IFA IRAN FINANCE ASSOCIATION

Iranian Journal of Finance

Print ISSN 2676-6337
Online ISSN 2676-6345

Investigating the Relationship between Liquidity Creation and Capital Adequacy in Banks

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Iranian Journal of Finance, 2026, Vol. 10, No.1, pp. 43-62.
Publisher: Iran Finance Association
doi: https://doi.org/10.30699/ijf.2025.468980.1481
Article Type: Original Article

Received: August 11, 2025
Received in revised form: October 17, 2025
Accepted: December 05, 2025
Published online: January 01, 2026

Abstract

Banks play a vital role in the economy by offering various financial services. One of their core functions is channelling surplus funds from units with excess resources to those with deficits, even when the latter have viable investment opportunities. This intermediary role is particularly crucial in developing economies, where capital markets are often underdeveloped and limited in scope. This study focuses on one of the most essential functions of banks—liquidity creation. Liquidity is generated when banks transform liquid liabilities into illiquid assets. While this process is fundamental to banking operations, it

also introduces potential risks, especially when liquidity levels decline. In such cases, banks may become vulnerable to liquidity and credit risks. The capital adequacy ratio (CAR), disclosed in financial statements, serves as an important indicator of a bank's resilience and its capacity to absorb losses and manage financial risks. This study investigates the relationship between liquidity creation and CAR using data from a sample of banks over the period 2011–2019, incorporating several control variables. The results support the financial fragility–crowding out hypothesis, indicating a negative relationship between liquidity creation and capital adequacy. Among the control variables, the deposit-to-asset ratio, non-interest income ratio, and bank size negatively influence CAR. In contrast, return on assets (ROA) shows a positive association, enhancing capital adequacy.

Keywords: Liquidity Creation, Capital Adequacy, Bank Performance

JEL Classification: G210

Introduction

Banks play a pivotal role in the economy by facilitating the transfer of surplus resources to units facing shortages, a function particularly crucial in developing economies with underdeveloped financial markets (Umar & Sun, 2017). One of the core functions of banks is liquidity creation, which involves transforming liquid liabilities (e.g., deposits) into illiquid assets (e.g., loans). This process, while essential for financial intermediation, exposes banks to various risks, including liquidity and credit risks (Bhattacharya & Thakor, 1993; Berger & Bouwman, 2009, 2017). To mitigate these risks, banks are required to maintain a sufficient capital adequacy ratio (CAR), which serves as a buffer against potential losses and ensures financial stability.

This study adopts a theoretical framework grounded in two competing hypotheses: the "financial fragility-crowding out" hypothesis and the "risk absorption" hypothesis, which examine the interplay between liquidity creation and capital adequacy. The financial fragility-crowding-out hypothesis posits that higher capital requirements reduce liquidity creation by crowding out deposits, as banks prioritize capital over liability generation (Diamond & Rajan, 2000; Gorton & Winton, 2017). Conversely, the risk-absorption hypothesis suggests that greater capital enhances a bank's ability to absorb risk, thereby supporting greater liquidity creation (Repullo, 2004; Von Thadden, 2004). This framework provides a structured lens for examining how liquidity creation influences capital adequacy, while accounting for bank-specific factors such as size, profitability, and income structure as control variables.

The rest of this article is organized as follows. Section 2 reviews the literature on liquidity creation and capital adequacy. Section 3 presents the proposed model and equations. Section 4 calculates the liquidity creation index for sample banks and examines its relationship with capital adequacy, using panel data and incorporating control variables. Finally, Section 5 discusses the findings and provides conclusions.

Literature Review

Liquidity Creation

The process of liquidity creation, defined as the transformation of liquid liabilities into illiquid assets, is a cornerstone of banking operations, where banks convert liquid assets into illiquid liabilities or fund illiquid assets with liquid liabilities (Bhattacharya & Thakor, 1993; Berger & Bouwman, 2009, 2017). This function drives economic growth but also introduces risks such as reduced liquidity and heightened systemic vulnerability (Chatterjee, 2018). Studies on liquidity creation reveal both convergences and divergences, necessitating a deeper analysis to address the reviewers' concerns about insufficient depth.

