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## Systemic Liquidity Management in the U.A.E.: Issues and Options

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**IMF Working Paper**

Monetary and Capital Markets Department and IMF Institute

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**Abstract**

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The paper analyzes the U.A.E.'s liquidity management framework in the context of the 2008 global financial crisis and the measures taken by the Central Bank of the U.A.E. to ease liquidity pressures in the second half of 2008. Drawing also on an empirical analysis of data for 15 U.A.E. banks through end-2008, the paper emphasizes the importance of making available to banks additional instruments to manage their liquidity as well as to strengthen the monitoring of a more comprehensive set of liquidity risk indicators. As regards the former, the paper discusses the merits and scope for the U.A.E. to introduce a domestic bond market.

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## I. INTRODUCTION

Spearheaded by the development of Dubai and Abu Dhabi, and backed by its oil wealth, the U.A.E. has established itself as a global player in international trade, finance, and tourism. The U.A.E.'s impressive broad-based growth in recent years has been underpinned by the government's outward-oriented development strategy. Continuous efforts to strengthen the business climate have been instrumental in boosting both domestic and foreign investment. High international prices for oil and gas, in conjunction with prudent macroeconomic policies prices have helped to sustain the growth momentum. As a result, per capita income amounted to US\$42,520 in 2007, and the U.A.E. is now the second largest economy in the Arab world after Saudi Arabia.

Notwithstanding these developments, the U.A.E. was adversely affected by the turmoil in global financial markets. By the end of 2008, sovereign risk spreads had widened and stock market indices had turned sharply lower—the decline was most pronounced for real estate companies. Large private capital inflows, driven by expectations of an appreciation of the dirham vis-à-vis the U.S. dollar, largely reversed over the summer of 2008. As a result of this and other factors, the financial system came under liquidity pressures in the second half of 2008. The Central Bank of the U.A.E. (CBU) took a number of measures to ease the strains and avert a ratcheting-up of liquidity pressures that could have threatened the solvency of the U.A.E.'s banks. These measures, while mostly successful, highlighted structural weaknesses that could, if unaddressed, complicate the authorities' smooth handling of monetary conditions were a more adverse economic environment (with sustained low oil prices and/or real estate price deflation) to emerge.

This paper analyses the U.A.E.'s liquidity management framework through end-2008 in light of the global financial crisis. In doing so, the paper builds on several studies (e.g. the recent Institute of International Finance (IIF) and Basle Committee Publications (BCP) reports on liquidity risks) that focus on the need for a better recognition of the liquidity management risks and emphasize the need for a more comprehensive approach to analyze a country's systemic liquidity framework, including its response in a period of stress. Specifically, the paper highlights some limitations of the systemic liquidity management framework, related to the reliance on central bank certificates of deposits (CDs) in the context of a fixed exchange rate regime, and the asymmetry of this approach during episodes of liquidity shortage. Cross-country experiences suggest that a standing liquidity providing instrument such as a Lombard facility, even in countries faced with structural liquidity surpluses, offers a valuable flexibility to deal with temporary liquidity shortages.

The paper also highlights the importance of strengthening the monitoring of vulnerabilities in the financial system through the use of more eclectic yardsticks than the ones offered by the traditional prudential and supervisory toolbox. In particular, the empirical analysis of key banks' liquidity pricing conditions in the U.A.E. confirms that there is some scope to improve liquidity management oversight by actively using information on a broader set of liquidity indicators. The empirical analysis in the paper shows that the U.A.E. banks with high loans to deposit ratios--the only liquidity indicator currently monitored by the CBU--tended to have lower lending rates, i.e. that the pricing of their liquidity actually reflected a more aggressive lending stance. This suggests that the banks that increased the most

