analysis are both statistically sound and methodologically robust. Table 7 provides the full details of the Durbin-Watson tests.

Table 7. Durbin-Watson Test Results

Model	Durbin-Watson Statistic	Conclusion
Fixed Effects Model (Final)	2.28	No autocorrelation detected

Source: Author's calculation based on residuals of the final model

4.4. *Summary of Findings*

The regression results closely align with the initial correlation analysis, offering several noteworthy insights. AML intensity shows a negative association with bank performance, reinforcing the understanding that, while compliance with stringent regulations is crucial for maintaining systemic

integrity, it imposes short-term financial burdens on banks. Liquidity management and operational scale emerge as pivotal drivers of profitability, highlighting the advantages that well-capitalized and efficiently managed banks have in mitigating regulatory compliance costs. Additionally, inflation appears to positively influence bank margins, reflecting how interest rate adjustments during inflationary periods can enhance banking profitability. These findings affirm that banks must balance fulfilling AML compliance obligations and sustaining profitability, particularly within Jordan's evolving financial environment. Specifically, the results supported Hypothesis 0 (H0), confirming that AML intensity negatively impacts financial performance. Hypothesis 1 (H1) was also supported, indicating that inflation positively affects bank profitability. Regarding Hypothesis 2 (H2), GDP exerted a positive influence, although statistically less dominant. A positive and significant relationship between bank size and performance validated Hypothesis 3 (H3). Furthermore, the positive effect of the quick ratio on profitability supported Hypothesis 4 (H4), demonstrating liquidity's vital role. Conversely, Hypothesis 5 (H5) was not supported, as leverage showed a negative but statistically insignificant association with performance. Collectively, these findings emphasize the complex interplay between regulatory, operational, and macroeconomic variables in shaping bank financial outcomes.

5. Discussion

The findings of this study offer significant insights into the relationship between anti-money laundering (AML) mechanisms and the financial performance of Jordanian banks. By ensuring methodological robustness through first-differencing and cointegration testing, we addressed the risk of spurious relationships, aligning our approach with the expectations of current econometric standards (Wong & Yue, 2024; Wong & Pham, 2025).

5.1. *Impact of AML Measures*

The analysis confirms a statistically significant negative association between changes in the Anti-Money Laundering Index (ΔAMLI) and bank financial performance (ΔFP). This finding suggests that while stringent AML controls are essential for maintaining regulatory compliance and financial integrity, they impose substantial short-term costs on banks. These costs likely stem from increased administrative burdens, higher compliance expenditures, and operational adjustments needed to meet evolving AML regulations.

This finding aligns with previous international research (Birindelli, et al., 2014; Köster & Pelster, 2017), emphasizing that although AML efforts enhance market reputation and long-term stability, they may temporarily hinder bank profitability, particularly in emerging economies like Jordan.

5.2. *Role of Liquidity and Bank Size*

Many quality control metrics, such as the Quick Ratio (ΔQR), have significantly enhanced banks' performance. A bank's favorable cash position allows it to obtain credit more affordably and increases its potential for profitable lending opportunities, particularly in uncertain markets where regulatory requirements restrict risk-taking. Similarly, the positive correlation between bank size (log(REV)) and performance illustrates economies of scale; larger banks typically possess more resources for compliance

costs and diversified income sources, helping alleviate the adverse financial impacts of strict AML enforcement.

5.3. *Macroeconomic Influences*

The critical aspect is that research has confirmed a relationship between inflation and bank performance. During inflationary periods, banks typically generate more revenue from the interest-rate spread, which increases net interest margins. For instance, this finding aligns with Barro's (1996) conclusions and reflects conditions in Jordan's banking sector. Historically, inflationary monetary policy settings have provided banks with profit cushions during high inflation periods in that region. These effects lead to considerably higher capital costs. Additionally, managers may escalate short-term borrowing, which can dilute ownership rights and potentially exacerbate agency issues. Conversely, changes in leverage (ΔLEV) have a significantly negative, yet statistically insignificant, effect on bank performance. This indicates that while adjustments to capital structure are pertinent, their short-term fluctuations do not substantially impact profitability when weighed against the operational constraints imposed by AML.

6. Conclusion and recommendations

6.1. *Conclusion*

This study explored the impact of anti-money laundering (AML) mechanisms on the financial performance of Jordan's commercial banks from 2007 to 2021. Our empirical results confirm that higher AML ratings lead to a temporary decline in bank financial performance. This decline is primarily attributable to increased internal compliance costs and necessary adjustments to meet evolving regulatory standards. However, these pressures appear mitigated by effective liquidity management and economies of scale, suggesting that while compliance imposes costs, operational strengths can lessen the financial burden and align regulations more closely with sustainable business practices.

