The Relationship Between Asset-Liability Management and Governance Quality in the Banking Industry

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This study investigates whether governance quality is associated with asset-liability management (ALM) within the US banking industry. Based on stewardship theory, we hypothesize that there ought to be a significant, positive association between bank governance quality and a strong balance sheet due to inherent fiduciary responsibility and internal controls associated with an ALM governance process. Due to endogeneity concerns, we employ two-stage least squares regression and examine the relationship between 10 ALM metrics and governance risk scores (a component of ESG quality scores) for a cross-sectional sample of 251 US publicly traded banks in 2022. The results suggest that corporate governance influences ALM, not vice-versa. However, contrary to our hypothesized direction, favorable governance quality is associated with weaker ALM metrics as the results indicate that there is an inverse relationship between governance quality and ALM. Even so, the results provide evidence that bank governance quality is associated with balance sheet management. The results should be of interest to bank executives, regulators, investors, and other stakeholders in the banking industry.

Keywords: asset-liability management, governance, banking industry, financial performance

INTRODUCTION

The failure of three large US banks in 2023 reopened debate about effective bank governance (Targeted News Service, 2023; Temple-West, 2023). While governing a bank is clearly multifaceted and complex (Spong & Sullivan, 2007), scholars often neglect one key part of bank administration, that of effective asset-liability management (ALM) (Swarup, 2012). ALM is an umbrella term used to convey management of a bank's balance sheet (Choudhry, 2011). ALM is the primary tool for controlling value creation in the banking industry (Canavezes & Schlener, 2012) as it involves the minimization of liquidity risk and interest rate risk by matching assets and liabilities by maturity pattern or duration (Kallur, 2016). ALM differs from bank regulatory compliance, which is the adherence to laws, regulations and exogenous capital and liquidity requirements. Failure to effectively manage ALM may affect bank survivability, as evidenced by Silicon Valley Bank's (SVB) failure in 2023 (Hanson, 2023).

Prior studies have documented the importance of ALM on bank financial performance (Belete, 2013; Chatterjee & Dutta, 2016; Dash, 2013; Guruswamy, 2018; Kosmidou et al., 2004; Memmel & Schertler, 2012; Owusu & Alhassan, 2021; Suresh & Krishnan, 2018; Tee, 2017). This literature affirms a positive

association between ALM and financial performance. Other studies have documented the relationship between bank governance quality and financial performance measures such as ROA or ROE, with mixed outcomes (Azmi et al., 2021; Daszyńska-Żygadło et al., 2021; Dragomir et al., 2022; El Khoury et al., 2023; Esteban-Sanchez et al., 2017; Khattak, 2021; La Torre et al., 2021; Rahi et al., 2021; Shakil et al., 2019). However, Fernandes et al. (2018) observed that empirical research related to the nexus of bank governance quality and financial performance has ignored ALM. We bridge this gap by hypothesizing that there ought to be a significant, positive relationship between bank governance quality and a strong balance sheet due to the intrinsic fiduciary responsibility associated with ALM management. In this vein, we align ourselves with previous literature which finds that specific bank governance quality indicators positively impact financial outcomes (Aebi et al., 2021; Caprio et al., 2007; Leventis et al., 2013; Minton et al., 2014). Further, while many bank governance quality studies rely on agency theory (Batae et al., 2021; Biswas et al., 2022; Grove et al., 2011; Grove et al., 2012; Jizi et al., 2014; Nguyen et al., 2015; Pourmansouri et al., 2022) we differentiate our study using stewardship theory which we believe more closely aligns to the fiduciary duties of bank management and directors as well as to a bank's role in society.

We model overall governance quality and its four components, audit and risk oversight, board structure, compensation, and shareholder rights, against relevant asset-liability metrics. From a design perspective, assessing this relationship is technically difficult because of the possibility of reverse causality (Bhagat et al., 2008). To overcome this issue, we employ ordinary least squares regression and address endogeneity through a simultaneous equation and two-stage least squares (2SLS) (Brown et al., 2011). To further resolve empirical challenges, we proxy governance quality through ESG governance scores; specifically, we rely on the Institutional Shareholder Services (ISS) Governance Quality Score (ISSGQS), a widely used, up-to-date, broad-based measure of corporate governance (Epps & Cereola, 2008; Jiraporn et al., 2015; Brown et al., 2011). Importantly, Lusk & Wells (2021a, 2021b) and Lusk et al. (2022) document that ISS derives its governance quality scores independent of GAAP-reported data, which makes their use in the present study appealing. Similarly, we use balance sheet-based metrics as indicators of effective ALM. On this point, we follow Choudhry's (2020) suggestion that meaningful ALM metrics should go beyond those required for regulatory purposes (e.g., Tier 1 capital ratio) as we leverage 10 quality indicators related to **liquidity** (quasi-liquid asset ratio (LIQ), 12-month coverage ratio (CR), real estate loans to assets ratio (RELA), loan-deposit ratio (LDR)), **organizational performance** (return on assets (ROA), net interest margin (NIM), equity to assets ratio (EAR), noninterest expense to asset ratio (NXA)), and **asset quality** (nonperforming loans to total loans (NPL), net charge-offs (NCO)).

To analyze the proposed relationship, we consider a cross-sectional sample of 251 US publicly traded banks and their fiscal year 2022 results. We derive our sample from banks classified as commercial banks or savings institutions by the Standard Industrial Classification (SIC) system; US banks with these classifications represent 98% of all banks classified as Depository Institutions under SIC major group code 60. We elected to narrow our focus to 2022 because of the extraordinary governance and financial challenges arising from both the Covid-19 pandemic and multiple monetary policy adjustments by the US Federal Reserve in response to inflationary pressure. We retrieved relevant financial data and certain qualitative variables from the US Securities and Exchange Commission's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system; we retrieved governance quality scores from a third-party intermediary. We controlled for seven bank characteristics including board structure, board size, board composition, auditor, sector, size, and market valuation.

Our study is novel in examining the relationship between governance quality and ALM in the banking industry. Beyond this, we differ from other ALM or bank governance quality research in four ways. First, we rely on ten ALM quality indicators within three measurement categories: liquidity, asset management, and organizational performance and ISS governance quality scores. Second, we ground our study in stewardship theory rather than agency theory; we believe stewardship theory is more germane for banking-related studies because stewardship theory recognizes the fiduciary and stewardship role of bank management. In contrast, agency theory presupposes recurring agency conflicts, which seems unlikely given the banking industry's role in society, its liquidity function, and its level of regulatory oversight. Third, we leverage a large US-based sample in a recent but unprecedented period of government stimulus

and rising interest rates. And finally, we address issues of reverse causality because the current bank governance quality – financial performance literature has not adequately done that.

Our primary finding suggests that governance quality drives ALM metrics, not vice-versa. However, contrary to our hypothesized direction, better governance quality is associated with weaker ALM metrics as the results indicate that there is an inverse relationship between governance quality, as measured by ISS governance quality scores, and ALM. At the governance component levels, weak audit and risk oversight, weak board structure, weak shareholder rights, and weak compensation is associated with stronger liquidity and profitability ratios. As such, our results support those of Festl-Pell and Hummel (2016) who similarly found that financially weaker banks have better governance, as measured by sustainability governance scores. They suggest that their empirical outcome is due to less stable, globally operating banks investing heavily in high quality ESG governance as part of their extended risk management frameworks. While this could also be true for the US banks, we suggest that our unexpected result may be due to riskier banks assuming aggressive loan postures because of excess cash arising from government stimulus in 2022.

This paper significantly contributes to the existing ALM and bank governance quality literature. We contribute to the governance quality literature by systematically investigating the relationship between governance quality and asset-liability management, the primary means of value creation in the banking industry. Here, we add clarity to the literature by finding that governance quality impacts ALM management, and not vice versa. While the results reveal that governance quality impacts balance sheet management in the banking industry, the results were not in the direction we anticipated. Further, we contribute to the literature by providing evidence that both supports and contradicts stewardship theory as the overall findings seem to both align with and challenge the predictions of this theory. Despite this paradox, one can see our results as a positive step in diversifying theoretical bases to fully interpret and explain governance practices in the banking sector.

We organize the remainder of this paper as follows. The next section reviews previous literature related to the importance of ALM in bank financial performance, the use of ALM as a governance mechanism, bank governance quality, measuring governance quality, and the nexus of governance and financial performance in banking. After developing our hypotheses, we review our research method, defining our data collection, variables of interest, and research design. After a review of the results, we note study limitations, suggest opportunities for future research, and provide concluding remarks.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Stewardship theory informs our examination of the proposed relationship between bank governance quality and ALM. Stewardship theory assumes management will act in the best interest of the company's shareholders to achieve organizational aims (Davis et al., 1997a). It contrasts with agency theory which assumes goal divergence between agent and principal, such that the agent may not always act in the principal's best interest. Importantly, stewardship theory assumes that management will function as a steward to maximize and protect shareholder wealth through financial performance (Davis et al., 1997a).

In relation to the present study, the act of stewarding relates to both the idea of one functioning as a fiduciary (Murninghan, 2018; Wu & Saunders, 2016) and to the notion of trust (Donaldson & Dunfee, 1999). As a matter of both convention and limited legal standard, practitioners and legal scholars have long established the concept of acting fiducially in banking (Baxter, 1993; Peres, 2015). A fiduciary responsibility requires a commitment to duty and forbearance of self-interested behavior, such that management acts with loyalty, care, and good faith (Kaplan, 1976; Johnson & Sides, 2003; Smith, 2002). Fiduciary responsibility arises from the pivotal concept of trust (Baxter, 1993). It should be clear that bank management must dutifully exercise trust when managing their debtor (asset) and depositor (liability) relationships. One can imagine the uproar if a financial institution creates dissonance in these interactions. Yet, it should also be clear that in managing external relationships, a bank has a fiduciary duty to its shareholders to manage financial risks, including risks inherent in its balance sheet structure such as liquidity risk, interest rate risk, credit risk, and other risks. Risk mitigation, therefore, is a fiduciary obligation for financial managers (Hiebl, 2012). When management's actions deviate from this goal, a bank

exposes itself to fiduciary risk (Eid & Asutay, 2019), for example, a monetary loss resulting from financial mismanagement (OECD, 2012). Fiduciary risk has legal/regulatory repercussions, and may hasten both reputational and withdrawal risk, the latter which may result in a liquidity crisis for the financial institution (Farhan & Alam, 2019).

Stewardship theorists like Davis et al. (1997a) suggest that the instrumentation for dealing with risk and uncertainty is through placing greater trust in workers, and that firms set up structures that help and empower that trust. Following this reasoning, we believe that financial institutions create governance structures which promote trust and stewardship to reduce risk, thus further advancing behaviors that are consistent with stewardship and fiduciary responsibility. Our logic seems consistent with stewardship theorists such as Donaldson and Davis (1989) and Hernandez (2012), as well as with management theorists such as Barnard (1938) and McGregor (1966), among others. ALM is the primary governance structure through which the banking industry mitigates financial risks. The Society of Actuaries (2003) defines ALM as "the ongoing process of formulating, implementing, monitoring and revising strategies related to assets and liabilities to achieve an organization's financial objectives, given the organization's risk tolerances and other constraints (p. 2)." While ALM is part of a bank's risk management framework, it differs from other risk management bodies in three specific ways: ALM looks at multiple risk factors at the same time, it acts as a decision channel through which strategic objectives are carried out as tactical actions, and its mandate affects the entire corporation (Adalsteinsson, 2014). At the implementation level, ALM includes planning and control activities that influence the size, maturity, quality, interest rate levels, and liquidity of a bank's assets and liabilities. Within a risk management framework, the primary goal of ALM is to produce accretive net interest income; realizing the best mix and level of assets, liabilities, and risk accomplishes this objective (van Greuning & Bratanovic, 2020).

When managing ALM, bank managements consider balance sheet structure and individual balance sheet elements (with specific risk aspects in mind) since understanding balance sheet composition is among the factors that decide a bank's risk level and profitability (van Greuning & Bratanovic, 2020). At its core, ALM is the adoption of a resilient balance sheet structure, such that a bank's liability structure aligns with its existing assets, thus protecting bank earnings from liquidity and interest rate risk while maximizing profitability. Effective ALM management is necessary because banks have an inherent problem, that is, they lend funds (loans) with longer maturities while accumulating funds (deposits) with shorter maturities. In other words, banks have significant long-term assets and short-term liabilities, compared to more modest long-term and short-term assets. These maturity mismatches lead to liquidity risks. Further compounding ALM management is interest rate risk, i.e., varying interest rates for each asset and liability contract. Ideally, banks want to borrow funds at lower interest rates and loan funds at higher interest rates. The spread, or net interest margin, between these values determines a bank's profitability. But rate mismatches due to different interest resetting frequencies lead to interest rate risk. Choudhry (2011) believes that one obvious interest rate risk is rising short-term interest rates which squeeze margins, especially when banks have substantial fixed, long-term lending contracts. Evidence of interest rate risk mismanagement was clear in the failure of SVB, Signature Bank, and First Republic Bank in early 2023 (The collapse of First Republic Bank, 2023). To say it briefly, a well-managed balance sheet is vital for bank survivability.

