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AN EXAMINATION OF THE SAFETY AND PROFITABILITY OF EU AND US BANKS SINCE BASEL III

Angelė Lileikienė[1], Pat Obi[2], Asta Valackienė[3]
Lithuania Business University of Applied Sciences[1,3], Purdue University Northwest[2]

Abstract
This paper investigates the performance of European and U.S. banks since Basel III. Key findings in the literature as well as multi-year bank performance data are summarized. With a focus on the regulatory requirements on capital adequacy and liquidity and how they affect profitability, we find evidence of improving safety standards across the board. Banking regulation addresses two critical aspects of risk management: capital adequacy and liquidity. Liquidity risk stems from the likelihood that a depository financial institution may not have sufficient funds to meet its recurring payment obligations. To that end, the key reason for bank regulation on liquidity is to address concerns over the safety and stability of banks and the payments system. Capital adequacy deals with the minimum capital capable of absorbing any unforeseen losses from credit, market, and operational risks to which banks are exposed. The goal of capital adequacy is to keep total bank capital sufficiently high so that the chance of bank failure is prevented when financial losses mount. Capital adequacy ratio (CAR) takes into account a bank's ability to pay its liabilities and respond fully to the risk of any such financial losses. A bank with strong CAR has more than sufficient capital to absorb these losses and therefore less likely to become insolvent. Banks in the EU lead their US counterparts in terms of safety but lag in terms of profitability. There is evidence that the strive toward higher capital and liquidity standards comes with the price of reduced profitability. Notwithstanding, most studies agree that while the new standards impose additional costs, they are necessary for ensuring the stability and sustainability of the financial system.
KEY WORDS: Basel III; Capital adequacy; Liquidity coverage; Risk-weighted asset; Profitability.
JEL: G21, F3, F65

Introduction

The commercial banking sector is arguably the most heavily regulated business in the financial services industry. A robust system of banking regulation is necessary to ensure that no one financial institution has such a concentrated amount of risk as could jeopardize the safety and soundness of the financial system. To that end, bank regulation is, in general, designed to address specific ways to ensure stable performance. The renewed focus on prudential supervision in recent years is purposed to increase the resiliency of commercial banks and thereby, the entire financial market system.

Banking regulation addresses two critical aspects of risk management: capital adequacy and liquidity. Capital adequacy deals with the minimum capital capable of absorbing any unforeseen losses from credit, market, and operational risks to which banks are exposed. The goal of capital adequacy is to keep total bank capital sufficiently high so that the chance of bank failure is prevented when financial losses mount. Capital adequacy ratio (CAR) takes into account a bank's ability to pay its liabilities and respond fully to the risk of any such financial losses. A bank with strong CAR has more than sufficient capital to absorb these losses and therefore less likely to become insolvent.

Liquidity risk stems from the likelihood that a depository financial institution may not have sufficient funds to meet its recurring payment obligations. To that end, the key reason for bank regulation on liquidity is to address concerns over the safety and stability of banks and the payments system. As Schmieder et al. (2011) put it, there is a natural link between solvency and liquidity in that the two tend to reinforce each other especially in times of crisis. A clear example was the European debt crisis in the spring of 2010 when concerns about bank solvency led to a liquidity crisis, with many banks struggling to access interbank funding. Two years earlier, widespread toxic loans on U.S. bank balance sheets led to a liquidity crisis and credit crunch – the main reason the Federal Reserve initiated the so-called *quantitative easing*.

From the supply side, deposit insurance is designed to guard against bank runs. However, this assurance alone is insufficient to ensure that banks maintain a healthy level of cash flow for their normal operations. Overall, regulation on capital adequacy and liquidity is designed to ensure that banks maintain sufficient investor capital given the amount of risk that arises from banking business and, as a retail lender of last resort, stand ready to intervene to ease temporary illiquidity as well as assure safety of customer deposits.

Recent Literature on Capital Adequacy and Liquidity

Many authors like Abdul - Rahman and Ayorinde (2013), Hagendroff, Nietto and Wall (2013), Pana, Park and Query (2007), Berger, Kick and Schaek (2010),Kemal (2011) define the sustainability of the financial system through the regulatory framework of the banking sector and commercial banks. indicators such as liquidity and ensuring capital adequacy ratios.

Since the end of the 2008-2009 financial crisis, the significance of regulatory capital and liquidity has gained increased attention among policy makers and scholars. The literature is replete with studies seeking to assess the efficacy of Basel III in terms of its overall impact on bank performance. The specific aim in many of these studies is to determine if the tougher standards in Basel III are serving their intended purpose, which is to enhance financial stability. Earlier studies that examine this issue include Berger and Bouwma (2009), Hagendroff and Nieto (2013), Shmieder et al. (2011), and Jokipii et al. (2011). More recent studies include Chandrasegaran (2020), Ankenbrand and Dao (2018), Obi and Sil (2015), Fratianni and Pattison (2015), and Ambrasas (2014), Lileikienė and Likus (2012), Kovalčik and Lileikienė (2015) and other.

Berger and Bouwma (2009) find mixed results in their investigation about the relationship between bank liquidity and bank value. While the relationship is found to be positive for large banks, it is negative for the small institutions. Recently, Bouwma (2018) gives a historical overview of bank liquidity creation in the U.S. from the early 1800s to Basel III and the Dodd-Frank Act of 2010 and find that large banks created most of the liquidity in the banking system.