Traditional research, including Lei and Song (2013), Horváth et al. (2014), Fu et al. (2016), Chaabouni et al. (2018), Casu et al. (2019), and Le (2019), suggests a negative relationship between bank capital and liquidity creation, arguing that higher capital requirements constrain lending capacity. In contrast, Diaz and Huang (2017) and Tran et al. (2016) propose a positive link, asserting that well-capitalized banks manage risks more effectively, thus supporting liquidity creation. Berger and Bouwman (2009) further complicate this by showing that the relationship varies by bank size: small banks exhibit a negative correlation, while large banks exhibit a positive one, likely due to differences in risk management and funding access.

The stability implications highlight these contradictions. Davydov et al. (2018), Berger and Sedunov (2017), and Fidrmuc et al. (2015) find a positive association with economic growth, attributing it to enhanced funding during expansionary cycles, while Chatterjee (2018) cautions that off-balance-sheet creation can precipitate crises, revealing a trade-off between economic stimulation and systemic risk. Recent studies deepen this debate.

Duan and Niu (2020) analyze U.S. bank data and find a positive correlation between liquidity creation and profitability across normal, critical,

and varying bank sizes, challenging the notion that liquidity creation inherently increases risk. Hsieh et al. (2024), using data from 13,487 banks across 43 European countries (2005-2020), show that heightened competition reduces fragile banks' incentives and risk absorption capacity, increasing unprofitable liquidity creation, and extend Horváth et al. (2014) by highlighting credit risk and crisis impacts post-2008 and during 2020 disruptions.

Using panel data on Czech banks, Horváth et al. (2016) conclude that banking competition negatively affects liquidity creation. However, Toh et al. (2018), using data from Malaysian banks, show that the adverse effect of bank competition on liquidity creation disappears for diversified banks. Moreover, studies show that factors such as managerial ability, strong corporate governance, and cost efficiency in banking positively affect liquidity creation (Diaz & Huang, 2017; Andreou et al., 2016; Baltas et al., 2017).

Hackethal et al. (2010) investigate liquidity creation in German banks over the period 1997 to 2006. Drawing on the methodology proposed by Berger and Bouwman (2009), they calculate a liquidity-creation index and compare it with the liquidity-gap index developed by Deep and Schaefer (2004). Their findings indicate that liquidity creation is negatively associated with the degree of monetary policy tightness.

Sadeghi (2019) examines the relationship between banks' internal governance and liquidity creation in Iran during the period 2010–2017. The findings indicate that corporate governance has no statistically significant effect on liquidity creation, whereas the capital ratio negatively affects liquidity creation.

Additionally, He et al. (2025) investigate the impact of macroprudential policies on liquidity creation in Chinese banks, finding that targeted regulations can mitigate excessive liquidity risks while supporting credit growth, adding a policy-specific perspective to the literature. Wang et al. (2025) emphasize that digital innovations in emerging markets enhance liquidity creation by improving credit access and efficiency, introducing a new dimension to the debate. These discrepancies reflect variations in regulatory environments, bank size, and economic conditions, which this study addresses within the Iranian banking context, where limited financial market development amplifies these dynamics.

Capital Adequacy

Capital adequacy, a measure of a bank's financial solvency, acts as a protective shield for depositors against potential losses, ensuring stability by enabling banks to absorb reasonable shocks (Muhmad & Hashim, 2015; Nimalathasan, 2008; Nikhat, 2016).

Post-2008 regulations mandated higher capital ratios, sparking diverse research outcomes. Mester (2008), Hughes (1999), Berger and Mester (1997), and Hughes and Mester (1993) suggest banks prefer lower capital ratios to minimize opportunity costs, while Kashyap and Stein (2004), Ayuso et al. (2004), and Barajas et al. (2004) argue that higher capital under Basel II reduces informal loan risks.

Lee and Hsieh (2013) identify a reverse capital-risk relationship in 42 Asian banks (1994-2008), with profitability effects varying by income level, while Guidara et al. (2013) note Canadian banks' resilience post-crisis without clear capital buffer-risk links. Li et al. (2016) and Nguyen et al. (2020) explore optimal capital adequacy ratios, adding to the debate on balancing stability and profitability.

