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## EXPLORING THE RELATIONSHIP BETWEEN FINANCIAL INCLUSION AND LIQUIDITY CREATION IN THE SAARC COUNTRIES

Ammara Sarwar <sup>a,b,\*</sup>, Wajid Alim <sup>a</sup>, Saleh Nawaz Khan <sup>a</sup><sup>a</sup> Lahore School of Accountancy and Finance, The University of Lahore, Lahore, Pakistan<sup>b</sup> Department of Lahore Business School, The University of Lahore, Sargodha Campus, Pakistan

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### ABSTRACT

The stimulation of economic growth and stability is facilitated by the increased accessibility to financial services, as it effectively enhances liquidity within the banking system. Our study seeks to enhance comprehension of the function of financial inclusion in advancing economic development and financial stability by illuminating the bidirectional association between liquidity creation and the financial inclusion of banks operating in the SAARC region. We employed the Simultaneous equation model by utilizing the Generalized Method of Moments (GMM) to establish the bi-causal association between financial inclusion and liquidity generation. The empirical data comprises banks operating in SAARC countries from 2010 to 2020. Overall, the empirical results suggest that financial inclusion, operational risk, capital, bank size, and monetary policy have a significant impact on liquidity creation in banks. Moreover, it is also concluded that financial inclusion is positively influenced by economic growth and monetary policy while negatively affected by liquidity risk, inflation, and unemployment. Policymakers should take steps to increase financial inclusion by expanding access to financial services, which leads to the provision of liquidity creation.

\* Email: [ammara.sarwer@gmail.com](mailto:ammara.sarwer@gmail.com)
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### INTRODUCTION

Over the past several decades, the global economy has expanded rapidly due to the development of a robust and well-developed financial system. Long-term economic and financial development could be facilitated by a stable and sophisticated financial system (Rumler and Waschiczek, 2016). Economic activity and the financial system are interdependent and affect each other's stability, growth, and development simultaneously (Ali et al., 2022). Considering the significance of financial institutions in influencing global and financial activity, the existence of banks is essential. As per the contemporary theory of financial intermediation, banks exist because they play two crucial roles in the economy: risk transformation and liquidity creation. The function of banks as risk transformers has also been extensively studied. There is a substantial body of literature on bank risk-taking as well as prudential regulation, market discipline, and supervision to restrict risk-taking behavior (Diamond, 2007).

The second core function of banks is the creation of liquidity for the market. Banks create liquidity by employing their liquid liabilities (demand and time deposits) to finance illiquid assets, such as commercial and agricultural long-term loans. Concurrently, satisfies the company's short-term and long-term funding needs as well as depositors accordingly (Mdaghri and Oubdi, 2022). In a similar manner, banks create liquidity through off-balance sheet items, such as bank guarantees, letters of credit, and other commitments, thereby enabling businesses to efficiently pursue long-term growth and investment opportunities. Since the establishment of the endogenous growth theory in recent

years, financial development has garnered a great deal of attention as a crucial and inextricable component of the economic system. Financial inclusion, i.e., the use of formal financial services, is a characteristic of financial development that attracted a lot of public attention and research interest in the early 2000s. It was identified as one of the nine essential pillars of the global development strategy during the G20 Summit held in Seoul, South Korea, in November 2010. The significance of financial inclusion lies in its potential to foster economic development and alleviate poverty by enabling individuals to engage in saving, investing, and obtaining credit. It may have a significant impact on economic growth, and it also helps maintain financial stability. The policy objective of enhancing financial inclusion is gaining recognition as a crucial driver for fostering economic expansion and advancement, particularly in developing and emerging markets. The generation of liquidity by financial institutions has the potential to facilitate the advancement of financial inclusion through the augmentation of credit accessibility and other financial services. The creation of liquidity by banks enables them to extend loans to both individuals and businesses, thereby facilitating investment and growth. The provision of credit and other financial services can be extended to individuals who have been marginalized from the conventional financial system, thereby generating additional opportunities (Almaleeh, 2020). It is noteworthy that the generation of liquidity by financial institutions can also be a double-edged sword. The excessive creation of liquidity by banks has the potential to result in inflation

and other economic complications. Furthermore, in the event that financial institutions exhibit unequal lending practices across various societal segments, the goal of achieving financial inclusion may not be realized. Hence, it is imperative to maintain equilibrium between the generation of liquidity and prudent lending methodologies while simultaneously striving to foster universal access to financial services.

