

## The Determinants of Excess Liquidity in the GCC Banking Systems

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### Abstract:

The paper investigates the voluntary (precautionary) and involuntary determinants of excess liquidity in the GCC banking systems using the Two Stage Least Squares (TSLS) method. The results show that the determinants of Excess liquidity in the GCC banking systems vary from country to another. The precautionary determinants reflect the cost of refinancing at the central Bank, the output gap, and the liquidity risks and uncertainty measured by the volatility of currency in circulation to deposit ratio, the volatility of output gap and volatility of total deposits, respectively. The involuntary determinants include oil exports and bank lending rate. They reflect also the movements in bank liabilities and assets, especially the credit to private sector to output ratio, the credit to public sector to output ratio, the private deposits to output ratio, the public deposits to output ratio, and the purchases of government bonds to output ratio. The banks in GCC countries can avoid the cost of excess liquidity by enhancing the credit to private sector and by promoting the economic diversification policies which reduce the uncertainty and liquidity risks.

**Keywords:** Bank excess liquidity, Precautionary determinants, involuntary determinants, GCC Banking systems, TSLS model.

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## 1- INTRODUCTION:

Commercial Banks play crucial role in the economy by closing the gap between depositors and borrowers, directing saving from agents with financing capacity to agents with financing needs. This process of financial intermediation allocates capital efficiently, supporting economic growth, investment and consumption. The importance of commercial bank is indeed heightened in the bank-based economy, because the banking system is the crucial component of the overall financial system. There is no doubt that banks' performance of the financial intermediation function, which involves transforming short-term deposits into long-term loans, can indeed expose them to multiple risks, including liquidity risk. To mitigate the liquidity risks, banks hold liquidity above the regulatory reserves, which can make them in an excess liquidity situation. Excess liquidity refers to the amount of cash and other liquid assets that a bank holds beyond what is required by regulatory reserves. While holding excess liquidity can help banks to meet unexpected withdrawals and reduce the risk of liquidity crises, it also comes with some costs because banks are not using those funds to generate income from loans, investments, or other revenue-generating activities (the opportunity cost of holding Excess reserves).

If the liquidity deficit situation in banks is evident and severe during banking and financial crises, where many banks face challenges in meeting their obligations to depositors, the bank excess liquidity is also a permanent feature of many countries around the world. For this reason, the interest in bank excess liquidity has increased among researchers and policymakers in recent years. The literature on this topic has focused on two main themes. The first is the impact of excess liquidity on the monetary policy effectiveness in achieving the ultimate goals, like price stability. In this regard, (Ganley, 2004, p. 2) noted that Excess liquidity could weaken the monetary policy transmission. In another study, (Djafferi & Chelghoum, 2017, p. 223) and (Bathaluddin, Nur, Adhi, & Wahyu, 2012, p. 245) found that Excess liquidity was the main reason for weakness of effective transmission of the monetary policy impact to price stability in Algeria and Indonesia, respectively. (Saxegaard, 2006, p. 1) Emphasized that the involuntary excess liquidity had weakened the monetary policy transmission to inflation in Kenya, Nigeria and Uganda, and found that attempts to boost economic activity through monetary policy were less effective when banks held high levels of involuntary excess liquidity.

Furthermore, the bank excess liquidity adversely affects monetary policy, as it makes the monetary authority's attempts to increase liquidity to stimulate aggregate demand ineffective (Agénor, Aizenman, & Hoffmaister, 2000, pp. 17-18). The presence of Excess bank liquidity, it is difficult to adjust the money supply by using the required reserve ratio and complicate the use of monetary policy in achieving economic stability (Saxegaard, 2006, p. 4). Furthermore, (Ganley, 2004, pp. 32-33) emphasized that the accumulation of excess liquidity allows banks to lend more, fueling a rise in the money supply that can exceed the central bank's targeted level. This can lead to increased domestic consumption, high inflation, and asset price bubble. When the excess liquidity eventually dries up, it can trigger a significant decline in asset values.

Regarding the second axis, researchers investigated the factors that determine banks' excess liquidity in developed and developing countries. In this regard, we distinguish between traditional theoretical models applied on developed countries and empirical studies applied on developing countries. The Great Depression in the United States sparked a surge of interest in bank excess liquidity, leading to the development of theoretical models exploring its causes and implications. These models largely focused on precautionary (voluntary) reasons for

banks holding excess reserves, suggesting that banks deliberately choose to maintain liquidity buffers beyond regulatory requirements. According to these models (Poole, 1968, p. 769); (Frost, 1971, p. 805), higher levels of uncertainty incentivize banks to hold larger excess liquidity, but in the same time bank's holding of precautionary excess liquidity implies an opportunity cost. Recently, many researchers are examined the determinants of excess liquidity in the developing countries. They incorporated to the voluntary determinants other factors such as structural economic characteristics and financial system features that can act as involuntary determinants.

As a result, the study of the determinants of Excess liquidity in the banking system helps to understand the voluntary and involuntary reasons for banks' holding of excess liquidity, and understanding the factors that might lead to the denial of funding to households and investors can inform policies that promote financial inclusion and access to credit. The study of this subject in the GCC countries is of great importance for several reasons. First, to our knowledge, this is the first study that examines bank's excess liquidity determinants in GCC countries. Second, the banking sector is the principal component of the financial system in GCC countries. In this regard, the market capitalization of financial market to bank assets ratio in 2021 in Bahrain, UAE, Qatar, Kuwait and Oman is estimated at 30.5, 36.2, 39.7, 56.6 and 61.6%, respectively; While the previous ratio in Saudi Arabia rises to 335.6%, due to the inclusion of Aramco's stock in the Saudi stock market in the fourth quarter of 2019 (Arab Monetary Fund, 2022). The third reason is the importance of Excess liquidity in GCC banking systems. As explained in section III of this paper, Excess liquidity as a proportion of private sector deposits and as a proportion of private sector loans from the period of study, in Saudi Arabia is estimated to be 9.56 and 8.8 per cent, respectively,. Qatar's previous ratios are estimated at 8.8 and 9.25 per cent, respectively. These ratios in Bahrain rise to 10.35 and 11.37 per cent respectively, and rising in Kuwait to 14.57 and 14.5 per cent respectively. The previous two rates in the UAE are about 17.7 and 16.5 per cent respectively. These ratios in Oman amount to 25.8 and 17.1 per cent, respectively. This helps policymakers to understand why banks might choose to hold non-remunerate excess liquidity rather than making loans to agents with financial needs, and promoting economic diversification policies.

Based on the above, the following question arises: What are the determinants of excess liquidity in GCC banking systems?

## 2- Method:

In this part of the research, we seek to indicate the reasons why banks in the GCC countries hold Excess liquidity. To achieve this, we follow the same methodology of (Saxegaard, 2006, pp. 17-20) and (Kamga & Ndambendia, 2008, p. 13), which confirms that banks hold Excess liquidity for voluntary and involuntary reasons. Thus, we propose a specification of the form:

$$\alpha_1(L)EL_t = \alpha_2(L)X_t^1 + \alpha_3(L)X_t^2 + V_t$$

Where (EL) is the dependent variable. It is the excess bank liquidity to total bank deposits. X1 and X2 are vectors of variables that explain voluntary and involuntary determinants of holding excess liquidity, respectively.  $V_t$  Is the error term, and  $\alpha_j(L)$  are vectors of lag polynomials defined as:

$$\begin{aligned} \alpha_1(L) &= 1 - \alpha_{11}L, \\ \alpha_j(L) &= \alpha_{j0} + \alpha_{j1}L, j \geq 2 \end{aligned}$$

Where L is the lag operator and we estimate our model with one lag due to the large set of independent variables. The Vectors X1 and X2 includes the determinants:

$$X1 = (RR, VOL_{CD}, VOL_{DEP}, VOL_Y, Y, R_d)$$

$$X2 = (DEP_G, DEP_{PS}, CRED_G, CRED_{PS}, BOND, POIL, OIL, R_l)$$

Where (RR) is the required reserve to total deposit ratio. (VOLcd) and (VOLy) are the volatility of currency in circulation to deposit ratio and the volatility of output gap. These two variables reflect liquidity risk and uncertainty, respectively. The volatility of currency in circulation and output gap equal to five quarter moving standard deviation of currency in circulation to deposit ratio and output gap, respectively. The output gap (Y) is the gross domestic product to trend component ratio as a proxy for the demand for cash. The trend component ratio is calculated using the Hodrick-Prescott Filter. We also include the volatility of total deposits (VOLdep) to reflect the fluctuations in total deposits, because the banks increase their holding of excess liquidity in case of increased deposit volatility. The volatility of total deposits equal to standard deviation of total deposits divided by the five-quarter moving average of total deposits. The variable (Rd) represents the central bank's main interest rate and reflects the cost of the illiquidity situation (the penalty rate).