aggressively their lending during the boom period from 2002-mid-2008 were the most exposed to a sudden lack of market access for alternative funding sources. This underscores the scope for a strengthening of prudential supervision. At the same time, the lack of sensitivity of bank lending rates to other indicators of liquidity (off-balance sheet items to total loans and the ratio of liquid assets--mainly holdings of CDs--to total loans) paints a more complex picture, and suggests a need to monitor an eclectic set of liquidity risk management indicators to strengthen the supervisory oversight of banks' liquidity management. The lack of sensitivity of banks' lending to the liquid assets ratio is consistent with the inelastic and exogenous nature of the supply of liquid assets in the U.A.E. CDs are the only liquid assets available and their supply is driven only by structural liquidity conditions related to the foreign exchange regime rather than by the portfolio choices of agents driven by risk/return preferences. The lack of sensitivity of lending conditions to off-balance sheet variables is also not surprising as the crisis has shown a pervasive complacency towards liquidity risk related to off-balance sheet commitments in most industrialized countries, an issue that is currently on banking supervisors' and regulators' agendas.

The paper argues that the development of a domestic bond market would provide a mechanism to manage systemic and private sector liquidity more smoothly across cycles. It would also de-link the supply of highly liquid assets from the domestic liquidity consequences of the exchange rate regime. Issuing T-bills could contribute to keep the supply of securities constant, and could meet several purposes, beyond the point of the financing of the budget. Increasing the supply of high-quality assets and, hence, of instruments that could be used for sterilization purposes would also contribute to improve the operations of the money market. It would also pave the way for the development of a genuine domestic currency-denominated corporate bond market, provide useful pricing references and spur the emergence of an interbank repo market. The paper highlights that developing the domestic bond markets is important to broaden the U.A.E.'s tools to conduct monetary policy both in the context of the current fixed exchange rate regime and for any other exchange rate regime, particularly with the U.A.E.'s continued integration into the global financial market and in the regional financial markets. Additional motivations for developing the domestic bond market include that it could provide the U.A.E. with more diversified sources of financing (i.e. foreign *and* domestic) for governments, quasi-government agencies and the private sector which can be important given differences in the funding sources across federal and emirate governments,<sup>2 3</sup> and can be a mechanism for the local sovereign wealth funds (e.g. Abu Dhabi Investment Council, ADIC) to provide financing to ailing quasi-public enterprises through their holdings of bond issues.

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<sup>2</sup> The liquidity crisis in 2008 exposed financial vulnerabilities of the Dubai government and quasi-government entities. The vulnerabilities were caused by their heavy reliance on borrowing from abroad and large refinancing needs.

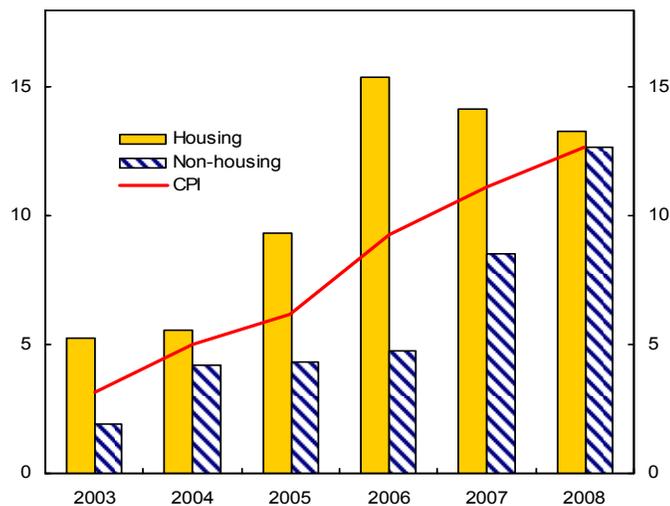
<sup>3</sup> The Abu Dhabi government is the largest recipient of oil revenues. The development of a Treasury bond market could, therefore, be seen as helping to ensure that the financing needs of the various levels of government (federal and emirates) are met. A mechanism would need to be devised by which the various fiscal entities coordinate the financing of their respective fiscal positions given their different sources of revenues and that their financing needs will vary over time and across the emirates and federal government.

The paper is organized as follows. Sections II and III discuss the recent economic developments in the U.A.E. and the contingency measures taken by the CBU and the Ministry of Finance (MOF) to support the local financial system in the wake of the global financial turmoil in the last four months of 2008. Sections IV and V analyze the U.A.E.'s underlying liquidity management framework and the contingency measures taken to address the liquidity pressures in the second half of 2008. Section VI conducts an empirical investigation of the relationship between banks' lending behavior and conventional indicators of liquidity. The empirical findings are used to support the analysis in Sections IV and V. The final section of the paper discusses a proposal to develop the U.A.E. domestic bond market which can act as a tool to manage systemic liquidity smoothly across cycles, facilitate the operations of the money market and banks' liquidity management, and accommodate the demand for highly liquid assets in periods of heightened stress.