Financial inclusion has the potential to result in a rise in bank liquidity creation. Increased accessibility to formal financial services enables individuals and enterprises to engage in saving, investing, and borrowing activities through established banking institutions. The aforementioned can potentially generate a greater number of prospects for banks to provide loans and make investments, thereby augmenting the creation of liquidity. Conversely, the generation of bank liquidity may also result in heightened financial inclusion. The creation of additional liquidity by banks enables them to extend credit to a wider range of borrowers, including those who have traditionally been marginalized from the conventional financial framework. This initiative has the potential to enhance financial inclusion by facilitating access to credit and other financial services. The intricate nature of the correlation between liquidity creation and financial inclusion and should be acknowledged, as it can be impacted by a multitude of variables, including economic conditions, government policies and regulatory frameworks. Hence, it is imperative to consider financial inclusion and bank liquidity creation as significant objectives in their own capacity, and endeavors to advance one should not be detrimental to the other.

The literature has paid relatively little attention to the effect of financial inclusion on the stability and soundness of the banking sector. The interplay between financial inclusion and liquidity creation constitutes a crucial aspect of this matter. The banking sector's effective functioning is contingent upon liquidity, which enables banks to satisfy depositors' withdrawal requests and extend loans to borrowers. Insufficient liquidity may result in bank runs, financial turmoil, and, ultimately, the failure of the banking sector. Hence, comprehending the correlation between financial inclusion and the generation of bank liquidity holds significant relevance for policymakers and regulatory bodies. The impact of financial inclusion on the generation of bank liquidity may exhibit variability contingent upon the degree of economic development and institutional framework. In nations where financial systems are not fully developed, enhancing financial inclusion could potentially result in a dearth of liquidity, given that banks may not possess adequate capital to extend loans to a significant number of borrowers. On the contrary, financial systems that are more developed may experience a boost in bank liquidity creation because of financial inclusion. This is due to the fact that financial inclusion can offer banks the chance to broaden their loan portfolios and access previously untapped segments of the population.

The objective of this study is to address the aforementioned void by examining the bidirectional association between financial inclusion and the generation of liquidity. Our study seeks to enhance comprehension of the function of financial inclusion in advancing economic development and financial stability by illuminating this relationship. As liquidity provision and financial inclusion may be jointly identified (Han & Melecky, 2013), we utilized a model with simultaneous equations to capture their relationship (Casu et al., 2018). As a case study for this analysis, the SAARC serves as a useful laboratory. The South Asian Association for Regional Cooperation (SAARC) serves as a shared forum for eight South Asian nations to promote their joint social,

economic, cultural, and technical advancement. The aforementioned organization was founded in December 1985 with the purpose of serving as a catalyst for the advancement of social progress within its constituent nations. The organization's inception was marked by the establishment of the objective of financial inclusion. The inaugural chairperson of SAARC, through a proposal, advocated for resolute endeavors toward achieving comprehensive financial inclusion for all segments of the populace across the SAARC nations. This entails the attainment of heightened financial inclusivity in all SAARC states (Lenka and Bairwa, 2016). The results suggest that operational risk, capital, bank size, financial inclusion, and monetary policy have a significant impact on liquidity creation in banks. Moreover, it is concluded that financial inclusion is positively influenced by past levels of financial inclusion, economic growth, and monetary policy while negatively affected by liquidity risk, inflation, and unemployment. These findings provide insights that can be useful for bank managers and policymakers in making decisions that can lead to better management of liquidity creation.

The subsequent sections of this document are structured in the following manner. The second section of this paper presents a comprehensive analysis of the empirical literature pertaining to financial inclusion and the creation of bank liquidity. The third section provides a detailed description of the data and methodology employed in the analysis. The findings of the regression analysis are presented in section four. Section five comprises concluding remarks and policy recommendations of the present study.

#### **Review of literature and Hypothesis development**

The focus of banking literature has always been on banks' functions as risk transformers rather than liquidity creators. There have been several exceptions to this pattern, however. For instance, research that looks at the function of banks in the supply of liquidity has been done by Kashyap et al. (2002), Gatev and Strahan (2006), and Pennacchi (2006). To reduce risk, Kashyap et al. (2002) recommend that banks provide liquidity to borrowers and depositors, provided that there is no significant correlation between the liquidity requirements of these two groups. This combination diversifies the portfolio, minimizes the requirement for cash, and lessens the risk of liquidity. By analyzing how equity risk and the provision of deposit money changed in response to the 1998 liquidity crisis, Gatev et al. (2006) look at the link between deposits and lending liquidity in more detail. According to their research, the diversification effect is most potent during times of crisis when there is a depressed connection between depositors' and borrowers' desire for cash. Pennacchi (2006) adds to this body of knowledge by illustrating how the government-provided deposit insurance safety net and banks' expertise in liquidity supply are connected. Other studies, such as Berger and Udell (2003) and Peek and Rosengren (1995), have concentrated on particular facets of liquidity creation, such as lending for businesses or real estate.