Across the Atlantic, Hagendorff and Nieto (2013) examine the impact of European bank mergers on changes in liquidity and bank performance of both the acquirer and the target. An important finding is that in cases where there is strict domestic oversight, both the acquirer and target performed better than in cases where supervision is lax. They also find that strong regulation coupled with a tough deposit insurance system produced a positive post-merger changes in liquidity and overall performance. In a related study, Shmieder et al. (2011) use a cash flow-based model that integrates liquidity stress test with solvency testing. They find that three critical factors that negatively affect bank performance are bank run, maturity transformation, and solvency risks.

The issue addressed by Jokipii et al., (2011) is how short-term capital buffers relate to portfolio risk adjustments. Their analysis points to a bi-directional positive relationship. That is, banks are encouraged to take on more risks as their capital cushion rises, and vice versa. Their empirical analysis utilizes a panel dataset of U.S. banks from 1986 to the start of the financial crisis in 2008.

Both Boissay and Collard (2016) and Schanz et al. (2018) show that the tougher Basel III standards have a direct effect on the broader economy. The latter study shows that optimal capital ratio lies somewhere between 10 percent and 15 percent of risk-weighted assets. Boissay and Collard (2016) find that strict enforcement of the new rules promotes a more efficient and productive allocation of credit to its best use. However, Schanz et al. (2018) find that the higher capital requirement imposes higher operating costs on banks. These costs are passed on to customers in the form of higher borrowing costs which have a negative impact on investment and growth. Obi and Sil (2015) draw a similar conclusion when the so-called *stressed value-at-risk*, introduced in the 2009 revision of market risk capital is factored into the CAR calculation. They find that this additional risk estimator often leads to the unintended consequence of excessive and costly capital charge. Notwithstanding, Schanz et al. (2018) conclude that the higher costs are relatively low when compared to the huge economic benefits of enhanced prudential supervision.

While a higher capital ratio increases risk protection, it also has the potential to reduce profitability. Herrala (2012) points out that the two stakeholders in a bank – shareholders and depositors – have asymmetric expectation. Shareholders seek higher yielding investments while depositors prefer safety. Herrala's approach is contested by Jokipii and Milne (2009) who argue that regulation of capital reduces risk and actually improves performance. However, in a bid to maximize profit, banks sometimes take inordinate risks which weakens their capital base.

Some negative outcomes of capital adequacy after the Basel III integration in the Eurozone are also discussed by Pana et al. (2009), and Oppliger and Martin (2009). These include reduced profitability, lower return on investment, constant inspections by supervisory authorities, increased fees for customers, and diversion of financial resources to IT upgrade. These issues are also identified by Fratianni and Pattison (2015) and Bullow and Klemperer (2013). While touting the merits of Basel III by its ability to enhance safety, these studies find significant weaknesses regarding the inability of banks to earn a fair return. Asymmetries in the ways that the standards are implemented in different countries were also identified by Fratianni and Pattison (2015) and Mawutor (2014) as a key reason for performance differences in different countries. It is obvious that the Basel amendment introduced in 2017 seeks to minimize the risk-weighting variations that account for many of these performance differences.

According to Lileikienė and Kovalčik (2014), the norm regulating the activities of commercial banks as a liquidity risk, in the context of Basel III, allows minimizing systemic risk. Systemic risk in the banking system is understood as a chain reaction of a lack of liquidity by one financial market participant throughout the financial sector. In their research, the authors draw attention to the interaction between liquidity risk and concentration in the banking sector, noting stronger systemic risk.

A growing number of studies have also examined the regulatory benefits of the new banking rules in the developing economies. For example, Chandrasegaran (2020) investigate the specific impact of Basel III capital adequacy on bank profitability in Sri Lanka. Key

findings include a positive relationship between CAR and non-interest income. However, Tier 1 capital ratio had a negative relationship with non-interest income. Importantly, this study did not show a direct linkage between CAR and either interest income or liquidity. Similar findings of a positive linkage between CAR and performance have also been identified for other developing economies. Examples include Ankenbrand and Dao (2018) in the case of Vietnam, Bogale (2021) for Ethiopia, Hafez (2015) for Egypt, Al-khalaf (2014) for Saudi Arabia, and Aymen (2013) for Tunisia. A study on the determinants of capital adequacy in Nigeria by Sanyaolu (2020) showed that return on assets and loan to total assets are positively related to CAR. However, nonperforming loans and asset size have a negative effect. This study also finds evidence of a linkage between macroeconomic factors and CAR.

Research and Methodology. The Concept of Capital Adequacy

Commercial banks face a wide range of financial risks, the most significant of which is *credit risk*. Additionally, banks are exposed to the risk of financial losses from their trading and off-balance sheet activities. These risks, which are classified as *market risk* were formally identified in the 1996 amendment to Basel I. Basel II adds a provision for *operational risk*, which includes risk of financial losses from failure in the bank's internal procedures as well as external hazards such as theft, fire, and natural disasters. The first pillar of the Basel Accords provides for minimum capital to reflect risk-weighted assets with respect to losses from these three sources of risks. Banks also face a host of other risks in the general conduct of business referred to as *business risk*. The capital adequacy ratio of a commercial bank serves as a buffer to cover unforeseen losses from these risks.