The Importance of ALM in Bank Financial Performance

Previous studies examined the importance of ALM by primarily focusing on the relationship between ALM and bank financial performance, *ex post*. Hester and Zoellner (1966), Haslem et al. (1992), and Lai and Hassan (1997) conducted pioneering work in this area. Hester and Zoellner saw that variation in individual bank assets and liabilities, including securities, loans, and demand-related accounts, accounted for 33%, 12%, and 11% of the variance in net current operating income, earnings before taxes (EBT), and after-tax income (EAT), respectively. Haslem et al. examined asset-to-liability matching strategy and its role in firm profitability. Haslem et al. found that foreign and domestic asset-to-liability matching strategies for US banks were associated with variations in net income, especially for those banks entangled in the less-developed nation lending crisis in the 1980s. Finally, Lai and Hassan extended the early research by introducing firm size with their study of small US commercial banks. In this context, Lai and Hassan found

that for banks with assets of less than $300 million, profit-related accounting variables (e.g., net interest margin) were the primary indicator of effective ALM. In a critique of these early studies, Al-Obaidan (1999) noted that Hester and Zoellner's study lacked theoretical structure. As a further critique, we highlight that the researchers undertook their respective studies before more recent developments in the banking sector, including the passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, US Basel III capital requirements, and Covid-19 stimulus.

Surprisingly, most of the literature exploring the nexus of ALM and bank financial performance in the past 20 years has been conducted outside the United States in countries like India (Chatterjee & Dutta, 2016; Dash, 2013; Suresh & Krishnan, 2018), Germany (Memmel & Schertler, 2012), the United Kingdom (Kosmidou et al., 2004), and in several developing countries in Africa (Belete, 2013; Guruswamy, 2018; Owusu & Alhassan, 2021; Tee, 2017). Table 1 supplies an overview of select literature from the last 20 years linking ALM and bank financial performance.

TABLE 1
OVERVIEW OF SELECT LITERATURE LINKING ALM AND BANK FINANCIAL PERFORMANCE

Author(s) (Year)	Context	Method	Time Period	Dependent Variable	ALM variables (accounts)	Major Finding
Belete (2013)	Ethiopia	Regression	2005 - 2010	ROA	Deposits in other banks, Other investments & debit balances, Loans and Advances, Fixed assets, Demand deposits, Saving and fixed deposits, and Other Liabilities and Credit Balances	Asset-liability spreads positively affects profitability of commercial banks in Ethiopia.
Chatterjee & Dutta (2016)	India	Regression	2004 - 2005. 2012 - 2013	EBT	Net loans and advances, Deposits and placings to banks, Investments, Fixed assets, Customer demand deposits, Customer time and savings deposits, Short-term funding, Other funding	High profit banks do not necessarily experience cheaper cost of funding than low profit banks, suggesting asset management is more important than liability management in India.
Dash (2013)	India	Gap Analysis; Regression	2005 - 2006	Profit	Asset-liability maturity mismatches	There is a risk-return trade-off for short-term maturity mismatches.
Guruswamy (2018)	Ethiopia	Regression	2010 - 2017	ROA	Deposits in other banks, Investments, Net loan and advances, Fixed assets, Demand deposits, Fixed deposits, Short-term loans, Long-term loans	Changes in specific asset and liability accounts are associated with changes in profitability.

Author(s) (Year)	Context	Method	Time Period	Dependent Variable	ALM variables (accounts)	Major Finding
Kosmidou et al. (2004)	UK	Regression	1996 - 2002	Operating Profit	Net loans, Deposits and placings, Investments, Fixed Assets, Demand deposits, Time & savings deposits, Other short-term funding, Other funding, Other (non-interest-bearing funding)	Liability management may be more important than asset management in the UK.
Memmel & Schertler (2012)	Germany	Canonical Correlation; Regression	1994 - 2007	ROE	Cash, Short-term & long-term interbank assets, Short-term & long-term loans to banks, Bonds, Stocks, Other assets, Short-term interbank liabilities, Long-term interbank liabilities, Short-term non-bank liabilities, Long-term non-bank liabilities, Savings accounts, Other liabilities	Bank characteristics and the choice of on-/off-balance sheet activities may shape the relationship between profits and asset-liability.
Owusu & Alhassan (2021)	Ghana	Regression	2007 - 2015	Net Income, Net Interest Income	Loans to customers, Loans and advances to banks, Cash and equivalents, Total securities, Fixed assets, Other assets, Demand deposits, Savings deposits, Fixed deposits, Deposits from banks, Other short-term funding, Total long-term funding, Other liabilities	Proper ALM management has a direct, positive impact on the profitability of banks.
Suresh & Krishnan (2018)	India	Gap Analysis	2007 - 2008. 2016 - 2017	Net Interest Income	Rate sensitive assets and rate sensitive liabilities	Asset-liability mismatches may lead to losses, especially if interest rates rise.
Tee (2017)	Ghana	Regression	2008 - 2012	ROA	Total assets, Total liabilities	Asset management may be more important than liability management in Ghana.

In these empirical studies, independent variables are various asset or liability accounts. The most prevalent asset factors include the levels of net loans, investments, and fixed assets, while the most prevalent liability accounts include the levels of demand deposits, time and savings deposits, and other short-term

liabilities. The dependent variable is a measure of overall profitability such as EBT or ROA, or a key part of bank success, such as net interest income (NII). The regression method is the most widely used in these empirical studies. However, many studies use a limited number of sampled banks, and therefore suffer from generalizability. Even so, this current literature overwhelmingly affirms a positive relationship between ALM and financial performance. In other words, good balance sheet management accrues financial dividends. Interestingly, no one best way of achieving positive financial outcomes through ALM is clear, as one author notes the supremacy of liability management over asset management (Kosmidou et al., 2004), while others document the supremacy of asset management over liability management (Chatterjee & Dutta, 2016; Tee, 2017). Others equate management of both sides of the balance sheet equally important (Belete, 2013; Guruswamy, 2018). Yet others, like Dash (2013) and Suresh & Krishnan (2018), merely highlight the risk-return trade-off inherent in the balance sheet structure, which is reasonable given the presence of liquidity and interest rate risks.

Research which would add value to the literature considered in this section includes the addition of US banks given this industry's economic size and impact, samples incorporating multiple bank sectors, or the inclusion of alternative independent variables such as the quasi-liquid asset ratio that analysts align more closely to ALM practices. Extending ALM research beyond financial performance is equally important, and one relevant area not yet fully explored is whether ALM is associated with governance quality. We address these gaps by studying the governance quality - ALM nexus amongst US banks across various sectors (e.g., state, and national commercial banks, and federally chartered savings institutions) and by using detailed bank performance measures that align with ALM, as described in the methods section of this paper.

ALM as a Governance Mechanism

ALM is a governance mechanism in banking. At the administrative level, stewardship of the bank's balance sheet falls under the responsibility of the Asset-Liability Committee (ALCO). ALCOs developed out of the ALM departments that banks created after the savings & loan crisis of the 1980s (Adam, 2007). The ALCO is vital in bank governance structures (Adalsteinsson, 2014). Choudhry (2020) summarizes its importance when writing, "If one accepts that ensuring a robust balance sheet is vital for a bank's survival…, then one will accept that the risk-management framework for managing the balance sheet is equally vital. *This sets the ALCO apart from other executive forums in a bank* [emphasis added]" (p.350). While there is no universal framework for ALCO governance (Choudhry, 2020), committees are typically composed of senior line managers of all relevant business and functional areas (van Greuning & Bratanovic, 2020). Customarily, ALCOs report directly to the Board of Directors. Among the committee's responsibilities are interest rate risk exposure management, liquidity policy and risk management, capital reporting and management, asset management, formulating hedging policy, and setting or recommending risk limits, among other things (Adalsteinsson, 2014; Choudhry, 2011).

Academic research has attempted to understand the effectiveness of ALM as a governance mechanism in banking, particularly in the context of ALM's ability and utility in managing risk, e.g., liquidity risk, interest rate risk, or financial distress. Unexpectedly, researchers find mixed results as to its effectiveness.

ALM management was ineffective as a risk-mitigating mechanism in studies by Illueca et al. (2014) and Karthikeyan et al. (2021). Illueca et al. point out that logical adjustments in ALM did not happen in Spanish savings institutions following bank deregulation in that country in 1988, despite the presence of increased lending and default risk associated with the adoption of aggressive lending policies and geographic expansions. As a subset of their regression study of 108 Spanish savings banks over the period of 1988 - 2010, Illueca et al. found that banks used neither bank capital nor insured retail deposits to offset the risk-taking effects of rapidly expanding Spanish savings institutions. Further, banks did not adjust average loan rates to compensate for risk increases in commercial lending. These results suggest that banks did not effectively use ALM as a risk-mitigating governance tool, despite the obvious changes in the market following Spanish banking deregulation.

Similarly, Karthikeyan et al. (2021) studied liquidity risk in small finance banks in India during interest rate and exchange rate volatility. Using the Maturity Gap analysis technique for the period 2019-2020, the

authors found this volatility exposed banks to liquidity risk and that this increased over time. In the short run (less than 14 days), 40% of the studied banks had deficient liquidity. This value grew to 60% for 15 - 28 days. In general, small Indian banks intensified their liquidity risk by mismatching assets with their short to long term liabilities in a volatile rate environment; this action was a counterintuitive response and represented poor ALM management in controlling risk.

In contrast, ALM was an effective risk-mitigating mechanism in studies by Burke and Warfield (2021), Purnanandam (2007), and Abou-El-Sood and El-Ansary (2017). First, Burke and Warfield investigate banks' ability to generate net interest income through ALM interest rate adjustments in response to changes in market interest rates. Using a sample of US bank holding companies for the period 1997 - 2013, the authors find that banks that are better at managing interest rate risk yield better returns and can sustain those returns over an extended period. The authors suggest that banks do so through intentional, asymmetric rate management on their rate-sensitive assets and liabilities where interest-rate changes on assets are greater than interest-rate changes on liabilities, regardless of increasing or decreasing market interest rates. Second, Purnanandam observes that certain US commercial banks manage their interest rate risk more aggressively by adopting conservative asset-liability management policies when faced with high probability of financial distress. Purnanandam exploited 1,443 bank failures between 1980 - 2003 to model the relationship between 12-month asset-liability maturity imbalances and financially distressed banks as part of his study on interest rate derivatives. He finds that banks with a higher likelihood of default maintain lower maturity mismatches, i.e., they hedge their interest rate risk more on the balance sheet. The results were particularly stronger for smaller institutions. Finally, Abou-El-Sood and El-Ansary added Islamic banks to the literature as they studied asset-liability interdependencies and ALM management in times of economic turmoil. The authors find that Islamic banks also tend to follow conservative asset-liability management practices, and like Purnanandam, this was especially true for smaller banks where the interdependencies were greater. In general, these studies show effective ALM governance responses at managing risk and uncertainty.

Table 2 summarizes the selected literature regarding the effectiveness of ALM as a governance mechanism. Our study extends this literature by investigating the relationship between governance quality and balance sheet management in the banking industry. In this regard, our study aligns more closely with Burke and Warfield (2021), Purnanandam (2007), and Abou-El-Sood and El-Ansary (2017). Still, we differentiate our study by examining the role of ALM as an indicator of overall governance quality as opposed to specifically measuring how effective ALM management is at managing risk.

TABLE 2
OVERVIEW OF SELECT LITERATURE REGARDING ALM AS A GOVERNANCE MECHANISM

Author(s) (Year)	Context	Method	Time Period	Focus	ALM Effectiveness	Major Finding
Abou-El-Sood & El-Ansary (2017)	MENA & Southeast Asia	Canonical Correlation	2002 - 2012	Liquidity risk	Strong	Highly interdependent asset and liability accounts, especially in small Islamic banks
Burke & Warfield (2021)	US	Regression	1997 - 2013	Interest rate risk	Strong	Effective interest rate risk management is associated with more persistent and high valuation of net interest income

Author(s) (Year)	Context	Method	Time Period	Focus	ALM Effectiveness	Major Finding
Illueca et al. (2014)	Spain	Regression	1998 - 2010	Interest rate risk	Weak	Spanish banks did not adjust bank capital, retail deposits, nor average loan rates following deregulation
Karthikeyan et al. (2021)	India	Gap Analysis	2019 - 2020	Liquidity risk	Weak	High liquidity risk exposure present in small finance banks
Purnanandam (2017)	US	Logit Regression, Econometric analysis	1998 - 2003	Interest rate risk / Financial distress	Strong	Commercial banks attempt to mitigate financial distress by adopting conservative asset-liability management policies

Governance Quality in the Banking Sector

Corporate governance represents "the system of laws, regulations, institutions, markets, contracts, and corporate policies and procedures...that direct and influence the actions of the top-level decision makers in the corporation" (Brickley & Zimmerman, 2010, p. 236). According to Craig (2004), corporate governance in banking differs from non-bank governance in four ways:

1. Banks typically have more governance stakeholders due to the banks' liquidity function and role in society.
2. Governance activities in banking focus on the debt (deposit) activities of unsophisticated debt holders rather than on debt activities of sophisticated debt holders typically found in non-banking institutions.
3. Depository insurance which protects depositors acts as a moral hazard by removing incentives to monitor bank activities.
4. Banks are subject to greater regulatory oversight and stakeholders hold bank directors to higher fiduciary standards.