Beyond AML, the findings also highlight the influence of other key factors. Inflation positively influenced bank profitability, likely stemming from widened interest margins during inflationary periods. Bank size and liquidity also emerged as significant determinants of stronger financial outcomes, underscoring the benefits of scale and robust liquidity management. Conversely, although leverage demonstrated a negative effect, its lack of statistical significance suggests that capital structure adjustments have a more limited short-term impact compared to operational and macroeconomic factors.

In conclusion, while AML structures are essential for safeguarding financial systems, banks must implement flexible strategies that enable them to fulfill regulatory requirements while maintaining profitability. Striking this balance is critical for preserving the distinction and competitive advantage of Jordan's banking sector.

6.2. *Policy Recommendations*

Based on these findings, several policy actions are recommended to effectively balance AML compliance with sustainable bank performance. First, banks should invest in technology-driven compliance solutions that automate AML processes, thereby enhancing operational efficiency and controlling related costs. Strengthening liquidity management practices remains essential, as robust liquidity positions enable banks to absorb the financial strains of regulatory compliance while pursuing growth opportunities. Larger banks should continue leveraging their scale advantages to distribute compliance costs across broader operations, while smaller banks might benefit from collaborative resource-sharing arrangements. Furthermore, regulatory authorities are urged to establish supportive frameworks that reduce the compliance burden on banks, particularly for smaller institutions facing disproportionate costs. Finally, continuous capacity building is crucial; banks should implement regular training programs to ensure staff remain well-informed of evolving AML requirements and that compliance initiatives are seamlessly integrated into daily operations. Collectively, these measures provide a pragmatic approach to enhancing compliance while maintaining financial performance, thereby reinforcing the banking sector's resilience.

6.3. *Future Research Directions*

For future research, this analysis could be extended to include Jordanian Islamic banks and microfinance institutions. Such an extension is warranted as the objectives and operations of these entities differ significantly from those of traditional commercial banks, potentially yielding distinct insights. Additionally, comparative regional studies encompassing a broader range of countries in the Middle East could illuminate how AML conditions and their impact on financial performance vary across diverse regulatory contexts within emerging markets.

References

Abdalla Abu Olaim, A. M., & Rahman, A. A. (2016). Recent development of anti-money laundering law in Jordan. *Journal of Money Laundering Control*, *19*(4), 316-328.

Abu Olaim, A. M. A., & A. Rahman, A. (2016). The impact of Jordanian anti-money laundering laws on banks. *Journal of Money Laundering Control*, *19*(1), 70-78.

Al-Manaseer, M., Al-Hindawi, R. M., Al-Dahiyat, M. A., & Sartawi, I. I. (2012). The impact of corporate governance on the performance of Jordanian banks. *European Journal of Scientific Research*, *67*(3), 349-359.

Alnasser Mohammed, S. A. S. (2021). Money laundering in selected emerging economies: is there a role for banks? *Journal of Money Laundering Control*, *24*(1), 102-110.

Al Qudah, A. M., Al-haddad, L., & Aljabali, A. A. (2025). Combatting medical corruption: A global review of root causes, consequences, and evidence-based interventions. *International Journal of Innovative Research and Scientific Studies*, *8*(2), 968-985.

Altunbaş, Y., Thornton, J., & Uymaz, Y. (2021). Money laundering and bank risk: Evidence from US banks. *International Journal of Finance & Economics*, *26*(4), 4879-4894.

Aluko, A., & Bagheri, M. (2012). The impact of money laundering on economic and financial stability and on political development in developing countries: The case of Nigeria. *Journal of Money Laundering Control*, *15*(4), 442-457.

Arrow, K. J., Dasgupta, P., Goulder, L. H., Mumford, K. J., & Oleson, K. (2012). Sustainability and the measurement of wealth. *Environment and development economics*, *17*(3), 317-353.

Barro, R. J. (1996). Democracy and growth. *Journal of economic growth*, *1*, 1-27.

Beekarry, N. (2011). International anti-money laundering and combating the financing of terrorism regulatory strategy: a critical analysis of compliance determinants in international law. *Nw. J. Int'l L. & Bus.*, *31*, 137.

Birindelli, G., Ferretti, P., & La Torre, M. (2014). Anti-Money Laundering in Italian Banks. *British Jorunal of Economics, Management & Trade*, *4*(6), 841-861.

Cheng, Y., Hui, Y., McAleer, M., & Wong, W. K. (2021). Spurious relationships for nearly non-stationary series. *Journal of Risk and Financial Management*, 14(8), 366.

Cohen, M. A., Fenn, S., & Naimon, J. S. (1995). *Environmental and financial performance: are they related?* Citeseer.

Condosta, L. (2012). How banks are supporting local economies facing the current financial crisis: An Italian perspective. *International Journal of Bank Marketing*.

Cotoc, C.-N. B., Șcheau, M. C., & Achim, M. V. (2020). Anti Money Laundering Effectiveness from a Legal Framework Perspective in Romania and European Countries. RSEP CONFERENCES.