Capital Adequacy Ratio (CAR) is the key metric used to determine a bank's ability to withstand financial shock. A bank with a good CAR has sufficient capital to absorb potential losses and therefore, is less likely to require a government bailout in cases of emergency. After the financial crisis in 2008, the Bank of International Settlements (BIS) began setting stricter CAR standards to protect depositors and minimize the risk of another financial crisis.

Pursuant to the central mission of the BIS, establishing a global standard for the prudential supervision of banks is the key responsibility of the Basel Committee on Banking Supervision (BCBS). While capital adequacy remains central in the Committee's charge, Basel III, which was published in 2010, also includes liquidity as well as leverage requirements as part of a bank's overall risk management regime. The stipulations in Basel III are considered a substantial strengthening of previous capital requirements. The revised standards were in response to observed deficiencies in banking practice that were partly to blame for the 2008 global financial crisis.

The revised provisions in Basel III raised minimum capital by increasing Tier 1 capital ratio from 4% to 6% of which Core Tier 1 capital ratio increased from 2% to 4.5%. Additionally, Basel III introduced "Mandatory Capital Conservation Buffer" which further raised Core Tier 1 ratio to 7% and the combined ratio for Tier 1 and Tier 2 to 10.5%. These new stipulations constitute a sharp increase from the Basel II level of 8%. Basel III also provides for a discretionary "Countercyclical Capital Buffer" capable of increasing minimum capital by an additional 2.5%. The ratio rises to an even higher level for globally focused commercial banks considered to be systemically important. The following table (Table 1) shows the maximum dividend payout ratio for the fully phased in Capital Conservation Buffer for U.S. banks which took effect in January 2019.

Table 1. Capital Conservation Buffer for U.S. Banks

Capital Conservation Buffer (% of RWA)	**Maximum Payout Ratio (% of Eligible Retained Income)**
Greater than 2.5%	No payout limitation
Less than or equal to 2.5% and greater than 1.875%	60%
Less than or equal to 1.875% and greater than 1.25%	40%
Less than or equal to 1.25% and greater than 0.625%	20%
Less than or equal to 0.625%	0%

Source: U.S. Federal Deposit Insurance Corporation (https://www.fdic.gov/regulations/safety/manual/section2-1.pdf)

Common equity Tier 1 capital ratio is the ratio of Tier 1 common equity to risk-weighted assets. In calculating CAR, risk weighting ensures that each asset is adjusted by its degree of risk. Since Core Tier 1 capital is common equity of which retained earnings are a major part, a low net interest income may not add much to the numerator of Tier 1 capital adequacy ratio, shown in Equation 1. Thus, for the same level of risk-weighted assets, regulatory capital ratio may end up lower than would be the case if earnings were higher.

$$Capital\ adequacy\ ratio: CAR = \frac{Tier\ 1\ Capital + Tier\ 2\ Capital}{Credit\ RWA + Market\ RWA + Operational\ RWA} \quad (1)$$

As stated by the U.S. Federal Deposit Insurance Corporation, bank capital performs several important functions. It absorbs losses, promotes public confidence, helps restrict excessive asset growth, and provides protection to depositors and the deposit insurance fund. Undoubtedly, Tier 1 capital is the core capital of any bank. This type of capital absorbs losses without requiring a bank to cease its operations. Tier 2 capital includes subordinated debt, and it is used to absorb losses in the event of a liquidation. For these reasons, some refer to Tier 1 capital as *going concern capital* and Tier 2 as *gone concern capital (*Risk Management Manual of Examination Policies, Federal Deposit Insurance Corporation (https://www.fdic.gov/regulations/safety/manual/section2-1.pdf) Retrieved on May 31, 2021.*)*.

Table 2 shows an example of CAR calculation for a hypothetical bank with $10 million in Tier 1 capital and $8 million in Tier 2 capital for total capital of $18 million. Suppose this bank made a loan of $30 million to Firm X with risk weighting of 25%. It also issued a loan of $95 million to Firm Z with risk weighting of 55%. This bank's total risk-weighted assets (RWA) equal $59.75 million ($30 million x 0.25 + $95 million x 0.55). The resulting total CAR is 30.13% ($18 million/$59.75 million) and Tier 1 capital ratio is 16.74% ($10 million/$59.75 million). From this outcome, we determine that this bank has more than met the minimum capital adequacy ratios under Basel III.

Table 2. Capital Adequacy Ratio Calculation for a Hypothetical Bank

Tier 1 capital	$10,000,000		
Tier 2 capital	$8,000,000		
Total	$18,000,000		
Asset		**Risk Weight**	**RWA**
Loan to Firm X	$30,000,000	25.00%	$7,500,000
Loan to Firm Z	$95,000,000	55.00%	$52,250,000
Total RWA			$59,750,000
Total capital adequacy ratio (CAR)			30.13%
Tier 1 capital ratio			16.74%

Capital ratios express a bank's capital as a percentage of its risk-weighted assets (RWAs). Tier 1 capital is the most significant since it is based on common equity capital. In 2020, Morgan Stanley had the highest common equity tier 1 capital ratio in the United States. This bank is the fifth largest by market capitalization. Its Tier 1 capital ratio of 19.44%, which was above the required level of 4.5%. The largest bank in the U.S., JPMorgan Chase, had a Tier 1 capital ratio of 15.05%.