Indicators of corporate governance quality include the role of the board of directors in protecting shareholder interests, the efficacy of large stockholders, the importance of executive compensation schemes that align management and ownership interests, and the value of information provided by management, auditors and/or analysts (Craig, 2004). Academics have researched governance quality within the banking sector along these factors; Table 3 offers a summary of selected literature by quality indicator. In general, the research suggests that bank governance is quite sophisticated and strong overall in the US and around the world. This is due to the highly regulated environment within which the industry operates.

Of the 17 studies listed in Table 3, agency theory is the most prevalent, followed by studies with no theoretical basis. While the latter is a concern on its own, the use of agency theory is also problematic because of its "conjecture that the interest of agents diverge sufficiently frequently for there to be a recurrent agency problem in organizations" (Davis et al., 1997b, p. 612). In other words, without sufficient agency conflict, the tenets of agency theory fall away. Given the banking industry's role in society, its liquidity function, its level of regulatory oversight, and its high fiduciary standards, we argue that a preponderance of agency conflicts seems unlikely, which diminishes the utility of agency theory as a preferred theoretical base in banking-related studies. Along this line of thinking, Himaj (2014) challenges researchers to use complementary and alternative theories (to agency theory) to fully interpret and explain governance practices in the banking sector. We answer this call through stewardship theory, which aligns more closely

with the fiduciary and stewardship responsibilities of bank management and directors. Here, we align ourselves with Sharif and Rashid (2014) who demonstrated that stewardship theory can explain board effectiveness and governance quality.

TABLE 3
SELECT LITERATURE ON BANK GOVERNANCE QUALITY

Authors (Year)	Context	Method	Time Period	Theoretical Basis	Governance Mechanism (Focus)	Major Finding(s)
Panel A: Board of Directors & Shareholder Interests						
Aebi et al. (2012)	US	Regression	2006	N/A	Board of Directors (Chief Risk Officer)	Banks, where the chief risk officer reports directly to the board, experienced significantly higher stock returns during the 2008 fiscal crisis
Batae et al. (2021)	Europe	Regression	2010 - 2019	Agency theory; Resource dep. theory	Board of Directors (Management & oversight)	Quality of bank governance was negatively associated with ROA and stock market returns.
de Andres & Vallelado (2008)	Canada, US, UK, Spain, Italy, France	Generalized Methods of Moments & Regression	1996 - 2006	N/A	Board of Directors (Composition)	There is an optimal combination of internal and external directors that is best to create value (market return)
Grove et al. (2011)	US	Regression	2005 - 2008	Agency theory	Multiple mechanisms	Negative association between level of debt and estimated future stock returns
Minton et al. (2014)	US	Regression	2003 - 2008	N/A	Board of Directors (Financial expertise & independence)	Financial expertise among independent directors is positively associated with increased risk (prior to the 2008 fiscal crisis)
Nguyen et al. (2015)	US	Regression	1999 - 2011	Agency theory; Upper echelons theory	Board of Directors (Board characteristics)	While certain board characteristics (education, age, work experience) create shareholder wealth, gender has no measurable effects.

Panel B: Efficacy of Large Stakeholders						
Attig et al. (2013)	Global	Regression	1999	N/A	Multiple large shareholders (Voting power; cash rights)	Multiple large shareholders with an even distribution of voting power or cash flow rights are associated governance quality
Caprio et al. (2007)	Global	Regression	2001	N/A	Owners (Ownership concentration)	Globally, families or the State tend to control banks rather than the public. Concentrated ownership, based on cash-flow rights, boosts valuation.
Grove et al. (2012)	US, Europe	Univariate	2012	Agency Theory	Owners (Ownership concentration)	Board quality is not associated with ownership concentration in the US.
Pourmansouri et al. (2022)	Iran	Regression	2011 - 2021	Agency Theory	Owners (Ownership concentration)	Higher level of voter ownership weakens the corporate governance system.
Panel C: Executive Compensation						
Laksmana (2008)	US	Regression	1993, 2002	N/A	Compensation Committee (Compensation disclosure)	Compensation committee meeting frequency and size are positively associated with compensation transparency
Sun et al. (2009)	US	Regression	2001	N/A	Compensation Committee (Stock options)	Future bank performance is associated with stock option grants as compensation committee quality increases

Panel D: Information						
Biswas et al. (2022)	India	PCA & Two-stage Least Squares	2010 - 2019	Agency theory	Board composition (Earnings management)	Corporate governance mitigates earnings management in Indian commercial banks. Greater board gender diversity failed to discourage earnings management.
Jizi et al. (2014)	US	Regression	2009 - 2011	Agency theory	Board independence & Composition (CSR disclosure)	Board independence and size are positively related to CSR disclosure
Leventis et al. (2013)	US	Regression	2003 - 2009	Interest alignment theory; Quiet life theory	Board & Audit Committee (Accounting practices)	Well-governed banks engage in higher levels of accounting conservatism
Sharif & Rashid (2014)	Pakistan	Regression	2005 - 2010	Legitimacy theory; Stewardship theory	Board composition (CSR disclosure)	External directors have a positive impact on CSR reporting among Pakistani banks
Zulfikar et al. (2020)	Indonesia	Regression	2010 - 2015	Agency theory	Board & Audit Committee (Compliance)	Positive association between board size and compliance reporting. Board independence, board experience, and audit committee size also play a role.

Two of the selected studies listed in Panel D of Table 3 are relevant to the present study as these studies highlight a relationship between bank governance quality and accounting. First, Biswas et al. (2022) investigated the role of governance quality on earnings management in Indian commercial banks. Using a sample of 22 private and public banks for the period 2010 - 2019, Biswas et al. found that governance mechanisms, including board independence, board size, audit committee, and meeting frequency, diminished the use of earnings management-like activities in banking including the use of discretionary loan-loss provisions and discretionary realized gains and losses on securities. Second, Leventis et al. (2013) explored the role of governance quality on accounting practices, specifically accounting conservatism. Using a sample of 315 US listed commercial banks for the period 2003 - 2009, Leventis et al. established that stronger governance quality, as proxied by RiskMetrics' Corporate Governance Quotient, leads to higher uses of conservative accounting practices, such as recognizing loan losses that are larger relative to changes in nonperforming loans. In critique, however, both the Biswas and Leventis studies assume a unidirectional nexus between governance quality and accounting. Our study diverges from this assumption exploring a possible bidirectional relationship.

Measuring Governance Quality

Based on stewardship theory, we hypothesize that there ought to be a significant, positive association between governance quality and a strong balance sheet. Even so, our inquiry naturally leads to a conversation about how to measure bank governance "quality." While some academics constructed indices to measure governance quality, such as the Gompers, Ishii, and Metrick's G-Index or the Brown and Caylor's Gov-Score Index (Tipurić et al., 2020), the use of proprietary quality indices from Refinitiv, Bloomberg, Sustainalytics, MSCI, or ISS, for example, are more commonplace in quality assessment amongst academics, especially in current and emerging ESG literature (Gyönyörová et al., 2023). These indices typically capture different non-financial governance-related categories such as shareholder voting rights, board composition, compensation, or risk management oversight, and quantify those criteria into composite (pillar) and/or subcategory (component) scores. Importantly, ESG governance pillar and component scores align with the quality indicators outlined in the previous section.

Emerging literature using machine learning techniques is reverse-engineering governance quality scores using balance sheet information and related ratios. In these studies, financial data includes balance sheet elements and related ratios such as asset level, ROA, ROE, debt ratios, solvency ratios, and liquidity ratios. ESG scores include both comprehensive ESG and pillar E, S, G ratings. Synthesizing key findings of this literature, two themes appear which appear relevant to our present study. First, financial statement data have some predictive power with respect to ESG scores in total (D'Amato et al., 2021; D'Amato et al., 2022; Garcia et al., 2020; Krappel et al., 2021). Second, with respect to the Governance pillar, contrasting results exist. Ang et al. (2023) find that financials more efficiently predict the Governance score (G pillar) than either the Environmental (E pillar) or Social (S pillar) scores. However, Krappel et al. (2021) note that the Governance pillar was the most difficult to predict. Ang et al. attribute the strength of the association to the maturity of corporate governance issues while Krappel et al. note that financial data contains limited governance structure information, making this pillar harder to predict. The contrarian results may also arise from the use of different ratings providers (Sustainalytics versus Refinitiv), the period under study (2015-2019 versus 2002-2019), or the industries studied, which neither author defined.

We build on this literature by examining the relationship between ESG scores provided by ISS and balance sheet metrics related to value creation in the banking industry. We assume that well-managed balance sheets are associated with governance quality, as measured by ESG scores. Still, one area we've yet to discuss in our review is whether there is any relationship between governance and financial performance in the banking industry, as measured by ESG ratings. The short answer is 'yes,' but that relationship is open for debate given the mixed results arising in the literature as described in the next section.

Research on the Governance Quality - Financial Performance Nexus in the Banking Sector

Here, we review empirical research examining the relationship between governance quality and financial performance in the banking industry, where researchers use accounting-based corporate financial performance measures as proxies of financial performance and third-party ESG ratings as proxy for governance quality. Table 4 supplies an overview of the relevant literature. Of the twelve studies in Table 4, ten hypothesized that better governance leads to better financial performance, one hypothesized that better financial performance explains governance quality, and one hypothesized and modeled the relationship using simultaneous equations. Most of the research used ROA and ROE as proxies for financial performance. Likewise, all the studies proxied governance using ESG governance pillar ratings from proprietary sources such as Refinitiv, Bloomberg, and MSCI; these studies often incorporated the components of the governance pillar score as well. Five studies examined the global banking industry, while the others concentrated on specific regions. Regression was the most popular research method, followed by the Generalized Method of Moments (GMM) method. Most of the regression studies do not address endogeneity in the modeled relationship, which is a sincere concern.

Panel A in Table 4 lists ten studies which hypothesized that better governance leads to better financial performance, that is, a "govern well-to-do-well" perspective. The results are surprisingly mixed. In certain cases, governance positively influences financial performance (Daszyńska-Żygadło et al., 2021; Esteban-

Sanchez et al., 2017; Khattak, 2021) while in other instances, governance did not affect financial performance (Dragomir et al., 2022; La Torre et al., 2021; Shakil et al., 2019). Further, four studies found that governance only influenced certain aspects of bank financial performance, or paradoxically, was negatively associated with financial performance (Azmi et al., 2021; El Khoury et al., 2023; Menicucci & Paolucci, 2023; Rahi et al., 2021). Differences in outcomes may be attributable to context (global versus regional perspectives), the period studied, the types of banks studied, the level of bank assets, the ESG ratings provider, and/or the use of dissimilar control variables, among other things.

TABLE 4
RESEARCH ON THE GOVERNANCE AND FINANCIAL PERFORMANCE NEXUS IN THE BANKING SECTOR

Authors (Year)	**Context**	**Method**	**Time Period**	**Accounting-based Corporate Financial Performance Measure(s)**	**ESG Measure**	**Major Finding**
Panel A: ESG as the Predictor Variable						
Azmi et al. (2021)	Emerging Markets (44 countries)	Generalized Method of Moments (GMM)	2011 - 2017	ROA, Cost of Debt, Cash flow, Net interest margin	ESG total and component ratings (Bloomberg)	Governance (G) component has a negative relationship with cost of debt, but a positive relationship with cash flow and net interest margin. Total ESG is marginally associated with improved ROA, but the governance component showed no relationship.
Daszyńska-Żygadło et al. (2021)	Global	Regression	2009 - 2016	ROA	ESG component ratings (Refinitiv)	Governance (G) performance has an influence on financial performance in the banking sector.

Authors (Year)	Context	Method	Time Period	Accounting-based Corporate Financial Performance Measure(s)	ESG Measure	Major Finding
Dragomir et al. (2022)	Global	Regression	2019 - 2021	ROA, ROE	ESG total and component ratings (Refinitiv)	Governance (G) was not significantly related to bank profitability during the Covid-19 pandemic, suggesting that any governance preparation could not offset the negative effects of the pandemic.
El Khoury et al. (2023)	Middle East, North Africa, Turkey	Regression	2007 - 2019	ROA, ROE	ESG total and component ratings (Refinitiv)	Governance (G) component is positively associated with ROE and negatively associated with ROA.
Esteban-Sanchez et al. (2017)	Global	Feasible Generalized Least Squares (FGLS)	2005 - 2010	ROE, ROA	Governance component rating (Refinitiv)	Governance (G) showed a positive relationship with ROE and ROA.
Khattak (2021)	Muslim Markets (13 countries)	GMM	2007 - 2016	ROA, ROE	Composite ESG rating score (MSCI)	In Muslim economies, higher sustainability practice, as measured by a composite ESG rating score, is associated with better financial performance in the banking sector.

Authors (Year)	Context	Method	Time Period	Accounting-based Corporate Financial Performance Measure(s)	ESG Measure	Major Finding
La Torre et al. (2021)	Europe	Regression	2008 - 2019	ROA, ROE	Composite ESG rating score (Eikon Thomson Reuters)	No relationship between composite ESG performance and accounting-based corporate financial performance.
Menicucci & Paolucci (2023)	Italy	Regression	2016 - 2020	ROE, ROA	ESG total and component ratings (Refinitiv)	Only the management and oversight component of the Governance (G) pillar positively influences financial performance. There is no association between financial performance and the other Governance components of shareholder rights or CSR strategy.
Rahi et al. (2021)	Sweden, Denmark, Finland, Norway	Regression and GMM	2015 - 2019	ROIC, ROE, ROA	ESG total and component ratings (Refinitiv)	Negative relationship between composite ESG performance and accounting-based financial performance in the financial industry. Governance (G) component has a positive relationship with ROA.