Over the past few years, an increasing amount of scholarly literature has emerged regarding the concept of financial inclusion. Numerous scholarly investigations have been conducted to analyze the influence of financial inclusion on the operational efficiency of small as well as medium-sized enterprises (SMEs). For instance, Ifeakachukwu (2013), Beck et al. (2006), and Naceur et al. (2014) have carried out studies in this regard. Furthermore, as indicated by the research undertaken by Chikalipah (2017), Kumar (2013), and Fungáčová and Weill (2015), various scholarly investigations have evaluated the level of financial inclusion in specific nations and its influence on the general economic well-being of these

nations. Although much research has been conducted on the demand side of financial inclusion, only a few studies have looked at the impact of financial inclusion on the supply side, specifically the performance of banks as measured by liquidity creation, as indicated by Berger and Bouwman (2009).

Hannig and Jansen (2011) conducted a study that suggests that the incorporation of low-income groups into the financial sector can enhance the deposit and loan base stability, ultimately mitigating liquidity risk in the financial industry. According to their research, financial institutions that cater to low-income groups exhibit superior crisis management capabilities and play a significant role in sustaining economic activity. The study conducted by Prasad (2010) predicted the correlation between financial inclusion and financial stability. The findings revealed that limited availability of credit for small and medium-sized enterprises (SMEs) and small-scale entrepreneurs could potentially result in adverse effects on the economic stability of the entire system. This is because of the fact that these enterprises are typically more human-intensive and play a crucial role in generating employment opportunities.

Morgan and Pontines (2014) have determined that an elevated degree of financial inclusion yields a favorable impact on financial stability. The researchers have identified concrete evidence that augmented lending to Small and Medium Enterprises (SMEs) has a positive impact on financial stability. This is primarily due to the minimization of Non-Performing Loans (NPLs) and lowered likelihood of financial institutions default. In comparison to the aforementioned research, there exists empirical support for the notion that financial inclusion may yield both favorable and unfavorable outcomes with respect to the liquidity of banks. According to Khan (2011), lending to smaller enterprises and people has a positive impact since it diversifies bank assets, reducing the overall riskiness of a bank's loan portfolio and the volatility of any particular borrower's size in the total portfolio. In addition, an increase in the number of small-scale savers may result in a more stable deposit foundation and less reliance on non-core funding. Khan comments that banks' efforts to extend their horizons of borrowers may result in the loosening of lending criteria, a factor that contributed to the financial upheaval in the United States. Furthermore, inadequate regulation of the expansion of SME lending has the potential to undermine the efficacy of broader economic regulation and amplify financial system risks.

Almaleeh (2020) conducted a study to interrogate the correlation between financial inclusion, profitability, and liquidity in banks operating in Egypt. The research investigated two hypotheses pertaining to the impact of financial inclusion on the profitability and liquidity of banks in Egypt. The research employed information obtained from Egyptian financial institutions spanning the period between 2012 and September 2018. The study utilized regression models to examine the data, revealing that financial inclusion measures accounted for 53% of the variability in the profitability of Egyptian banks. Additionally, the study found that financial inclusion had a significant impact on various measures of banks' liquidity.

Financial inclusion gained a lot of public and research interest in the early 2000s and has now been considered an important area of interest for international banks and organizations, as well as a crucial determinant of financial development and economic growth. Bank liquidity creation and financial inclusion are interlinked processes. Bank liquidity creation increases through illiquid assets (loans) and liquid liabilities (deposits), while financial inclusion is the access of individuals as well as businesses to formal financial products and services provided by banks at a

reasonable cost and suitable mode. When people have more access to financial services, deposits, and increased loans, it affects the liquidity creation capacity of banks. Moreover, when more individuals enter the financial system, they are able to save their funds and invest, which enhances economic growth (Bruhn and Love, 2014). Furthermore, high deposits from people come up with an excessive and stable bank deposit base which protects them from the financial crisis (Han & Melecky, 2013) and may be contributed to liquidity creation. Some other prominent financial variables which have been studied with financial inclusion include innovation (Beck et al., 2013), financial stability (Hannig and Jansen, 2011), financial performance (Shihadeh, 2021), gender dimension (Swamy, 2014), Regulatory constraints (Rosengard and Prasetyantoko, 2011), Credit risk and Bank competitiveness (Musau et al., 2018) and sustainability and efficiency (Le et al., 2019).

