

Explaining the role of banks' market power on the creation of liquidity in the conditions of economic boom and recession

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Abstract

The present study aims to explain the role of banks' market power in creating liquidity during periods of economic boom and recession. The case study in this research includes commercial and specialized banks in Iran for the period from 2011 to 2021. In order to examine the research hypotheses based on the multiple regression method in the EViews 10 software, after checking the stationarity of the data and the assumptions of the regression model, the data analysis was conducted. The Lerner index was used to measure the market power of banks as the independent variable of the research, while the inverse ratio of sustainable net financing based on Basel III liquidity requirements was used to measure the dependent variable of the research, which is liquidity creation. The economic boom and recession variable was also considered as a moderating variable in the present study. The results showed that bank market power has a positive and significant effect on the creation of bank liquidity at the 99% confidence level, and the impact of economic boom and recession on liquidity creation in banks is significant at the 90% confidence level. Therefore, changes in economic boom and recession affect the liquidity creation of banks. Economic boom and recession also have a significant impact on the relationship between bank market power and liquidity creation in banks, at the 95% confidence level. This suggests that changes in economic conditions can impact the effect of bank market power on liquidity creation within banks.

Keywords: liquidity creation, banks' market power, economic boom and recession
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1 Introduction

Banking is considered one of the most important sectors of the country's economy. Banks facilitate commercial transactions by organizing and directing receipts and payments, thereby expanding markets and fostering economic growth and boom. The creation of liquidity is crucial for the stability and functioning of financial markets, especially during periods of economic shocks. In times of economic crises, such as recession or financial market disruptions, the demand for liquidity increases as individuals and businesses seek to meet their short-term financial needs and manage their financial risks.

Banks play a vital role in creating liquidity within the economy. They provide various financial services, including deposit-taking, lending, and payment systems, which facilitate the flow of funds and the exchange of goods and

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services. Additionally, banks act as intermediaries between savers and borrowers, channelling funds from surplus units to deficit units within the economy. Thus, their ability to create and supply liquidity is essential for maintaining financial stability and supporting economic growth.

However, the concentration of market power within the banking sector can have significant implications for liquidity creation during economic shocks. In the context of the banking industry, market power can stem from factors such as barriers to entry, economies of scale, and the presence of dominant players. When banks possess significant market power, they may have the ability to manipulate prices and restrict the supply of liquidity during economic shocks. This can exacerbate the impact of the crisis and lead to further deterioration of financial conditions. Moreover, the concentration of market power can result in reduced competition among banks, leading to higher costs and decreased efficiency in the provision of liquidity services.

The importance of the role that the financial system plays, both directly and indirectly, in promoting economic growth is widely recognized in the literature on finance and economic growth. A small portion of this literature focuses on explaining such linkages through the role of the financial sector in responding to real or monetary shocks. The concept in this field revolves around the idea that the financial sector may play a role in mitigating and smoothing the effects of real shocks, leading to reduced macroeconomic volatility. Therefore, the financial sector can indirectly stimulate economic growth by smoothing and reducing real shocks, as discussed in studies by (Denizer et al. [6], Easterly and Kraay [11], Ibrahim and Alagidede [15], Moradbeigi and Law [27], and Kpodar et al. [23]) [1].

Hence, examining various dimensions of the banking system (including liquidity and its influencing factors) and monitoring these performance aspects can prevent destructive events and facilitate crisis management if one occurs [17]. Therefore, given the importance and role of the banking network in Iran's economy and its contribution to the country's economic development, as well as the emphasis of the Fourth Development Plan on the competitiveness and efficiency of the country's banking system, attention to competition and the measurement of the market power of the banking network can lead to the provision of appropriate solutions to reduce this market power, increase competition, and, overall, improve the efficiency of the country's banking system. In advancing development programs, Iran's banking network plays an effective role in providing financial resources and, more broadly, in the country's financial system [19].

Therefore, considering the above-mentioned points and the fact that no study has addressed the issue of how to measure liquidity creation as a condition of new liquidity under Basel III, in periods of economic boom and recession, which is influenced by market power in Iran's banking industry, this research aims to answer the question: "To what extent does market power in Iran's banking industry affect liquidity creation during periods of economic boom and recession?"