In the European Union, Royal Bank of Scotland had the largest Tier 1 capital ratio of 18.5%. Capital requirements for European banks were raised after Basel III and phased in on the 1st of January 2015. Tier 1 capital ratios of selected US and EU banks as of the 4th quarter 2020 is presented in Table 3.

Table 3. US and EU Banks with Highest Tier 1 Capital Ratios as of 2020

	United States		**European Union**	
	Bank	**Tier 1 Ratio**	**Bank**	**Tier 1 Ratio**
1	Morgan Stanley	19.44%	Royal Bank of Scotland	18.50%
2	HSBC North America	17.08%	Credit Agricole Group	17.20%
3	TD Group	17.03%	Lloyds Banking Group	16.20%
4	Goldman Sachs	16.73%	Groupe BPCE	16.00%
5	BNY Mellon	16.06%	Unicredit S.P.A.	16.96%
6	Capital One Financial	15.30%	HSBC Holdings	15.90%
7	JP Morgan Chase	15.05%	ING Group	15.50%
8	American Express	14.66%	Barclays PLC	15.10%
9	State Street Corp	14.39%	Intesa Sanpaolo	14.00%
10	Citigroup	13.70%	UBS AG	13.80%
11	Bank of America	13.52%	Deutsche Bank	13.60%
12	Wells Fargo	13.25%	Societe Generale	13.40%

Source: Statistica, Largest US and EU Banks in 2020, by CET1 Ratio, Published by F. Norrestad, May 27, 2021

Tier 1 capital ratio for U.S. banks hit an all-time low during the 2008-2009 financial crisis. Since then, banks have become much better capitalized with ratios rising up to 12 percent. As Figure 1 shows, this has caused the share of under-capitalized banks to fall sharply to less than 0.5 percent. Because of this strong capital position, the banking industry was able to weather through the COVID-19 recession and was better positioned to support continued lending.

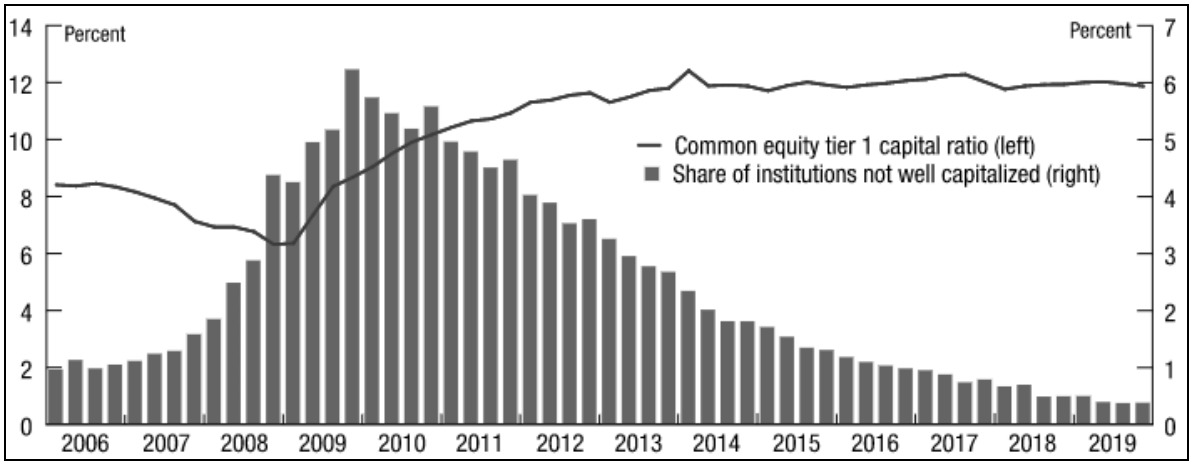

Figure 1. Bank Capital Data for US Banks
Source: Federal Reserve, Call Report and FR Y-9C

Multi-year safety data for European banks are presented in Table 4. European banks have continued building a solid capital position and strengthening their balance sheets throughout 2019. The recapitalisation effort that European banks have made following the 2008 financial crisis makes the European banking sector more resilient and robust. In recent years, Core Tier 1 capital ratio was at 14.3%, the highest level it had ever been and more than double the same ratio in December 2011.

Table 4. Bank Capital Data for EU Banks

	Jun 2011	**Dec 2011**	**Jun 2012**	**Dec 2012**	**Jun 2013**	**Jun 2014**	**Jun 2015**	**Jun 2016**	**Jun 2017**	**Jun 2018**	**Jun 2019**
Core Tier 1	5.3%	7.0%	7.8%	8.3%	9.0%	11.4%	11.8%	12.8%	13.8%	14.3%	14.3%
LCR	71%	76%	N/A	113%	110%	116%	128%	135%	143%	147%	147%
NSFR	89%	93%	95%	96%	N/A	103%	105%	108%	112%	114%	113%
LR (min=3%)	2.8%	3.0%	3.1%	3.0%	3.1%	4.0%	4.4%	4.7%	5.0%	5.2%	5.1%

Source: European Banking Federation, Banking Sector Performance
Core Tier 1 = Common equity tier 1 capital ratio; LCR = Liquidity coverage ratio; NSFR = Net stable funding ratio; LR = Leverage ratio.