Authors (Year)	Context	Method	Time Period	Accounting-based Corporate Financial Performance Measure(s)	ESG Measure	Major Finding
Shakil et al. (2019)	Emerging Markets (19 countries)	GMM	2015 - 2018	ROA, ROE	ESG component ratings (Refinitiv)	Governance (G) performance does not influence financial performance.
Panel B: ESG as the Dependent Variable						
Festl-Pell & Hummel (2016)	Global	Regression	2005 - 2014	Bank Financial Characteristics Score	Environmental, Social and Governance Banking Sustainability Governance Index (Refinitiv)	Results suggest that financially unsustainable banks have a higher ESG score because they consider ESG investment as part of their extended risk management framework.
Panel C: ESG as Both a Dependent and Explanatory Variable						
Gonenc & Scholtens (2019)	Global	Three Stage Least Squares	2002 - 2015	Net interest margin, Tier 1 capital adequacy ratio, Non-performing loans ratio, Cost to income ratio	ESG total and component ratings (Refinitiv)	Net interest margin and Governance (G) have a positive, bidirectional relationship. Tier 1 capital adequacy is positively associated with better Governance (G).

The study in Panel B by Festl-Pell and Hummel (2016) assumes a contrarian, "do-well-to-govern well" perspective. This study regressed a lagged Bank Financial Characteristics Score (BFCS) against an ESG sustainability governance index. The BFCS measured asset quality, capital quality and business risk; however, upon closer inspection, these variables included ALM-related factors such as provision for loan loss percent, net charge-off percent, return on asset, and the ratio of commercial loans to total loans. Using a sample of 270 large, globally operating banks across fifty countries for the period 2005 - 2014, Festl-Pell and Hummel find that less financially stable banks, i.e., banks with weaker financials, have better ESG

governance ratings. They attributed this paradoxical result to a bank's investment in ESG measures as part of an overall risk management framework; in other words, financial institutions enhance governance efforts to mitigate financial risks.

Finally, the study in Panel C by Gonenc and Scholtens (2019) is worth noting because it specifically models simultaneous equations to understand a possible endogenous relationship between governance and financial performance. It is also noteworthy because several accounting-based corporate performance measures are ALM-related, such as net interest margin and non-performing loans ratio. Using an international sample of 2400 bank/year observations from 2002 to 2015, the authors find positive, bidirectional support between bank governance and net interest margin. Drilling into the governance pillar, the authors found that board function, board structure, and compensation policy were associated with higher net interest margin. Board vision and board strategy had a bidirectional relationship with net interest margin. In contrast, the authors found only a positive association between a Tier 1 Capital Adequacy rank and governance which suggests that financial performance affects governance, and not the other way around.

Research that would add value to this literature includes a focus on US banks since this region has been under-researched. Other considerations include larger sample sizes (many of the studies listed have small sample sizes, which limits generalizability), different periods, and the inclusion of different accounting-based corporate financial performance variables. We try to address these issues and extend this literature by examining the link between governance quality and the primary means of value creation in the banking industry i.e., ALM. We also address issues of reverse causality because the current governance quality - financial performance literature has not adequately done that, which might be a leading reason for the existing contrarian results.

Summary and Hypotheses

In summary, stewardship theory holds that management will function as a steward to maximize and protect shareholder wealth through financial performance. In the banking industry, bank management protects shareholder wealth by adopting a resilient balance sheet structure to minimize liquidity and interest rate risks. Banks manage their balance sheets through ALM, and researchers have found that asset-liability management is positively associated with financial performance. ALM management falls under the ALCO's responsibility, a vital element in bank governance structures. The process through which bank managers manage ALM is a governance mechanism. However, empirical results as to the effectiveness of ALM as a governance mechanism are extremely limited and mixed. Our study tries to clarify and extend current literature by examining the relationship between governance quality and good balance sheet management in the banking industry. We leverage ESG governance quality scores; these scores quantify a firm's governance risk exposure (Tocchini & Cafagna, 2022). We adopt ESG scores because research has shown that financial statement data have predictive power with respect to these ESG scores. To this end, we align ourselves with Ang et al. (2023), D'Amato et al. (2021), D'Amato et al. (2022), and Garcia et al. (2020). Ideally, if an ALCO has genuine ownership of the balance sheet, then in theory the level of governance quality (governance risk) should be high (low) relative to ALM metrics. Consistent with Daszyńska-Żygadło et al. (2021) and Esteban-Sanchez et al. (2017), we hypothesize:

H_1: *There is a positive relationship between governance quality and ALM in banking.*

However, academics have not settled on the direction of the relationship between governance quality and financial performance for the banking industry. In other words, does governance quality precede financial performance, or does good financial performance precede governance quality. To account for the possible reverse causality, we also hypothesize:

H_2: *There is a positive relationship between ALM and governance quality in banking.*

Finally, overall ESG governance scores are composed of subcategories that include variables such as shareholder rights, board composition, or risk management. We hypothesize that the relationship between

total ESG Governance pillar scores and ALM will hold true for any governance sub-categories. Refer to the next section for further discussion on governance sub-categories used in this study.

RESEARCH METHOD

This paper analyzes the relationship between governance quality and ALM within the banking industry. We conduct our research using accounting-based measures standing for management stewardship of the balance sheet and a proxy for governance quality, the Institutional Shareholder Services' Governance Quality Score. We use descriptive statistics, regression analysis, simultaneous equations, and two-stage least squares (2SLS) regression; Brown et al. (2011) suggests that researchers should use the latter when one suspects the presence of endogeneity. A regression-based model is proper to assess dependency because the dependent variable is continuous, the independent variables are continuous, and the sample size is large enough such that the model will remain robust even if we do not meet the requirements of normality and constant variance. We use 95% as the criterion for statistical significance.

Sample and Data Collection

We derived the sample used in this research from actively traded US banks on the American (ASE), NYSE or NASDAQ exchanges under the following Standard Industrial Classification (SIC) codes:

Commercial Banks
- 6021 - National Commercial Banks
- 6022 - State Commercial Banks
- 6029 - Commercial Banks, not classified elsewhere

Savings Institutions
- 6035 - Savings Institutions, Federally Chartered
- 6036 - Savings Institutions, Not Federally Chartered

US Banks classified under these five SIC codes represent 98% of all banks categorized as *Depository Institutions* under SIC major group 60. We collected annual bank financial data from the annual reports stored in the Securities and Exchange Commission's EDGAR database for fiscal year 2022. This period is particularly relevant because of the extraordinary financial and governance challenges arising from (a) the Covid-19 pandemic and, (b) substantial monetary policy adjustments by the US Federal Reserve in response to inflationary pressures in the US. We retrieved other relevant data for the study from 2022 proxy reports (Schedule 14A) and a third-party provider. We screened our extracted data to find inaccurate or missing values; of the 694 banks first identified as exchange listed financial institutions, we eliminated 349 banks because investors were not actively trading the stocks as of June 2023, and we removed another 94 for missing ESG governance quality metrics. The final convenience sample included 251 US banks. We minimized data processing errors by rechecking values to ensure accuracy. For the sampled firms, average assets are $74 billion. FTSE Russell classifies sixty percent of the banks as small-cap stocks. Big-4 accounting firms audit 33% of the banks, and the average number of board directors is just under twelve. Table 5 supplies a complete profile of the banks used in the study.

TABLE 5
SAMPLED BANKS PROFILE

Variable	Total Sample	National Commercial Banks	State Commercial Banks	Other Commercial Banks	Federally Chartered Savings Institutions	Non-Federally Chartered Savings Institutions
No. of Firms *(percent of total)*	251	70 *(27.9%)*	134 *(53.4%)*	11 *(4.4%)*	24 *(9.6%)*	12 *(4.8%)*
Avg. Assets (Billions)	$74.3	$213.4	$23.2	$23.5	$8.2	$11.4
Market Capitalization:						
Large cap	10.4%	21.4%	7.5%	0%	0%	8.3%
Mid-cap	29.5%	38.6%	29.9%	9.1%	25.0%	0%
Small cap	60.1%	40.0%	62.7%	90.9%	75.0%	91.7%
Avg. No. of Board Directors	11.7	12.5	11.7	12.3	10.0	10.2
Percent Audited by a Big-4 CPA Firm	32.7%	48.6%	27.6%	9.1%	33.3%	16.7%

Variables

Bank Governance Quality

We measure governance quality using the Institutional Shareholder Services' Governance Quality Score (ISSGQS) from June 2023. ISSGQS is a broad-based, comprehensive governance metric which assesses a firm's governance risk relative to its peers. ISSGQS is a widely used quality metric in both business and established governance-related literature (e.g., Cormier et al., 2019; Jiraporn et al., 2011; Jiraporn et al., 2015; Vintila & Gherghina, 2012). ISS supplies both an overall governance pillar score and component scores on four governance dimensions - board structure (ISSGQS – B), compensation (ISSGQS – C), shareholder rights (ISSGQS – SR), and audit and risk oversight (ISSGQS – A). ISS reports the overall and component scores by firm on a scale of 1 to 10, where lower values stand for higher governance quality and lower governance risk. Importantly, Lusk and Wells (2021a, 2021b) and Lusk et al. (2022) document that the Governance Quality Score is independent of GAAP-reported data, which makes its use as a response variable in the present context appealing. Thus, a marginal effect of ALM might have a more detectable impact on governance quality.

Selecting June 2023 ISSGQS ratings as our benchmark against a bank's fiscal 2022 SEC filing resulted in an average lag of approximately 3 months. Our lag is shorter than the one-year lag used in related research (Festl-Pell & Hummel, 2016; Gonenc & Scholtens, 2019), but as noted by Brown et al. (2011), shorter lag lengths may be more relevant (stronger).

Asset-Liability Management

Academic research has analyzed the association between governance mechanisms and bank performance using summary-level elements of financial performance such as ROA, ROE, or stock returns (Fernandes et al., 2018). However, because bank balance sheets are different from those found in non-financial firms, Choudhry (2020) suggests that balance sheet risk metrics need to include financial

indicators that are meaningful, transparent, easily discussed, and better barometers of ALM-related activities. As such, based on both ALM-related and general banking studies, we use ten relevant, quality ALM indicators as our independent variables within three measurement categories: liquidity, asset management, and organizational performance. Table 6 supplies a summary of the selected predictor variables and their derivation.

TABLE 6
ASSET-LIABILITY MANAGEMENT VARIABLES

Variable	Ratio	Purpose	Focus	Formula	References
CR	Coverage ratio (12 month)	Liquidity	Asset & Liability	Total Cash ÷ Total Liabilities	Kallur (2016)
EAR	Equity to assets ratio	Organizational Performance	Asset	Total Equity ÷ Total Assets	Illueca et al. (2014)
LDR	Loan-to-deposit ratio	Liquidity	Asset & Liability	Total Loans ÷ Total Deposits	Adam (2007); Choudhry (2011, 2020); Golin & Delhaise (2001); Kallur (2016)
LIQ	Quasi-liquid asset ratio	Liquidity	Asset	(Cash + Short-term Assets) ÷ Total Assets	Golin & Delhaise (2001)
NCO	Net charge-offs	Asset Quality	Asset	Net Loans Written Off ÷ Total Loans	Festl-Pell & Hummel (2016); Swarup (2012)
NIM	Net interest margin	Organizational Performance	Asset & Liability	Net Interest Income ÷ Average Earning Assets	Azmi et al. (2021); Choudhry (2020); Gonenc & Scholtens (2019); Lai & Hassan (1997); Owusu & Alhassan (2021); Pathan & Faff (2013); Saksonova (2014)
NPL	Nonperforming loans to total loans	Asset Quality	Asset	Loan Delinquency ÷ Total Loans	Berger et al. (2005); Gonenc & Scholtens (2019); Grove et al. (2011); Swarup (2012)
NXA	Noninterest expense to assets ratio	Organizational Performance	Asset	Non-Interest Expense ÷ Total Assets	Kovner et al. (2014)
RELA	Real estate loans to assets ratio	Liquidity	Asset	Real Estate Loans ÷ Total Assets	Golin & Delhaise (2001)
ROA	Return on assets	Organizational Performance	Asset & Liability	Net Income ÷ Total Assets	Choudhry (2011); Fernandes et al. (2018); Illueca et al. (2014); Purnanandam (2007)

Liquidity ratios compare one asset category against another one asset category against a funding liability category (Golin & Delhaise, 2001). Our liquidity ratios are the 12-month coverage ratio (CR), loan-

to-deposit ratio (LDR), quasi-liquid asset ratio (LIQ), and real estate loans to assets ratio (RELA). The coverage ratio shows a financial institution's ability to fund new loans or sustain significant deposit withdrawals; it shows liquidity stress (Kallur, 2016). Coverage ratios typically are measures of very short-term liquidity, such as 30 days; we adopt a more conservative level by calculating each bank's ability to meet its projected cash outflows over a longer period. The loan-to-deposit ratio shows how efficiently a financial institution is generating income from depositors. It supplies a sign of asset and liability mismatches and whether bank credit is expanding or contracting (Golin & Delhaise, 2001). The quasi-liquid assets ratio is a broader variant of a liquid asset ratio. This ratio places general marketable assets in the numerator instead of liquid assets. While liquid asset ratios show the percentage of total deposits held in liquid assets, analysts often use the quasi-liquid asset ratio to overcome financial reporting variations among banks (Golin & Delhaise, 2001). The real estate loans to asset ratio measures the amount of the loan portfolio subject to fixed rates for longer durations. In rising rates, this portfolio can weigh heavily on earnings. One can think of this ratio as an illiquid assets ratio because it compares relatively illiquid assets to total assets (Golin & Delhaise, 2001).

