Money Supply, Banking and Economic Growth: A Cross Country Analysis

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ABSTRACT

The primary objective of the research is to understand the interactions between money supply, banking and economic growth for effective policy interventions and business decisions. Based on annual data for the time period (2004-2021), descriptive analysis, correlations, causality tests and panel data regressions are analyzed for a sample from India, Saudi Arabia and UAE to draw conclusions. The results favored the "intermediation theory" and were contrary to the "credit creation" theory of banking. It was observed that the GDP of a country can be efficiently explained by financial soundness, broad money, loans and deposits for a country. Also, that the GDP of a country influences banking loans and deposits but not vice versa. The monetary policy of the sample was questioned by the finding that GDP causes banking loans and banking deposits but not vice versa. This important finding will add to the effectiveness in business decision making.

Keywords: Panel Data, Banking, Broad Money, Financial Soundness, GDP
JEL Classifications: E440; E520

1. INTRODUCTION

"The bank acts as an intermediary, channeling money from thousands of depositors and other investors to its loan clients" (Krugman, 2015).

Iyoha et al. (2014) defines monetary policy as *"the attempt to achieve the national goals of full employment, without inflation, rapid economic growth and balance of payments equilibrium through the control of money supply, cost of credit and size of credit."*

Friedman (1968) effectively explained the role of monetary policy in influencing the cost and volume of credit. the interest rate, which is the cost of credit, is the main channel through which lending is influenced. an increase in money supply or a lowering of the monetary policy rate, representing an easing in monetary policy

engender a regime of increase in bank deposits and the volume of money that banks have to lend, while the reverse holds for a restrictive monetary policy (Ozekhome, 2018).

The strength of a nation's financial system depends on the interactions between money supply, banking systems and the economic activity. The relationship between GDP and money supply is unique to every country (Hussain and Haque, 2017). Monetarism as a macroeconomic theory propagates the idea that governments can achieve economic stability by controlling monetary supply. It suggests that the total amount of money circulating in an economy is one of the main factor that determines its growth. The total amount of money in circulation in a country, including bank deposits and currency, is referred to as the money supply. The money supply has a significant impact on inflation and general economic activity. The basis risk (also known as residual risk), which arises from financial institutions' use of

hedging methods is a crucial factor in ensuring financial stability through sound monetary policy.

Financial institutions, such as banks, must be strong and stable in order to maintain the public's confidence and their ability to withstand economic shocks (Werner, 2016). Banking involves the allocation of credit and the mobilization of savings, enabling economic growth and facilitating consumption and investment. Hook (2022) studied the "credit creation theory" and concludes that the commercial banks and the central banks are the only sets of institutions that can create new money. Pollin (1991) holds a contrary view on monetarism. He concludes that money supply and credit rate are not an important tool for government's policy interventions.

The central bank's control over the money supply affects the liquidity and lending capacity of financial institutions, which in turn affects the overall health of the banking industry and the stability of the financial system. Countries can encourage sustainable economic development and reduce systemic risks in their financial systems by creating a balanced relationship between the money supply, financial soundness, and banking. The central bank's control over the money supply affects the availability of cash as well as inflation and economic expansion. Chindengwike (2022) and Marshal (2016) observed that money supply enhances economic growth. Ayub and Shah (2015) found a contrary result.

Financial institutions' stability and strength are gauged by their financial soundness, which also protects against possible crises and ensures depositor confidence. The economy may become vulnerable due to weak financial institutions, an overly cautious banking sector, and unsustainable money supply growth, thus it is crucial to strike a precise balance between these elements. For generating sustainable economic development and preserving stability in the face of external shocks, effective coordination between monetary policies, regulatory frameworks, and banking practices is essential.

The financial intermediation theory of banking says that banks collect deposits and then lend these out, just like other non-bank financial intermediaries. The fractional reserve theory of banking says that each individual bank is a financial intermediary without the power to create money, but the banking system collectively is able to create money through the process of "multiple deposit expansion." The "credit creation theory" of banking does not consider banks as financial intermediaries that gather deposits to lend out, but instead argues that each individual bank creates credit and money newly when granting a bank loan. An increase in money supply or a lowering of the monetary policy rate, representing an easing in monetary policy engender a regime of increase in bank deposits and the volume of money that banks have to lend, while the reverse holds for a restrictive monetary policy (Ozekhome, 2018).