The involuntary determinants include public sector deposits to GDP ratio (DEPg), and Private Sector Deposit to GDP ratio (DEPps), which affect positively the bank excess liquidity. CREDg and CREDps are the ratio of bank credit to public sector to GDP and the ratio of bank credit to private sector to GDP, respectively. BOND is the debt securitization to GDP ratio. OIL and POIL are the Oil exports to GDP ratio and the quarterly percentage change in the oil price, respectively. The commercial lending rate (RL) is the cost of borrowing. The increase in the lending rate is the excess liquidity because it reduces the demand for bank credit.

During the process of estimating the model for each country, and similar to the methodology of (Agénor, Aizenman, & Hoffmaister, 2000, pp. 7-10), (Saxegaard, 2006, pp. 17-21), (Bathaluddin, Nur, Adhi, & Wahyu, 2012, pp. 252-253) and (Djafferi & Chelghoum, 2017, p. 233), the initial model that includes all the previous variables is reduced by removing the insignificant variables. The OLS estimation in our case is inconsistent because of the presence of several explanatory variables that are likely to be endogenous. Hence, we estimate the model using the Two Stage Least Squares (TSLS). The variables that we consider likely to be endogenous are the variables that are under the control of Central Banks and commercial Banks. These variables include (RR, Rd, DEPg, DEPps, CREDg, CREDps, BOND, RL). Due to the time lag in transmission of commercial banks and central bank decisions, the set of the instrument variables include the second lag of the endogenous variables and the second lag of the dependent variables (EL). Furthermore, we add to the instruments set the exogenous variables that are statistically insignificant.

We use quarterly time series data, which covers the period Q1 2005-Q3 2021 for Kuwait, and Q1 2009-Q3 2021 for Saudi Arabia, Qatar and Bahrain, and Q1 2011-Q3 2021 for Oman, and Q1 2014-Q3 2021 for the UAE. All the variables are reported in appendixes 1, 2, 3, 4, 5, 6.

The paper is structured as follows: in section 3, we present a literature review. Section 4 shows the bank excess liquidity evolution in GCC countries. Section 5 describes our econometric methodology. Section 6 sets forth our main results and policy implications. Finally, section 7 concludes the paper.

### 3-Literature Review:

Literature on bank excess liquidity in developing and developed countries is abundant. We present a summary of the results of a sample of 27 studies.

After the Great Depression of 1929, the banks in the USA have increased the holding of excess liquidity. The results from many theoretical models, such as those developed by; (Frost, 1971, p. 821), (Poole, 1968, p. 769), (Baltensperger, 1980, p. 35) and (Santomero, 1984, pp. 588-589), highlight the trade-off between the opportunity cost and insurance benefits of holding excess liquidity. On the one hand, holding excess liquidity represents an opportunity cost for banks, as they forego the potential interest income, they could earn by lending out those funds or investing them in other yielding assets. On the other hand, holding excess liquidity provides banks with insurance against uncertainty and liquidity risks. By maintaining a buffer of excess reserves, banks can better withstand unexpected events such as deposit withdrawals, loan defaults, or economic downturns.

Recently, numerous empirical papers have examined the determinants of excess liquidity in developing countries. In this regard, (Agénor, Aizenman, & Hoffmaister, 2000, p. 27) studied the voluntary determinants of bank Excess liquidity in Thailand during the period (Jan 1992- Oct 1998). The results show that excess liquidity is negatively related to required reserve, and positively related to the penalty rate and the volatility of currency in circulation.

(Maynard & Moore, 2005, p. 3) Examined the determinants of excess liquidity on Barbados for the period (1975-2004). The findings show that the penalty rate, the output gap, and the volatility of currency in circulation affect negatively the excess liquidity? In contrast, money creation to finance budget deficit affects positively the bank excess liquidity. In another study (Fielding & Shortland, 2005, p. 7), found for the case of Egypt that financial liberalization and political conflicts tend to reduce and rise the excess liquidity, respectively. (Aikaeli, 2006, p. 1) Found that the lending rate, volatility of currency in circulation led to the build-up of excess liquidity in Tanzania banking system. In contrast, required reserve tends to reduce the excess liquidity.

(Saxegaard, 2006, pp. 1- 25) Examined the determinants of excess liquidity in sub-Saharan African countries. He challenged the traditional view that excess liquidity primarily arises from voluntary determinants by banks to hold precautionary reserves. Instead, he emphasized that involuntary determinants, such as limited financial infrastructure, external capital inflows, and regulatory constraints, can also play a significant role in contributing to excess liquidity in these economies. The results suggest that the voluntary determinants include the required reserves, the volatility of currency in circulation, the volatility of deposits, the volatility of output gap, and the demand deposits. The involuntary determinants are the deposits, the lending rate, the credits and the oil exports.

(Khemraj T. , Excess liquidity and the foreign currency constraint: the case of monetary management in Guyana, 2009, p. 2073) Study delves into the specific case of Guyana, a small open developing country, where the central bank imposes restrictions on foreign exchange represented in the accumulation of exchange reserves. This restriction prevents banks from investing their excess liquidity in secure external assets, leading to increased excess liquidity. In on other paper, (Khemraj T. , 2008, p. 14) presented a compelling argument about the relationship between excess liquidity, private lending, and interest rates. His central point is that there exists a minimum interest rate at which excess liquidity and private lending become perfect substitutes for each other. (Khemraj T. , 2010, pp. 108-109) Key finding is that banks are willing to hold non-yielding excess liquidity when the prevailing interest rate in the lending market falls below the marginal cost of risk-adjusted lending.

(Kamga & Ndambendia, 2008, p. 1) Examined the voluntary and involuntary determinants of Excess liquidity in the Central African Economic and Monetary Community (CEMAC) countries. They found that as a group, loan to private sector led to reduce excess

liquidity. ( Anderson-Reid, 2011, p. 1) Examined the determinants of excess liquidity in Jamaica. The results from the ARDL model showed that required reserve, volatility of currency in circulation, volatility of output gap, output gap, and interest rate on treasury bills affect the bank holding of excess liquidity. Using the TSLS method on the islands of Cape Verde, ( Pontes & Sol-Murta, 2012, pp. 20-21) found that the excess liquidity is the results of the poor effectiveness of the lending market, the underdevelopment of the government bond market and the financial system.

(Khasawneh, 2013, p. 160) Used the VARX model on Jordan and found that the excess liquidity is negatively related with currency in circulation and required reserve. In contrast, Interest rates in the interbank market is positively affected excess liquidity (Bathaluddin, Nur, Adhi, & Wahyu, 2012, p. 245) Concluded that banks' holding of excess liquidity in Indonesia is determined by currency in circulation, volatility of output gap, and the penalty rate.

( Nwakanma & Mgbataogu, 2014, p. 174) Found that the money supply, foreign exchange monetization, and lagged excess liquidity were the factors that cause excess liquidity in Nigeria. In another paper, ( Omer, Haan , & Scholtens, 2015, p. 4754) estimated the determinants for excess liquidity in Pakistan. The financing of the budget deficit by the Central Bank and the non-bank sector is the principal reason for the excess liquidity situation. (Primus, 2014) Examined the Involuntary determinants of Excess liquidity in Trinidad and Tobago's banks. The results show that the government's fiscal operations is one of the main factors in determining involuntary excess liquidity.