Organizational performance ratios are fundamental ratios of return, margin, or cost-efficiency (Golin & Delhaise, 2001). Our organizational performance ratios are the equity to assets ratio (EAR), net interest margin (NIM), noninterest expense to asset ratio (NXA), and return on assets (ROA). The equity to assets ratio is an important indicator of capitalization safety. Effectively funding loans (assets) requires a balance between deposits (liabilities) and equity. In general, a higher degree of equity to assets indicates a safety against runs on deposits. The net interest margin is a key benchmark that focuses on the return on loans compared to the funding costs. The net interest margin does not include the cost of fixed assets. Saksonova (2014) states that the net interest margin is the most important fundamental indicator of bank operations. The noninterest expense to asset ratio evaluates the relationship of operating fixed assets, such as branches, to the overall asset efficiency and profitability. This ratio is a variation on an efficiency ratio which measures the operating cost per revenue dollar (Kovner et al., 2014). The return on assets ratio is a key indicator of profitability. It shows a bank's ability to extract earnings from assets (Golin & Delhaise, 2001). A return on assets above 1% is strong in banking (Choudhry, 2011).

Asset quality ratios examine loan quality, including nonperforming loans, loan charge-offs, and impaired loans (Manohar, 2012). Asset quality is a premiere indicator of bank health, with poor asset quality a significant factor in bank failures (Golin & Delhaise, 2001). Our asset quality ratios include net charge-offs (NC) and nonperforming loans to total loans (NPL). Net charge-offs are actual losses because of written off loans, adjusted for later loan recoveries. Nonperforming to total loans are the proportion of loans that have stopped accruing interest because collection is doubtful.

Control Variables

We use seven control variables to account for bank-specific characteristics. Table 7 supplies a summary.

TABLE 7
CONTROL VARIABLES

Variable	Description	Variable Type	References
ALCB	Presence of a standing board-level ALCO committee	Categorical (Binary)	Choudhry (2020)
AUD	External Auditor (Big-4 vs non-Big-4)	Categorical (Binary)	Brown et al. (2011); Khanchel (2007); van Greuning & Bratanovic (2020)
BOD	Overall board size	Quantitative (Discrete)	Fernandes et al. (2018); Grove et al. (2011); Pathan & Faff (2013)
GNDR	Board composition (Percent of Female Board Members)	Quantitative (Continuous)	Pathan & Faff (2013)
PBV	Price-to-Book Value	Quantitative (Continuous)	Kinateder et al. (2021); Matemilola et al. (2013)
SIC	Industry sector classification	Categorical (Nominal)	Memmel & Schertler (2012)
SIZE	Firm Size (Log of Total Assets)	Quantitative (Continuous)	Grove et al. (2011); Kovner et al. (2014); Lai & Hassan (1997); Purnanandam (2007)

The variables include the presence of a standing board-level ALCO committee (ALCB), the type of external auditor (AUD), the overall board size (BOD), board composition (GNDR), industry classification (SIC), price-to-book value (PBV), and firm size (SIZE). ALCB is a binary variable that equals one for banks that report a board level standing committee for ALM management in their annual proxy statement. Choudhry (2020) suggests that elevating ALM management to this governance level ensures the primacy of preserving a robust balance sheet. AUD separates the sample by auditor type, Big-4 versus non-Big-4. The choice of a Big-4 auditor may convey better oversight (Khanchel, 2007). BOD is the total number of directors serving on the board. The size of the board may affect bank performance (Grove et al., 2011; Pathan & Faff, 2013). GNDR captures board composition, specifically the percent of female directors. The gender diversity of bank boards may influence financial performance (Pathan & Faff, 2013). SIC allows us to split the sample by the type of bank, based on the bank's Standard Industrial Classification. The type of bank may affect the association between financial performance and governance (Memmel & Schertler, 2012). We determine SIZE by the logarithm of a bank's total assets. Following standard practice, we also leverage a variable (PBV) that is likely correlated with ALM but would not affect governance quality except through ALM. PBV is the bank's stock price ratio to book value for the sample period. Although firm-level ALM might influence firm-level governance quality, we believe it is unlikely that PBV will influence industry governance quality because PBV is a market-based measure of bank performance.

Research Design

To evaluate whether ALM is associated with bank governance quality at the overall governance pillar and component levels, we employ ordinary least squares (OLS) regression. We also address latent endogeneity through a simultaneous equation and two-stage least squares (2SLS). On the former, we swap the dependent and independent variables using a proxy, ALM management, with ten different measures,

each entering the model in turn for ten different estimations. The ten measures include LIQ, CR, LDR, EAR, RELA, NCO, NPL, ROA, NIM, and NXA, which we defined in the previous section. The regression function is:

$$ALM_{it} = \alpha + \beta_{ISSGQS}ISSGQS_{i,t-3,c} + \beta_{CONTROL}CONTROL_{it} + \varepsilon_{it} \quad (1)$$

where the subscript *i* denotes individual banks, *t* is the period, *t-3* is the lagged period, and *c* is the overall governance pillar score or a governance component score. CONTROL includes the control variables ALCB, AUD, BOD, GNDR, and SIZE.

2SLS requires an instrumental variable that is correlated with overall governance pillar and component levels but would not affect ALM measurements except through governance quality. We employ the variables ALCB, AUD, BOD, GNDR, and SIZE which are relatively correlated with governance and uncorrelated with ALM components.

The second equation swaps the overall governance pillar and component levels as the dependent variable with ALM management variables as the independent variables which are proxied by ten different measures, LIQ, CR, LDR, EAR, RELA, NCO, NPL, ROA, NIM, and NXA, and are each separately entered into the model in turn for 10 different estimations. The regression function is:

$$ISSGQS_{i,t-3,c} = \alpha + \beta_{CR}CR_{it} + \beta_{EAR}EAR_{it} + \beta_{LDR}LDR_{it} + \beta_{LIQ}LIQ_{it} + \beta_{NCO}NCO_{it} + \beta_{NIM}NIM_{it} + \beta_{NPL}NPL_{it} + \beta_{NXA}NXA_{it} + \beta_{RELA}RELA_{it} + \beta_{ROA}ROA_{it} + \beta_{CONTROL}CONTROL_{it} + \varepsilon_{it} \quad (2)$$

where the subscript *i* denotes individual banks, *t* is the period, *t-3* is the lagged period, and *c* is the overall governance pillar score or a governance component score. CONTROL includes the control variables PBV and SIC.

We address endogeneity using 2SLS which requires an instrumental variable that is correlated with ALM but would not affect governance quality except through ALM. We employ the variables, PBV and SIZE, which are relatively correlated with ALM measurements and uncorrelated with governance components.

RESULTS

Descriptive statistics results in Table 8 (Appendix) compare the means, standard deviation, medians, and normality for all the variables used in the study. The governance pillar score (ISSGQS) and governance component scores (ISSGQS_A, ISSGQS_B, ISSGQS_C, ISSGQS_SR) each have a minimum of one and maximum of ten, where lower values represent higher governance quality. Each of the variables exhibit an approximate mean of five with the overall governance pillar score of 4.657 and a standard deviation of 2.231. Comparative banking studies using Refinitiv ESG scores, which measures governance quality on a scale of 0 – 100, where higher values reflect better governance quality, reported mean governance scores of around 50 (see e.g., Dragomir et al. (2022), El Khoury & Nasrallah (2023); Esteban-Sanchez et al. (2017), Gonenc & Scholtens (2019), Rahi et al (2021)). Our results, using the ISS Governance Quality Score, appear consistent to these other banking studies, suggesting average governance quality in the banking sector.

The Return on Assets and Price-to-Book values, which reflect overall strength of the ALCO management, display values of 1.2% and 1.38, respectively. The ROA for all the banks ranges from a minimum return of -1.51% to a maximum of 2.68% while the PBV ranges from minimum of .49 to 4.30. Our results reveal banking strength since an ROA above 1% is strong for banks (Choudhry, 2011). In addition, for comparison, our ROA results are consistent with Chukwuogor et al. (2021) who reported a mean ROA for US banks of 1.1% for the period 1996 – 2019. The mean PBV suggests investors put a premium on bank value in the study year.

The mean Net Interest Margin, which reflects overall bank profitability, is 3.4%; NIM for all banks ranges from a minimum of 1% to a maximum of 7.8%. Pathan & Faff's 2013 study on US National and State Commercial Bank Holdings Companies revealed a mean NIM of 4%, while Gonenc & Scholtens'

(2019) global banking study revealed a mean NIM of 2.7%. For further comparison, our results are consistent with 30-year average (for the period 1996 – 2019) NIMs for US banks of 3.55% (Chukwuogor et al., 2021) and with average net interest margins for 2022, as reported by the FDIC (FDIC, 2023). The liquidity ratios (CR, LDR, LIQ, RELA) reveal that sampled US banks have adequate liquidity. The remaining organizational performance ratios (EAR, NXA) reveal effective capitalization and efficient operations. Finally, the means of the asset quality ratios (NCO, NPL) reveal an environment of muted loan write-offs and delinquencies.

We present Tukey simultaneous tests of mean differences by depository institution in Table 9 (Appendix). From this analysis, we primarily observe that homogeneity exists across US bank subsectors. Yet, we see statistically significant differences occurring for the following variables, including ISSGQS_C, LDR, RELA, ROA, AUD, BOD, and SIZE. Commercial banks that are not national or state in scope have significantly weaker compensation governance systems than national or state commercial banks, as measured by ISSGQS_C. As measured by LDR, national and state commercial banks have lower loan-to-deposit ratios than all savings institutions and federally chartered savings institutions, respectively. The results seem reasonable given savings institutions' missions and that most commercial banks provide a broader range of financial offerings than a savings institution offers. As measured by RELA, national commercial banks have lower real estate to total asset ratios than all other depository types. The results are logical given that national banks focus on more than just mortgage markets. ROAs are higher for federally chartered savings institutions than for all forms of commercial banks, and non-federally chartered savings institutions have higher ROAs than state commercial banks. The results suggest asset efficiencies for smaller banks. The use of a Big-4 auditor (Deloitte, EY, KPMG, or PWC) is more concentrated in national commercial banks than in state commercial banks, as measured by AUD. However, the two have no significant difference in audit governance, as measured by ISSGQS_A. As measured by BOD, savings institutions have the least number of directors on their boards, relative to national and state commercial banks. However, there is no significant difference in board structure governance between these depository types, as measured by ISSGQS_B. Logically, national commercial banks are larger in size than all other depository types, as measured by SIZE.

Empirical Findings

The analysis using the primary statistic, 2SLS, begins with the evaluation of the correlation between the control variables, used as instruments in the simultaneous equations, and the independent and dependent variables. While 2SLS addresses the latent endogeneity, the instruments must be correlated with the related independent variable while showing little to no correlation with the dependent variable. We employ a Pearson's correlation to study these relationships. For two-stage OLS to function properly, the instrument must be both correlated with the independent and uncorrelated dependent variable. Theoretically, the correlation matrix should have all significant p-values for independent variables and instruments and no significant p-values for dependent variables and instruments. Since the results did not perfectly reflect this outcome, we calculated the overall percentage of variables with the appropriate p-values to the total, as described below.

In the first equation (Eq. 1), we used ALCB, AUD, BOD, GNDR, and SIZE as instruments since these variables correlate relatively with governance and uncorrelated with ALM components. An evaluation of Pearson's correlation matrix in Table 10 (Appendix) indicates that 60% of the instruments and independent variables are correlated at the 0.05 significance level. We observe that AUD is correlated with all the ISS Components except the Shareholder Rights component at the 0.05 significance level. The BOD component is correlated with the Audit & Risk Oversight component at the 0.01 significance level, and the GNDR variable was correlated with the Overall Governance and Board Structure components at the 0.01 significance level. However, ALCB was not correlated with any of the Governance variables, while the SIZE variable was significant with all Governance variables.

When we examine the correlation of the instrument variables, ALCB, AUD, BOD, GNDR, and SIZE with the dependent variables, only 40% of the instruments and dependent variables are correlated. Pearson's correlation matrix in Table 11 (Appendix) shows that AUD is correlated with RELA and NIM at the 0.01

significance level. BOD exhibits correlation with RELA, while GNDR shows correlation with all the dependent variables except CR, NPL and NXA.ALCB does not exhibit any correlation with the independent variables, but SIZE shows correlation with all the variables except EAR, NCO, ROA, and NXA at the 0.05 significance level. In summary, the correlation between the instrument and independent variables exhibits stronger relationships than the instrument and dependent variables for equation #1.