## II. RECENT ECONOMIC DEVELOPMENTS

The U.A.E. economy grew on average by about 9 percent over the 2003-2007 period. The non-hydrocarbon sector recorded double digit growth during 2003-2006 and remained strong at about 8.5 percent in 2007. Growth has been fairly broad-based with most sectors growing at historically high rates. Construction and services have led the way, followed by manufacturing. Growth in the hydrocarbon sector has tended to fluctuate in line with OPEC policy. The U.A.E.'s strong growth performance has been buttressed by high global oil prices and strong domestic demand reflecting the rapid population growth (about 5 percent per year on average) and large infrastructure investment projects in Abu Dhabi and Dubai. But inflation has also risen, driven by housing shortages and other domestic supply bottlenecks, strong aggregate demand, and high international commodity and food prices. Both fiscal and external current accounts recorded large surpluses, and foreign assets grew rapidly.

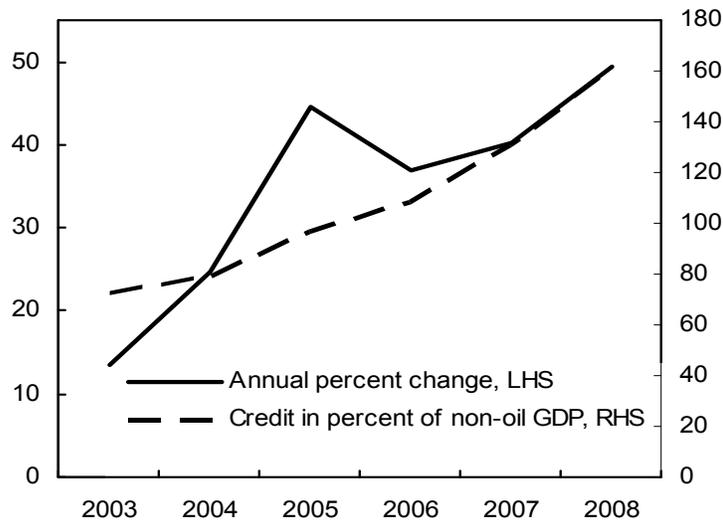
**Figure 1. Consumer Price Index**  
(annual percentage change)



Source: U.A.E. authorities

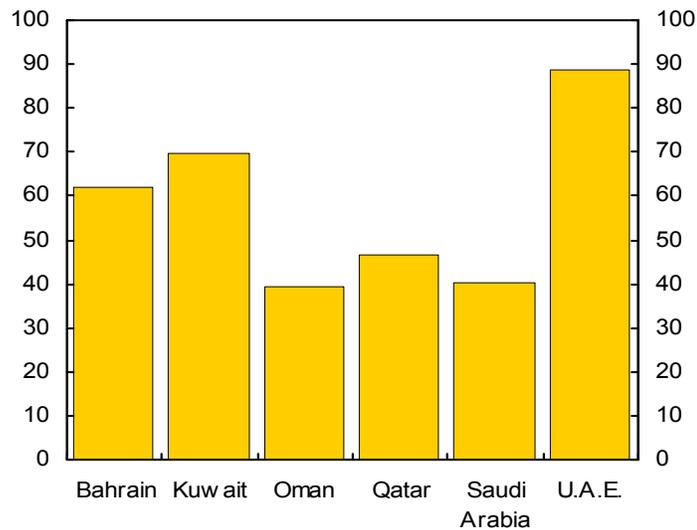
The strong growth of the U.A.E. economy and high inflation would have called for a tightening of monetary policy. However, the U.A.E. maintains a pegged exchange rate to the U.S. dollar and an open capital account. Therefore, it has been forced to follow the United States' easing of monetary policy since mid-2007. As a result, monetary policy has added stimulus to the economy with negative real interest rates providing additional momentum to an already powerful boom in private sector credit. As oil export prices continued to rise in 2007 and the boom in the U.A.E. showed no signs of easing, foreign exchange market participants started to speculate on a revaluation of the dirham. This triggered large capital inflows into the U.A.E., particularly during the last quarter of 2007, further exacerbating credit growth and inflationary pressures. As a result, the outstanding stock of credit to the private sector, already the highest in the GCC by end-2007, rose further.