Although a global agreement on banking supervision was reached in Basel III, implementation lay in the hands of national and regional regulators. Asymmetry in the implementation of national regulation and supervision has given rise to concerns that were subsequently addressed in what some refer to as Basel IV. In December 2017, the Basel Committee published its reforms to Basel III, the main objective being to reduce the wide variability in the risk weighting used to calculate risk-weighted assets and capital ratios.

In recent years, the banking sector has also been subjected to widespread discretionary regulation by governments especially in times of crisis. This was evident during the 2008-2009 financial crisis and the European debt crisis in 2010-2011. Unprecedented fiscal initiatives were taken to bail out insolvent banks, arrange bank mergers, and in some cases even, maintain a significant public stake in some banks. These additional regulations augment established regulatory measures designed to guard against systemic failure.

Banking Regulation in the US and EU

While the Basel Committee on Banking Supervision lays out standards to harmonize bank regulation globally, countries and regions are ultimately responsible for designing and implementing their own regulatory regime. In the United States, nationally chartered banks are supervised by the Federal Reserve Board, Federal Deposit Insurance Corporation (FDIC), and Office of the Comptroller of the Currency (OCC). Additionally, state-chartered banks are subject to state regulatory authorities.

In the European Union, banking supervision is governed by the Single Supervisory Mechanism (SSM), which is the common system of banking supervision in the Eurozone. The mechanism consists of the European Central Bank (ECB) and the national supervisory authorities of the participating countries. In addition to the central goal to ensure the stability of the European banking system, bank supervision in the EU is aimed at

increasing financial integration and ensuring consistent supervision across all E.U. banks. (European Central Bank Banking Supervision: Single Supervisory Mechanism (https://www.bankingsupervision.europa.eu/about/thessm/html/index.en.html) retrieved on May 22, 2021.)

The ECB has the principal authority to directly supervise all the national banks in the European Monetary Union deemed to be "significant" in that they hold more than 80 percent of bank assets in the member states. All euro area countries participate automatically in European banking supervision. To that end, the ECB conducts supervisory reviews and on-site inspections, grant or withdraw banking licences, assess bank acquisitions and disposals, ensure compliance with E.U. prudential rules and importantly, set capital requirements to forestall financial losses.

Worldwide, bank supervision is conducted by designated state regulators, at the top of which is the country's central bank. Notable central banks include the Federal Reserve, European Central Bank, Bank of Japan, and Bank of England. In all, bank supervision is designed to ensure that banks comply with established regulatory standards in order to avoid the types of financial losses that could lead to systemic failure and a collapse of the financial system.

Results and discussion. The Liquidity-Profitability Paradox

Basel III also includes provisions for leverage ratio and two liquidity ratios. The latter are Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). Liquidity ratios are designed to ensure that banks maintain sufficient liquid assets given their expected cash outflows. This requirement is introduced in Basel III to address the liquidity problem caused by the maturity mismatch of bank assets and liabilities. That is, the financing of long-term investments (bank loans) with short-term funds (customer deposits).

Liquidity Coverage Ratio (LCR), defined in Equation 2, provides information as to whether a bank has the capacity to survive a 30-day period of liquidity disruptions. Prior to the 2007-2008 financial crisis, bank regulation did not include explicit liquidity requirements. This ratio imposes a minimum requirement on the amount of unencumbered high-quality liquid assets (HQLA) that would prevent cash flow disruptions. It requires the amount of HQLA be at least as large as the net outflow of funds under the 30-day stress period. Off-balance sheet positions such as undrawn committed credit lines are included in the denominator as an outflow rate times the undrawn amount on the credit lines.

$$Liquidity\ Coverage\ Ratio:\ LCR\ =\ \frac{High\ quality\ liquid\ assets}{Net\ cash\ outflows\ in\ a\ 30\text{-}day\ period} \geq 100\% \quad (2)$$

Net Stable Funding Ratio (NSFR) in Equation 3 focuses on liquidity management over a 1-year period. Like LCR, the minimum NSFR that banks must maintain under Basel III standards is 100%. This ratio helps determine if a bank has sufficient long-term, stable funding sources to cover long-term interest-bearing assets. Stable funding sources consist of customer deposits, long-term debt, and common equity. The numerator includes Tier 1 and Tier 2 capital in addition to customer deposits. Each item is multiplied by a factor reflecting its level of stability. The denominator includes all assets and off-balance sheet items, all of which are also multiplied by a factor to reflect the level of permanence of the funding required.

$$Net\ Stable\ Funding\ Ratio:\ NSFR = \frac{Amount\ of\ stable\ funding}{Required\ amount\ of\ stable\ funding} \geq 100\% \quad (3)$$

Banks in the European Union preceded the U.S. in fully integrating the new liquidity standards in 2016. Full compliance in the U.S. came into effect a year later. The liquidity risk exposure which can hamper a bank's ability to fulfil its payment obligations was evident in the United States when the mortgage crisis erupted in 2007. Widespread toxic loans on bank balance sheet meant that many loans – most of which were subprime – went into default. It also meant that interest on these bad loans were not received, leading to reduced net interest income. All of this made it difficult for banks to be able to create new loans as well as fully meet withdrawal requests.