A limited amount of research has been done to establish a correlation between financial inclusion, liquidity, and financial stability. Moreover, no single study was conducted on the association between financial inclusion and liquidity creation. Present research fills the research gap by examining the bidirectional relationship between financial inclusion and liquidity creation. As per the above discussion, the following research hypotheses are being formulated;

H1: Financial inclusion has a significant impact on liquidity creation

H2: Liquidity creation has a significant impact on financial inclusion

## METHODOLOGY

The aforementioned hypotheses are tested by utilizing a simultaneous equations model, which considers the possibility that financial inclusion and liquidity creation are interdependent.

1. Sample and Research Approach
2. Sample and Data Sources

Our study utilizes a sample of 332 commercial banks, savings banks, and cooperative banks operating in SAARC countries between 2010 and 2020, resulting in a total of 2309 bank/year observations. Due to data availability considerations, the data used in our study is derived from the Fitchconnect database, with a concentration on SAARC countries. Unconsolidated financial statements are used to consider foreign subsidiaries as separate credit institutions, reducing the possibility of introducing aggregation bias in the results. Merged institutions are regarded as discrete entities before and after the merger. Outliers are eliminated from the sample to ensure that the analysis is not affected by potential measurement errors and misreporting. The final dataset obtained from this filtration consists of an unbalanced panel with 2309 observations. Our sample differs from other studies examining only listed banks, as the study comprises listed and unlisted banks providing a more representative picture of the SAARC banking sector.

## Research Approach

We use a simultaneous equations model to address the possible connection between liquidity generation and financial inclusion (Casu et al., 2019). We use the generalized method of moments (GMM) estimator to estimate the two equations concurrently. When compared to instrumental variables (IV) estimators such as the two-stage least square (2SLS) and three-stage least square (3SLS), the GMM estimator is more efficient in dealing with heteroskedasticity and more resilient for error distribution. We regress a proxy for liquidity generation on liquidity creation and a

collection of independent factors that impact liquidity production in the first equation. In the second equation, we regress our financial inclusion on a proxy for liquidity generation and a collection of variables that impact financial inclusion. As a result, our empirical model is based on the baseline simultaneous equations system:

$$LC_{i,t} = a_0 + a_1 LC_{i,t-1} + a_2 (FI)_{i,t} + a_3 (OpRk)_{i,t} + a_4 (CrRk)_{i,t} + a_5 (ECO)_{i,t} + a_6 (COUNGOV)_{i,t} + a_7 (BC)_{i,t} + a_8 (SIZE)_{i,t} + a_9 (PERF)_{i,t} + a_{10} (MOP)_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$FI_{i,t} = a_0 + a_1 (FI)_{i,t-1} + a_2 (LC)_{i,t} + a_3 (LiqRk)_{i,t} + a_4 (INFL)_{i,t} + a_5 (UEMP)_{i,t} + a_6 (OpRk)_{i,t} + a_7 (CrRk)_{i,t} + a_8 (ECO)_{i,t} + a_9 (COUNGOV)_{i,t} + a_{10} (SIZE)_{i,t} + a_{11} (PERF)_{i,t} + a_{12} (MON)_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where  $i$ : banks,  $t$ : time, LC: Total bank liquidity creation, FI: Financial inclusion, OpRk: Operational risk, CrRk: Credit risk, ECO: Economic growth, COUNGOV: Country governance, BC: Bank capital, SIZE: Bank size, PERF: Profitability, MOP: Monetary policy, LiqRk: Liquidity risk, INFL: Inflation, UEMP: Unemployment rate.

### Measurement of Variables

#### Calculation of liquidity creation

Various indicators have been used to assess bank liquidity in liquidity risk management, monetary theory, and financial intermediation theory. They were, however, meant to quantify a bank's liquidity rather than the quantity of liquidity generated by a bank. Deep and Schaefer introduced the liquidity transformation gap (LT gap) in 2004 as a mechanism to quantify bank liquidity transformation. This metric is computed by dividing total assets by the difference between liquid and liquid liabilities. Berger and Bouwman argued in 2009 that the LT gap was insufficient for gauging bank liquidity creation and proposed four alternative measures. Due to data constraints, only two of the four proxies suggested by Berger and Bouwman were used in this investigation. These proxies were dubbed catfat and catnotfat, with catfat taking into account both on and off-balance-sheet things and catnotfat solely taking into account on-balance-sheet items. Catfat was employed to investigate liquidity creation, while catnotfat was used to corroborate the catfat findings.