2 Theoretical framework and literature review

2.1 Liquidity creation

Bank liquidity is defined as a bank's ability to finance the growth of its assets and meet its short-term obligations with minimal acceptable losses [22]. Banks create liquidity by converting their liquid liabilities into illiquid assets or by financing their illiquid assets (i.e., investments and loans) with liquid liabilities (i.e., demand deposits) [3]. Additionally, banks engage in off-balance sheet activities, such as loan commitments, to generate liquidity [20]. Depositors are given the option to withdraw funds from their accounts, while borrowers are committed to making long-term cash payments through loans. Thus, banks maintain a balance between the liquidity needs of savers and the demand for long-term financing commitments, while also contributing capital to the economy [7]. Berger and Bouwman [3] classified assets, liabilities, equity, and off-balance sheet activities into categories of liquid, semi-liquid, or illiquid. Researchers have developed a set of indicators to measure liquidity creation by combining these classifications in various ways. In recent years, the measurement framework proposed by Berger and Bouwman [3] has been widely utilized in banking liquidity research [9, 30]. Liquidity creation can also be influenced by the pricing channel [25]; banks with sufficient capital are generally more capable of producing liquidity compared to those with insufficient capital [28].

The role of banks in financial intermediation and liquidity creation is crucial for economic development. A healthy and profitable banking sector serves as an essential infrastructure for sustainable economic growth and development. Conversely, the accumulation of overdue debts on banks' balance sheets can lead to financial crises and adverse impacts on the economy. Given the significance of bank performance on financial stability and economic growth, identifying the determinants of banking sector performance is vital for central bank officials and banking industry decision-makers. Understanding these factors is crucial for formulating policies and implementing reforms to enhance the efficiency of the banking sector [28].

2.2 Market power

Bank market power refers to a bank's ability to influence market conditions, pricing mechanisms, and economic activities within the financial sector. It reflects the extent of control or dominance a bank has in the market in which it operates. This influence goes beyond merely setting prices. Many antitrust regulators in various countries define market power in terms of market concentration. The concentration of bank resources refers to a situation where the banking industry is dominated by a few large or leading banks. Market power is defined as the ability of a bank to set its prices above the marginal cost [28]. To measure a bank's market power, we use the Lerner Index. The Lerner Index is a well-known measure of market power and is widely accepted as a standard criterion for assessing market power in a static context. Introduced by Abba Lerner, the Lerner Index indicates the extent to which a firm with market power can charge a price above its marginal cost. If overproduction occurs, the marginal cost exceeds the price, resulting in a Lerner Index value of less than zero. A significant advantage of the Lerner Index is that it is based on the firm's behavior in the market and is derived from optimization, providing a strong theoretical foundation. Another advantage of the Lerner Index over other competition measures is that it allows for the measurement of market power at the individual bank (or firm) level and can be analyzed over time. Additionally, the Lerner Index can capture the exercise of market power by banks on both sides of the balance sheet [21].

2.3 The relationship between bank market power and liquidity creation

The relationship between bank market power and liquidity creation is bidirectional, with each factor influencing and reinforcing the other in various ways. To understand this relationship, it is crucial to examine how a bank's market power affects its capacity to create liquidity. The existing literature reveals that a bank's ability to create liquidity is associated with its market power from two distinct perspectives.

On one hand, liquidity creation is likely to increase through the "price channel," which posits that a high level of market competition may enhance credit availability [25]. Conversely, increased competition can lead to reduced bank profitability, thus raising the risk of bank insolvency. As a result, under banking supervision standards, liquidity may be compromised, and fragility becomes evident. Petersen and Rajan [29] contended that increased competition diminishes liquidity creation, thereby supporting the "fragility channel" perspective. Bank fragility pertains to its role in providing protection and converting maturity into liquidity to meet creditor demands. In both mechanisms, the effects of market power in a competitive environment are closely linked to the bank's liquidity creation capabilities [28].