Due to their comparable economic structures and cultural histories, the banking sectors of Gulf nations share a number of traits. The banking industry is impacted by variations in revenue from governments and foreign exchange reserves as a result of the Gulf countries' economies' reliance on oil and gas exports. To safeguard the stability and soundness of the financial systems, there are robust regulatory frameworks in place. Central banks regularly monitor the activities of banks and enforce adherence to prudential requirements. The financial industry also helps to enable transfers from international workers and actively promotes infrastructure initiatives. State-owned banks are common, and initiatives aimed at diversifying the economies have resulted in the development of "fintech" solutions to satisfy the changing needs of tech-savvy populations.

Need of the study: The countries that make up the Gulf Cooperation Council (GCC), which includes Saudi Arabia, Bahrain, Kuwait, Oman, Qatar, and the United Arab Emirates (UAE), have recently experienced a remarkable economic transformation. Due to their huge oil and gas reserves, these nations have emerged as major players in the world economy. This growth and expansion of the economy have been greatly aided by the banking sector in the Gulf region. In order to maintain the intricate relationships between the money supply, financial stability, and banking in the Gulf countries is essential for maintaining economic stability and prosperity. The GCC's vulnerabilities and systemic risks have increased as a result of financial integration, innovation, and deregulation Haddad and Hakim (2017). Some of the previous studies (Bitar et al., 2017) studied financial soundness of the banking sector while (Peek et al., 2016) studied monetary policy in the context of financial stability. Bitetto et al. (2023) used the IMF's financial soundness indicators to develop an alternative measure for financial soundness. Modugu and Dempere (2022) found that an expansionary monetary policy such as an increase in money supply stimulates bank lending. Many country specific studies have been conducted in the past [Arfanuzzaman (2014) on Bangladesh; Hussain and Haque (2017) on Nigeria; Ahmed and Suliman (2011) on Sudan] studying the relationship between economic activity and money supply. As per the understanding of the authors, no previous research is found which has studied money supply, financial soundness and economic growth in a comparative study involving India, Saudi Arabia and the UAE. Despite the availability of enormous literature on the linkages between money supply, economic growth and banking system, there is always a need for a research on this subject which adds to the existing literature. Considering the methodology used and the scope of the research, the study demonstrates novelty. Apart from the financial soundness, the interplay and the dynamics amongst economic growth and banking variables is another aspect of the research which is expected to draw prolific conclusions.

2. LITERATURE REVIEW

The relationship between GDP and money supply has been previously studied multiple times for a specific country [Arfanuzzaman (2014); Hussain and Haque (2017); Modugu and Dempere (2022)]. This relationship is unique to a country (Hussain and Haque, 2017). Previous researches [Qamruzzaman (2014); Salina et al. (2021)] have shown that there is interaction amongst financial and economic variables. Mishkin (1999) addressed two key issues in his study for policymakers managing global financial instability when it occurs and its prevention. It explored how financial instability is defined and what damage it can do to the

economy. The study used the most recent financial crises in Mexico and East Asia as examples, and it ended by outlining important policy issues. Australia, Japan, the USA, and Germany were four advanced nations that were the subject of a study by Allen and Wood (2006) focused on defining financial stability and offered a way to characterize times of financial instability. Such instability is thought to be less likely to occur in a state of financial stability. The study examined governmental strategies for creating stability, identifying preventive and remedial actions, and weighing the benefits and drawbacks of each.