Since the end of the 2008-2009 financial crisis, banks in the U.S. and Europe have greatly improved their liquidity positions. For US banks, this is evident by the remarkable increase in the level of high quality liquid asset (HQLA) as shown in Figure 2.

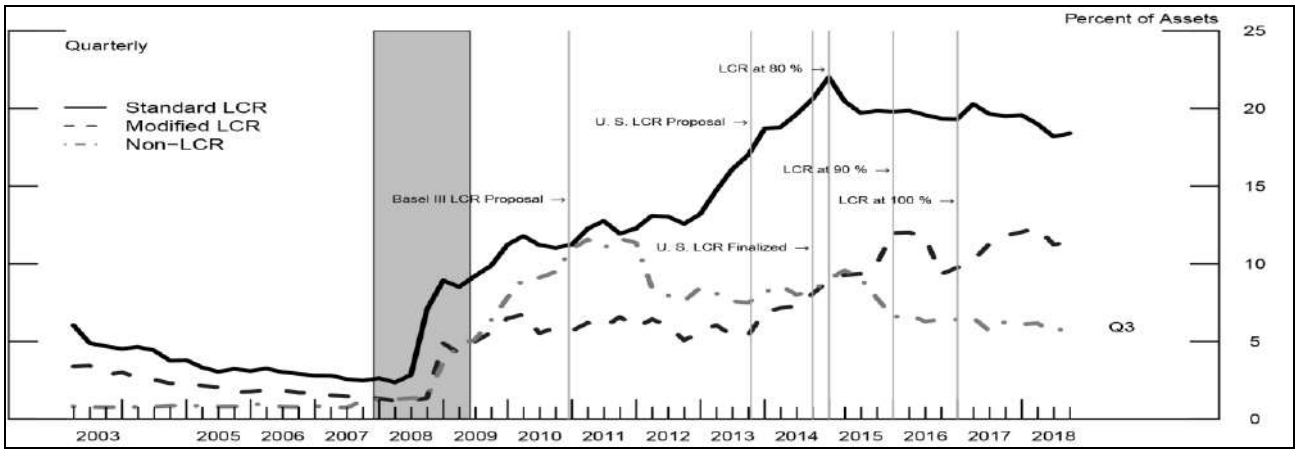

Fig. 2. High Quality Liquid Assets-to-Total Assets Ratio for US Banks
Standard LCR banks are those with total consolidated assets above $250 billion. Modified LCR banks are all bank holding companies with assets between $50 and $250 billion. Non-LCR banks are banks with total assets below $50 billion. The shaded area is the period of the 2008-2009 recession. Vertical lines are different stages of the LCR implementation. Source: Federal Reserve, "The Liquidity Coverage Ratio and Corporate Liquidity Management."

One important way that banks can boost cash flows and improve liquidity is to issue mostly high quality and short-term loans, both of which are low risk. Such loans guarantee strong liquidity and therefore increases the numerator of LCR. However, the low return on such loans means that banks would have to contend with reduced profit margins. Two studies that examine the relationship among liquidity, profitability, and bank safety are Taraila (2001) and Vadova (2011). Both studies find evidence of a negative relationship between liquidity and profitability. According to Liang (2012) and Lileikienė and Likus (2011), to maintain the required liquidity level, banks forego profitability by holding a disproportionate amount of low-yielding short-term loans. The implication therefore is that strict compliance with the new liquidity requirement potentially leads to two conflicting outcomes: improved liquidity but reduced profitability.

As illustrated in Figure 3, the least profitable assets are often the most liquid. These are assets that can be readily converted to cash without loss of value. As Lileikienė (2004) explains, these assets have zero return and contribute very little to profitability. At the other end are long-term loans and investment securities, assets which although are most profitable are also least liquid. Because traditional banking involves the creation of loans out of customer deposits, the challenge to determine an optimal cash balance capable of meeting the daily liquidity needs while maintaining a profitable loan portfolio, is critical in a successful asset-liability management.