In the second equation (Eq. 2), we used PBV and SIC as instruments since these variables are relatively correlated with ALM and uncorrelated with overall governance scores and their components. An evaluation of Pearson's correlation matrix in Table 12 (Appendix) indicates that 53% of the instruments and independent variables are correlated at the 0.05 significance level. We observe that PBV is correlated with five of the dependent variables which include LDR, EAR, RELA, NPL, and ROA at the 0.05 significance level, while SIC exhibits correlation with four of the variables, LIQ, LDR, RELA, and ROA. When we examine the correlations with the instruments and dependent variables in Table 13 (Appendix), only 7% of the variables show a correlation. Only PBV is correlated with the ISS Component of Board Structure at the .05 significance level. In summary, the correlation between the instrument and independent variables exhibits stronger relationships than the instrument and dependent variables for equation #2.

Next, we consider the results using 2SLS, which we chose to address latent endogeneity. In the first equation, the overall corporate governance and components represent the independent variable with ALM management as the dependent variable. On the second equation, we swap the dependent and independent variables using a proxy, ALM management, with ten different measures each of which we enter into the model in turn for ten different estimations. We ran the model multiple times to produce five iterations, including the ISS Overall Governance Score and the four ISS Component scores Audit & Risk Oversight, Board Structure, Shareholder Rights, and Compensation.

First the research evaluates model iteration #1 with ISS Overall Governance Score as the dependent variable with the related results in Table 14 (Appendix). Upon examination of the Equation #1 results, we see that six of the 10 ALM management variables exhibit a significant relationship with ISS Overall Corporate Governance, all exhibiting model p-values that are significant at the 0.10 level or greater. The significant variables include LDR, EAR, RELA, NCO, ROA, and NIM. Except for the NCO variable, all the significant variables are positively related with the ISS Overall Corporate Governance score. We expected that financial institutions with favorable/lower governance scores would experience lower degrees of loan net charge-offs while other variables such as the net interest margins would be higher for the same institutions. However, the coefficients in the equation appear to show an inverse relationship. The R-square for models with significant variables fell between 2 and 6%. All the results for Equation #2 were insignificant.

Next, the research evaluates model iteration #2 with ISS Component, Audit & Risk Oversight, as the dependent variable with the related results in Table 15 (Appendix). The results for the Equation #1 exhibit three of the 10 ALM management variables with a significant relationship with Audit & Risk Oversight which exhibit model p-values that are significant at the 0.10 level or greater. The significant variables include LDR, RELA, and NIM. All the significant variables positively relate to the Audit & Risk Oversight score. We expected that financial institutions with favorable/lower governance scores would experience higher loan to deposit ratios, real estate to total assets, and net interest margins. However, the coefficients in the equation appear to show an inverse relationship. The R-square for models with significant variables fell between 2 and 5%. As with the first iteration, all the results for the Equation #2 were insignificant.

When we ran model iteration #3, we used the ISS Component, Board Structure, as the dependent variable, with the related results in Table 16 (Appendix). The results for Equation #1 exhibit six of the 10 ALM management variables with a significant relationship with Board Structure which exhibit model p-values that are significant at the 0.10 level or greater. The significant variables include LDR, EAR, RELA, NCO, ROA and NIM. Except for the NCO variable, the significant variables are positively related with the Board Structure score. We expected that financial institutions with favorable/lower governance scores would experience lower degrees of loan net charge-offs while the other variables such as the net interest margins would be higher for the same institutions. However, the coefficients in the equation appear to show

an inverse relationship. The R-square for models with significant variables fell between 2 and 6%. As with the other iterations, all the results for Equation #2 were insignificant.

We ran model iteration #4 with the ISS Component, Shareholder Rights, as the dependent variable, with the related results in Table 17 (Appendix). The results for Equation #1 exhibit six of the 10 ALM management variables with a significant relationship with Shareholder Rights which exhibit model p-values that are significant at the 0.10 level or greater. The significant variables include LIQ, CR, LDR, RELA, NPL and NIM. Except for the LIQ, CR, and NPL variables, the significant variables are negatively related with the ISS Corporate Governance score. We expected that financial institutions with favorable/lower governance scores would experience lower degrees of Non-Performing Loans while the other variables such as the net interest margins would be higher for the same institutions. However, the coefficients in the equation appear to show an inverse relationship. In addition, we expect financial institutions generating favorable financial performance to maintain lower liquidity levels since the opportunity cost of generating less loans in lieu of higher liquidity reduces profitability. The R-square for models with significant variables fell between 2 and 6%. As with the other iterations, all the results for Equation #2 were insignificant.

Finally, we ran model iteration #5 with the ISS Component, Compensation, as the dependent variable, with the related results in Table 18 (Appendix). The results for Equation #1 exhibit three of the 10 ALM management variables with a significant relationship with Compensation which exhibit model p-values that are significant at the 0.10 level or greater. The significant variables include LDR, RELA, and NIM. The significant variables were positively related with the ISS Corporate Governance score. We expected that financial institutions with favorable/lower governance scores would experience higher loans to assets, real estate loans to assets and net interest margins than less profitable financial institutions. However, the coefficients in the equation appear to show an inverse relationship. The R-square for models with significant variables fell between 2 and 6%. All the results for Equation #2 were insignificant except for Real Estate Loans to Assets which was significant at the 0.01 level.

Robustness Tests

While the 2-stage OLS model displayed results indicating that financial institutions with favorable (lower) governance quality scores tend to have less favorable ALM metrics as displayed in Equation #1, the results are somewhat muted given that the simultaneous equation #2 was insignificant for all four scenarios except for real estate loans to assets (RELA) in iteration #5. In this instance, RELA was significant in both simultaneous equations comparing the governance component, Compensation, and the ALM management ratio of RELA. Since the instruments substituted for the independent variables in each equation are different, there is greater confidence that endogeneity is not impacting the significance. While this outcome appeared in the results for this iteration, this outcome did not occur with the significant variables found in equation #1 throughout all four previous iterations.

Even with the lack of significance between the simultaneous equations, our results still suggest that corporate governance appears to influence ALM metrics, and not vice versa. However, contrary to our hypothesized direction, favorable governance quality (i.e., lower ISS governance quality scores) appeared to be associated with weaker ALM metrics as the results indicate that there is an inverse relationship between governance quality, as measured by ESG scores, and ALM. As such, our results support those of Festl-Pell and Hummel (2016) who similarly found that financially weaker banks have better governance, as measured by sustainability governance scores. They rationalize their results by suggesting that less stable, globally-operating banks invest heavily in high quality ESG governance as part of their extended risk management frameworks. While this could also be true for the US banks under study in this research, we suggest that our unexpected results may be due to governance decisions arising from aggressive loan posturing due to excess cash, perhaps a result of government stimulus, as described in the next section.

DISCUSSION

Overall bank governance quality is the result of many factors, including board structure, board policies, related-party transactions, litigation rights, pay-for-performance, communications and disclosure, equity

risk mitigation, external auditor, and information security risk management, among other things. The ISS Governance Quality Score, at both the pillar and component levels, does not allow us to necessarily drill into exact causes of the inverse relationship between governance quality and ALM because each component relies on multiple proprietarily weighted factors. However, on the surface, the overall findings contradict the predictions of stewardship theory. On this point, our findings diverge from Sharif and Rashid (2014), whose results demonstrated a positive application of stewardship theory. However, their study limited its focus to internal/external board composition rather than overall governance. Even so, our results are not necessarily out of line with research using competing theories, including Batae et al. (2021), Dragomir et al. (2022), El Khoury et al. (2023), La Torre et al. (2021), or Shakil et al. (2019), for example. Respectively, these scholars provided evidence against their supporting theory by finding no relationship or a negative relationship between governance quality and financial performance in the banking sector. Alternatively, one could argue that our findings support stewardship theory, given that US banks show quite respectable ALM metrics overall. In other words, the descriptive statistics point to a well-functioning industry, suggesting that bank managements successfully manage assets and liabilities to achieve organizational and stakeholder interests.

Our study differs from previous governance quality literature with our novel use of ALM metrics. When we look at governance quality relative to each ALM management variable, we observe that firms with lower governance quality (i.e., greater governance risk) tend to have mixed ALM management ratios when evaluated within three measurement categories: liquidity, asset management and organizational performance. First, we consider the category of liquidity. One can consider liquidity related ALM indicators favorable only within a relevant range, dependent upon the mix of the investment and loan portfolios held by the financial institution. On one hand, a lack of liquidity can translate into elevated risk where a bank may be unable to meet short term cash needs; on the other hand, an abundance of liquidity can indicate that a bank is not appropriately evaluating the opportunity cost of failing to invest free cash through loans or other investment opportunities. When we observe the ratios of quasi-liquidity (LIQ) and cash coverage (CR) related to the overall and component governance scores, the results indicate an inverse relationship. This suggests that firms with lower governance quality (greater governance risk) tend to loan out excess cash, when possible, to mitigate the related opportunity cost. The remaining liquidity ratios of loans-to-deposits (LDR) and real estate loans-to-deposits (RELA) are positively correlated with governance scores which also suggests that firms with lower governance quality (greater governance risk) tend to loan out excess cash when possible. In theory, good governance quality should lead to higher loan-to-deposit ratios. Assuming the quality of loans made are sound and in-policy, banks want to loan out as much as possible. The issue, of course, is matching the rates and loan durations of the sources of cash with the rates and duration of the loans. In the short-run, banks may be able to absorb minor mismatches, but high loan-to-deposit ratios by poorly governed banks may simply be masking a larger problem. Banks may eventually run into liquidity issues when their assets lose value due to poor loan quality or when poorly managed investments lose market value (i.e., default risk & interest rate risk). By then, poor governance cannot make up for poor balance sheet management. Furthermore, good governance should lead to higher real estate loans to assets ratios and therefore higher profits. If banks offset real estate loans with appropriate matching deposits, with the right duration and interest rate spreads, banks will have a strong net interest margin and profit. However, if a bank's loan quality is poor and the interest rates do not reflect the market, banks will have assets/loans that decline in value (i.e., again, default risk and interest rate risk). Our study shows that poorly governed banks make a higher percentage of real estate loans relative to well governed banks, but we question whether these loans are subject to greater interest rate and duration risk. Here, we need a longer-term analysis.

Next, we evaluated asset management using the ALM indicators of non-performing loans (NPL) and net charge offs (NCO), assessing the quality of banks' assets. Poor governance should be associated with poor loan quality, resulting in higher delinquencies and bad debt. Higher ISS governance scores and higher delinquency and bad debt ratios should have a positive relationship. However, our research reveals poor governance quality (greater governance risk) is associated with lower non-performing loans and net charge-

offs. We believe this paradoxical result means that poorly governed banks aggressively loaned out excess cash without sacrificing loan quality in 2022.

Finally, we consider the organizational performance ratios of equity to assets (EAR), net interest margin (NIM), noninterest expense to assets (NXA), and return on assets (ROA). We observed that banks with weak governance quality (i.e., riskier firms with higher overall and component governance risk scores) tend to exhibit higher equity to assets, return on assets and net interest margins, and lower non-interest expense to assets. On the surface, the relationships between governance and these metrics seem counterintuitive as it does not seem plausible that weak governance should result in better returns and profitability. We surmise, however, that aggressive lending by poorly governed firms, as discussed earlier, may have resulted in better returns and greater profitability. Since our study only used one fiscal year of data, one should not infer that poorly governed banks will achieve superior returns over well governed banks over the long term.

STUDY LIMITATIONS AND FUTURE RESEARCH

Several factors related to the data collected and modeled in the study limit our results. As previously stated, we derived the sample used in this research from annual reports of actively traded US banks on the American (ASE), NYSE, or NASDAQ exchanges with SIC codes encompassing 98% of all financial institutions categorized as *Depository Institutions* for the year ending 2022. We recognize that collecting financial performance for 2022 limits the results for three reasons. First, economic conditions associated with high inflation and rising interest rates mandated by the Federal Reserve in 2022 may skew bank financial performance. Since loan interest rates tend to rise faster than deposit rates, financial firms experience increased net interest margins during rising rates. Second, financial firms experienced large increases in deposits due to the federal government Covid-19 stimulus, resulting in artificially high liquidity levels. Finally, loan delinquencies and charge-offs were relatively low in 2022 since borrowers had surplus cash from stimulus measures, and higher employment rates due to economic expansion as federal and state governments lifted COVID-19 restrictions. To overcome these limitations, researchers could expand future studies to include observations from multiple periods to control for changes in financial performance impacted by macroeconomic conditions.

In addition, restricting the sample to publicly traded, commercial banks also limit the study results. Other sources of consumer lending such as online, private lenders and credit unions experience different variations of federal lending compliance and tax laws that impact ALM performance relative to commercial banks. For example, credit unions are tax exempt under federal law while commercial bank earnings are subject to federal income tax. Scholars should conduct additional research to evaluate the relationship between ALM and governance quality for non-commercial lending institutions.

Finally, the low explanatory power of our model limits the application of results. The R-square for models with significant variables ranged between 2 and 6%. Opportunities for future studies may consider other instrumental variables for corporate governance and ALM which are less correlated with the dependent variable, possibly resulting in greater model explanatory power.