(Hasanovi'c & Lati'c, 2017, p. 2) Examined the determinants of excess liquidity 19 commercial banks in Bosnia and Herzegovina. They found that the bank's size, ratio of non-performing loans, and total loans affect positively bank excess liquidity. In addition, inflation and the inter-European market interest rate affect negatively the bank excess liquidity. (Ansari & Sensarma, 2022, p. 2) Found that required reserves, exchange rate and call rate are the Common factor which are responsible for build-up of excess liquidity in banks of India.

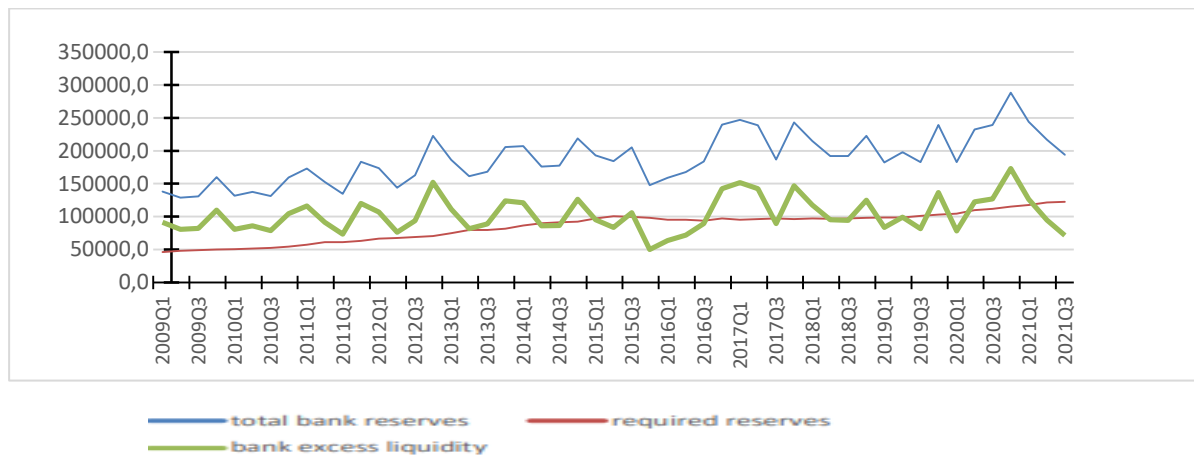
### **4-Evolution of Excess liquidity in GCC banking systems:**

According to the papers presented in the section 2 of this study, Bank excess liquidity refers to the surplus reserves held by banks beyond the minimum legal requirements set by the central bank. The figure 1 shows the evolution of both the bank reserves, required reserves and ban excess liquidity in the GCC countries, for different periods depending on the availability of data for each country, with the exception of Kuwait, which does not use required reserves as a monetary policy instrument, and therefore the bank excess liquidity in Kuwait is the total banks reserves.

From the figure 1, the excess liquidity in the GCC banking systems is volatile and highly correlated with the total bank reserves, which means a limited impact of the required reserve on the Excess of liquidity. Furthermore, the combination of expansionary monetary and budgetary policies and reduced economic activity due to the COVID-19 pandemic played a significant role in the rise of bank excess liquidity in GCC countries in 2020. while the easing of restrictions and subsequent economic recovery in 2021 played a crucial role in the decline of bank excess liquidity in many GCC countries, including Saudi Arabia, UAE, Qatar, Kuwait, and Oman. This demonstrates the dynamic nature of excess liquidity and its sensitivity to economic conditions (Benaziza & Chelghoum, The impact of the coronavirus pandemic on the banking systems of the GCC countries, 2022a, p. 13) The excess liquidity in Saudi Arabia's banking system is characterized by the fact that the bulls are mostly recorded

at the end of each year except in 2015, where the banking system was adversely affected by the shock of oil prices in June 2014. In this regard, starting in late 2014, companies, families and government bodies began withdrawing their deposits with banks to cover their cash flow requirements and purchase government securities issued to finance public deficits. Bank deposits also fell sharply, while lending continued to expand. This led to a decline of about two-thirds of banks' excess liquidity at the central bank, and higher interbank interest rates, reflected in the 3-month interest rate prevailing among Saudi banks (Financial Stability Report of Saudi Central Bank, 2017, p. 9). The year 2020 saw a significant increase in excess liquidity in Saudi Arabia's banking system due to a confluence of factors related to the COVID-19 pandemic and the government's response (Benaziza & Chelghoum, 2022b, p. 3).

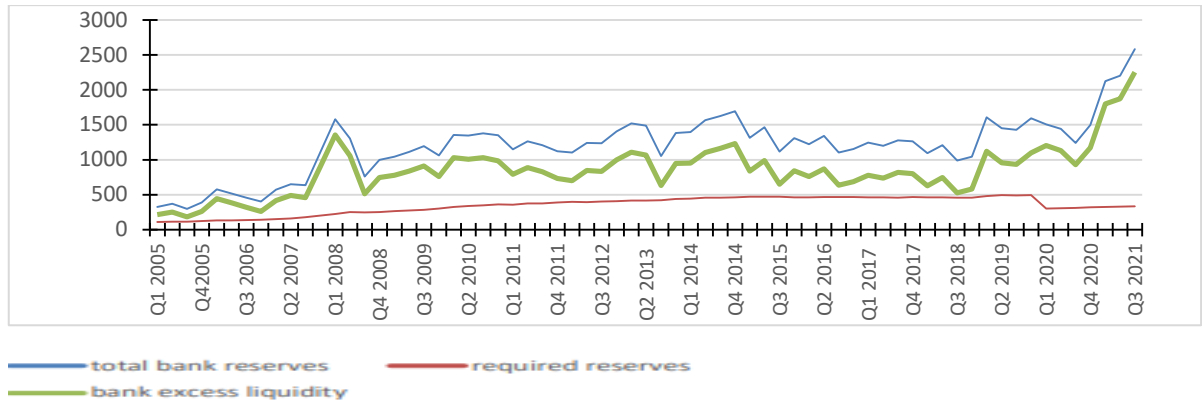
**Figure 1: Evolution of bank reserves, required reserves and bank excess liquidity in Saudi Arabia banking system (million local currency)**



**The Source: produced by authors based on website of Saudi Arabia Central Bank.**

In the case of Bahrain in the Figure 2, the fluctuations in excess liquidity during periods of crisis is insightful. It highlights the significant impact of uncertainty on bank behavior and their liquidity management strategies. The significant changes in excess liquidity levels during the 2008 global financial crisis and the COVID-19 pandemic suggest that banks tend to adjust their liquidity holdings based on the perceived level of risk and uncertainty in the market. This means that the degree of uncertainty associated with various types of crises increases banks' holding of excess liquidity for voluntary purposes. Further, the Central Bank of Bahrain's package of facilities and financial decisions implemented in response to the COVID-19 pandemic contributed significantly to the increase in bank excess liquidity, including the reduction of the required reserve from 5 per cent to 3 per cent, the reduction of Central Bank interest rates and the interbank interest rate (Annual report of Central Bank of Bahrain, 2021, p. 2)

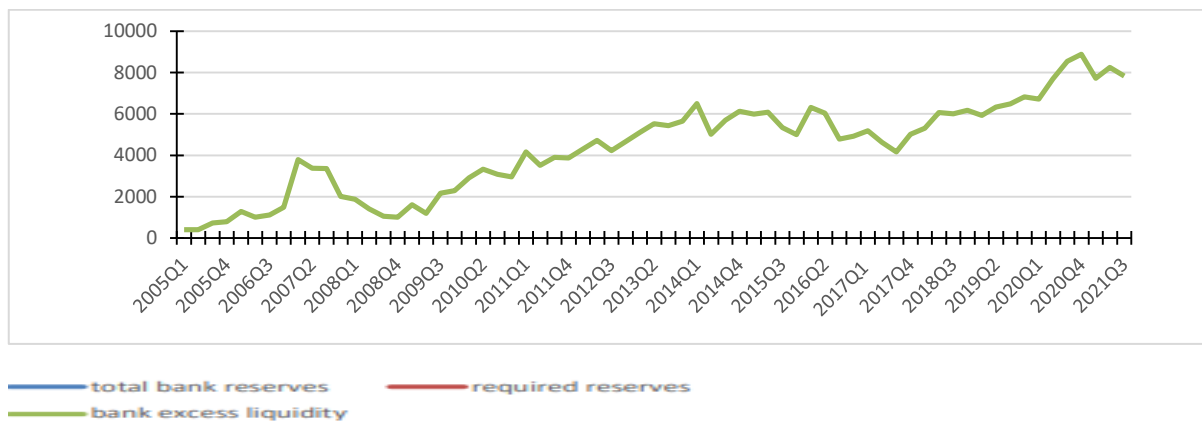
**Figure 2: Evolution of bank reserves, required reserves and bank excess liquidity in Bahrain (million local currency)**



The Source: produced by authors based on website of Bahrain Central Bank.