Hussain and Haque (2017) and Ahmed and Suliman (2011) studied the relationship between money supply and GDP. Ahmed and Suliman (2011) found no causality between GDP and money supply but the series were observed to be co-integrated. Hussain and Haque (2017) used broad money as a variable and found its impact on GDP growth rate in long and short run for Nigeria. Arfanuzzaman (2014) found that causality flows from broad money to GDP. Granville and Mallick (2009) studied the relationship and pro-cyclicality of monetary and financial stability. They examined the impact of inflation shocks on share prices, interest rate spreads, and financial stability in the Eurozone using quarterly data (1994-2008). They found a long-run pro-cyclicality between monetary and financial stability, emphasizing the necessity of monetary stability as a requirement for financial stability. Balakrishnan et al. (2011) explored the transmission of financial stress from developed to emerging economies and found that past financial crises had a significant and quick impact on emerging economies. Valencia (2014) observed that lower monetary policy rates, conditional to equity financing, might either exacerbate or alleviate the banking incentives. Peek et al. (2016) looked at the relationship between monetary policy and financial stability in the US. They presented a simple model that includes financial instability into the utility function of monetary policy. Their findings highlighted how important it is to take financial stability into account when deciding how to formulate monetary policy.

Tong (2017) in his study looked at 257 institutions from 26 different nations to see how US monetary policy influences worldwide bank risk-taking. Haddad and Hakim (2017) observed that following the global financial crisis, the Gulf Cooperation Council (GCC) countries experienced an economic slowdown marked by dropping share prices, restricted bank credit, stalled GDP growth, skyrocketing sovereign bond spreads, and increased risk aversion. Elsayed and Yarovaya (2019) studied how the volatility of the Arab Spring had affected the financial stress indices in eight MENA nations. Nasreen and Anwar (2019) introduced a composite index and analyzed the monetary policies and financial stability of the GCC nations. Akanksha and Dubey (2022) examined the impact of an inflation-targeting monetary policy on financial stability in emerging market economies. They found that improved central bank openness and accountability improve banking sector resilience and external capital inflows. Wang et al. (2022) in their study examined China's monetary policy role in sustaining financial stability during the crisis in the 21st century. Nguyen et al. (2023) explored how banks' activity choices influence stability during periods of uncertainty, discovering that diversification into non-interest revenue may boost riskiness.

According to the quantity theory of money, a nation's supply of money is directly proportional to the economic activity of tested the country. With velocity assumed stable (Jahan and Papageorgiou, 2014), the money supply becomes a function of country's GDP. The quantity theory also proposes that an increase in the stock of money has a temporary effect on real output (GDP) in the short run. The research attempts to test this hypothesis in long run. Accordingly, a null hypothesis (H_1) is proposed to be tested for the three sample countries.

H_1: Money supply does not affect GDP (Jahan and Papageorgiou, 2014)

The theory of fractional reserve proposes that banks create credit in the economy by keeping a fraction of customer's deposits as reserve and lending the balance amount. An increase in deposits should increase the credit level in the economy. In the context of the modern monetary theory, two famous economists, Alexandria Ocasio-Cortez and Bernie Sanders, have been advocating money creation as a useful economic tool for economic growth. Another null hypothesis (H_2) is proposed as follows.

H_2: Increase in bank deposits does not increase banking loans

3. RESEARCH METHODOLOGY

The theory of quantity of money, theory of credit creation and the intermediation theory are the seminal philosophy and the influence for this research. The primary objective of the research is to understand the interactions between money supply, banking and economic growth. A latent secondary objective of the research is understanding the interplay and interactions amongst five macroeconomic variables (money supply, financial soundness, economic growth, banking loans and banking deposits). It is imperative to understand if there is any significant effect of one variable over another. This analysis will surely help the managers and policy makers to formulate effective business strategy and policy.

Qamruzzaman (2014) applied Multivariate Discriminate Analysis (MDA) on a sample of 20 listed banks from Bangladesh to study financial soundness based on banking ratios. The International Monetary Fund (IMF) publishes the financial soundness indicators to assess the strength and vulnerabilities of the financial system of the member countries. It also publishes data on banking and insurance parameters for member countries. The World Bank also publishes data on different parameters for member countries. The sample data has been extracted from these two databases (Table 1). The research uses a panel data for 5 macroeconomic variables (Table 1) for three countries [India, Kingdom of Saudi Arabia (KSA), United Arab Emirates (UAE)] for the time period 2004-2021. The three country has been selected considering the rationale that the authors are based in these countries which facilitates analysis and inferences. Additionally, a combined panel of developed countries (KSA and UAE) and a developing country (India) is expected to deliver better generalized results. The natural logarithm of all the variables have been used in the study (Table 1) for data analysis. The use of panel data fixed effects and ordinary least squares techniques in such data has been confirmed by Daas et al. (2021) and Ahmad and Murray (2019). Descriptive analysis,