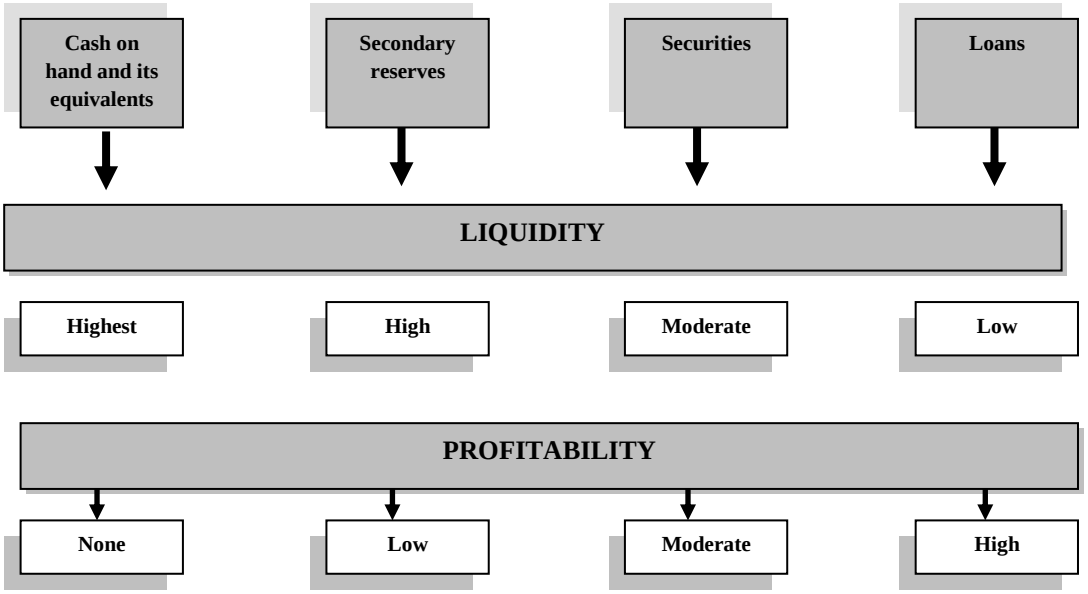

Fig. 3. Asset Type versus Liquidity and Profitability

It is noteworthy that while liquidity and capital positions of American and European banks have greatly improved in recent years, the same cannot be said of profitability. Although ROE has remained generally positive since the end of the financial crisis, it plateaued to around 10 percent for U.S. banks and is generally below 6 percent for European banks. Recent trends are presented in Figures 4 and 5.

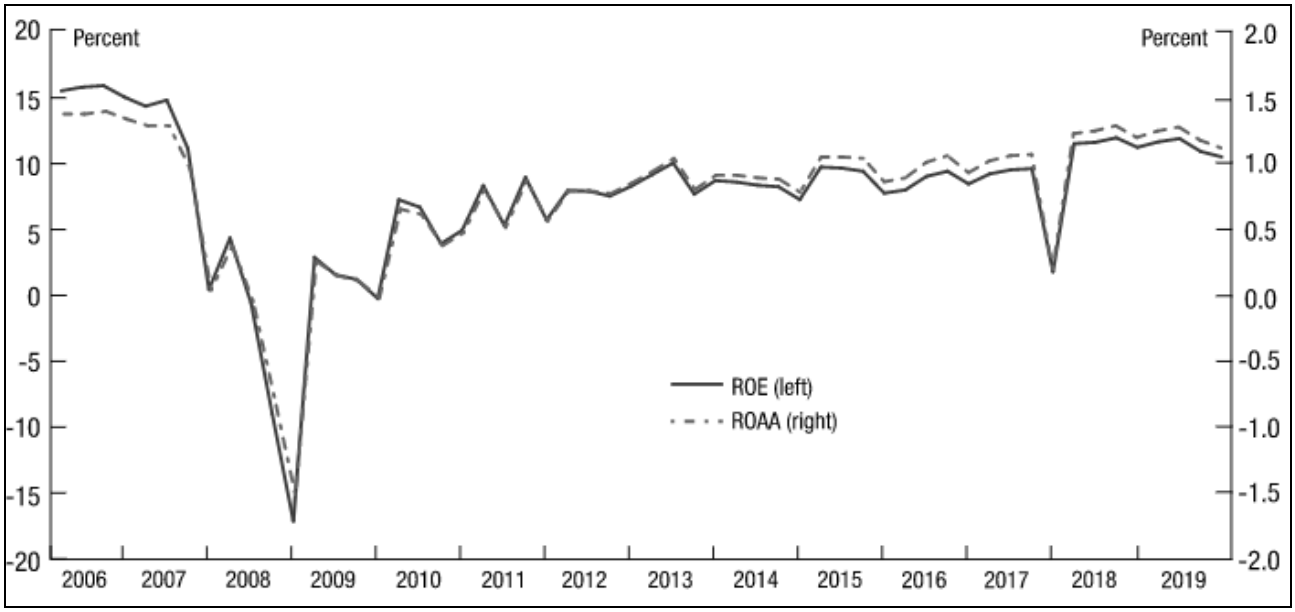

Fig. 4. Return on Equity of U.S. Banks
Note: ROE = Net income/average equity capital; ROAA = Net income/quarterly average assets.
Source: Federal Reserve System, Call Report and FR Y-9C.