The Excess of bank liquidity in Kuwait is the total bank reserves (the sum of bank cash and bank claims at the Central Bank of Kuwait). From figure 3, there is a trend towards rising Excess liquidity in Kuwait's banking system despite its decline during the 2008 global financial and the oil shock on 2014, It went back up until the fourth quarter of 2020. The rise of excess liquidity in the coronavirus pandemic was due to the negative impact of the coronavirus pandemic on various economic activities, including the banking sector. Besides the facilitation measures taken by the Central Bank of Kuwait to enhance banks' liquidity to confront the consequences of the pandemic, the discount rate has been reduced to 1.5%, which is historically low; cut the interest rate on repo agreements by 1.0%; It reduced by 0.125% in intervention rates and on all interest rate structure terms up to 10 years, including repo operations, Central Bank of Kuwait bonds, term deposit acceptance system and direct intervention tools as well as public debt instruments (Annual report of Central Bank of Kuwait , 2021, p. 25).

Figure 3: Evolution of bank reserves, required reserves and bank excess liquidity in Kuwait banking system (million local currency)

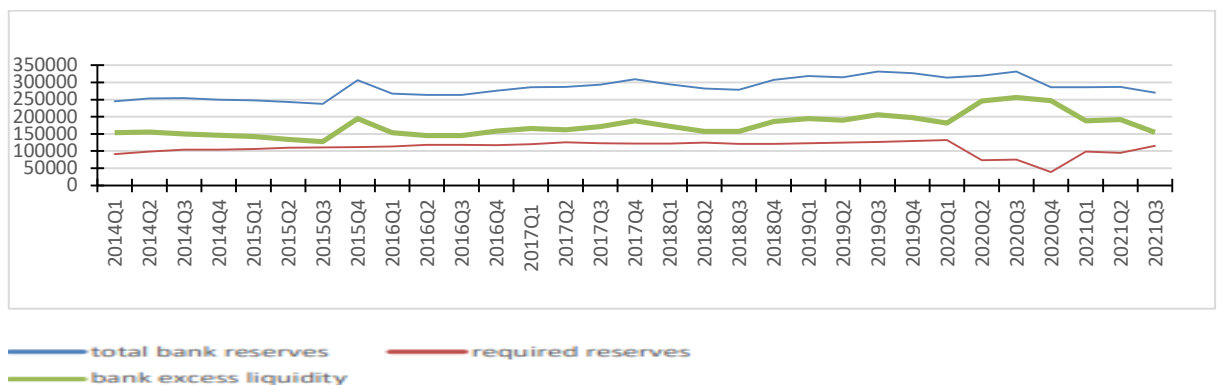


The Source: produced by authors based on website of Kuwait Central Bank.

From the figure 4, the data for the United Arab Emirates are available from the first quarter of 2014 to the third quarter of 2021. The bank excess liquidity increased in the fourth quarter of 2015, after a decline since 2014. This rise is attributable to the increase in banks' holdings of free balances and free reserves at the Central Bank as well as the increase in bank investments in central bank certificates (UAE Central Bank, 2015, p. 59). The data suggests a decrease in excess liquidity in the first quarter of 2016. This could be attributed to several factors, such as a change in the economic climate, and adjustments in banks' liquidity

management strategies. Despite the initial decrease, excess liquidity continued to fluctuate throughout the period, and the overall trend, however, shows an upward trajectory, indicating a gradual increase in excess liquidity over time. This trend is due to the policy measures implemented by the Central Bank of the UAE to mitigate the economic impact of the pandemic. These measures, including expansionary monetary policy and support packages for businesses, likely contributed to the further increase in excess liquidity by increasing the overall supply of funds in the banking system. In 2021, the excess liquidity began to decline in the UAE. This decline indicates a shift in focus towards supporting economic recovery and ensuring banking and financial stability ( Financial stability report of UAE Central Bank, 2020, pp. 27-28).

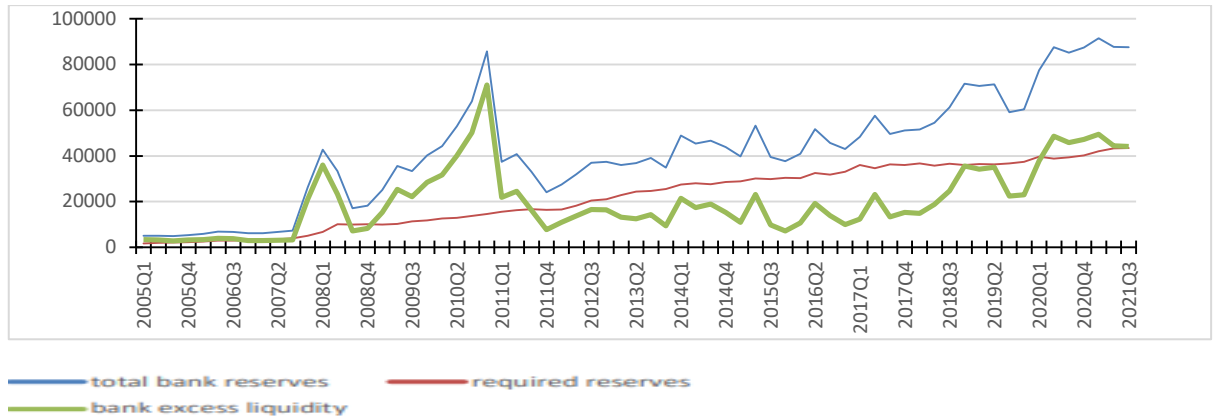
**Figure 4: Evolution of bank reserves, required reserves and bank excess liquidity in United Arab Emirates banking system (million local currency)**



**The Source: produced by authors based on website of UAE Central Bank.**

The case of Qatar in figure 5 shows a sharp rise in Excess liquidity after the decline of subprime crisis, from the beginning of the study period. The decrease in the excess liquidity in the end of 2011 can be attributed to two factors: (a) The Central Bank of Qatar's liquidity management strategy has changed towards a cap on total deposit of funds by banks with the Central Bank not exceeding the mandatory reserve starting from both sides of 2011, in order to discourage it from retaining its liquidity Excess within the framework of the country's monetary market mechanism and in the form of deposit certificates; (b) reduced interest rate on deposits of cash market operations and repo rate to encourage the flow of credit to economic sectors, which actually occurred as a result of the sharp increase in net claims to the Government (banks' underwriting) and domestic claims (credit and securities) (Qatar Central Bank, 2011, p. 65). The excess liquidity in Qatar's banking system fluctuated with a steady overall trend through the third quarter of 2018 the year-over-year trend of Excess liquidity, excluding a decline in the third quarter of 2019, explains the uncertainty associated with the coronavirus pandemic, which has led to slower growth of credit to the private sector. In addition to actions taken in the area of facilitative monetary policies, particularly with regard to liquidity support through the zero-repo agreement rate, which increased the country's cash market deposits, which partly found their way into Excess bank reserves ( Qatar Central Bank, 2020, p. 40).