Table 1: Description of data variables

Variable	Time period	Code	Data source
Outstanding deposits with commercial banks (% of GDP) (see Nguyen et al.,2023)	2004–2021	D.CB	World Bank database
Outstanding loans from commercial banks (% of GDP) (see Nguyen et al., 2023)	2004–2021	L.CB	World Bank database
Broad money (current LCU) [see Hook (2022) and Hussain and Haque (2017)]	2004–2021	BM	IMF database
Regulatory capital to risk-weighted assets (see Bitetto et al., 2023)	2004–2021	FINSND	IMF database
GDP per capita (current US$) (see Ahmed and Suliman, 2011)	2004–2021	GDP	World Bank database

IMF: International Monetary Fund, GDP: Gross domestic product

Table 2: Country wise descriptive statistics

Country	Variables	Mean	CV
India	D.CB	1.775	0.028
	L.CB	1.644	0.046
	BM	13.734	0.028
	FINSND	1.125	0.031
	GDP	3.049	0.077
Saudi Arabia	D.CB	1.975	0.063
	L.CB	1.967	0.066
	BM	11.793	0.030
	FINSND	1.271	0.020
	GDP	4.598	0.015
UAE	D.CB	1.975	0.063
	L.CB	1.967	0.066
	BM	11.793	0.030
	FINSND	1.271	0.020
	GDP	4.598	0.015
Panel	D.CB	1.869	0.078
	L.CB	1.798	0.108
	BM	12.794	0.074
	FINSND	1.214	0.062
	GDP	4.011	0.164

GDP: Gross domestic product

correlation analysis (Spearman's coefficients), linear regressions, Granger causality (Marshal, 2016) and the pooled ordinary least squared (POLS) regression is used for analysis. Country wise and combined panel analysis is done for more robust results. The R-squared values from the regressions have been used to analyze the inter variable dependency (Black, 1998).

The panel regression used in the research is represented as equation 1.

$$Log(Y) = f (Log\ X_{j,t,i}) \tag{1}$$

Here,

"Y" is the dependent variable, "X" is the independent variable, "I" is the counter for four independent variables used and thus varies from 1 to 4, "j" is the counter for number of countries in cross section and varies from 1 to 3 and "t" is the counter for yearly time period from (2004-2021). Hausman test for random effects could not be applied as the number of cross-sections (3) is less than the number of regression coefficients (5) and thus the redundant fixed effect test (likelihood ratio) was conducted to check for fixed effects in the panel. This test assumes that the fixed effects are redundant. Eviews 13, SPSS 21.0 and Microsoft-Excel software have been used for data analysis.

3.1. Data Analysis
This section includes the results from different analytical techniques used.

Analyzing the volatility (coefficient of variation, CV, Table 2) in the study variables, a low variability is observed across all countries and the panel data. The highest CV for all variables, across the countries, was observed for all the five variables in the panel data.

Analyzing the country wise correlations (Table 3), all correlation coefficients are observed positive for India and Saudi Arabia but not for UAE. All variables are negatively correlated with financial soundness for UAE. Banking deposits and loans were found high positively correlated with each other for the three countries and the panel (0.98). GDP and financial soundness is observed positively and highly correlated for the panel (0.93) but not for the countries. On the contrary, it is negative for UAE (−0.34). BM is observed negatively correlated with all variables in the panel data (Table 4).

In Tables 5 and 6, "p" represents the P (significance) and "r" represents the regression coefficients. The Table 5 indicates the results from the bivariate linear regression analysis, country wise. For India, the financial soundness was significantly explained by banking deposits (R-squared = 26%, P = 0.07), by money supply (R-squared = 31%, P = 0.05) and by GDP (R-squared = 24%, P = 0.09). Indian GDP was significantly explained by all variables, the best explained by money supply (R-squared = 98%).