2.4 Economic boom and recession

2.4.1 The impact of economic boom and recession on banks' market power

Economic shocks, such as fluctuations in exchange rates, oil price shocks, economic booms and recessions, and changes in inflation rates, can impact banks' market power in various ways. The specific effects depend on the nature of the shock, the bank's exposure and operations, the overall economic environment, and the bank's risk management practices. Understanding these dynamics is essential for assessing banks' market power under different economic scenarios. It is important to recognize that the impact of these economic shocks on banks' market power is influenced by several factors, including the banks' business models, risk management practices, and the broader economic context. Additionally, the interconnectedness of the financial system and the responses of central banks and regulatory authorities to these shocks can affect the outcomes for banks' market power [10].

Therefore, economic boom and recession, as types of economic shocks, can significantly influence banks' market power, which can be interpreted as follows:

- **Economic Boom:** During an economic boom, banks may experience increased demand for loans, higher profitability, and enhanced market power. As economic activity and credit demand rise, banks can capture a larger market share and potentially exert greater pricing power.
- **Economic Recession:** During a recession, banks may face reduced loan demand, increased credit risk, and diminished market power. Economic downturns can lead to higher loan defaults, reduced profitability, and tighter lending conditions, which can limit banks' market power.

Economic boom and recession directly affect banks' market power by influencing credit demand, credit risk, and overall economic conditions. The ability of banks to maintain or increase their market power during an economic boom or to mitigate market power erosion during a recession depends on their risk management practices, capital adequacy, and business strategies [24].

2.4.2 The impact of economic boom and recession on banks' liquidity creation

The cyclical nature of economic boom and recession is a fundamental aspect of economic dynamics. These cycles influence investment, consumption, and overall economic activity, which in turn impact liquidity demand in the banking sector. The following interpretation explores these impacts:

1. Economic Boom: During an economic boom, banks' liquidity creation can be influenced in the following ways:
 - Increased Credit Demand: An economic boom can lead to higher credit demand from businesses and consumers, potentially resulting in increased liquidity creation by banks.
 - Favorable Credit Conditions: During boom periods, banks may have easier access to funding and face lower credit risk, which facilitates liquidity creation.
2. Economic Recession: During an economic recession, banks' liquidity creation can be influenced as follows:
 - Reduced Credit Demand: A recession can lead to decreased credit demand as businesses and consumers become more cautious, potentially limiting banks' liquidity creation.
 - Tighter Credit Conditions: A recession can result in tighter lending standards, increased credit risk, and reduced liquidity creation by banks.

Economic boom and recession can have varying effects on banks' liquidity creation. Generally, a boom fosters liquidity creation due to increased credit demand and favorable credit conditions, while a recession may constrain liquidity creation due to reduced credit demand and tighter credit conditions [24].

2.5 Foreign studies

Suleymanov and Talishinskaya [31] analyzed data from U.S. banks covering the period 1976-2000, including the 1990-1992 crisis period for comparison with "normal times," using the two-stage least squares method. Their results indicated that a reduction in the level of competition negatively impacts the liquidity creation ability of U.S. banks, with this negative effect being more pronounced during the crisis period. Sun [32] using data from U.S. banks for the years 1997-2020, the research hypotheses were tested using panel data regression methods. The findings revealed that banks with stronger market power tend to create more liquidity. Specifically, the combined effect of bank market power and the capital adequacy ratio was shown to positively influence liquidity creation. Vivertia et al. [33] by examining monthly data from 85 commercial and Islamic banks in Indonesia, found that Islamic banks created more liquidity during the COVID-19 crisis compared to commercial banks. Dang and Huynh [5] analyzed data from Vietnamese banks for the period 2007-2019 and found that greater market power weakens the transmission of monetary policy through the bank liquidity creation channel. Additionally, banks with less reliance on customer deposits may be less sensitive to monetary policy shocks in terms of liquidity creation. Nguyen et al. [28] found that higher market power in banks is associated with increased liquidity creation. Furthermore, highly profitable banks positively influence market power in terms of liquidity creation. Jiang et al. [18] examined the relationship between competition and bank liquidity creation. The results indicated that competition arising from regulatory adjustments leads to greater liquidity creation among banks with lower risk absorption capacity (e.g., less profitable banks).