**Figure 2. Growth in Credit to the Private Sector**



Source: Central Bank of the U.A.E.

**Figure 3. GCC: Bank Claims on the Private Sector, 2007**  
(in percent of GDP)

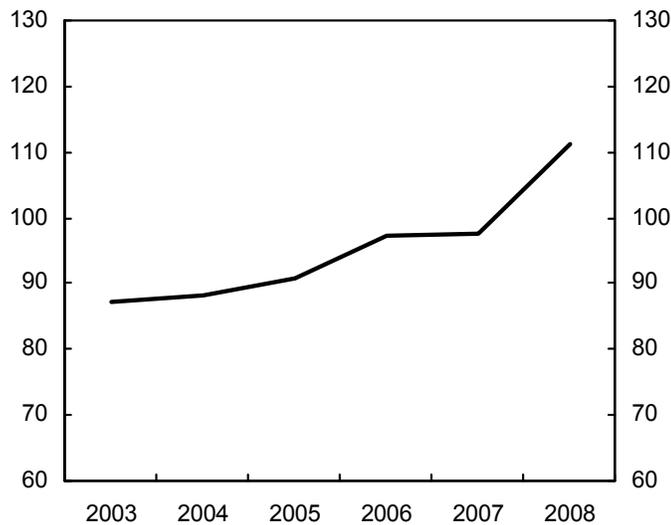


Source: Country authorities

The boom in the U.A.E. was partly funded from an increase in borrowing from abroad. BIS and U.A.E. balance of payments data suggests that external debt was \$133 billion or 74 percent of GDP at end 2007. Although an inter-emirates breakdown of data on external borrowing and external debt is not available, anecdotal evidence suggests that Dubai-based corporations were the main borrowers on international capital markets.

The U.A.E. banking system appeared adequately capitalized and highly profitable through mid-2008. Banks' assets and profits increased sharply in 2007 and the capital adequacy ratio stood at 13.3 percent by 2008, above the regulatory minimum of 10 percent, though somewhat below the level of 2007. However, the further acceleration of the growth of credit to the private sector, from a year-on-year growth of 40 percent in 2007 to 49 percent in 2008 obviously raised the risk of a future increase in nonperforming loans particularly given the increased exposure of the financial system to consumer and real estate loans and the uncertain outlook for asset prices following strong rises in the prices of real estate and stocks. Indeed, the banking system's loans-to-deposits ratio continued to rise steadily even after it had exceeded the regulatory limit of 100 percent by the end of 2007.

**Figure 4. Banking System Loans-to-Deposits Ratio 1/ 2003-2008**  
(in percent)



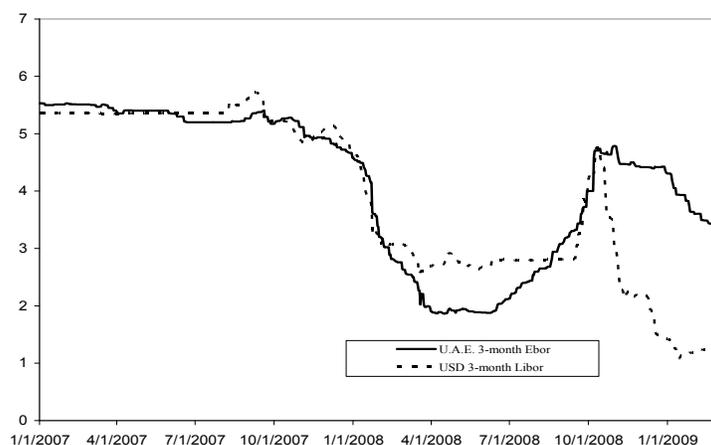
Source: Central Bank of the U.A.E.