The liquidity creation measures were built in three steps. To begin, all banking balance-sheet activities were categorised as liquid, semi-liquid, or illiquid, including assets, liabilities, equity, and off-balance-sheet entities. Second, weights were assigned to these activities based on the notion that when illiquid assets are converted into liquid liabilities, the most liquidity is provided, and when liquid assets are converted into illiquid liabilities, the most liquidity is removed. Finally, catfat (ComLC) and catnotfat (SpLC) were classified and calculated, with ComLC accounting for both on and off-balance-sheet items and SpLC accounting for solely on-balance-sheet ones.

$$\text{ComLC} = 1/5(\text{illiquid assets} + \text{liquid liabilities \& equity} + \text{illiquid off balance sheet items}) + 0(\text{semiliquid assets} + \text{semiliquid liabilities \& equity} + \text{semiliquid off balance sheet items}) - 01/5(\text{liquid assets} + \text{illiquid liabilities \& equity} + \text{off balance sheet items})$$

$$\text{SpLC} = 1/5(\text{illiquid assets} + \text{liquid liabilities \& equity}) + 0(\text{semiliquid assets} + \text{semiliquid liabilities \& equity}) - 01/5(\text{liquid assets} + \text{illiquid liabilities \& equity})$$

#### Calculation of financial inclusion

In this study, we utilize the macro-dimensional measure of financial inclusion created by Shah and Ali (2023). To the best of the author's knowledge, this is the first study to establish and formulate the empirical bidirectional relationship between financial inclusion and liquidity creation. Shah and Ali (2023) created a comprehensive and up-to-date financial inclusion index for developing countries. The study relied on recent data ranging from 2005 to 2020 obtained from various reputable sources such as the World Bank, central banks, and finance divisions of each country. By utilizing socio-economic and financial dimensions, the study has constructed a macro-level multidimensional financial inclusion index with values ranging from 0 to 1. To evaluate the financial inclusion level of each country, the study has classified the index score into three categories: low financial inclusion for scores between 0 to 0.30, medium financial inclusion for scores between 0.31 to 0.50, and high financial inclusion for scores between 0.51 to 1. All the selected variables, symbols, measurements and sources of data are given in Table 1.

Table 1. Measurement and Symbols of variables with data sources.

Variables Name	Symbol	Measurement	Sources
LC (total)/TA	ComLC	CATFAT/Total Assets	Fitchconnect and author's own calculations
	SpLC	CATNONFAT/Total Assets	Same as above
Financial Inclusion	FIN	FI Index by Shah and Ali (2023)	World bank
Profitability	PERF	Return on Assets	Fitchconnect and author's own calculations
Credit risk	CrRk	Total debt/Total assets	Same as above
Operational risk	OpRk	Total expenses/Total revenue	Same as above
Liquidity Risk	LiqRk	Current liabilities/Current Assets	Same as above
Bank Capital	BC	Ratio of total equity capital to gross total assets	Same as above
Size	SIZE	Natural logarithm of gross total assets	Same as above
Country governance	COUNGOV	CG index (Kaufman et al., 2010)	World Governance Indicators (WGI)
Unemployment rate	UEMP	Unemployment rate	CEIC database
Economic growth	ECO	Real GDP percentage change	Same as above
Inflation	INFL	Percentage change in GDP deflator index	World Development Indicators (WDI)
Monetary policy	MON	Lending rates	Same as above

**RESULTS AND DISCUSSION*****Descriptive Statistics and Correlation Analysis***

Table 2 displays the descriptive statistics for selected variables in a study. The variables are related to liquidity Creation (ComLC, SpcLC), Operational Risk (OpRk), Credit Risk (CrRk), Liquidity Risk (LqRk), Inflation (INF), Unemployment Rate (UEMP), Economic Growth (ECO), External Governance (COUNGOV), Covid 19 (COVID), Bank Stability (BSTAB), Capital (BC), Size (SIZE), Profitability (PERF), Monetary Policy (MOP) and Financial Inclusion (FIN). The mean and standard deviation values of each variable can provide insight into the distribution of data.