2.6 Internal studies

Isfahani et al. [16] examined Iranian banks and developed a New Keynesian model incorporating price stickiness and financial frictions, but without real frictions, to assess the consequences of bank liquidity creation. The results showed that, as long as the bank has access to household investment deposits as a marginal source of loan financing, the bank's ability to create money affects only the behavior of nominal variables. Farhang et al. [13] analyzed data from Iranian banks for the period 2006-2020 and found that GDP shocks and bank deposit interest rate shocks positively impact bank liquidity creation, while credit risk shocks, loan interest rate shocks, and exchange rate shocks negatively impact liquidity creation. Fallahpour, Tehrani, and Gorgani [12] analyzed data from 11 banks listed on the Tehran Stock Exchange for the period 2008-2018 and found that the impact of negative oil price shocks on bank liquidity creation, due to their effect on large banks, is greater than the impact of positive oil price shocks and economic sanctions. Mahmoudinia, Mohammadi, and Memarzadeh [26], using data from 17 banks for the period 2005-2017 and applying the logit model, tested the research hypotheses. The results indicated that the impact of liquidity on banking crises is significantly positive. Asset size, credit risk, inflation, and non-performing loans have a positive impact, while free trade and the capital adequacy ratio hurt banking crises. Chalaki et al. [4] analyzed data from Iranian banks for the period 2009-2013 using panel data regression methods. The results showed that the previous year's liquidity, capital, the bank interest income ratio, bank size, the interest rate gap, deposit changes, and the ratio of foreign currency deposits to total deposits have significant impacts on bank liquidity.

3 Research hypotheses

1. The bank's market power significantly affects the creation of liquidity.
2. The economic boom and recession significantly affect the creation of liquidity.
3. Economic boom and recession significantly impact the relationship between bank market power and liquidity creation.

4 Research methodology

4.1 Data collection method

The current research is applied in terms of purpose and descriptive survey regarding implementation and data collection method. The recent research aims to explain the role of bank market power in creating liquidity in the conditions of economic boom and recession. Furthermore, the practical purpose of the study is to use the results to provide new insights into bank liquidity. In general, this research aims to achieve realistic goals and provide proposals based on research results to the government, policymakers, monetary authorities, and banking system managers for better and more effective monitoring. Also, investigating the effect of other variables in the form of control variables is one of the other goals of the research. This research uses linear regression methods to examine the impact of bank market power on liquidity creation in periods of economic boom and recession. The source of data for economic variables is the Central Bank Economic Indicators. For bank variables, it is the statistics and banking data of the Central Bank and financial statements published on the Codal website.

4.2 Statistical population, statistical sample, and time frame of the research

The statistical population of the present research is all the banks under the supervision of the Central Bank of the Islamic Republic of Iran in the period of 2011-2021. The sampling method was systematic elimination. The selection criteria are the availability of the required banking information and statistics of the banks in the period under review. Twenty-three banks have had the sampling criteria.

5 Research models and variables

According to the research results of Bawazir [2], Fu et al. [14], and Distinguin et al. [8], the intended model is defined as Model 1 to test the research hypotheses:

$$\Delta y_{it} = C_0 + d_1 Lerner_{it} + d_2 ES_t^{GDP} + d_3 (Lerner_{it} * ES_t^{GDP}) + d_4 X_{i,t-1} + \varepsilon_{it} \quad \text{Model (1)}$$

$X_{i,t-1}$'s are considered as research control variables with one lag. How to calculate the dependent, independent, and control variables is shown in Table 1.