Esoimeme, E. (2016). Balancing Anti-Money Laundering/Counter-Terrorist Financing Requirements and Financial Inclusion for Migrants: A Case Study of Germany. *Counter-Terrorist Financing Requirements and Financial Inclusion for Migrants: A Case Study of Germany (January 2, 2016)*.

Guidara, A. (2022). CRYPTOCURRENCY AND MONEY LAUNDERING: A LITERATURE REVIEW.

Hopton, D. (2009). *Money laundering: a concise guide for all business*. Gower Publishing, Ltd.

Idowu, A., & Obasan, K. A. (2012). Anti-money laundering policy and its effects on bank performance in Nigeria. *Business Intelligence Journal*, *6*(3), 367-373.

Ingves, S. (2014). Banking on leverage. keynote address to the 10th Asia-Pacific High-Level Meeting on Banking Supervision, Auckland, New Zealand.

Jarrow, R. A. (2014). Financial crises and economic growth. *The Quarterly Review of Economics and Finance*, *54*(2), 194-207.

Jewell, J. J., & Mankin, J. A. (2011). What is your ROA? An investigation of the many formulas for calculating return on assets. *Academy of Educational Leadership Journal*, *15*, 79-91.

Kemal, M. U. (2014). Anti-money laundering regulations and its effectiveness. *Journal of Money Laundering Control*, *17*(4), 416-427.

Khan, W. A., Jawaid, S. T., & Arif, I. (2018). Where does a nation's wealth go? Evidence from a third world country. *Journal of Money Laundering Control*.

Köster, H., & Pelster, M. (2017). Financial penalties and bank performance. *Journal of Banking & Finance*, *79*, 57-73.

Le Khac, N. A., Markos, S., O'neill, M., Brabazon, A., & Kechadi, M. T. (2009). An investigation into data mining approaches for anti money laundering. In *Proceedings of international conference on computer engineering and applications (ICCEA 2009)* (pp. 504-508).

Levi, M., & Reuter, P. (2011). Money laundering.

Meles, A., Porzio, C., Sampagnaro, G., & Verdoliva, V. (2016). The impact of the intellectual capital efficiency on commercial banks performance: Evidence from the US. *Journal of Multinational Financial Management*, *36*, 64-74.

Naheem, M. A. (2015). Trade based money laundering: towards a working definition for the banking sector. *Journal of Money Laundering Control*, *18*(4), 513-524.

Naik, R. R., Stringer, S. J., Agarwal, G., Jones, S. E., & Stone, M. O. (2002). Biomimetic synthesis and patterning of silver nanoparticles. *Nature materials*, *1*(3), 169-172.

Nance, M. T. (2018). The regime that FATF built: an introduction to the Financial Action Task Force. *Crime, Law and Social Change*, *69*, 109-129.

Oulahan, R., & Lambert, W. (1967). The scandal in the Bahamas. *Life*, *62*(5), 58-74.

Prendi, L., Borakaj, D., & Prendi, K. (2023). THE NEW MONEY LAUNDERING MACHINE THROUGH CRYPTOCURRENCY: CURRENT AND FUTURE PUBLIC GOVERNANCE CHALLENGES.

Shbeilat, M. K., & Alqatamin, R. M. (2022). Challenges and forward-looking roles of forensic accounting in combating money laundering: Evidence from the developing market. *Journal of Governance and Regulation/Volume*, *11*(3).

Sonsuphap, R. (2022). The structure of the illegal economy and its relationship to money laundering. *Corporate & Business Strategy Review*, *3*(1), 45-54.

Stessens, G. (2000). *Money laundering: a new international law enforcement model* (Vol. 15). Cambridge University Press.

Truby, J. (2016). Measuring Qatar's compliance with international standards on money laundering and countering the financing of terrorism. *Journal of Money Laundering Control*, *19*(3), 264-277.

Vaithilingam, S., & Nair, M. (2007). Factors affecting money laundering: lesson for developing countries. *Journal of Money Laundering Control*, *10*(3), 352-366.

Villányi, B. (2021). Money Laundering: History, Regulations, and Techniques. In *Oxford Research Encyclopedia of Criminology and Criminal Justice*.

Wijaya, D. P., & Sedana, I. B. P. (2020). Effects of quick ratio, return on assets and exchange rates on stock returns. *Am. J. Humanities Soc. Sci. Res*, *4*, 323-329.

Wong, W. K., & Pham, M. T. (2025). Could the correlation of a stationary series with a non-stationary series obtain meaningful outcomes?. *Annals of Financial Economics*, forthcoming.

Wong, W. K., & Yue, M. (2024). Could regressing a stationary series on a non-stationary series obtain meaningful outcomes?. *Annals of Financial Economics*, forthcoming.

Zutter, C. J., & Smart, S. B. (2019). *Principles of managerial finance*. Pearson London.