The variables "ComLC" and "SpcLC" have means of 0.574 and 0.515, respectively, indicating that liquidity creation is positive on average. However, the standard deviations of these variables are relatively high, indicating that there is a wide range of liquidity creation levels

among the banks in the study. The variable "FIN" has a mean of 0.141 and a standard deviation of 0.013, indicating that the level of financial inclusion varied among the countries or regions studied. Overall, descriptive statistics provide an overview of the data and highlight the variability among the variables.

Table 3 provides a correlation matrix between variables in a study. The values represent the correlation coefficients between pairs of variables. Multicollinearity is a concern when there is a high correlation between two or more independent variables, which can lead to unstable estimates of the coefficients in regression models. In the table, we can identify potential multicollinearity problems by looking for high correlations (above 0.7 or below -0.7) between pairs of variables. The results suggest that there is no multicollinearity problem among selected independent variables.

Table 2. Descriptive Statistics of all variables.

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
ComLC	2309	0.574	0.731	-4.055	9.102
SpcLC	2309	0.515	0.734	-4.392	9.102
OpRk	2309	1.655	2.061	-34.83	60.405
CrRk	2309	0.907	0.726	0.0004	15.192
LqRk	2309	1.071	3.812	-8.25	168.25
INF	2309	5.934	2.407	2.237	13.661
UEMP	2309	19.51	6.796	1.286	30.896
ECO	2309	5.327	3.061	-6.596	9.144
COUNGOV	2309	36.034	11.938	18.648	49.377
COVID	2309	0.078	0.269	0	1
BSTAB	2309	21.33	7.145	7.21	43.646
BC	2309	0.843	12.361	-14.192	239.06
SIZE	2309	9.009	1.006	6.018	11.749
PERF	2309	0.004	0.0773	-2.337	0.254
MOP	2309	10.218	1.845	0	14.419
FIN	2309	0.141	0.013	0.115	0.191

Table 3. Correlation matrix of all variables.

Variable	ComLC	SpcLC	OpRk	CrRk	LqRk	INF	UEMP	ECO	COUNGOV	COVID	BSTAB	BC	SIZE	PERF	MOP	FIN
ComLC	1															
SpcLC	0.99	1														
OpRk	0.174	0.176	1													
CrRk	0.447	0.448	0.009	1												
LqRk	0.088	0.086	0.007	0.001	1											
INF	-0.2	-0.215	-0.0002	0.013	0.014	1										
UEMP	0.261	0.284	0.002	0.047	0.009	-0.466	1									
ECO	0.068	0.073	0.004	0.0005	0.02	-0.163	0.0468	1								
COUNGOV	0.115	0.152	-0.064	0.028	-0.025	-0.434	0.728	-0.015	1							
COVID	0.039	0.032	0.021	0.013	-0.014	0.08	0.186	-0.754	-0.003	1						
BSTAB	0.284	0.262	0.021	-0.023	0.003	-0.441	0.481	0.015	0.414	0.047	1					
BC	-0.01	-0.006	-0.022	-0.056	0.002	-0.019	0.042	-0.007	0.046	0.012	-0.003	1				
SIZE	-0.118	-0.145	-0.028	-0.092	-0.007	0.159	-0.053	-0.037	-0.084	0.061	-0.043	-0.05	1			
PERF	-0.453	-0.459	0.127	-0.669	0.01	-0.03	-0.025	-0.015	-0.03	0.028	0.051	0.118	0.118	1		
MOP	-0.164	-0.179	0.0016	-0.007	0.043	0.573	-0.403	0.103	-0.431	-0.332	-0.378	-0.02	0.016	0.006	1	
FIN	0.164	0.15	-0.008	-0.041	-0.031	-0.616	0.207	-0.021	0.369	-0.083	0.71	3E-04	-0.106	0.042	-0.287	1