Table 1: Measurement method of variables in model 1

Variable	Symbol	Variable type	Measurement method
Liquidity Creation	I.NSFR	Dependent	(required liquidity with stability)/(liquidity with stability available)
Market power	Lerner	Independent	Lerner = (final cost - price)/(price) Price = (Total Income)/(Total Assets)
Economic shock (economic boom and recession)	ES	Moderating	Virtual variable: Years when there was a recession = 1 ; and otherwise = 0
Bank size	Size	Control	Natural logarithm of bank assets
Bank capital (to control the bank's capital structure)	Capital	Control	(equity)/(total assets)
Return on equity (to control the profitability of the bank)	ROE (Return on equity)	Control	(net profit)/(equity)
Loan loss provision (to control credit risk)	LLP (Loan loss provision)	Control	(deferred facilities)/(total facilities)

5.1 Dependent variable

Liquidity creation: The variable of changes in liquidity creation is the dependent variable of this research; based on the liquidity requirements of the Basel 3 Committee, we use the inverse of the net stable funding ratio as an index of liquidity creation, in the form of relation (5.1): This ratio is obtained by dividing the sustainable allocation of resources (in the section of balanced assets and items by coefficients in the area of assets, including facilities and other items) by the sustainable supply of resources (in the section of balanced debts and items by coefficients in the area of debt including deposits and other items).

$$\text{The inverse of the net funding ratio} = (\text{required liquidity with stability})/(\text{liquidity with stability available}) \quad (5.1)$$

In relation (5.1), the coefficients for balancing the required financial resources (assets or numerator) are as follows:

- 1% to 5% cash and government bond
- 21% corporate and government bonds,
- 51% cooperative loans,
- 65% mortgage loans
- 85% micro and quick-return loan
- 111% for other assets with a maturity date of more than one year and off-balance sheet items

Coefficients for balancing available sustainable financial resources (debt or denominator) are as follows:

- 50% deposits of private companies and non-financial institutions, public sector financing, and...
- 95% micro-deposits of commercial customers
- 90% of retail customer deposits
- 100% of the first and second-class capital, shares, and debts that mature after one year.
- 0% for any debt and capital not in the above classification

5.2 Independent variable

Bank market power: To calculate the bank market power variable, it is first necessary to calculate the final bank costs. In the present research, relation (5.2) is used to calculate the final cost, based on the two products of loan (L) and deposit (D):

$$\begin{aligned} LnC_{it} = & \alpha_0 + \gamma_1 LnW_{lit} + \gamma_k LnW_{kit} + \gamma_L LnL_{it} + \gamma_D LnD_{it} + \frac{1}{2}\gamma_{ll}(LnW_{lit})^2 + \gamma_{lk} LnW_{lit} LnW_{kit} + \frac{1}{2}\gamma_{kk}(LnW_{kit})^2 \\ & + \frac{1}{2}\gamma_{LL}(LnL_{it})^2 + \gamma_{LD} LnL_{it} LnD_{it} + \frac{1}{2}\gamma_{DD}(LnD_{it})^2 + \gamma_{Ll} Ln(L) LnW_{lit} + \gamma_{Lk} Ln(L) LnW_{kit} \\ & + \gamma_{Dl} LnD_{it} LnW_{lit} + \gamma_{Dk} LnD_{it} LnW_{kit} + \mu_1 Trend + \frac{1}{2}\mu_2 Trend^2 + \mu_L Trend Ln(L) + \mu_D Trend Ln(D) \\ & + \mu_l Trend Ln(W_l) + \mu_k Trend Ln(W_k) + v_{it} + U_{it}. \end{aligned} \quad (5.2)$$

In the above function, there are explanatory variables as follows: C : operating cost in bank, L : loan and granted facilities, W_k : cost of capital, W_l : cost of labor, D : bank deposits, $Trend$: time trend variable that includes technological changes, v : Random error component with $N(0, \sigma^2)$ distribution, u : Inefficiency error component, a non-negative random variable that indicates inefficiency, Ln : natural logarithm operator, i : bank indicator, and t : year. Usually, technological changes in the banking system happen very quickly with the use of electronic tools such as ATMs and internet services, so we include the “Trend” variable in the cost function.