For Saudi Arabia, the financial soundness was significantly explained by banking loans (R-squared = 34%, P = 0.03) and money supply (R-squared = 52%, P = 0.03). Saudi Arabian GDP was significantly explained by loans, deposits and best by money supply (R-squared = 91%).

For the UAE, the financial soundness was significantly explained by deposits (R-squared = 65%, P = 0), loans (R-squared = 48%, P = 0) by money supply (R-squared = 73%, P = 0) but indicated a negative relationship with these three variables. The UAE's GDP was significantly explained only by the money supply (R-squared = 48%). Loans and deposits significantly explained broad money for all the three countries.

In Table 6, broad money was observed to significantly explain the banking loans and deposits in all the three sample countries. The best results were observed for UAE with an R-squared value of 88% for both loans and deposits.

Table 3: Correlations (country wise)

Country	Variables	D.CB	L.CB	BM	FINSND	GDP
India	D.CB	1	0.948**	0.911**	0.505	0.898**
	L.CB	0.948**	1	0.860**	0.296	0.873**
	BM	0.911**	0.860**	1	0.553	0.989**
	FINSND	0.505	0.296	0.553	1	0.493
	GDP	0.898**	0.873**	0.989**	0.493	1
SA	D.CB	1	0.927**	0.754**	0.461	0.453
	L.CB	0.927**	1	0.694**	0.580*	0.416
	BM	0.754**	0.694**	1	0.722*	0.953**
	FINSND	0.461	0.580*	0.722*	1	0.376
	GDP	0.453	0.416	0.953**	0.376	1
UAE	D.CB	1	0.975**	0.938**	−0.805**	−0.023
	L.CB	0.975**	1	0.938**	−0.692**	−0.069
	BM	0.938**	0.938**	1	−0.853**	0.690**
	FINSND	−0.805**	−0.692**	−0.853**	1	−0.344
	GDP	−0.023	−0.069	0.690**	−0.344	1

*Correlation is significant at the 0.05 level (two-tailed), **Correlation is significant at the 0.01 level (two-tailed). GDP: Gross domestic product

Table 4: Correlations (all country panel)

Variables	FINSND	GDP	BM	D.CB	L.CB
FINSND	1	0.93	−0.89	0.41	0.53
GDP	0.93	1	−0.94	0.56	0.66
BM	−0.89	−0.94	1	−0.40	−0.51
D.CB	0.41	0.56	−0.40	1	0.98
L.CB	0.53	0.66	−0.51	0.98	1

GDP: Gross domestic product

The findings from the bivariate regressions were further tested in a country wise multivariate regression analysis (Table 7). For India, GDP was significantly explained (R-squared = 97%) by loans, deposits, broad money and financial soundness taken together. A similar relationship was observed for Saudi Arabia (R-squared = 99.9%) and UAE also (R-squared = 93%). Here, loans (coefficient = −1.12) indicated a negative impact on the GDP of UAE. Financial soundness was significantly explained by all the four independent variables taken together for UAE (R-squared = 79%) and Saudi Arabia (R-squared = 91%). Broad money was observed to be significantly explained by loans and deposits for India (R-squared = 83%, negative coefficient for loans), Saudi Arabia (R-squared = 57%, negative coefficient for loans) and UAE (R-squared = 89%).

The log likelihood redundant test results (Table 10) indicates that fixed effects are relevant in this panel of data (dependent variable: financial soundness) and thus a fixed effect based POLS regression was done (Table 9) to probe the relationship further. Here, Financial soundness, was significantly explained (R-squared = 90%) by bank deposits (coefficient = −0.8), loans, broad money and GDP (coefficient = −0.39) taken together.

The log likelihood redundant test results (Table 11) indicates that fixed effects are relevant in this panel of data (dependent variable: GDP) and thus a fixed effect based POLS regressionwas done (Table 12) for further analysis.