1/ Loans are defined as claims on government, public sector entities, private entities, and non bank financial institutions. Deposits are defined as demand deposits, quasi-monetary deposits, nonresident deposits and government deposits

### III. THE GLOBAL FINANCIAL CRISIS AND THE INITIAL RESPONSE

The turmoil in global financial markets that intensified at the end of the summer of 2008 negatively affected the U.A.E. with its financial system coming under substantial liquidity pressures. U.A.E. banks witnessed significant capital outflows against the backdrop of widening sovereign risk spreads, substantial declines in the Dubai and Abu Dhabi stock markets—most pronounced for real estate companies—and a considerable tightening of foreign financing for non-bank corporates which caused a slowdown in real estate and construction. The capital outflows were exacerbated by the revision in the outlook by foreign and domestic investors who had earlier speculated on a revaluation of the dirham. Banks had used a substantial part of the earlier speculative inflows to finance longer-term investments. Therefore, the reversal of the speculative capital flows contributed to the liquidity crunch. The liquidity shortage was aggravated by the liquidity constraints in international money markets and growing concerns about counterparty risk. As a result, there were upward pressures on deposit rates and interbank rates rose sharply. Because of the peg of the dirham to the U.S. dollar, short-term interest rates in the U.A.E. have broadly tracked the U.S. federal funds rate. Accordingly, the U.A.E. interbank offer rate (EBOR) declined from 5.5 percent at the beginning of 2007 to 1.9 percent in June 2008 in conjunction with the easing of monetary policy in the United States. However, reflecting the severe tightening of liquidity conditions in the U.A.E. at the end of the summer of 2008, the EBOR rose to above 4 percent and remains above the 3-month LIBOR rate on U.S. dollars.

**Figure 5. Three-month Interbank Rates, January 1, 2007-March 4, 2009**  
(in percent per annum)



Source: Bloomberg

During the period March-September 2008 the central bank reacted promptly and pro-actively by introducing several facilities aimed at improving the liquidity conditions in the banking system within the constraints on monetary policy resulting from the exchange rate peg:

- The CBU initially took measures to ease U.S. dollar funding pressures. A swap facility introduced in March was aimed at cushioning the impact of capital outflows related to the rapid unwinding of positions taken in anticipation of a dirham revaluation. The capital outflows sparked intense U.S. dollar funding pressures in local markets. During the month of March the central bank provided commercial banks with US\$8 billion through this facility. From April to June, there was an additional net flow of US\$1.2 billion from the central bank to the commercial banks.
- The CBU later took measures to ease dirham funding pressures. Starting from September 22, it allowed commercial banks to borrow against their reserve requirements by waiving the obligation to meet reserve requirements on average over a weekly cycle. Average reserve requirement shortfalls (U.S. dollar and U.A.E. dirham aggregated) were charged 300 basis points above the repo rate, while plain overdrafts (banks actually running negative balances on their CBU account) were charged 500 basis points above the repo rate. On October 8, the central bank reduced these spreads to 150 basis points and 300 basis points, respectively. Later developments showed that this facility was not used to its full extent (about AED 50 billion), and that most banks drew on their reserve requirements only up to 20 percent of the maximum amount. The stigma effects associated with greater than 20 percent recourse—which required administrative clearance by the CBU—may have discouraged banks from fully using this facility, thus undermining its potential impact.

- The Liquidity Support Facility (LSF) that was announced on September 29 aimed at furthering the impact of the earlier measures. Under this facility, dirham liquidity can be obtained by banks against CDs with maturities of up to 14 days, and by an early redemption facility for all unencumbered CD holdings. In addition, the CBU allowed banks to borrow against any security collateral, provided the security presented was deemed eligible. The interest rate on this new facility amounted to 300 basis points over the repo rate. The recourse to this facility is conditional on: (i) the issuance of a promissory note by the borrowing bank, (ii) no lending to nonresidents, subjecting further credit to an expansion of the deposit base, (iii) the liquidation of money market assets holdings to reduce obligations towards the CBU and the reinvestment of any residual balance into CDs, and (iv) the commitment to stop the expansion of administrative and general expenses for the duration of this liquidity support.