SUMMARY AND CONCLUSIONS

This study examined the endogenous relationship between governance quality and balance sheet management in the banking industry using ISS Governance Quality Scores and financial results for 251 publicly traded US banks for 2022. Specifically, we considered overall governance quality and its components, audit and risk oversight, board structure, compensation, and shareholder rights, against ten relevant asset-liability metrics. We controlled for bank characteristics including board structure, board size, board composition, auditor, sector, size, and market valuation. Although overall bank governance quality is average in the US, as measured by ISS, we find in several cases that corporate governance appears to influence ALM metrics, and not vice versa. Contrary to expectations, however, banks with weaker governance quality (higher governance risk) had stronger balance sheet management in the areas of liquidity, asset quality, and organizational performance, as proxied by ALM ratios. Specific to banks with

weak governance, we find an inverse relationship between the quasi-liquidity (LIQ) and cash coverage (CR) ratios related to the overall and component governance scores, but a positive correlation for the remaining liquidity ratios, loans-to-deposits (LDR) and real estate loans-to-deposits (RELA). In similar fashion, we find that poor governance quality (greater governance risk) is associated with lower non-performing loans and net charge offs. And finally, we find that banks with weak governance quality (i.e., riskier firms with higher overall ISS and component governance risk scores) tend to exhibit higher equity to assets, return on assets and net interest margins, along with lower non-interest expense to assets. We attribute the contrarian results to aggressive loan postures due to excess cash in the industry due to Covid-19 government stimulus funds.

Our study contributes to the governance quality literature by systematically investigating the relationship between governance quality and asset-liability management, the primary means of value creation in the banking industry. Here, we add clarity to the literature by finding that governance quality impacts ALM management, and not vice versa. Leveraging a large, US-based sample, we differentiate our study from other studies in three ways: (1) we address endogeneity through simultaneous equations and 2SLS; (2) we proxy balance sheet management through ten, detailed bank specific ALM measures within three measurement categories: liquidity, asset management, and organizational performance; and (3) we rely on ISS's governance quality scores which Lusk and Wells (2021a, 2021b) and Lusk et al. (2022) found to be derived independent of GAAP-reported data. Further, we contribute to the literature by providing evidence for and against stewardship theory. On one hand, we see a properly functioning industry with the majority of the ALM metrics across commercial banks and savings institutions relatively strong, suggesting appropriate balance sheet management. In this regard, bank management is fulfilling its fiduciary and stewardship role, and affirms stewardship theory.

On the other hand, the overall findings contradict the predictions of stewardship theory. While the results reveal that governance quality impacts balance sheet management in the banking industry, the results were not in the direction we anticipated. An explanation may be that in the short-term, banks with weak governance are more likely to undertake rapid growth strategies to achieve superior financial results; in this regard, they function as "agents" rather than "stewards." This might explain why we see an inverse relationship between the compensation governance quality score and liquidity and net interest margin, for example, as bank managements may undertake profit maximization activities so as not to sacrifice compensation incentives. Since governance quality literature generally relies on agency theory, or on no theory at all, one can still view our results as a positive step in diversifying theoretical bases in empirical papers to fully interpret and explain governance practices in the banking sector. Further application of stewardship theory over the longer term, or the application of other theories beyond agency theory, is necessary.

In conclusion, even though we find that banks with low governance quality (high governance risk) and aggressive lending policies may achieve greater short-term returns and profitability, good bank governance still matters when it comes to maintaining an appropriate asset-liability structure and avoiding possible bank failure. Our study suggests that governance quality significantly influences ALM. However, riskier banks with higher overall ISS and component governance risk scores (i.e., low governance quality) tend to exhibit higher liquidity, return on assets, and net interest margin suggesting that aggressive lending by these firms in 2022 may have resulted in greater profitability along with minimal loan delinquency and losses. Unique economic conditions from Covid-19, lack of firm-type lender diversification, and low explanatory power moderated the results. The results suggest that while good bank governance matters, bank managements must balance ALM risk with appropriate aggressive lending policies that optimize profitability. We need future research that evaluates the relationship between corporate governance and ALM over the longer term, especially research that aims to understand the delicate balance between maximizing risk and return and bank failure to inform how bank management, regulators, and other stakeholders can avoid SVB-like failures in the future.

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APPENDIX

TABLE 8
DESCRIPTIVE STATISTICS (n=251)

Variable	Definition	Mean	Std. Dev.	Median	Skewness	Kurtosis
Primary Variables						
CR	Coverage Ratio (12 month)	0.046	0.052	0.028	3.160	12.760
EAR	Equity to Assets Ratio	0.104	0.057	0.098	11.030	151.260
ISSGQS	ISS Overall Governance Score	4.657	2.231	5.000	0.210	(0.520)
ISSGQS_A	ISS Component: Audit & Risk Oversight	5.175	2.670	5.000	0.020	(1.150)
ISSGQS_B	ISS Component: Board Structure	5.171	2.444	5.000	0.160	(0.800)
ISSGQS_C	ISS Component: Compensation	4.434	2.659	4.000	0.460	(0.800)
ISSGQS_SR	ISS Component: Shareholder Rights	4.964	2.634	5.000	0.080	(1.110)
LDR	Loan-to-Deposit Ratio	0.848	0.186	0.860	(0.280)	2.450
LIQ	(Cash + ST Assets) ÷ Total Assets	0.121	0.113	0.094	1.640	3.440
NCO	Net Charge-offs	0.001	0.004	0.000	7.020	58.340
NIM	Net Interest Margin	0.034	0.007	0.033	1.810	11.260
NPL	Nonperforming Loans to Total Loans	0.004	0.004	0.003	3.060	14.830
NXA	Noninterest Expense to Assets Ratio	0.023	0.013	0.021	7.350	81.540
RELA	Real Estate Loans to Total Assets	0.494	0.187	0.520	(0.430)	0.160
ROA	Return on Assets	0.012	0.004	0.012	(1.620)	11.510
Other Variables						
ALCB	Standing Board-level ALCO Committee (1 = yes)	0.072	0.259	0.000	3.340	9.230
AUD	External Auditor (1 = Big-4 auditor)	0.327	0.470	0.000	0.740	(1.460)
BOD	BOD Members	11.729	2.811	12.000	1.220	5.520
GNDR	% Board Female	0.243	0.100	0.250	0.170	(0.370)
PBV	Price to Book Value	1.384	0.545	1.260	2.080	5.920
SIC	Industry Sector Classification*	1.861	0.938	2.000	0.630	0.680
SIZE	Total Assets (Log)	7.019	0.633	6.885	1.470	2.680

* 0 = Savings Institutions, Not Federally Chartered 1 = National Commercial Banks; 2 = State Commercial Banks; 3 = Commercial Banks, not classified elsewhere; 4= Savings Institutions, Federally Chartered

TABLE 9
TUKEY SIMULTANEOUS TESTS FOR DIFFERENCES OF MEANS (n=251)

Variable by Type of Depository Institution		Differences of Means				
		National Commercial Banks	State Commercial Banks	Commercial Banks, Other	Savings Institutions, Federally Chartered	Savings Institutions, Not Federally Chartered
CR	National Commercial Banks	---				
	State Commercial Banks	0.001	---			
	Commercial Banks, Other	-0.003	-0.005	---		
	Savings Institutions, FC.	0.008	0.007	0.012	---	
	Savings Institutions, NFC.	-0.027	-0.028	-0.023	-0.035	---
EAR	National Commercial Banks	---				
	State Commercial Banks	0.008	---			
	Commercial Banks, Other	0.003	-0.004	---		
	Savings Institutions, FC.	-0.003	-0.010	-0.006	---	
	Savings Institutions, NFC.	-0.001	-0.008	-0.004	0.002	---
ISSGQS	National Commercial Banks	---				
	State Commercial Banks	-0.038	---			
	Commercial Banks, Other	-1.825	-1.786	---		
	Savings Institutions, FC.	-1.268	-1.229	0.557	---	
	Savings Institutions, NFC.	-1.643	-1.604	0.182	-0.375	---
ISSGQS_A	National Commercial Banks	---				
	State Commercial Banks	0.096	---			
	Commercial Banks, Other	-1.804	-1.900	---		
	Savings Institutions, FC.	-0.861	-0.957	0.943	---	
	Savings Institutions, NFC.	-1.069	-1.165	0.735	-0.208	---
ISSGQS_B	National Commercial Banks	---				
	State Commercial Banks	-0.181	---			
	Commercial Banks, Other	-1.387	-1.206	---		
	Savings Institutions, FC.	-0.656	-0.475	0.731	---	
	Savings Institutions, NFC.	-1.364	-1.183	0.020	-0.708	---

Variable by Type of Depository Institution		Differences of Means				
		National Commercial Banks	State Commercial Banks	Commercial Banks, Other	Savings Institutions, Federally Chartered	Savings Institutions, Not Federally Chartered
ISSGQS_C	National Commercial Banks	---				
	State Commercial Banks	-0.088	---			
	Commercial Banks, Other	-2.494*	-2.405*	---		
	Savings Institutions, FC.	-0.982	-0.894	1.511	---	
	Savings Institutions, NFC.	-0.857	-0.769	1.640	0.125	---
ISSGQS_SR	National Commercial Banks	---				
	State Commercial Banks	-0.018	---			
	Commercial Banks, Other	-0.075	-0.057	---		
	Savings Institutions, FC.	-1.215	-1.197	-1.140	---	
	Savings Institutions, NFC.	-1.924	-1.905	-1.850	-0.708	---
LDR	National Commercial Banks	---				
	State Commercial Banks	-0.038	---			
	Commercial Banks, Other	-0.136	-0.098	---		
	Savings Institutions, Fed.	-0172**	-0.134**	-0.036	---	
	Savings Institutions, FC.	-0.157*	-0.119	-0.021	0.016	---
	Savings Institutions, NFC.					
LIQ	National Commercial Banks	---				
	State Commercial Banks	0.029	---			
	Commercial Banks, Other	0.043	0.013	---		
	Savings Institutions, FC.	0.058	0.028	0.015	---	
	Savings Institutions, NFC.	0.032	0.002	-0.011	-0.026	---
NCO	National Commercial Banks	---				
	State Commercial Banks	0.000	---			
	Commercial Banks, Other	0.001	0.001	---		
	Savings Institutions, FC.	-0.000	-0.001	-0.001	---	
	Savings Institutions, NFC.	0.001	0.001	-0.000	0.001	---
NIM	National Commercial Banks	---				
	State Commercial Banks	-0.001	---			
	Commercial Banks, Other	-0.002	-0.001	---		
	Savings Institutions, FC.	0.001	0.002	0.003	---	
	Savings Institutions, NFC.	0.000	0.001	0.002	-0.001	---

Variable by Type of Depository Institution		Differences of Means				
		National Commercial Banks	State Commercial Banks	Commercial Banks, Other	Savings Institutions, Federally Chartered	Savings Institutions, Not Federally Chartered
NPL	National Commercial Banks	---				
	State Commercial Banks	0.001	---			
	Commercial Banks, Other	0.002	0.001	---		
	Savings Institutions, FC.	-0.001	-0.002	-0.002	---	
	Savings Institutions, NFC.	0.001	0.000	-0.001	0.002	---
NXA	National Commercial Banks	---				
	State Commercial Banks	-0.001	---			
	Commercial Banks, Other	-0.000	0.001	---		
	Savings Institutions, FC.	-0.001	-0.000	-0.001	---	
	Savings Institutions, NFC.	0.002	0.003	0.002	0.003	---
RELA	National Commercial Banks	---				
	State Commercial Banks	-0.093**	---			
	Commercial Banks, Other	-0.228**	-0.134	---		
	Savings Institutions, FC.	-0.191**	-0.098	0.037	---	
	Savings Institutions, NFC.	-0.191**	-0.098	0.036	-0.000	---
ROA	National Commercial Banks	---				
	State Commercial Banks	-0.001	---			
	Commercial Banks, Other	-0.002	-0.001	---		
	Savings Institutions, FC.	0.005**	0.005**	0.006**	---	
	Savings Institutions, NFC.	0.003	0.003*	0.004	-0.002	---
ALCB	National Commercial Banks	---				
	State Commercial Banks	-0.003	---			
	Commercial Banks, Other	-0.019	-0.016	---		
	Savings Institutions, FC.	-0.012	-0.009	0.008	---	
	Savings Institutions, NFC.	0.071	0.075	0.091	0.083	---
AUD	National Commercial Banks	---				
	State Commercial Banks	0.210*	---			
	Commercial Banks, Other	0.395	0.185	---		
	Savings Institutions, FC.	0.152	-0.057	-0.242	---	
	Savings Institutions, NFC.	0.319	0.109	-0.076	0.167	---

Variable by Type of Depository Institution		Differences of Means				
		National Commercial Banks	State Commercial Banks	Commercial Banks, Other	Savings Institutions, Federally Chartered	Savings Institutions, Not Federally Chartered
BOD	National Commercial Banks	---				
	State Commercial Banks	0.747	---			
	Commercial Banks, Other	0.213	-0.534	---		
	Savings Institutions, FC.	2.486**	1.739*	2.273	---	
	Savings Institutions, NFC.	2.319*	1.572	2.106	-0.167	---
GNDR	National Commercial Banks	---				
	State Commercial Banks	0.028	---			
	Commercial Banks, Other	0.056	0.028	---		
	Savings Institutions, FC.	0.027	-0.001	-0.029	---	
	Savings Institutions, NFC.	-0.020	-0.049	-0.077	-0.047	---
PBV	National Commercial Banks	---				
	State Commercial Banks	0.105	---			
	Commercial Banks, Other	0.100	-0.005	---		
	Savings Institutions, FC.	0.252	0.148	0.152	---	
	Savings Institutions, NFC.	0.360	0.256	0.260	0.108	---
SIZE	National Commercial Banks	---				
	State Commercial Banks	0.359**	---			
	Commercial Banks, Other	0.609*	0.250	---		
	Savings Institutions, FC.	0.600**	0.241	-0.009	---	
	Savings Institutions, NFC.	0.657**	0.298	0.048	0.057	---