The operating cost of each bank (C) is extracted from the personnel, depreciation, administrative, and other expenses in the profit and loss statement of banks. Loan (L), considering the diversity of the headings of granted facilities in the financial statements of different banks, these facilities are extracted from the assets section in the

balance sheets and financial reports in two ways: 1- The facilities granted to the non-governmental sector in addition to the facilities granted to the government sector; 2- Demands from the government in addition to the granted facilities. Deposits (D): The amount of deposits in each bank is obtained from the sum of long-term, short-term deposits, savings interest-free (Qard-Al Hasanah) deposits, current interest-free deposit (Qard-Al Hasanah), and other deposits. Cost of labor (W_1): The labor value is calculated from the personnel expenses in each bank's profit and loss statement, extracted each year, and from the ratio of personnel expenses to the number of personnel of each bank. Cost of capital (W_k): Capital value is calculated from the sum of non-personnel costs (depreciation, administrative, and other expenses) compared to fixed assets. Since the homogeneous cost function is of degree one, applying symmetry assumption, the function related to relation (5.3) is obtained as:

$$\begin{aligned} n\left(\frac{C_{it}}{W_{kit}}\right) = & \gamma_I \ln\left(\frac{W_{lit}}{W_{kit}}\right) + \gamma_L \ln L_{it} + \gamma_D \ln D_{it} + \frac{1}{2} \gamma_{II} \left(\ln\left(\frac{W_{lit}}{W_{kit}}\right)\right)^2 + \gamma_{LD} \ln L_{it} \ln D_{it} + \frac{1}{2} \gamma_{LL} (\ln L_{it})^2 \\ & + \frac{1}{2} \gamma_{DD} (\ln D_{it})^2 + \gamma_{LI} \ln(L_{it}) \ln\left(\frac{W_{lit}}{W_{kit}}\right) + \gamma_{DI} \ln(D_{it}) \ln\left(\frac{W_{lit}}{W_{kit}}\right) + \mu_1 Trend_{it} \\ & + \frac{1}{2} \mu_2 Trend_{it}^2 + \mu_L Trend_{it} \ln(L_{it}) + \mu_D Trend_{it} \ln(D_{it}) + \mu_I Trend_{it} \ln(W_{lit}) \\ & + \mu_k Trend_{it} \ln(W_{kit}) + \epsilon_{it}. \end{aligned} \quad (5.3)$$

To estimate the market power through the Lerner index in the loan and deposit markets, deriving the cost function relative to the loan (L) and deposit (D), the final cost (MC) related to loans and deposits is obtained from relation (5.4):

$$\begin{aligned} mc_{it} = & \left[\gamma_D + \gamma_{LD} \ln L_{it} + \gamma_{DD} \ln D_{it} + \gamma_{DI} \ln\left(\frac{W_{lit}}{W_{kit}}\right) + \mu_D Trend_{it} \right] \times \left(\frac{C_{it}}{D_{it}}\right) \\ & + \left[\gamma_L + \gamma_{LD} \ln D_{it} + \gamma_{LL} \ln L_{it} + \gamma_{LI} \ln\left(\frac{W_{lit}}{W_{kit}}\right) + \mu_L Trend_{it} \right] \times \left(\frac{C_{it}}{L_{it}}\right). \end{aligned} \quad (5.4)$$

After calculating the final cost index, the value of Lerner's index is obtained from relation (5.5).

$$Lerner_{it} = \frac{p_{it} - mc_{it}}{p_{it}} \quad (5.5)$$

p is the monopoly price obtained from the ratio of total revenue divided by total assets, mc is marginal cost and Lerner represents market power.

6 Results

6.1 Checking the validity of the variables

In the present research, to check the regression model assumptions, the validity of the research variables was measured based on the Levin-Lin-Chu statistic, whose results are demonstrated in Table 2. As the significance of all variables is less than 0.05, the null hypothesis (Invalidity: existence of unit root) is rejected. Thus, all research variables are valid and reliable.