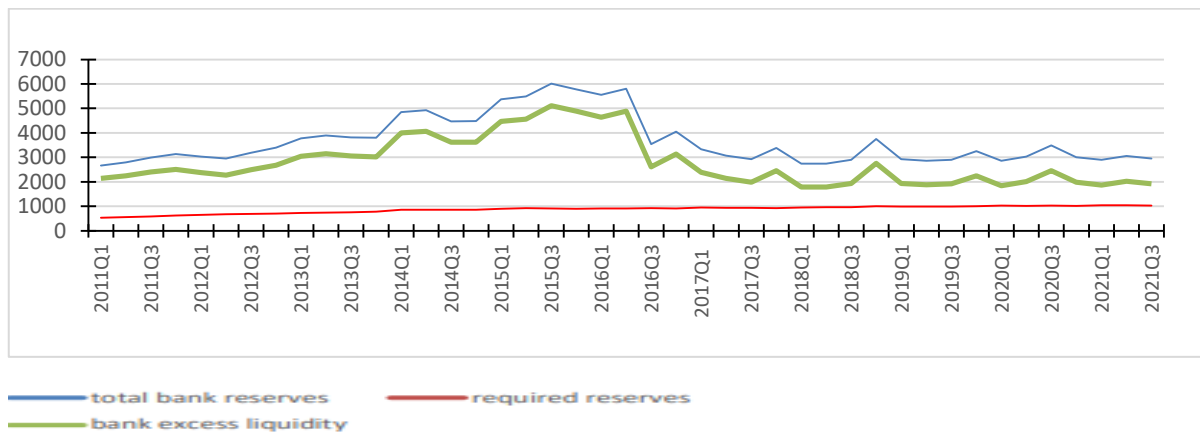
**Figure 5: Evolution of bank reserves, required reserves and bank excess liquidity in Qatar banking system (million local currency)**



The Source: produced by authors based on website of Qatar Central Bank.

The evolution of Excess liquidity in the Omani banking system in the figure 6 shown an overall trend of rise from 2011 to 2015. The data of Excess liquidity in the Omani banking system was followed by a general downward trend due to the 2014 oil shock, which adversely affected economic activity and led to the contraction of the banking sector. Continued until the end of the study period, except for a slight improvement in 2018 due to improved oil prices that boosted real growth and local liquidity and provided support to the banking and financial sector (Central Bank of Oman, 2019, p. 80), Excess liquidity in the Oman banking system continued to fluctuate with a general trend to decline until the third quarter of 2021.

Figure 6: Evolution of bank reserves, required reserves and bank excess liquidity in Omani banking system (million local currency)



The Source: produced by authors based on website of Omani Central Bank.

### 3-Results and Discussion:

In this section, the results are reported in table 1. For Saudi Arabia, the results suggest that holding of voluntary excess liquidity can be explained by the volatility of output gap and the penalty rate. In particular, an increase in the volatility of output gap increases bank's excess liquidity. Saudi Arabia's economy remains heavily reliant on oil prices. When oil prices become volatile, it creates uncertainty in the economy, causing banks to hold excess liquidity. In this regard, the hydrocarbon account for about 38.7 per cent of GDP, 73.2 per cent of total exports, and oil revenues account for 67.6 per cent of total public revenues in 2022 (Financial Stability Report of Saudi central bank, 2022, p. 28). The results suggest that the penalty rate affects negatively the bank excess liquidity, which is not consist with to economic theory, as a decline in the penalty rate reduce the cost of refinancing of banks, and

thus increase the liquidity Excess. As the US dollar is the anchor currency for Saudi Arabia, their monetary policies are often linked to the Federal Reserve's decisions. Consequently, the low interest rates in the US after 2008 crisis led to a similar trend in the GCC, including Saudi Arabia. The low-interest rate environment in Saudi Arabia and the GCC encouraged private sector borrowing (Financial Stability Report of Saudi central bank, 2015, pp. 9-10). Government initiatives, such as promoting mortgages, further stimulated loan demand, particularly during the period of 2009-2014. In this regard, the bank credit to private sector raised by 12.9 per cent during 2009-2014 (Financial Stability Report of Saudi central bank, 2015, p. 14). Furthermore, even if interest rates in the United States of America tend to rise, and therefore in the Saudi Arabia, the high level of liquidity in the Saudi banking system, and the structure of interest-free deposit (as the most important deposit component of the Saudi banking system) limit the transmission of rising interest rate to lending rates, and thus bank loans and growth (Chelghoum, 2019, p. 756) .

The involuntary determinants of Excess liquidity in the Saudi banking system include both public sector deposits and private sector deposits that increase Excess liquidity, which are consistent with economic theory. The results suggest that private sector loans reduce bank excess liquidity, and show a healthy and functioning financial system. The Kingdom's diversification policies have supported this phenomenon. By supporting bank lending to non-oil private sector, the government is stimulating consumer and investment demand, which in turn drives economic growth, creates a more resilient economy, and reduces the bank excess liquidity. Finally, there is also evident that an increase in securitization debt decreases the bank excess liquidity. In this regard, the Kingdom has halted the issuance since 2009 due to an improvement in the financial situation associated with the rise in oil prices since the beginning of the third millennium, and decided to repay the government debt. Due to the decline in the oil price on 2014, the government has restored the issuance of government debt since 2015 (Financial Stability Report of Saudi central bank, 2018, p. 17). The issuance of these instruments again absorbed liquidity from the banking system, contributing to a decrease in excess liquidity. The government's use of securitization during periods of fiscal challenges and its suspension during periods of economic prosperity highlights its strategic approach to managing bank liquidity and maintaining financial stability.

In Kuwait, bank's demand for excess liquidity for voluntary purposes is mainly due to the volatility of currency in circulation, the volatility of total deposits and the output gap. The positive impact of volatility of currency in circulation reflects the high liquidity risk in the Kuwait banking system. The positive impact of volatility of deposit on Excess liquidity reflects the increased uncertainty that forces banks to hold excess liquidity. Higher volatility in deposits indicates that the amount of deposits fluctuates significantly over time. This uncertainty can lead banks to hold more excess liquidity as a precautionary measure. By holding excess reserves, banks are better prepared to meet potential deposit withdrawals and avoid liquidity shortfalls, especially private deposits constitute the most important component of the deposit base in Kuwait. It is clear that the output gap as an indicator of individuals' demand for cash affect positively the excess liquidity for voluntary purposes. The involuntary determinants include the private sector deposits, the debt securitization and the lending rate. The positive impact of private sector deposits on excess liquidity is due to the importance of private deposits on total bank deposits. To support economic activity and finance budget deficit during long term weak oil price, the government is issued bonds, and thus absorbed and reduce the bank excess liquidity. While issuing bonds can be beneficial in the short term, it's important to consider the potential crowding-out effect. This occurs when government borrowing drives up interest rates, making it more expensive for private businesses to borrow funds. This can discourage investment and slow down economic growth. This is clear in the

positive impact of lending rate on the excess liquidity, and therefore, GCC governments, including Kuwait need to develop strategies to diversify their revenue sources and reduce their dependence on oil prices. This could include implementing tax reforms, promoting non-oil sector growth, and improving fiscal discipline.

The voluntary determinants of excess liquidity in Bahrain are the volatility of output gap and the penalty rate. This means that bank's holding of excess liquidity for voluntary purposes is affected positively by the uncertainty and the cost of illiquidity situation (the cost of refinancing at the Bahrain Central Bank). The involuntary determinants include public sector deposits, private sector deposits, public sector loans and private sector loans, oil revenue and lending rate. In particular, increases in private and public sector deposits appear to increase excess liquidity whereas increases in credit to private and public sectors lower the excess liquidity. The observed negative relationship between credit to the private sector and excess liquidity in Bahrain and Saudi Arabia can be interpreted as a positive sign of developing bank intermediation. The commercial banks are channeling funds from savers to borrowers, which is essential for stimulating economic activity and promoting long-term growth. It is clear that oil exports to GDP ratio affect positively the excess liquidity in Bahrain banking system. Finally, the lending interest rate adversely affects the excess liquidity, which is not consistent with the economic theory. The low-interest rate in Bahrain in this period seems to be driving private sector borrowing, leading to a decrease in excess liquidity.