* Significant at the 0.05 level (2-tailed); ** Significant at the 0.01 Level (2-tailed)

TABLE 10
CORRELATIONS OF INSTRUMENTS AND CORPORATE GOVERNANCE INDEPENDENT VARIABLE (EQUATION 1)

	Auditor (AUD)	BOD Members (BOD)	% Board Female (GNDR)	Standing ALCO Committee (ALCB)	Log of Total Assets (SIZE)
ISS Overall Governance Score (ISSGQS)	-0.202**	-0.091	-0.264**	-0.006	-0.212**
ISS Component: Audit & Risk Oversight (ISSGQS_A)	-0.199**	-0.187**	-0.123	0.115	-0.192**
ISS Component: Board Structure (ISSGQS_B)	-0.150*	-0.001	-0.389**	-0.045	-0.127*
ISS Component: Shareholder Rights (ISSGQS_SR)	-0.100	-0.018	-0.083	-0.026	-0.183**
ISS Component: Compensation (ISSGQS_C)	-0.216**	-0.108	-0.122	0.030	-0.167**

* Significant at the 0.05 level (2-tailed); ** Significant at the 0.01 Level (2-tailed)

TABLE 11
CORRELATIONS OF INSTRUMENTS AND ALM DEPENDENT VARIABLE (EQUATION 1)

	Auditor (AUD)	BOD Members (BOD)	% Board Female (GNDR)	Standing ALCO Committee (ALCB)	Log of Total Assets (SIZE)
LIQ (Cash + ST Assets / Total Assets)	0.071	0.020	.128*	-0.056	.161*
CR (12 Month Coverage Ratio)	0.078	-0.051	0.024	-0.036	.201**
LDR (Loans to Deposits)	-0.116	-0.114	-.161*	0.020	-.262**
EAR (Equity to Assets)	-0.003	0.010	-.148*	0.008	-0.040
RELA (Real Estate Loans to Assets)	-.269**	-.159*	-.297**	0.092	-.490**
NPL (Nonperforming Loans to Total)	0.004	0.046	0.095	0.037	.149*
NCO (Net Charge-offs)	0.018	0.027	.160*	-0.032	0.057
ROA (Return on Assets)	-0.043	0.026	-.137*	0.054	-0.033
NIM (Net Interest Margin)	-.237**	-0.052	-.140*	0.018	-.298**
NXA (Noninterest Expense to Assets)	-0.055	-0.008	0.101	-0.061	-0.036

* Significant at the 0.05 level (2-tailed); ** Significant at the 0.01 Level (2-tailed)

TABLE 12
CORRELATIONS OF INSTRUMENTS AND ALM INDEPENDENT VARIABLE (EQUATION 2)

	Price to Book Value (PBV)	SIC Code (SIC)
LIQ (Cash + ST Assets / Total Assets)	0.120	-0.126*
CR (12 Month Coverage Ratio)	0.032	-0.083
LDR (Loans to Deposits)	-0.319**	0.178**
EAR (Equity to Assets)	-0.129*	-0.004
RELA (Real Estate Loans to Assets)	-0.161*	0.231**
NPL (Nonperforming Loans to Total)	-0.172**	0.027
NCO (Net Charge-offs)	-0.083	0.024
ROA (Return on Assets)	0.289**	-0.153*
NIM (Net Interest Margin)	-0.062	-0.011
NXA (Noninterest Expense to Assets)	-0.052	0.042

* Significant at the 0.05 level (2-tailed); ** Significant at the 0.01 Level (2-tailed)

TABLE 13
CORRELATIONS OF INSTRUMENTS AND CORPORATE GOVERNANCE DEPENDENT VARIABLE (EQUATION 2)

	Price to Book Value (PBV)	SIC Code (SIC)
ISS Overall Governance Score (ISSGQS)	-0.054	0.066
ISS Component: Audit & Risk Oversight (ISSGQS_A)	-0.021	0.099
ISS Component: Board Structure (ISSGQS_B)	.127*	0.042
ISS Component: Shareholder Rights (ISSGQS_SR)	-0.093	0.034
ISS Component: Compensation (ISSGQS_C)	-0.062	0.103

* Significant at the 0.05 level (2-tailed)

TABLE 14
ESTIMATION RESULTS – TWO-STAGE LEAST SQUARES ISS OVERALL GOVERNANCE SCORE (ISSGQS)

Panel A: Equation #1 – Asset Liability Management										
	LIQ	**CR**	**LDR**	**EAR**	**RELA**	**NPL**	**NCO**	**ROA**	**NIM**	**NXA**
Corporate Governance	-0.012	0.000	0.028**	0.008**	0.052***	0.000	-0.001***	0.001*	0.001**	-0.001
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	2.674	0.001	4.925	4.388	14.643	1.512	5.013	3.650	4.811	1.529
Model Significance	0.103	0.981	0.027**	0.037**	0.001***	0.22	0.026**	0.057*	0.026**	0.217
R Squared	0.011	0.000	0.02	0.002	0.056	0.006	0.020	0.014	0.019	0.006
Panel B: Equation #2 – Corporate Governance (CG)										
	CG	**CG**	**CG**	**CG**	**CG**	**CG**	**CG**	**CG**	**CG**	**CG**
Liquidity	-9.872									
12-Month Coverage		-49.779								
Gross Loans to Deposits			2.112							
Equity to Assets				3.323						
Real Estate Loans to Assets					4.022					
Non-Performing Loans to Assets						96.639				
Net charge-offs							304.260			
Return on Assets								-100.811		
Net Interest Margin									-14.939	
Expense to Assets										195.605
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	1.442	0.948	1.000	0.030	2.118	0.226	0.376	0.938	0.002	0.068
Model Significance	0.231	0.331	0.318	0.862	0.147	0.635	0.541	0.334	0.962	0.41
R Squared	0.006	0.004	0.004	0.000	0.008	0.001	0.002	0.004	0.000	0.003

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level

TABLE 15
ESTIMATION RESULTS – TWO-STAGE LEAST SQUARES ISS COMPONENT: AUDIT & RISK OVERSIGHT (ISSGQS – A)

Panel A: Equation #1 – Asset Liability Management										
	LIQ	**CR**	**LDR**	**EAR**	**RELA**	**NPL**	**NCO**	**ROA**	**NIM**	**NXA**
Corporate Governance	-0.017	-0.002	0.046**	0.004	0.089***	0.000	0.000	0.000	0.002***	0.000
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	2.499	0.294	5.807	0.595	13.036	0.605	1.705	1.156	7.257	0.139
Model Significance	0.115	0.588	0.017**	0.441	0.001***	0.437	0.193	0.283	.008***	0.71
R Squared	0.010	0.001	0.023	0.002	0.050	0.002	0.007	0.005	0.028	0.001
Panel B: Equation #2 – Corporate Governance: Audit & Risk Oversight (ARO)										
	ARO	**ARO**	**ARO**	**ARO**	**ARO**	**ARO**	**ARO**	**ARO**	**ARO**	**ARO**
Liquidity	-11.583									
12-Month Coverage		-49.915								
Gross Loans to Deposits			3.080							
Equity to Assets				17.107						
Real Estate Loans to Assets					4.312					
Non-Performing Loans to Assets						229.423				
Net charge-offs							578.488			
Return on Assets								-150.001		
Net Interest Margin									224.260	
Expense to Assets										248.857
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	5.174	0.707	1.354	0.494	1.592	0.855	0.787	1.405	0.275	0.736
Model Significance	0.264	0.401	0.246	0.483	0.208	0.356	0.376	0.237	0.600	0.392
R Squared	0.005	0.003	0.005	0.002	0.006	0.003	0.003	0.006	0.001	0.003

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level

TABLE 16
ESTIMATION RESULTS – TWO-STAGE LEAST SQUARES ISS COMPONENT: BOARD STRUCTURE (ISSGQS – B)

Panel A: Equation #1 – Asset Liability Management										
	LIQ	**CR**	**LDR**	**EAR**	**RELA**	**NPL**	**NCO**	**ROA**	**NIM**	**NXA**
Corporate Governance	-0.012	0.000	0.028**	0.008**	0.052***	0.000	-0.001**	0.001*	0.001**	-0.001
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	2.674	0.001	4.925	4.388	14.643	1.512	5.013	3.650	4.811	1.529
Model Significance	0.103	0.981	0.027**	0.037**	0.001	0.22	0.026**	0.057*	0.029**	0.217
R Squared	0.011	0.000	0.019	0.017	0.056	0.006	0.020	0.014	0.019	0.006
Panel B: Equation #2 – Corporate Governance: Board Structure (BS)										
	BS	**BS**	**BS**	**BS**	**BS**	**BS**	**BS**	**BS**	**BS**	**BS**
Liquidity	7.021									
12-Month Coverage		-0.098								
Gross Loans to Deposits			-3.359							
Equity to Assets				-43.167						
Real Estate Loans to Assets					-1.603					
Non-Performing Loans to Assets						-427.207				
Net charge-offs							-900.674			
Return on Assets								169.683		
Net Interest Margin									-736.358	
Expense to Assets										-198.895
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	0.674	0.000	1.912	1.934	0.267	2.581	1.227	1.982	0.811	0.577
Model Significance	0.412	0.998	0.168	0.166	0.606	0.109	0.269	0.16	0.396	0.448
R Squared	0.003	0.000	0.008	0.008	0.001	0.010	0.005	0.008	0.003	0.002

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level

TABLE 17
ESTIMATION RESULTS – TWO-STAGE LEAST SQUARES ISS COMPONENT: SHAREHOLDER RIGHTS (ISSGQS – SR)

Panel A: Equation #1 – Asset Liability Management										
	LIQ	**CR**	**LDR**	**EAR**	**RELA**	**NPL**	**NCO**	**ROA**	**NIM**	**NXA**
Corporate Governance	-0.036**	-0.022**	0.093***	0.007	0.172***	-0.001**	0.000	0.000	0.004***	0.001
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	4.319	5.753	7.426	0.901	9.125	3.961	0.904	0.336	7.544	0.210
Model Significance	0.039**	0.017**	0.007***	0.344	0.003***	0.048**	0.343	0.583	0.006***	0.647
R Squared	0.017	0.023	0.029	0.004	0.035	0.016	0.004	0.001	0.029	0.001
Panel B: Equation #2 – Corporate Governance: Shareholder Rights (SR)										
	SR	**SR**	**SR**	**SR**	**SR**	**SR**	**SR**	**SR**	**SR**	**SR**
Liquidity	-11.832									
12-Month Coverage		-35.604								
Gross Loans to Deposits			3.790							
Equity to Assets				31.637						
Real Estate Loans to Assets					3.698					
Non-Performing Loans to Assets						358.781				
Net charge-offs							828.493			
Return on Assets								-187.238		
Net Interest Margin									488.348	
Expense to Assets										-1.296
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	1.546	0.654	2.318	1.343	1.477	1.864	1.168	2.216	0.726	0.826
Model Significance	0.215	0.419	0.129	0.248	0.225	0.173	0.281	0.138	0.395	0.364
R Squared	0.006	0.003	0.009	0.005	0.006	0.007	0.005	0.009	0.003	0.003

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level

TABLE 18
ESTIMATION RESULTS – TWO-STAGE LEAST SQUARES ISS COMPONENT: COMPENSATION (ISSGQS – C)

Panel A: Equation #1 – Asset Liability Management										
	LIQ	**CR**	**LDR**	**EAR**	**RELA**	**NPL**	**NCO**	**ROA**	**NIM**	**NXA**
Corporate Governance	-0.018	-0.003	0.050**	0.005	0.101***	0.000	0.000	0.001	0.003***	0.000
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	2.209	0.393	5.695	0.64	11.495	0.372	1.449	1.294	7.818	0.000
Model Significance	0.139	0.531	0.018**	0.425	0.001***	0.542	0.230	0.256	0.006***	0.99
R Squared	0.009	0.002	0.022	0.003	0.044	0.001	0.006	0.005	0.030	0.000
Panel B: Equation #2 – Corporate Governance: Compensation (C)										
	C	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**
Liquidity	-15.873									
12-Month Coverage		-68.58								
Gross Loans to Deposits			3.996							
Equity to Assets				18.512						
Real Estate Loans to Assets					6.060*					
Non-Performing Loans to Assets						271.077				
Net charge-offs							710.053			
Return on Assets								-193.715		
Net Interest Margin									217.058	
Expense to Assets										333.8
Number of Observations	251	251	251	251	251	251	251	251	251	251
F-Stat	2.21	1.027	2.477	0.563	3.230	1.102	0.888	2.334	0.271	0.75
Model Significance	0.138	0.312	0.117	0.454	0.074*	0.295	0.347	0.128	0.603	0.387
R Squared	0.009	0.004	0.010	0.002	0.013	0.004	0.004	0.009	0.001	0.003

* Significant at the 0.10 level; ** Significant at the 0.05 level; *** Significant at the 0.01 level