Recent research further enriches this discussion. Hastuti et al. (2024) investigate the impact of capital adequacy, non-performing loans (NPL), and debt-to-equity ratios on the financial performance of Indonesian banks listed on the Indonesia Stock Exchange (IDX) from 2020 to 2022, finding that capital adequacy positively influences financial performance, with a predictive ability of 18.8%, while NPL and debt-to-equity ratios have a negative effect. Similarly, Olawale (2024) examines the resilience of Nigerian banks in a volatile economy, using data from 2005 to 2020, and concludes that capital adequacy and firm size significantly enhance financial stability. However, stricter regulations and non-performing loans can mitigate these benefits, with recommendations for aligning policies with Basel III standards. Jalali et al. (2023) utilized a two-stage analytical framework to assess the operational efficiency of banks listed on the Tehran Stock Exchange over the period from 2015 to 2020. Their study employed a data envelopment analysis (DEA) approach in the first stage to measure efficiency scores, followed by a regression model to identify the determinants of bank efficiency. The findings indicate that the capital adequacy ratio exerts a statistically significant positive effect on bank efficiency ($p < 0.05$). Specifically, a 1-unit increase in the capital adequacy ratio is associated with approximately a 4% increase in

efficiency scores, highlighting its critical role in improving banks' operational performance.

Liquidity Creation and Bank Capital

The relationship between liquidity creation and bank capital is theorized through two opposing hypotheses. The "financial fragility-crowding out" hypothesis posits a negative effect, where high capital reduces liabilities and thus liquidity creation (Diamond & Rajan, 2000; Gorton & Winton, 2017; Berger & Bouwman, 2009). Conversely, the "risk absorption" hypothesis suggests a positive effect: higher capital enhances risk absorption and liquidity potential (Bhattacharya & Thakor, 1993; Repullo, 2004; Von Thadden, 2004).

Empirical evidence remains mixed. For instance, Mohanty and Mahakud (2021) and Kinini et al. (2024) support the fragility hypothesis by documenting negative relationships in Indian and Kenyan banks, respectively, while Hsieh et al. (2022) identify a risk-absorption effect in Asian commercial banks. By examining the role of capital adequacy in bank money creation in Iran, Shoaleh and Zamanzade (2023) conclude that a positive shock to capital adequacy does not have a statistically significant effect on bank money creation.

Fuad et al. (2021) also explore the role of banking competition in the effect of liquidity creation on bank capital, using data from 96 of 114 Indonesian banks from 2008 to 2018. The results of this study show that banking competition, at any level, weakens the effect of liquidity creation on bank capital. The results are consistent with the view that banks increasing their capital in response to banking competition may decrease the liquidity creation in the bank.

Gorodilov and Sokolov (2024) confirm this negative link in Russian banks, unaffected by bank size or the business cycle. Hsieh et al. (2024) add complexity, showing that competition intensifies the negative impact on fragile European banks, while Evans and Haq (2022) find that well-capitalized banks created more liquidity during the 2007-2008 crisis due to robust capital buffers. Gupta et al. (2024) reveal a U-shaped relationship: moderate capital boosts liquidity creation, but high levels stifle it due to regulatory constraints.

These contradictions highlight the context-specific nature of this relationship, driven by regulatory, competitive, and technological factors, which this study explores in the Iranian setting.

Research Methodology

In this study, we examine the relationship between the creation of liquidity in banks, which is one of the main functions of a bank, and the capital adequacy ratio, which indicates the soundness and performance of the bank.