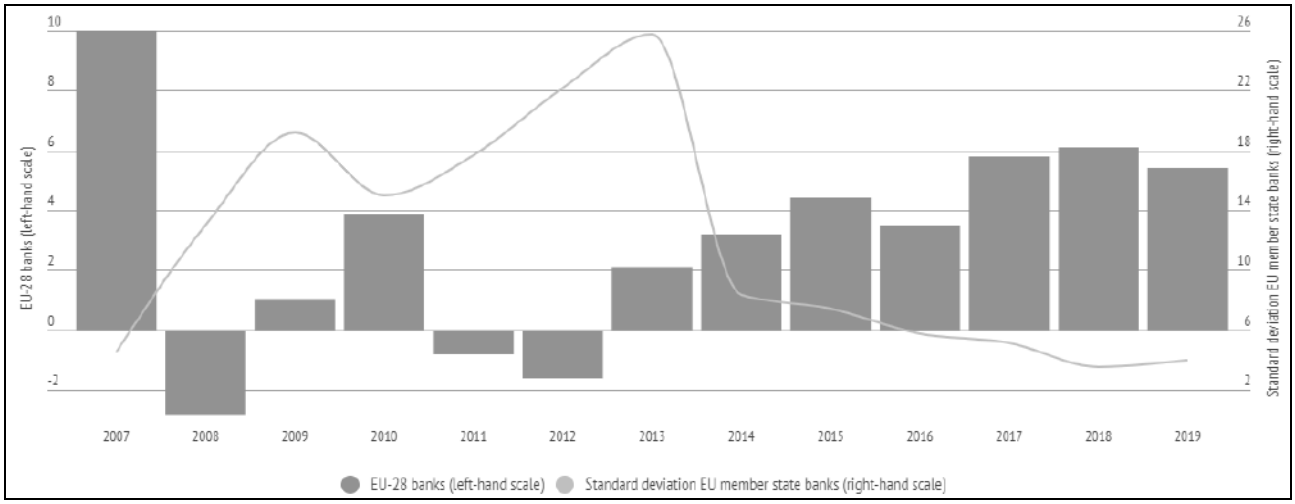

Fig. 5. Return on Equity of European Banks
Source: European Banking Federation, "Facts and Figures, Banking in Europe 2020: Banking Sector Performance"

As can be seen, while capital and liquidity ratios have significantly improved with time, profitability has not been as robust. Low profitability has real consequences as recent studies have shown. It restricts the extent to which banks can fund growth from retained earnings and makes issuing new capital more costly. It also accelerates the point at which banks have to use existing capital rather than earnings to absorb losses. Finally, it raises questions about the viability and sustainability of the affected financial institutions.

Conclusions

This paper examined the performance of US and EU banks since Basel III. Performance was conducted with regard to multi-year changes in capital adequacy, liquidity, and profitability. Most authors agree that the sustainability of commercial banking depends on a strict compliance with the new Basel III liquidity and capital standards. Yet, strict adherence to the new standards appears to have a negative impact on profitability. Notwithstanding, the consensus in the literature is that strong a capital and liquidity position is necessary to mitigate the risk of a systemic crisis like what happened in 2008-2009. Systemic crisis arises when the collapse of

one bank affects the financial conditions of others, thereby jeopardizing the safety and soundness of the global financial system.

Capital Adequacy Ratio (CAR) is the key measure of bank safety and considers a bank's ability to pay liabilities and absorb unexpected losses from credit, market, and operational risks. A bank with a strong CAR is less likely to become insolvent and lose depositors' funds. After the financial crisis in 2008-2009, the Bank of International Settlements (BIS) began setting stricter CAR requirements to protect depositors. Additionally, it instituted liquidity standards to ensure that banks maintain sufficient high quality liquid assets to back up their cash outflows.

In the United States, average CAR steadily increased following the 2008-2009 financial crisis. In recent years, this ratio has risen above 12 percent with the share of undercapitalized banks falling to less than 0.5 percent even through the peak of the COVID-19 pandemic in 2020-2021. For countries in the European Monetary Union, one of the initial challenges was reconciling the disparate national regulatory standards with those established by the European Central Bank. Under the Single Supervisory Mechanism (SSM), Tier I capital has risen remarkably to almost 16 percent by the end of 2020. The recapitalisation effort that European banks made following the 2008 financial crisis has undoubtedly made the European banking sector much more resilient and robust. Similarly, for both regions, liquidity coverage ratios have risen steadily to levels well above 100 percent. Unfortunately, while safety standards have improved across the board, bank profitability has not fared as well. The situation is more dire in the EU where return on equity is only one half the level in the US.

Overall, it appears that adherence to tougher safety standards comes with the price of reduced profitability. Evidence in recent literature and bank operating performance seems to support this view. Striking an optimal balance between capital adequacy and liquidity on one hand and profitability on the other is necessary if the safety and sustainability of the banking system is to be assured.

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Angelė Lileikienė is professor, doctor of social sciences. Research field – "Financial system sustainability problems". The author has written and published more than 80 articles on the subject, made presentations at national and international conferences. The author is a member of the editorial boards of research journals or the editor-in-chief of the journal "European Science". Address: Turgaus Street, 21. Klaipėda, LT-91249. E-mail: angele.lileikiene@ltvk.lt

Pat Obi is an endowed Professor of Finance at Purdue University Northwest. He received his Ph.D. in Finance with a minor in Econometrics from the University of Mississippi. With professional engagements in several countries, he is the author of numerous scholarly articles and two finance books. His research uses a variety of panel data and time series models to examine interrelationships among financial and economic variables. Obi sits on the editorial boards of three academic journals. Address: 2200 169th Street, Hammond, IN 46323, USA. obi@purdue.edu.

Asta Valackienė is professor at Lithuania Business University of Applied Sciences of Vilnius Branch.
Research interests: Methodology of Science and Research; Change Management; Responsible Research and Innovation. A Member of Management Committee of COST ACTION 17127 Programme. National representative from Lithuania. A Member of UNESCO Unitwin Network Baltic and Black Seas Circle Consortium in Education Research (BBCC) Association. Author of Research studies, Books, Handbooks. Has published over 80 scientific papers indexsed in the international data bases with co-authors and single-authored.
Address: Žirmūnų Str. 70, LT-09124, Vilnius. Phone: +37068694121. E-mail: asta.valackiene@gmail.com