Table 2: The results of the validity test of the research variables

Variable	Levin-Lin-Chu statistic	Sig.
Bank liquidity creation(-1)	-5.09	0.000
Bank market power	-8.86	0.000
Economic boom and recession	-15.84	0.000
Bank capital(-1)	-7.61	0.000
The ratio of nonperforming loan to bank facilities(-1)	-6.57	0.000
Size(-1)	-4.58	0.000
Return on equity(-1)	-7.79	0.000

6.2 Checking the collinearity of the variables

Variance Inflation Factor (VIF) provides a measure of the degree of coherence, such that a variance inflation factor of 1 or 2 indicates essentially no coherence, and a measurement of 20 or higher indicates a strong correlation. Multicollinearity appears when more than two predictor variables are related to each other so that a decrease in statistical significance is observed when all are included in the model. Multicollinearity can be evaluated using variance inflation factors, as values greater than 10 indicate a high degree of multicollinearity. The results of collinearity are shown in Table 3.

Table 3: The results of the non-collinearity test

Variable symbol	Collinearity test		Result
	Tolerance	Variance inflation	
Economic boom and recession	0.841	1.189	Absence of collinearity
Size	0.842	1.188	Absence of collinearity
Bank capital	0.732	1.366	Absence of collinearity
The ratio of nonperforming loan to bank facilities	0.924	1.082	Absence of collinearity
Return on equity	0.884	1.131	Absence of collinearity
Bank market power	1.278	0.783	Absence of collinearity

According to the results obtained from Table 3, the value of the tolerance index for the variables in the model is close to zero, and the value of the VIF index is not more than 10. Thus, there is no evidence of collinearity among the variables.

6.3 Checking the existence of autocorrelation and heterogeneity of the variance of variables

The Waldridge Test is used to check the dependence and relationship between sections. In panel data, the generalized White Test is used to check the heterogeneity of variance, the results of which are presented in Table 4.

Table 4: The results of the Waldridge and White Tests

Pattern	statistic	Sig.	Result
$\Delta y = C_0 + d_1 Lerner_{i,t} + d_2 ES_{i,t}^{GDP} + d_3 X_{i,t-1} + \epsilon_{it}$	67.09	0.000	Existence of autocorrelation
	0.90	0.597	Homogeneity of variance

Since the value of Waldridge's statistic is less than 0.05 in Table 4, the null hypothesis of the autocorrelation test that there is no autocorrelation between the residuals of the regression model is rejected. Furthermore, to assess the homogeneity of variance, since the significance value is 0.588, which is more than 0.05, the null assumption of the homogeneity of variance test is accepted based on the homogeneity of variance of the model's residuals. Therefore, the GLS model is fitted to the observations to remove the autocorrelation.

Table 5: The results of the Wald Test

Model	statistic	Sig.	Result
$\Delta y = C_0 + d_1 Lerner_{i,t} + d_2 ES_{i,t}^{GDP} + d_3 X_{i,t-1} + \epsilon_{it}$	9978.12	0.000	Troubleshooting by adding the first interval of the dependent variable

The results obtained from the Wald chi-square test in Table 5 show that by adding the dependent variable interval to the model, the significance value of the chi-square test is smaller than 0.05, which indicates the absence of autocorrelation and heterogeneity of variance after adding the dependent variable interval to the model. Therefore, according to the conducted tests and the need to remove the autocorrelation and homogeneity of variance, the dependent variable interval is added to the model.

6.4 Data type detection test

Limer test was used to understand which panel or integrated method is suitable for fitting the model to the observations. If the significance value of the F statistic is less than 0.05, the null hypothesis, which states the integrated model is appropriate, is rejected, and the panel method is used. The test results are shown in Table 6.

According to the results of Table 6, as the significance level of the Limer test is greater than 0.05 for the model, the assumption that the use of the integrated model is appropriate is accepted, and a cross-sectional model is used for fitting.

Table 6: The results of the F-Limer test

Model	statistic	df	Sig.	Result
$\Delta y_{it} = C_0 + d_1 Lerner_{i,t} + d_2 ES_t^{GDP} + d_3 (Lerner_{it}^* ES_t^{GDP}) + d_4 X_{i,t-1} + \varepsilon_{it}$	0.451158	(22,200)	0.9847	Cross-sectional model

6.5 Model fitting

In this part, to test the research hypothesis, the research model has been fitted to the observations according to the selected approach in the previous phases, and the results are presented in Table 6.