Major Variables: Liquidity Creation and Capital Adequacy

Liquidity creation is calculated using the three-step methodology proposed by Berger and Bouwman (2009). In the first step, all on- and off-balance-sheet activities of banks are classified into three categories based on liquidity: liquid (e.g., cash, government securities), semi-liquid (e.g., short-term loans), and illiquid (e.g., long-term loans, fixed assets). This classification reflects the ease, cost, and time required for banks to convert these items into cash when customers demand them. In the second step, weights are assigned to each category based on the theory of financial intermediation: a positive weight of 0.5 is assigned to illiquid assets and liquid liabilities (which contribute to liquidity creation), a negative weight of -0.5 is assigned to liquid assets and illiquid liabilities (which reduce liquidity), and a weight of 0 is assigned to semi-liquid items. In the third step, the weighted values are summed up to obtain the total liquidity creation for each bank, normalized by total assets to ensure comparability across banks.

The capital adequacy ratio (CAR) is calculated as regulatory capital divided by risk-weighted assets, in accordance with the Central Bank of Iran (CBI) guidelines. Regulatory capital comprises Tier 1 and Tier 2 capital, while risk-weighted assets reflect credit, market, and operational risks, with weights assigned according to Basel standards. The CBI mandates a minimum CAR of 8%, which is derived directly from banks' financial statements and serves as a proxy for bank risk and financial health in this study.

Control Variables

According to prior studies, various factors influence the relationship between capital adequacy and liquidity creation in banks. This study aims to incorporate the most relevant control variables into the final model, based on previous research.

Research by Anginer et al. (2019) and Iqbal and Vähämaa (2019) indicates that bank size has a direct impact on risk. Similarly, Davydov et al. (2021) demonstrate that variables such as size, equity, profitability, income structure,

and budget composition—considered key bank characteristics—affect the relationship between liquidity creation and systemic risk.

Based on recent literature, the following control variables are included in the model:

1. Bank size – measured as the natural logarithm of total assets.
2. Return on assets (ROA) – calculated by dividing net profit by total assets- is used as an indicator of profitability.
3. Deposits-to-assets ratio – employed to reflect the bank's budget structure.
4. Non-interest income ratio – derived by dividing non-interest income by interest income, serving as a proxy for income structure and providing strategic insight into the bank's operations (Davydov et al., 2021).

Final Model

We examine the relationship between liquidity creation and bank capital adequacy within a regression framework. Given the variables described, the final model is specified as Equation (1):

$$CAR_{it} = \alpha_i + \beta_1 LC_{it} + \beta_2 SIZE_{it} + \beta_3 ROA_{it} + \beta_4 DTA_{it} + \beta_5 NIIR_{it} + \varepsilon_{it} \quad (1)$$

Where CAR represents the capital adequacy ratio, LC denotes liquidity creation, SIZE denotes the bank's size, ROA denotes return on assets, DTA denotes the deposit-to-asset ratio, and NIIR denotes the non-interest income ratio.

Data Sources and Sample Construction

The statistical population includes all banks listed on the Iranian Stock Exchange (TSE) and Over-the-Counter (OTC) market from 2011 to 2019. Due to data availability constraints, a sample of 16 banks was selected, ensuring that only those with consistent, reliable financial data were included. Banks lacking up-to-date or coherent information, as well as those on the verge of bankruptcy or reporting significant losses, were excluded to avoid bias in the analysis.

Non-listed banks were excluded from the sample due to limited access to their financial information during the study period, as their data are not systematically disclosed through publicly available sources such as codal.ir. While this sample provides valuable insights into the Iranian banking sector, its relatively small size (16 banks) may limit the generalizability of the findings. Future research could address this limitation by incorporating a larger, more diverse sample, including non-listed banks and financial institutions from other emerging markets. The names of the selected banks are presented in Table A1 in Appendix A. The required data were extracted from the comprehensive information system of publishers (codal.ir) and the financial statements of sample banks. EViews and Stata were used for data processing.

Results

Descriptive statistics of the studied variables are reported in Table 1.