**Table 1: The determinants of bank excess liquidity in GCC banking systems**

Sample period	Saudi Arabia (2009Q1-2021Q3)	Kuwait (2005Q-2021Q3)	Bahrain (2009Q1-2021Q3)	Qatar (2009Q1-2021Q3)	Oman (2011Q1-2021Q3)	UAE (2014Q1-2021Q3)
Constant	-0.2564 (-2.3089)**	-0.455 (-1.9126)**	0.1407 (0.6779)	-0.2728 (-4.867)*	1.5773 (4.3011)*	-0.5221 (-3.819)*
<i>RR</i>	-	-	-	-	-	-0.6779 (-3.9903)*
<i>VOL<sub>CD</sub></i>	-	2.0562 (2.3204)**	-	0.2706 (3.1811)*	-	-
<i>VOL<sub>DEP</sub></i>	-	0.2202 (1.8518)***	-	-	-	-
<i>VOL<sub>Y</sub></i>	4.6238 (3.4445)*	-	6.6678 (3.0441)*	-	5.4929 (3.005)*	2.6342 (1.945)***
<i>Y</i>	-	0.3097 (3.0219)*	-	-	-	0.3256 (3.6865)*
<i>R<sub>d</sub></i>	-0.0219 (-2.7012)*	-	0.0215 (2.4158)**	-	-	-
<i>DEP<sub>G</sub></i>	0.9184 (2.9846)*	-	0.2032 (3.2919)*	-	-0.5358 (-3.005)*	-0.0803 (-2.4074)**
<i>DEP<sub>PS</sub></i>	0.4486 (3.0134)*	0.2187 (3.089)*	0.0791 (2.8108)*	0.0839 (4.3955)*	-	0.0671 (3.1333)*
<i>CRED<sub>G</sub></i>	-	-	-0.064 (-3.6482)*	-0.0556 (-2.535)**	-	-
<i>CRED<sub>PS</sub></i>	-0.3667 (-3.4855)*	-	-0.097 (-2.5969)**	-	-	-
<i>BOND</i>	-0.9750 (-2.742)*	-0.5167 (-2.6521)**	-	-	-0.4445 (-4.086)*	-
<i>OIL</i>	-	-	0.137 (2.3438)**	-	0.1002 (2.231)**	-

<i>POIL</i>	-	-	-	-	-	-
<i>R<sub>L</sub></i>	-	3.8694 (1.8168)***	-0.0184 (-2.2281)**	3.5037 (5.4435)*	-0.239 (-5.238)*	-

**Notes:** Numbers between parentheses are t-statistics. \*, \*\*, and \*\*\* significance at 1%, 5% and 10%, respectively.

**Source:** Author's calculation based on the results obtained by Eviews 12.

In Qatar, the results suggest that increases in liquidity risks measured by the volatility of currency in circulation, lead to an increase in bank demand for excess liquidity as banks try to protect themselves from sudden surges in the demand for cash. The involuntary determinants include private sector deposits, credit to public sector and lending rate. The private sector deposits contribute to increasing Excess liquidity in Qatar banks, but this contribution remained limited, mainly due to a gap between deposits and credit, which is often financed from external sources such as debt securities and foreign financial institutions' balances (Qatar central bank , 2016, pp. 40-43) and (Qatar central bank , 2018, p. 47). Public sector loans reduce Qatar's excess liquidity in view of the significant growth in public sector credit and its high share in total bank credit. We also note that the lending interest rate positively affects the liquidity Excess, which means that higher lending rate reduce credit demand and consequently increase excess liquidity.

In Oman, the uncertainty measured by the volatility of output gap is the main determinants' of excess liquidity for precautionary purposes, reflecting weak economic diversification policies. High volatility in the output gap indicates significant fluctuations in economic activity, leading to uncertainty about future economic conditions. This uncertainty can incentivize banks to hold higher levels of excess liquidity as a precautionary measure against potential financial shocks or economic downturns. The involuntary determinants include public sector deposits, government debt issuances, oil exports, and loan interest rates. The inverse relationship between public sector deposits and excess liquidity in the Oman, seemingly contradicting traditional economic theory. This is due to high proportion of public sector deposits relative to total bank deposits amplifies their impact on overall liquidity (Central Bank of Oman, 2019, p. 17). Even a relatively small decrease in public sector deposits can have a significant effect on excess liquidity. However, the public deposits unregistered a negative growth rate since 2011, except in 2018 as a result of the deposit of a large public sector company from the proceeds of the sale of a gas tank field (Central Bank of Oman, 2019, p. 24). In this regard, the instability of government cash flows, with the high share of public sector deposits in total deposits, is a potential risk to the banking sector, as a result of the possibility of the government resorting to withdrawal from these deposits to meet expenditure financing requirements in the budget (Central Bank of Oman, 2019, p. 40). Furthermore, government issuances of bonds and treasury bills contribute to reducing Excess liquidity in banks, but this could increase the risk of crowding out private sector investments. In this regard, the government and public sector companies benefit more from bank financing than the private sector (Central Bank of Oman, 2019, p. 44). For this reason, the lending interest rate is inversely linked to Excess liquidity contrary to economic theory, because the public sector takes the lion's share either through loans to public companies or through buying government bonds, and the private sector remains deprived of bank financing. The impact of oil exports on Excess liquidity is positive, confirming what we noted earlier that the oil shock in 2014 contributed to the negative impact on the assets and liabilities of the banking sector. The impact of oil exports on Excess liquidity in the Oman and Bahrain is undoubtedly due to weak preventive fiscal margins as a result of the limited revenues on oil exports, making any decline in oil prices a direct impact on the banking sector and its Excess liquidity.

The excess liquidity determinants for the voluntary purposes in UAE banking system include the required reserves, the volatility of output gap and the output gap. As accepted, the increase in required reserves has the effect to decreasing excess liquidity. An increase in the uncertainty and the demand for cash measured by the volatility of output gap and output gap, respectively, lead to an increase in the excess liquidity. This is mainly due to the fact that the period of 2014-2021 in the UAE was indeed characterized by significant economic instability, primarily due to the decline in oil prices and the COVID-19 pandemic. This period of uncertainty likely had a substantial impact on the determinants of excess liquidity in the banking system. The involuntary determinants include public sector deposits and private sector deposits. As expected, the rise in the private sector deposits increase the bank excess liquidity, because private sector deposits account for about 73.62 per cent of total deposits during (2014-2021). The negative impact of public sector deposits on bank excess liquidity is due to fact that public deposits showed a net decrease during 2014-2021. This decline, coupled with the relatively small proportion of public deposits compared to private sector deposits (around 19%), resulted in a negative impact on excess liquidity.

We also reported the diagnostic tests for our model in the table 2. The residual is normally distributed according to Jarque-Bera test. The Lagrange Multiplier statistic is not significant indicating the absence of serial correlation. In addition, the ARCH test is not significant showing that our model has no heteroskedasticity and autoregressive conditional heteroskedasticity (ARCH) problems. In addition, the Sargan test for is insignificant showing the validity of the instruments used in our models. In sum, the model estimated is well specified.

**Table 2: tests on the models of determinants of bank excess liquidity in GCC banking systems**

Sample period	Saudi Arabia (2009Q1-2021Q3)	Kuwait (2005Q-2021Q3)	Bahrain (2009Q1-2021Q3)	Qatar (2009Q1-2021Q3)	Oman (2011Q1-2021Q3)	UAE (2014Q1-2021Q3)
R-squared	0.43	0.49	0.51	0.62	0.71	0.72
$X_{SC}^2$	3.6333 (0.1626)	3.811 (0.1487)	2.6825 (0.2615)	3.1557 (0.2064)	0.5383 (0.764)	1.531 (0.4651)
$X_{NOR}^2$	0.7012 (0.7042)	1.8092 (0.4047)	1.2567 (0.5334)	0.1855 (0.1607)	2.6781 (0.2608)	1.7813 (0.4103)
$X_{HET}^2$	0.1729 (0.6794)	1.3853 (0.2437)	0.0004 (0.9836)	1.8529 (0.1801)	0.0815 (0.9219)	0.286 (0.5973)
$X_{SER}^2$	7.4636 (0.3822)	1.9444 (0.3782)	1.8007 (0.8751)	11.6854 (0.2316)	4.4077 (0.8185)	9.4393 (0.4909)

**Notes:**  $X_{SC}^2$ ,  $X_{NOR}^2$ ,  $X_{HET}^2$ , and  $X_{SER}^2$  refer to LM test of serial correlation, Normality, heteroscedasticity, and Sargan test, respectively. The numbers between parentheses for these tests are the probabilities.