As per the POLS fixed effects POLS results (Table 12), GDP was significantly explained (R-squared=99.9%) by deposits (coefficient = −0.87), loans, broad money and financial soundness (coefficient= −0.26) taken together.

Analyzing the results from the Granger causality test for the panel of data (Table 12), it is observed that bank loans cause bank deposits but not vice versa. Broad money is observed to causes loans while deposits and broad money cause each other. Also, it is observed that GDP causes loans and deposits but not vice versa. Broad money and GDP are observed to cause each other. Financial soundness is causing loans as it is a direct determinant of loans. The influence of GDP and financial soundness on each other is not observed.

4. DISCUSSION

The study delves under the influence of theory of intermediation, theory of credit creation and the theory of quantity of money. Analyzing the presence of volatility in the five study variables, a low volatility was observed for the five study variables for the three countries and also for the full panel. This implies financial stability for the three countries and a good fit sample for such a study.

Bank deposits and bank loans were found high and positively correlated with each other for the three countries and for the panel (0.98) underlining the rationale of the banking system and conforming to the "intermediation theory" of banking. All variables are negatively correlated with financial soundness for UAE but not for India and Saudi Arabia (Table 3). The findings for UAE was validated in a bivariate linear regression (Table 5) which also indicated negative regression regressions coefficients. The broad money is observed to be negatively correlated with all variables in the panel data. A validation for this finding through a fixed effects based multivariate POLS regression did not conformed to this finding. Here, the broad money was explained (R-squared = 99.9%) by the other four independent variables taken together.

The Granger causality test revealed interesting findings. It is observed that banking loans cause deposits but not vice versa (R-squared = 97%, correlation = 0.98). This finding conforms to the "intermediation theory" of banking but is contrary to the "credit creation" theory of banking. Broad money is observed to cause loans (R-squared = 91%, correlation = −0.5, regression coefficient

Table 5: Bivariate regressions (country wise)

India											
Dependent variable: FINSND				**Dependent variable: GDP**				**Dependent variable: BM**			
Independent variable	**R² (%)**	**P**	**r**	**Independent variable**	**R² (%)**	**P**	**r**	**Independent variable**	**R² (%)**	**P**	**r**
D.CB	26	0.07	0.45	D.CB	81	0	3	D.CB	83	0	5.6
L.CB	8.8	0.32	0.18	L.CB	76	0	1.9	L.CB	74	0	3.5
BM	31	0.05	0.08	BM	98	0	0.6				
GDP	24	0.09	0.13	FINSND	24	0.09	1.9				
Saudi Arabia											
D.CB	21	0.11	0.23	D.CB	21	0.06	0.65	D.CB	57	0	1.98
L.CB	34	0.03	0.21	L.CB	17	0.09	0.53	L.CB	48	0	1.76
BM	52	0.03	0.19	BM	91	0	0.58				
GDP	14	0.21	0.17	FINSND	14	0.2	0.82				
UAE											
D.CB	65	0	−0.25	D.CB	0.1	0.9	−0.009	D.CB	88	0	1.78
L.CB	48	0	−0.27	L.CB	0.5	0.78	−0.03	L.CB	88	0	1.71
BM	73	0	−0.2	BM	48	0	0.13				
GDP	12	0.25	−0.2	FINSND	12	0.24	−0.7				

GDP: Gross domestic product

Table 6: Bivariate regressions (country wise, independent variable: Broad money)

India							
Dependent variable: DCB				**Dependent variable: LCB**			
Independent variable	**R² (%)**	**P**	**r**	**Independent variable**	**R² (%)**	**P**	**r**
BM	83	0	0.15	BM	74	0	0.21
Saudi Arabia							
BM	57	0	0.29	BM	48	0	0.27
UAE							
BM	88	0	0.5	BM	88	0	0.51

= 0.31, P = 0). Also deposits and broad money are observed to cause each other (correlation = −0.4). This finding was further evaluated in a bivariate POLS (fixed effect) regression. Broad money regressed over deposits indicated a significant relationship (R-squared = 97%, regression coefficient = 2.23, P = 0). Bank deposits regressed over broad money also indicated a significant relationship (R-squared = 86%, regression coefficient = 0.28, P = 0). This implies that a change in broad money will impact loans and deposits but the nature of impact needs to be further validated as negative correlations have also been observed in this relationship.