Table 1. Descriptive statistics of variables

Description	Mean	Median	Maximum	Minimum	Standard deviation	Number of observations
Dependent variable						
CAR	0.0634	0.0757	0.3085	-0.575	0.1048	131
Independent variable						
LC	-0.0831	-0.0907	0.3457	-0.3855	0.1627	131
Control variables						
DTA	0.7720	0.7924	1.1583	0.0000	0.1709	131
NIIR	0.1287	0.0807	1.2275	0.0000	0.1525	131
ROA	0.0028	0.0070	0.0614	-0.0171	0.0315	131
SIZE	19.6120	19.6378	22.2102	16.6533	1.1927	131

The table reports descriptive statistics for 16 banks from 2011 to 2019. CAR is the capital adequacy ratio measured at the individual bank level, and LC is the liquidity creation index calculated using Berger and Bouwman's (2009) methodology. The bank-specific control variables are defined as follows: DTA is the ratio of total deposits to total assets; NIIR is the ratio of non-interest income to interest income; ROA is the return on assets ratio (net income to total assets); and SIZE is the logarithm of total assets.

The deposits-to-assets ratio (DTA) ranges from a minimum of about 0 per cent to a maximum of 115.8 per cent, with a mean of 0.770. The maximum DTA exceeds 100 per cent due to negative capital in some banks (e.g., Dey, Saderat, Postbank, Tejarat, and Shahr banks), which inflates the ratio. This is a common phenomenon among banks experiencing financial distress, in which

liabilities exceed assets, resulting in negative equity. To ensure the robustness of our analysis, we retained these observations while controlling for their impact using the fixed-effects model. The sample banks, on average, have an ROA of 0.28 per cent, with considerable variation in the non-interest income ratio (mean of 12.8%). The total assets of banks, represented by SIZE, have a mean of 19.612, reflecting the logarithmic scale.

The average trend of changes in research variables for sample banks during the years under review is shown in Figure 1.

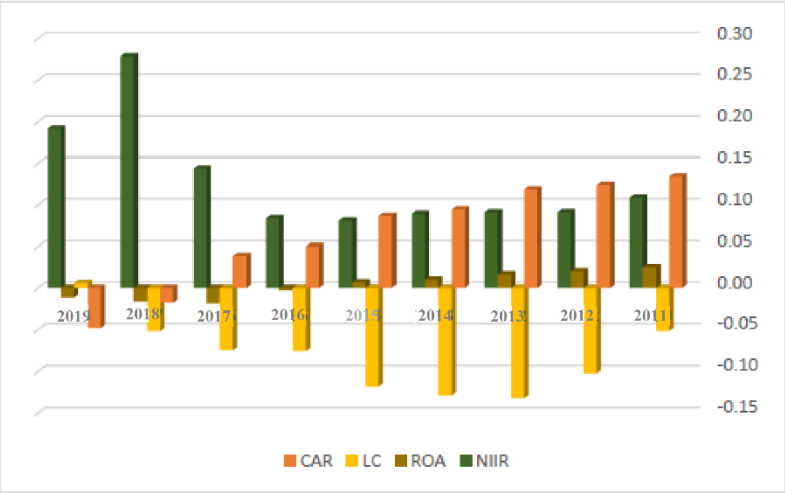

Figure 1. Average trend of changes in research variables from 2011 to 2019

The key observation from Figure 1 is that the displayed values represent average indices across banks, with some banks exerting a notable influence on those averages. For instance, the negative capital adequacy values observed in the final years of the study for Day, Saderat, Postbank, Tejarat, and Shahr banks have reduced the overall average capital adequacy ratio. Additionally, the average liquidity creation and the non-interest income ratio initially decreased, but subsequently increased from 2011 to 2019. In contrast, the size of banks and the deposit-to-asset ratio exhibited no significant changes during the period. Because these two variables exhibit distinct behaviour compared to others, they are illustrated separately in Figure 1.

Initially, it is essential to assess the stationarity of the variables used. This is considered given that the probability value associated with the statistic in the unit root test for the selected variables is less than 5%. Consequently, the null

hypothesis of a unit root is rejected, leading to the conclusion that the variables are stationary.

The F-Limer test is also used to determine whether to use a pooled or panel method for the model. The test results are presented in Table 2.

Table 2. Results of the F-Limer test

F-statistic	Degree of freedom	Prob
2.659281	(15,110)	0.0018

Since the p-value is less than 5%, the null hypothesis of equal intercepts is rejected, indicating that the model exhibits significant differences in intercepts. Therefore, the cross-sectional factor (banks) and the time factor (year) cannot be ignored, as there are statistically significant differences among the banks. Consequently, panel data is deemed appropriate for the sample.