## Regression Analysis

### *Impact of financial inclusion on liquidity creation*

The regression results show the impact of various bank-specific and country-specific independent variables on two measures of liquidity creation, i.e., Comprehensive measure including off balance sheet items (ComLC) and Specific measure excluding off balance sheet items (SpLC). Financial inclusion has a statistically significant positive impact on both ComLC and SpLC, indicating that an increase in financial inclusion leads to an increase in liquidity creation. It indicates that when financial institutions have access to a larger pool of potential borrowers, they are able to extend more credit, which can lead to an increase in liquidity creation. This, in turn, can stimulate economic activity and promote growth. Some studies have found a positive relationship between financial inclusion and components of liquidity creation. For example, a study by Demirgüç-Kunt and Klapper (2012) found that countries with higher levels of financial inclusion tend to have higher levels of credit-to-GDP ratios, which is a measure of liquidity creation. Another study by Beck et al. (2007) found that improvements in financial inclusion were associated with an increase in the volume of loans provided by banks. Operational risk has a statistically significant positive impact on both ComLC and SpLC, indicating that an increase in operational risk leads to an increase in liquidity creation. Credit risk has a statistically significant negative impact on ComLC, but not on SpLC, indicating that an increase in credit risk leads to a decrease in ComLC. Capital has a statistically significant positive impact on both ComLC and SpLC, indicating that an increase in capital leads to an increase in liquidity creation. SIZE has a statistically significant positive impact on both ComLC and SpLC, indicating that an increase in bank size leads to an increase in liquidity creation. Performance has a statistically significant negative impact on both ComLC and SpLC, indicating that a decrease in bank performance leads to a decrease in liquidity creation. Economic growth has a positive impact on ComLC, but not on SpLC, but the effect is not statistically significant. Monetary policy has a statistically significant negative impact on both ComLC and SpLC, indicating that a tightening of monetary policy leads to a decrease in liquidity creation.

Overall, the regression results suggest that operational risk, capital, bank size, financial inclusion, and monetary policy have a significant impact on liquidity creation in banks. These findings provide insights that can be useful for bank managers and policymakers in making decisions that can lead to better management of liquidity creation. Table 4 presents the summary of regression results regarding the impact of financial inclusion on liquidity creation.

### *Impact of liquidity creation on financial inclusion*

The regression results presented in Table 5 show the relationship between financial inclusion with liquidity creation and other bank-specific and country-specific independent variables. The results depict that there is no significant impact of liquidity creation (ComLC, SpLC) on financial inclusion. Financial inclusion has a significant positive relationship with economic growth and monetary policy. Liquidity risk, inflation, and unemployment have negative and significant relationships with financial inclusion, indicating that these factors may hinder the progress of financial inclusion. This suggests that countries with greater access to financial services are more likely to experience higher economic growth and have more effective monetary policies. Conversely, liquidity risk, inflation, and unemployment have negative relationships with financial inclusion, implying that these issues may impede access to financial services and hinder economic growth. Policymakers could use these findings to prioritize efforts to increase financial inclusion as a means of promoting economic growth and reducing the negative effects of liquidity risk, inflation, and unemployment. Furthermore, the results show that operational risk, credit risk, external governance, size, and performance have insignificant relationships with financial inclusion, implying that these factors may not have a significant impact on financial inclusion.

Overall, the regression results suggest that financial inclusion is positively influenced by past levels of financial inclusion, economic growth, and monetary policy while negatively affected by liquidity risk, inflation, and unemployment.

Table 4. The impact of financial inclusion on liquidity creation in SAARC Region.

Variable	ComLC	SpLC
Constant	-1.738*** (-0.5134)	-1.746*** (0.495)
ComLC (L-1)	0.555*** (0.0266)	0.548*** (0.026)
OpRk	0.0273*** (0.0049)	0.027*** (0.004) ***
CrRk	-0.3389** (0.1405)	-0.427 (0.135)
ECO	0.0034 (0.0031)	0.002 (0.003)
COUNGOV	-0.0051 (0.0069)	0.0003 (0.006)
BC	0.0041** (0.002)	0.004** (0.002)
SIZE	0.1804*** (0.0498)	0.169*** (0.048)
FIN	7.601*** (1.274)	7.305*** (1.268)
PERF	-2.812*** (0.1903)	-2.88*** (0.182)
MOP	-0.0254*** (0.0055)	-0.023*** (0.005)
AR(1)	0.000	0.000
AR(2)	0.421	0.171
Hansen Value	0.793	0.907

Note: Significance levels are indicated as follows: \* Significant at the 10% level. \*\* Significant at the 5% level. \*\*\*; Significant at the 1% level.

Table 5. The impact of liquidity creation on financial inclusion in SAARC Region.