**Source:** Author's calculation based on the results obtained by Eviews 12.

## 5-Conclusion:

The GCC banking systems are characterized by excess liquidity. The aim of our paper is to research the voluntary and involuntary determinants of excess liquidity in GCC banking systems. We have used the TSLS model. The results indicate that the voluntary determinants in Saudi Arabia include the volatility of output gap and the penalty rate. The involuntary determinants include public and private sectors deposits, and bank credit to private sector and

debt securitization. In Kuwait, the voluntary determinants include output gap, volatility of currency in circulation and volatility of total deposits. The involuntary determinants' include ending rate, debt securitization, and private sector deposits. The voluntary determinants' of excess liquidity in Bahrain include penalty rate and volatility of output gap. While, the involuntary determinants include the assets and liabilities of commercial banks, the lending rate and the oil exports. In Qatar, the bank holding of excess liquidity for precautionary purposes include the liquidity risks measured by the volatility of currency in circulation. The involuntary determinants include the private sector deposits, bank credit to public sector, and lending rate. The volatility of output gap is the main determinant of voluntary excess liquidity in Oman. The involuntary determinants include public sector deposits, oil exports and lending rate. In UAE, the excess liquidity is affected by the required reserve, volatility of output gap and the output gap. The private and public deposits are the excess liquidity determinants for involuntary purposes.

Given this situation, a set of measures are more than necessary to correct the situation:

- Fiscal consolidation: Governments in GCC countries need to implement fiscal consolidation measures to reduce budget deficits and build fiscal buffers. This can involve reducing spending, increasing non-oil revenue, and diversifying the economy.

- Macro prudential policies: Central banks can implement macro prudential policies, such as capital adequacy ratios and countercyclical capital buffers, to mitigate the risks associated with excess liquidity in the banking system.

- Financial sector reforms: Strengthening the financial sector through reforms aimed at enhancing risk management practices and improving financial inclusion can promote stability and resilience.

- Promoting economic diversification: Implementing policies that encourage the growth and development of non-oil sectors can help to reduce the reliance on a single source of income and diversify the economy. This can contribute to lower output gap volatility and reduced precautionary demand for excess liquidity by banks.

- Strengthening financial stability: Implementing macro prudential regulations and promoting sound banking practices can help to mitigate the negative effects of high output gap volatility on financial stability. This can be achieved by setting appropriate capital adequacy ratios, introducing countercyclical capital buffers, and encouraging banks to maintain sound lending practices.

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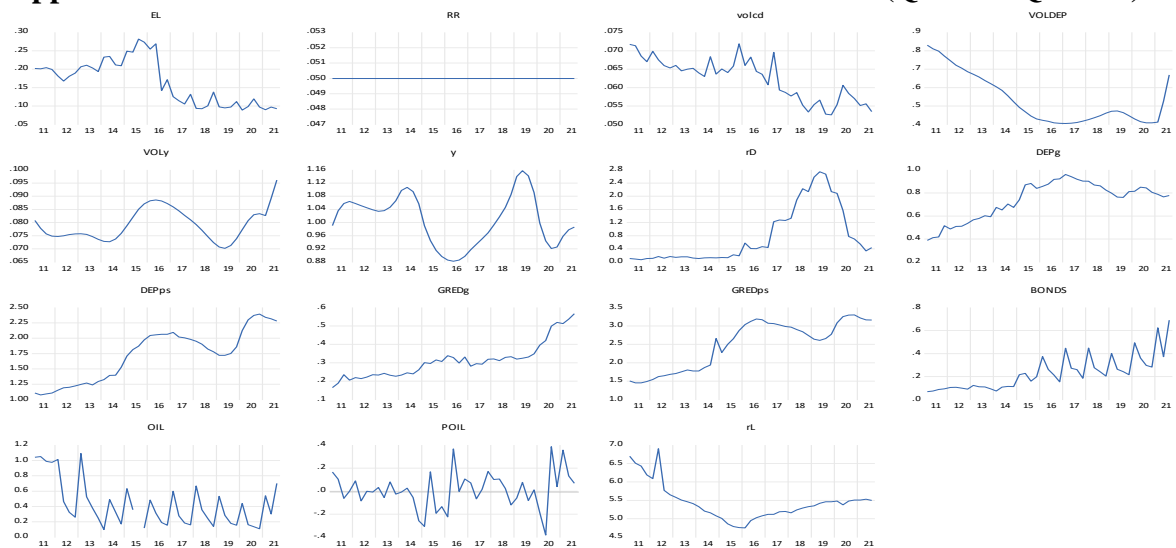
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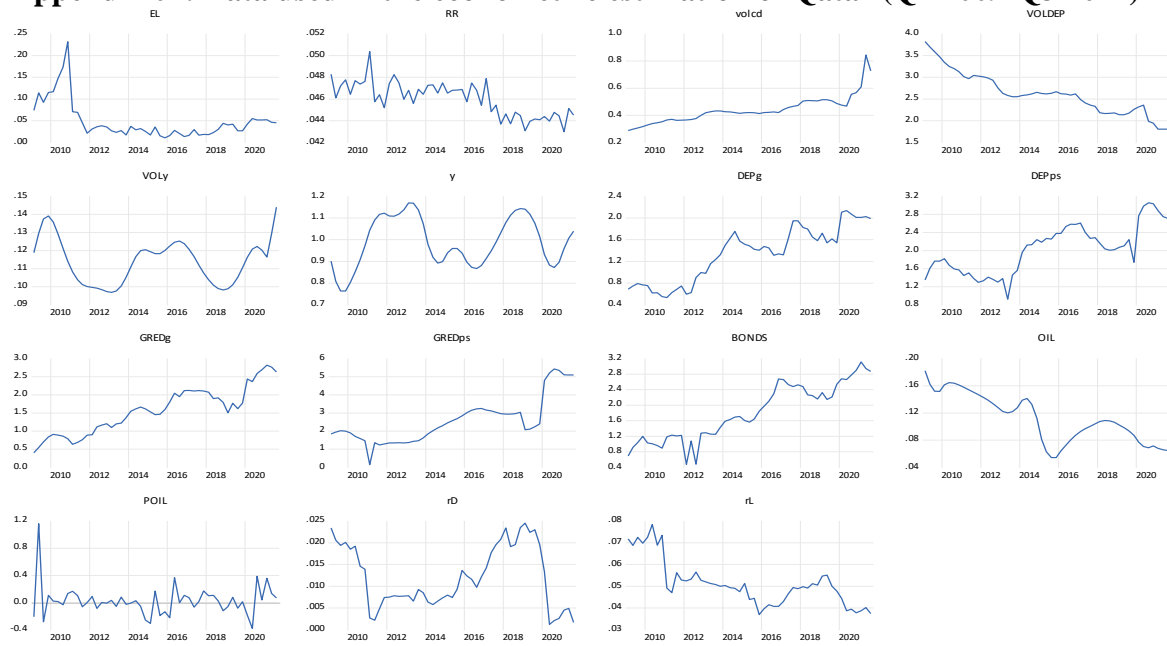
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## Appendixes:

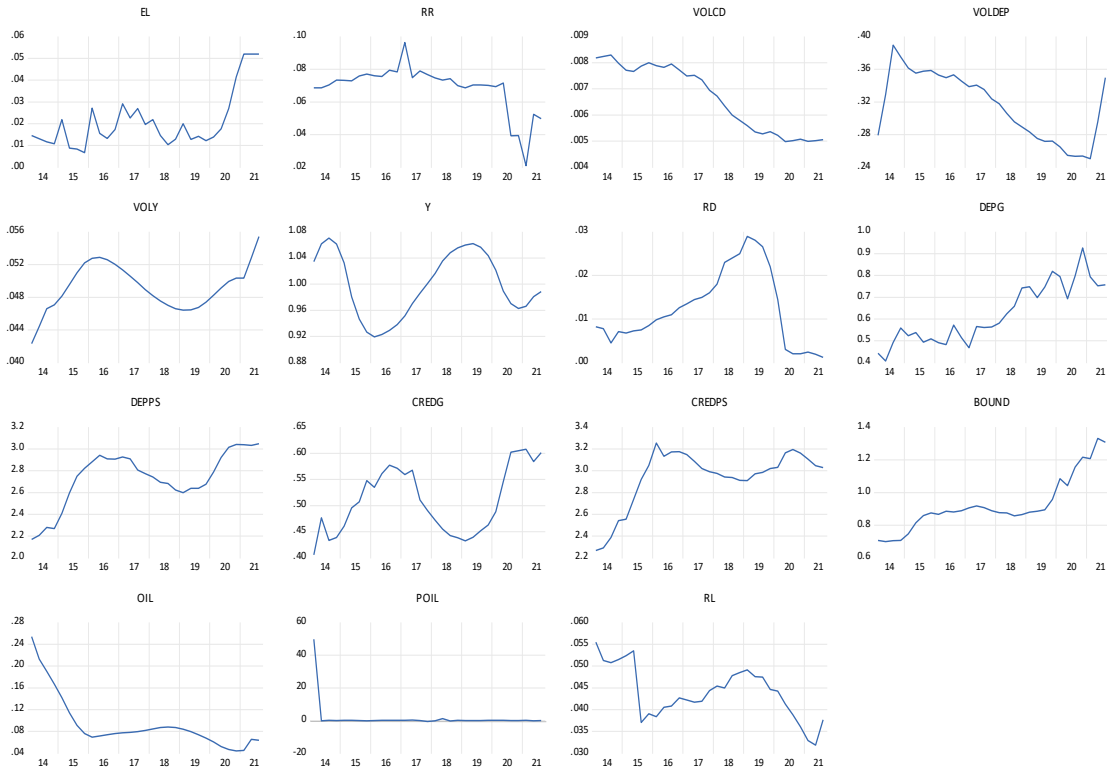
### Appendix 01: Data used in the econometric estimation of Oman (Q1 2011-Q3 2021)



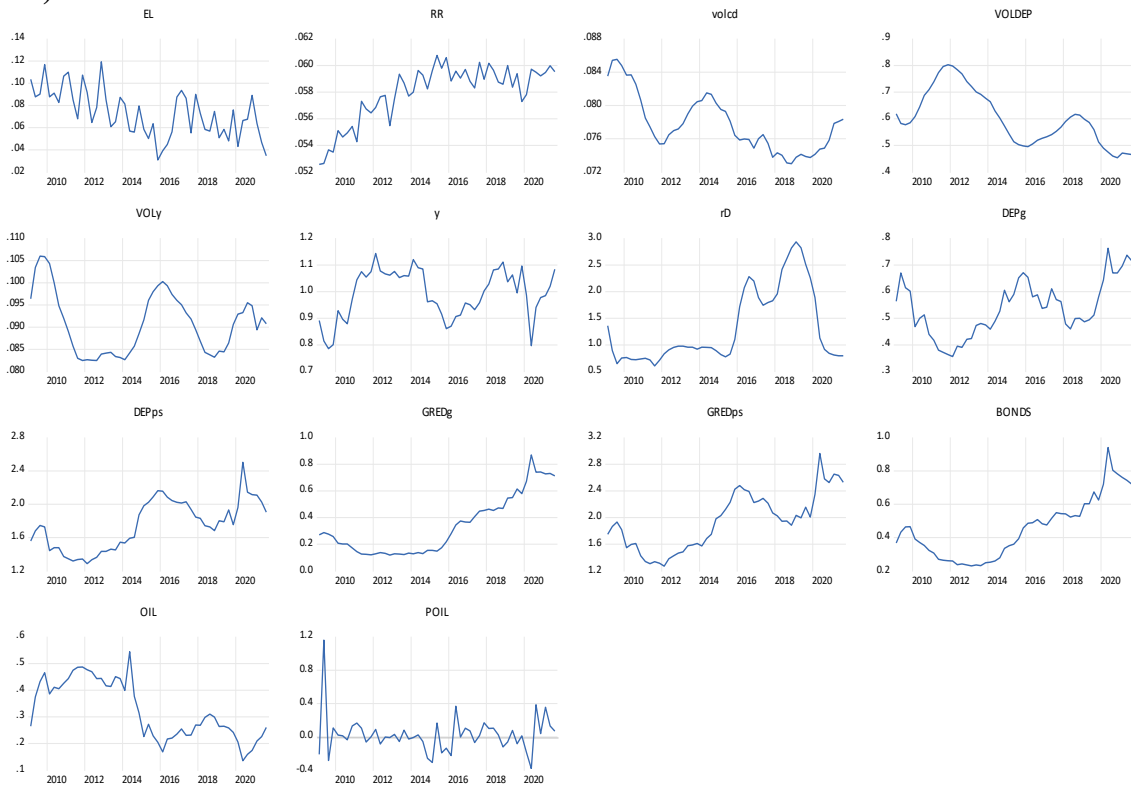
**Appendix 02: Data used in the econometric estimation of Qatar (Q1 2009-Q3 2021)**



**Appendix 03: Data used in the econometric estimation of United Arab Emirates (Q1 2014-Q3 2021)**

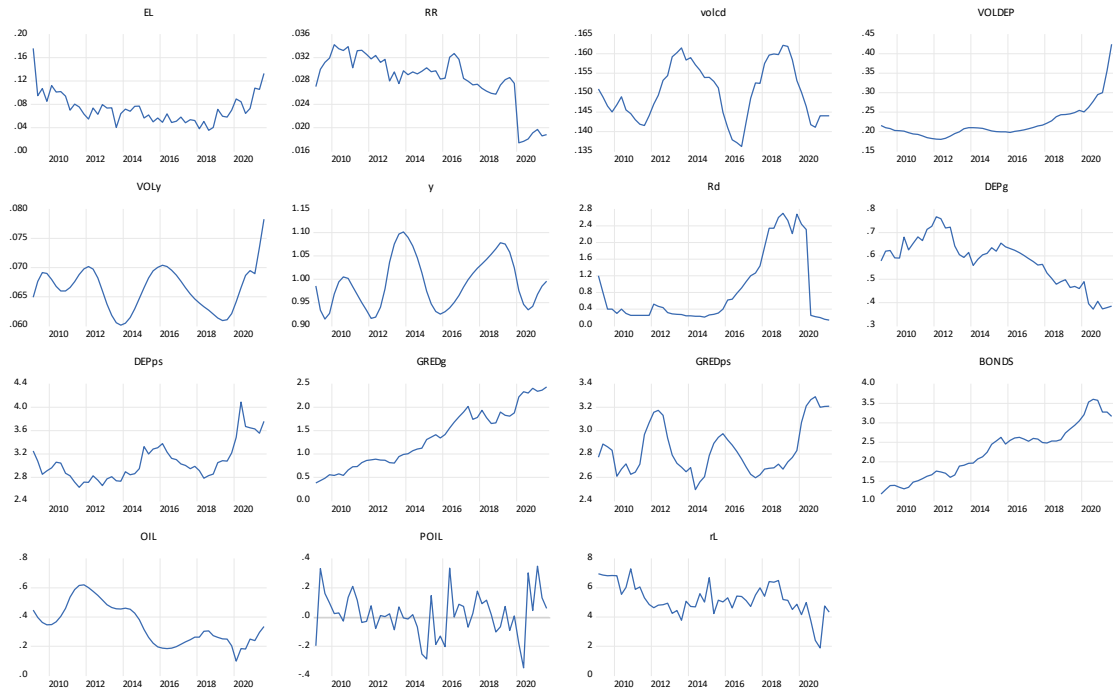


**Appendix 04: Data used in the econometric estimation of Saudi Arabia (Q1 2009-Q3 2021)**



**Appendix 05: Data used in the econometric estimation of Bahrain(Q1 2009-Q3 2021)**

## The Determinants of Excess Liquidity in the GCC Banking Systems



### Appendix 06: Data used in the econometric estimation of Kuwait(Q1 2009-Q3 2021)