The Hausman test is used to determine whether a fixed-effects or a random-effects model is more suitable. The results are presented in Table 3.

Table 3. Results of the Hausman test

F-statistic	Degree of freedom	Prob
26.535163	5	0.0001

Given that the probability value is less than 5%, the null hypothesis of random effects is rejected. Therefore, fixed-effects estimates are considered more appropriate, and a fixed-effects model should be employed. The fixed effects model captures the influence of variables that are assumed to have a constant effect on the outcome variable over time.

The Wiggins and Poi (2003) test is used to detect variance heterogeneity, which is assessed through model estimation using the generalized least squares (GLS) method. The test results are presented in Table 4.

Table 4. Results of the Wiggins and Poi test

LR chi2-statistic	Degree of freedom	Prob
147.38	15	0.0000

The chi-square statistic (147.38) indicates heteroskedasticity in the model. Accordingly, the GLS approach is adopted to address heteroscedasticity.

The Wooldridge test is applied to examine autocorrelation in the residuals. The test results are shown in Table 5.

Table 5. Results of the Wooldridge test

F-statistic	Degree of freedom	Prob
70.514	(1,15)	0.0000

The significance of Fisher's statistic (70.514) indicates the presence of first-order serial autocorrelation in the model's error term. Therefore, the regression model is derived by assuming the presence of first-order serial autocorrelation in the error term and by the generalized least squares approach. The regression results of the model are given in Table 6.

Table 6. Regression results

CAR	Coefficient	Standard error	Z	Probability
LC	-0.1184337	0.0258532	-4.58	0.000
SIZE	-0.0165705	0.0040325	-4.11	0.000
DTA	-.0.0552671	0.0190571	-2.90	0.004
ROA	1.932047	0.2016493	9.58	0.000
NIIR	-0.0984054	0.0194553	-5.06	0.000
C	0.4253708	0.0826312	5.15	0.000
Chi2-statistic	311.56			
Prob	0.0000			

When the p-value is less than 5%, the null hypothesis is rejected, indicating that the variable is statistically significant. Based on the explanations provided and the p-values derived, the analysis reveals the following findings for the studied variables: The regression results in Table 6 indicate an inverse, statistically significant relationship between the capital adequacy ratio and liquidity creation. Additionally, the linkage between the non-interest income return ratio and capital adequacy is negative. The deposit-to-asset ratio and bank size also exhibit a negative association with the capital adequacy ratio. In contrast, the return on assets is the only variable that demonstrates a positive, direct relationship with the capital adequacy ratio. Furthermore, the intercept of this model is statistically significant, as its p-value is below 5%.

Conclusion

This study explores the relationship between liquidity creation and capital adequacy within Iranian banks. Liquidity creation, achieved by converting liquid liabilities into illiquid assets such as loans, is considered the primary measure of a bank's performance and is also critical due to the potential exposure to various risks resulting from reduced liquidity. To mitigate these risks, regulatory authorities at both international and national levels have

established several regulations and guidelines.

One key regulation is the capital adequacy ratio for credit institutions, calculated by dividing regulatory capital by risk-weighted assets, with banks required to report this ratio annually in their financial statements. In this calculation, assets are weighted based on credit risk, market risk, and operational risk, which are recognized as the primary risk categories to which banks may be exposed. Consequently, the capital adequacy ratio serves as a risk-sensitive indicator influencing bank performance.

To test the proposed model, annual data from 16 banks listed on the Tehran Stock Exchange (TSE) and Over-the-Counter (OTC) markets were obtained from their financial statements. The liquidity creation for each bank was computed using the methodology outlined by Berger and Bouwman (2009).

The regression results (Table 6) confirm a significant negative relationship between liquidity creation (LC) and the capital adequacy ratio (CAR), supporting the financial fragility-crowding-out hypothesis. This finding aligns with prior studies such as Mohanty and Mahakud (2021) and Kinini et al. (2024), Diamond and Rajan (2000), Gorton and Winton (2017) and Sadeghi (2019), suggesting that increased liquidity creation reduces the capital buffer, as banks prioritize lending over capital retention. The findings are the opposite of those of Diaz and Huang's (2017), Tran et al. (2016), Hsieh et al. (2022), and Shoaleh and Zamanzade (2023).