Variables	(1) Financial inclusion	(2) Financial inclusion
Constant	0.0857*** (0.008)	0.0859*** (0.008)
ComLC	0.0004 (0.000)	- -
SpLC	- -	0.0007 (0.000)
FIN(L1)	0.5757*** (0.032)	0.5702*** 0.0319
LiqRk	-0.0001*** (0.000)	-0.0001*** (0.000)
INFL	-0.0017*** (0.000)	-0.0017*** (0.000)
UEMP	-0.0002** (0.000)	-0.0002** (0.000)
OpRk	0.00006 (0.000)	0.00006 (0.000)
CrRk	-0.0019 (0.002)	-0.0017 (0.002)
ECO	0.0003*** (0.000)	0.0003*** (0.000)
COUNGOV	-0.0003*** (0.000)	-0.0003*** (0.000)
SIZE	-0.0003 (0.000)	-0.0003 (0.000)
PERF	-0.0023 (0.003)	-0.0016 (0.003)
MON	0.0007*** (0.000)	0.0007*** (0.000)
AR(1)	0.000	0.000
AR(2)	0.521	0.271
Hansen value	0.791	0.974

Note: Significance levels are indicated as follows: \* Significant at the 10% level. \*\* Significant at the 5% level. \*\*\*, Significant at the 1% level.

## CONCLUSIONS AND RECOMMENDATIONS

One of the essential functions of banks is the development of liquidity for the market. Banks generate liquidity by utilizing their liquid liabilities to finance illiquid assets, including commercial and agricultural long-term loans. Early in the twenty-first century, financial inclusion attracted a great deal of public and academic interest, and it is now regarded as an essential area of focus for international banks and organizations, as well as a crucial determinant of financial development and economic growth. The processes of bank liquidity creation and financial inclusion are interdependent. Through illiquid assets (loans) and liquid liabilities (deposits), banks are able to increase their liquidity, whereas financial inclusion is the access of individuals and enterprises to formal financial products and services offered by banks at a reasonable cost and in an appropriate manner (Almaleeh, 2020).

The objective of current research is to deepen our understanding of the role of financial inclusion in promoting economic development and financial stability. Specifically, we aim to shed light on the bidirectional association between financial inclusion and the generation of liquidity by banks operating in the SAARC region. The Simultaneous equation model was utilized in this

study, employing the Generalized Method of Moments (GMM) technique. The empirical dataset comprises banks that have been operational in the member countries of the South Asian Association for Regional Cooperation (SAARC) during the period spanning from 2010 to 2020. In general, the empirical findings indicate that various factors, namely financial inclusion, operational risk, capital, bank size, and monetary policy exert a substantial influence on the generation of liquidity within banks. Furthermore, it has been determined that economic growth and monetary policy have a positive impact on financial inclusion, whereas liquidity risk, inflation, and unemployment have a negative influence on it.

First, the empirical study shows that liquidity creation, monetary policy, and economic growth have a favorable impact on financial inclusion. This implies that when the economy expands, and monetary policies are supportive, financial services become more easily accessible, hence fostering financial inclusion. These results underline how crucial economic expansion and successful monetary policy initiatives are for promoting financial inclusion. The study also shows that a number of factors have a big impact on how banks create liquidity. The liquidity levels of banks are significantly influenced by a number of variables, including

monetary policy, operational risk, capital, operational risk tolerance, and financial inclusion. It is shown that when more people have access to financial services, deposits and loans increase, which impacts banks' ability to create liquidity. Moreover, when more people enter the financial industry, they are able to save and invest, which creates liquidity and stimulates economic expansion as per the findings of present research (Laghate and Chotaliya, 2021).

Several policy recommendations can be made based on these findings. Policymakers should take steps to increase financial inclusion by expanding access to financial services, particularly for marginalized people. This can be accomplished by expanding banking networks, providing mobile banking services, and developing novel financial technologies. A stable and accommodating monetary environment can aid in the production of liquidity and assist in overall financial stability. To mitigate operational risks, banks should implement strong risk management frameworks. Effective risk management procedures can improve bank stability and liquidity, ultimately protecting the financial system as a whole. Regulators should impose capital adequacy criteria on banks to ensure that they keep enough capital buffers. Sufficient capital levels strengthen banks' resilience, allowing them to absorb shocks and retain liquidity during difficult times. Policymakers should monitor and control liquidity concerns inside the financial sector. Furthermore, inflation-control measures should be implemented to maintain price stability, as high inflation can have a negative influence on financial inclusion.

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#### Declaration of Interest Statement

I declare that I have no competing interests that could have influenced the design, conduct, or reporting of this research. I received no funding or any financial assistance that could have influenced the research findings. I have no personal or professional affiliations that could have influenced the study's findings. Any potential conflicts of interest have been completely addressed in accordance with the journal standards to which this study is submitted.

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