Also it is observed that GDP causes loans (R-squared = 77%, coefficient = 0.34, correlation = 0.66) and deposits (R-squared = 68%, coefficient = 0.26, correlation = 0.56) but not vice versa. This finding is contrary to the fundamental rationale of monetary policy that an increase in loans and deposits will enhance GDP. It implies that if GDP of a country increases, the bank deposits and bank loans will increase. This novel finding proposes a hypothesis which needs to be validated in further studies. This is an imperative finding useful for policymakers and business managers.

Broad money and GDP are observed to Granger cause each other (correlation = −0.94). This finding was revalidated in a bivariate POLS (fixed effect) regression. Broad money regressed over GDP indicated a significant relationship (R-squared = 97%, regression coefficient = 1.73). Alternately, GDP regressed over broad money also indicated a significant relationship (R-squared = 98%,

regression coefficient = 0.41). This implies that broad money may be used as a monetary policy tool to enhance GDP. Also that the GDP level in an economy should be considered while deciding on the level of broad money in the economy.

UAE indicated a differentiating behavior from India and Saudi Arabia. For the UAE, the financial soundness was significantly explained by banking deposits (R-squared = 65%, P = 0), banking loans (R-squared = 48%, P = 0) and the broad money (R-squared = 73%, P = 0) but indicated negative relationship with all three variables. The UAE's GDP was significantly explained only by the broad money (R-squared = 48%).

The broad money was observed to significantly explain banking loans and banking deposits in all the three countries. The best results were observed for the UAE with an R-squared value of 88% for both loans and deposits. This conforms to (Ozekhome, 2018). Thus the money supply may impact banking business which may further impact the economic environment in a country. This relationship is true for three different countries but may be tested further for robustness in future studies on a larger sample.

Financial soundness (Table 9) was significantly explained (R-squared = 90%) by deposits (coefficient = −0.8), loans, broad money and GDP (coefficient = −0.39) taken together as independent variables. Granville and Mallick (2009) found a pro-cyclicality between money supply and financial stability. This has concurrence in Nasreen and Anwar (2019).

GDP (Table 11) was significantly explained (R-squared = 99.9%) by deposits (coefficient = −0.87), loans, broad money and financial soundness (coefficient = −0.26) taken together in a multivariate POLS.

The null hypothesis H01 was rejected while the null hypothesis H02 could not be rejected based on the Granger causality test. The null hypothesis H01 and the null hypothesis H02 were rejected based on the POLS (bivariate, fixed effects) regression test.

Table 7: Multivariate regressions (country wise)

India								
Dependent variable: FINSND					**Dependent variable: GDP**			
Independent variable	**R² (%)**	**P**	**r**	**P**	**Independent variable**	**R² (%)**	**P**	**r**	**P**
Constant	57	0.11	−1.2	0.4	Constant	97	0	−4.1	0
D.CB			1.358	0.159	D.CB			−0.704	0.472
L.CB			−0.878	0.104	L.CB			0.292	0.606
BM			0.142	0.539	BM			0.589	0
GDP			−0.183	0.625	FINSND			−0.171	0.625
Saudi Arabia									
Constant	91	0.02	−10.863	0.02	Constant	99.9	0	−3.77	0
D.CB			−2.315	0.026	D.CB			−0.755	0.01
L.CB			−0.345	0.53	L.CB			−0.165	0.308
BM			2.396	0.016	BM			0.823	0
GDP			−2.882	0.019	FINSND			−0.273	0.019
UAE									
Constant	79	0	2.356	0.08	Constant	93	0	0.624	0.733
D.CB			−0.398	0.412	D.CB			0.295	0.626
L.CB			0.209	0.713	L.CB			−1.12	0.079
BM			−0.022	0.904	BM			0.486	0.006
GDP			−0.095	0.748	FINSND			−0.144	0.748

GDP: Gross domestic product

Table 8: Redundant fixed effects tests results (dependent variable: Financial soundness)