These measures somewhat eased funding pressures for banks, but the worsening of the global financial environment detracted from the positive impact of these measures, in particular because of the lingering tensions in global money markets. While LIBOR tensions abated somewhat, USD offshore fixings remained extremely high in overseas offshore market. To preempt spillovers from the global turmoil and address continued liquidity pressures in the banking system, the government declared a blanket guarantee of deposits and inter-bank lending for three years, and put in place an additional US\$19.1 billion emergency liquidity support fund (in the form of interest-yielding government deposits) to provide banks with longer-term funding relief. More precisely:

- The Ministry of Finance announced on October 12, 2008 a blanket guarantee on local commercial bank liabilities. The coverage of the guarantee was later amended to include foreign banks. In the absence of a relevant CBU circular, the conditions embedded in this guarantee have only been spelled out in general terms.
- On October 14, 2008, the Prime Minister of the U.A.E. and the ruler of Dubai HH Sheikh Mohammed bin Rashid Al Maktoum ordered the transfer of \$19.1 billion (Dhs 70 billion) to the Ministry of Finance. This facility, setup and financed by the Ministry of Finance, was aimed at banks that were prepared to meet certain conditions, which were negotiated between the Ministry of Finance, the Central Bank of the U.A.E. and the Ministry of Economy. The CBU wanted to require banks acceding these facilities to (i) limit the growth of their assets; (ii) stop the financing of new real estate projects and instead limit banks' lending to existing projects and infrastructure; (iii) channel their funding towards trade and self-liquidating assets (such as trade receivables); (iv) commit to resume their operations in the interbank market; (v) not acquire equity participation or debt securities; (vi) refrain from lending to non-residents unless approved by the CBU, and commit to bring the loan-to-deposit ratio below the statutory maximum of 100 percent within 6 months. As the counterpart to the loan from the Ministry of Finance, the borrowing banks were to issue a promissory note. The funding of this operation was ensured by the CBU's

purchase of a 5-year Treasury Bond issued by the Ministry of Finance, and bearing an interest rate of 10 basis points in excess of the rate on 5-year U.S. Treasury Bonds, with a quarterly coupon. Commercial banks pay 120 basis points in excess of the rate on 5-year U.S. Treasury Bonds, or 4 percent, whichever is higher.

These measures inspired some confidence and trades were reported on short-term tenors (maturities within one month), but the bulk of operations remained concentrated on the overnight segment, and the EBOR remained elevated at end December 2008.<sup>4</sup> It is likely that these pressures have lingered as a result of the global increase in risk aversion stemming from higher perceived systemic risk rather than because of any lack of effectiveness of the CBU's measures. In this respect it should be noted that many emerging market countries which experienced liquidity tensions of a similar nature to the U.A.E. (i.e. had difficulties to roll-over overseas US dollar denominated short-term funding) obtained substantial relief from the announcement of a inter-central bank swap agreement by the U.S. Federal Reserve on October 30, 2008,<sup>5</sup> which extended from the December 2007 agreement concluded between the U.S. Federal Reserve and a set of G10 countries. The U.A.E. did not benefit from this framework, and from the further easing of domestic money market fixings that was observed in the countries that entered into a swap agreement with the United States following the easing of off-shore dollar rates.

#### **IV. AN ANALYSIS OF THE U.A.E.'S LIQUIDITY MANAGEMENT FRAMEWORK**

##### **A. Analyzing Systemic Liquidity Management**

The IMF and the World Bank, in the context of their role in the surveillance of countries' financial systems, have placed the notion of systemic liquidity at the core of their work. Systemic liquidity analysis is one of the key components of the review undertaken for FSAPs (Financial Sector Assessment Programs) which focus on the linkages between financial system developments and macroeconomic outcomes for member countries.