Among the control variables, the deposit-to-assets ratio (DTA) exhibits a negative relationship with CAR, indicating that banks with higher deposit levels relative to assets may face greater pressure on their capital adequacy, as deposits increase liquidity creation but reduce available capital. Similarly, the non-interest income ratio (NIIR) negatively affects CAR, suggesting that reliance on non-interest income (e.g., fees, commissions) may lead to riskier activities that deplete capital reserves. Bank size (SIZE) also has a negative impact on CAR, implying that larger banks, which typically engage in more liquidity creation, tend to maintain lower capital adequacy ratios due to their risk-taking behavior. In contrast, return on assets (ROA) positively influences CAR, suggesting that more profitable banks can bolster their capital buffers through retained earnings, thereby improving their financial stability.

The negative relationship between liquidity creation and capital adequacy has significant implications for both theory and practice. From a theoretical

perspective, the findings support the financial fragility-crowding-out hypothesis, suggesting that higher capital requirements may constrain banks' ability to create liquidity by reducing the availability of deposits for lending (Diamond & Rajan, 2000). This trade-off is particularly pronounced in the Iranian banking sector, where banks face structural challenges, including high non-performing loans and limited access to foreign capital due to economic sanctions. From a practical standpoint, regulators should consider the unintended consequences of stringent capital requirements, which may hinder banks' ability to support economic growth by creating liquidity. For instance, banks like Dey and Saderat, which reported negative CAR in some years, may face heightened risks during periods of economic stress, as their low capital buffers limit their ability to absorb losses.

The positive relationship between ROA and CAR underscores the importance of profitability in maintaining financial stability. Banks with higher ROA can accumulate capital through retained earnings, thereby mitigating the adverse effects of liquidity creation on capital adequacy.

These findings suggest that banks must carefully balance liquidity creation with capital adequacy, particularly for Iranian banks, where economic sanctions and limited access to international capital markets exacerbate financial pressures. Also, Iranian banks should focus on improving operational efficiency and diversifying income sources to enhance profitability, thereby supporting capital adequacy.

Future research could extend this study in several directions. First, expanding the sample to include non-listed banks and financial institutions from other emerging markets would enhance the generalizability of the findings and provide a more comprehensive understanding of the liquidity creation-capital adequacy nexus. Second, incorporating additional control variables, such as macroeconomic factors (e.g., inflation, interest rates) and governance indicators (e.g., board independence, managerial quality), could offer deeper insights into the factors mediating this relationship. Third, longitudinal studies examining the impact of regulatory changes (e.g., the adoption of Basel III standards) on liquidity creation and capital adequacy in Iranian banks could shed light on the dynamic effects of policy interventions. Finally, exploring the role of digital banking and fintech innovations in liquidity creation could provide a modern perspective on how technological advancements influence bank risk and capital management.

Declaration of Conflicting Interests

As the corresponding author, I certify that there is no actual or potential conflict of interest concerning this article.

Funding

The authors received no financial support for the research, authorship and, or publication of this article.

Appendix A

Table A1. List of selected banks in Iran

No	Banks	No	Banks
1	Dey Bank	9	Post Bank of Iran
2	Saman Bank	10	Tejarat Bank
3	Ansar Bank	11	Khavarmiane bank
4	Ayande Bank	12	Sina Bank
5	Bank Saderat Iran	13	Shahr Bank
6	Melat Bank	14	Ghavamin Bank
7	Parsian Bank	15	Karafarin Bank
8	Pasargad Bank	16	Eghtesad Novin Bank

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Bibliographic information of this paper for citing:

Sargolzaei, Mostafa & Honarkar Shafee, Marzieh (2026). Investigating the Relationship between Liquidity Creation and Capital Adequacy in Banks. *Iranian Journal of Finance*, 10(1), 43-62.