Effects test	P
Cross-section F	0.0512
Cross-section χ²	0.0243

Table 9: Pooled ordinary least squared (fixed effects, dependent variable: Financial soundness)

Dependent variable	Independent variable	R² (%)	P	Coefficient	P
FINSND	Constant	90	0	−0.52	0.47
	D.CB			−0.83	0.005
	L.CB			0.373	0.09
	BM			0.32	0.03
	GDP			−0.39	0.08

GDP: Gross Domestic Product

Table 10: Redundant fixed effects tests results (dependent variable: Financial soundness)

Effects test	P
Cross-section F	0
Cross-section χ²	0

Table 11: Pooled ordinary least squared (fixed effects, dependent variable: Gross domestic product)

Dependent variable	Independent variable	R² (%)	P	Coefficient	P
GDP	Constant	99.9	0	−2.7	0
	D.CB			−0.87	0
	L.CB			0.06	0.76
	BM			0.67	0
	FINSND			−0.26	0.08

GDP: Gross domestic product

Table 12: Results from the pairwise Granger causality test (lag 2)

Null hypothesis	P
GDP does not Granger cause FINSND	0.65
FINSND does not Granger cause GDP	0.36
BM does not Granger cause FINSND	0.41
FINSND does not Granger Cause BM	0.94
D_CB does not Granger cause FINSND	0.74
FINSND does not Granger cause D_CB	0.61
L_CB does not Granger cause FINSND	0.72
FINSND does not Granger cause L_CB	0.08
BM does not Granger cause GDP	0.05
GDP does not Granger cause BM	0.001
D_CB does not Granger cause GDP	0.41
GDP does not Granger cause D_CB	0.05
L_CB does not Granger cause GDP	0.18
GDP does not Granger cause L_CB	0
D_CB does not Granger cause BM	0.06
BM does not Granger cause D_CB	0.07
L_CB does not Granger cause BM	0.11
BM does not Granger cause L_CB	0.01
L_CB does not Granger cause D_CB	0.006
D_CB does not Granger cause L_CB	0.24

GDP: Gross domestic product

$$GDP = -1.3 + 0.42 * \text{money supply} \tag{2}$$

$$\text{Loans} = -0.19 + 1.01 * \text{deposits} \tag{3}$$

5. CONCLUSION

The theory of intermediation, theory of credit creation and the theory of quantity of money were the primary influence for the study. The research objective of the research was to understand more about the relationship amongst financial soundness, broad money, economic growth and loans and deposits. The expectation was to analysis the findings for new information. The results from data analysis successfully explains the interactions amongst the study variables. Several interesting conclusions can be made from the findings.

Equation 2 (R-squared = 98%, P = 0, fixed effects) demonstrates the relationship based on H01 while equation 3 demonstrates the relationship based on H02 (R-squared = 97%, P = 0, fixed effects).

The "intermediation theory" (Krugman, 2015) of banking was revalidated based on high positive correlations between loans and deposits. The results were uniform for the full panel of data and for the respective countries. Occasionally contrary findings were observed for the panel correlations and panel regressions. This needs to be further probed.

The "intermediation theory" of banking and the "credit creation" theory of banking were put across each other as the banking loans were observed to cause deposits but not vice versa. The two theories are supposed to coexist but the findings supported the former and confronted the later.

A change in broad money is expected to impact loans and deposits but the nature of impact needs to be further validated as negative correlations have also been observed in this relationship.

A monetary policy effects banking loans and deposits as tools to impact economic output of a country. The monetary policy of the sample was questioned by the finding that GDP causes banking loans and banking deposits but not vice versa. This important finding should be checked for robustness on a wider sample. If this holds true it will add to the effectiveness in business decision making.

Broad money and GDP are observed to cause each other. This implies that broad money may be used as a monetary policy tool to enhance GDP. UAE indicated a differentiating behavior from India and Saudi Arabia at times. This deviation may be probed for better policy evaluation and implementation.

The research is based on a panel data for three countries. Further research can be done on a wider cross section of countries to check for robustness and more generalized results.

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