- Examining the effect of economic boom and recession on the relationship between bank market power and liquidity creation

Table 7: The results of model fitting - the moderating effect of economic boom and recession (Significance at the 99% level (***), significance at the 95% level (**), significance at the 90% level(*))

$\Delta y_{it} = C_0 + d_1 Lerner_{i,t} + d_2 ES_t^{GDP} + d_3 (Lerner_{it}^* ES_t^{GDP}) + d_4 X_{i,t-1} + \varepsilon_{it}$				
Variable	Regression coefficient	SD	t	Sig.
LERNER	0.035	0.011	3.171	0.001***
CAPITAL	0.304	0.176	1.732	0.084*
LLP	0.339	0.798	0.425	0.671
ROE	0.108	0.080	1.349	0.178
SIZE	-0.001	0.004	-0.159	0.873
DELGDP	-0.041	0.023	-1.756	0.068*
DELGDP*LERNER	0.076	0.034	2.237	0.032**
Y(-1)	0.736	0.043	17.299	0.000***
C	0.050	0.059	0.848	0.397
Coefficient of determination	0.664		Fisher statistic	54.625
Adjusted coefficient of determination	0.651		Sig.	0.000***

Table 7 demonstrates that since the significance level of Fisher's test is less than 0.05, the assumption of the linear relationship between variables is confirmed, and the model is significant. The coefficient of determination is used to check the model's explanatory power. As the model's coefficient of determination is 0.66, it shows an average fit for the dependent variable by the independent variables. It indicates that about 66% of the changes in the dependent variable are explained by the independent variables.

The first hypothesis: Table 7 shows that the bank market power has a positive and significant effect on the bank liquidity creation with a significance of 0.001 at the confidence level of 99%, so the first research hypothesis is confirmed.

The second hypothesis: Table 7 shows that the economic boom and recession significantly negatively affects liquidity creation with a significance of 0.068 at 90% confidence levels. Therefore, the second hypothesis of the research is also confirmed.

The third hypothesis: Upon the results of Table 7, examining the moderating effect of the economic boom and recession on the relationship between bank market power and liquidity creation in banks, the test is significant at 95% confidence levels. Therefore, the third hypothesis of the research is also confirmed.

7 Conclusions and suggestions

The primary objective of this study was to elucidate the role of bank market power in liquidity creation during economic boom and recession. The hypothesis testing results indicate that bank market power significantly and positively influences liquidity creation at a 99% confidence level, with a p-value of 0.001. These findings align with the research by Sun [32] and Nguyen et al. [28]. Additionally, economic boom and recession have a significant negative impact on liquidity creation, with a p-value of 0.068, consistent with the findings of Farhang et al. [13].

Regarding the moderating effect of economic boom and recession on the relationship between bank market power and liquidity creation, the results show that these cycles significantly and positively influence this relationship at a 95% confidence level, with a p-value of 0.032. This suggests that economic downturns can affect the impact of bank market power on liquidity creation. Stability during these cycles plays a crucial role in the relationship between bank market power and liquidity creation. During periods of economic stability, when sudden and drastic market changes

are absent, banks can better plan for liquidity creation and face fewer financial risks. This enhances bank market power and facilitates liquidity creation activities. Consequently, effective management of this relationship during economic boom and recession shocks is vital to mitigate negative effects on liquidity creation and to achieve a more stable and sustainable economy. The findings of this study have several policy implications. First, bank market power is a critical consideration for macroprudential policies. The results indicate that banks with higher market power tend to assume greater liquidity risk. Given the new liquidity regulations requiring banks to hold more liquid assets, policymakers face a challenge in balancing sustainable economic growth through liquidity creation with adherence to Basel III policies. The results of this research can inform macroeconomic policymakers, the National Competition Council, banking system managers, senior industry executives, and other stakeholders. Based on the research conducted and the findings obtained, the following areas are recommended for future research:

1. Examining the effect of economic shocks (exchange rate, economic prosperity, and recession) on creating liquidity,
2. Examining the market power of specialized banks in creating liquidity,
3. Examining the effect of bank capital on creating liquidity.

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