The notion of systemic liquidity, while at the center of the analysis of financial system's vulnerabilities, is also one of the components of the FSAP that is the least documented. The key building blocks of this analysis are well identified, such as central bank operations and payment system infrastructures. Still, the analytical framework that was developed to evaluate commercial banks assets' resilience to various shocks (stress tests), to assess supervisors' role in the surveillance of financial systems (various ROSCs, BCPs), appear more detailed and systematic than the various yardsticks that were used to envision the vulnerability of systemic liquidity arrangements. This lack of a structured perspective explains why in most cases systemic liquidity issues have been alternatively considered

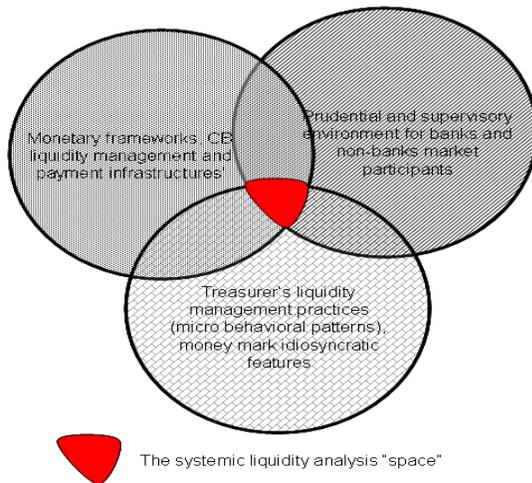
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<sup>4</sup> Daily offers from ten banks (of which 5 are local) contribute toward the determination of the U.A.E. interbank offer rate.

<sup>5</sup> The Federal Reserve established temporary liquidity swap facilities with the following central banks: Banco Central do Brasil, the Banco de Mexico, the Bank of Korea, and the Monetary Authority of Singapore. These new facilities amounted to \$30 billion for each signatory.

through a review of the central bank operations, through the deployment of safety nets in case of liquidity tensions, or via a simple review of wholesale payment and security settlement systems. One frequently omitted element was a review of how commercial bankers' micro-behavioral pattern in terms of liquidity management practices, in the context of a given prudential or regulatory environment incentives set, could generate at the aggregate level some cumulative phenomenon that could bring about some impact at the macro-level of liquidity conditions.

The essence of the analysis of systemic liquidity is precisely that none of these aspects, considered separately, can provide a comprehensive analysis of the risks to the system. Even a cumulative assessment of the risks does not give a complete sense of the potential dynamics at play between central banks' frameworks for liquidity management, asymmetric or systemic liquidity shocks, and individual treasurers' responses to these shocks as they are shaped by the prudential, regulatory and infrastructural environment. A dynamic analysis, focusing on the interplay between these different factors in times of stress, could provide an assessment that may differ markedly, vulnerability-wise, from a sequential review of these three pillars.



Several post-turmoil backward-looking analyses of the build-up of liquidity risk through aggressive leverage by G10 commercial banks highlighted the fact that the traditional approaches and yardsticks used to assess liquidity risks had failed. The IIF, in its February 2008 report, provided a cross-cutting view on how the analysis of liquidity risks was tainted by many structural deficiencies, and issued a large set of recommendations to central bankers, supervisors, treasurers and risk managers. These recommendations highlight the limitations of the liquidity risk indicators and measures that were used as main yardstick by risk managers and regulators, and advocated a more encompassing approach to liquidity risk, as well as better reporting and governance.

This revised approach would focus on a revised perimeter, putting more emphasis on the contingent liquidity risks stemming from off-balance sheet activities, on the risk and limitations related to the functioning of secured markets like repo (including a more in depth-review of collateral related issues, e.g. adequate pricing and collateral calls), and also a more cautious approach toward the operational risks stemming from more complex funding techniques such as cross-currency operations. It also underscored the need to link dynamically the analysis of capital adequacy with liquidity stress tests<sup>6</sup> and to make the

<sup>6</sup> This point is also made in a compelling fashion in the 2008 report of the Counterparty Risk Management Policy Group. The report emphasizes that to the extent that capital adequacy and rigorous stress-testing of

(continued...)

preparation of Contingency Funding Plans (CFP) and liquidity stress-tests compulsory, and subject to recurrent supervisory reviews.

The Basle Committee on Banking Supervision published a review of its “Principles for Sound Liquidity Risk Management and Supervision” in September 2008. This report lists a set of updated recommendations reflecting the concerns conveyed by private sector participants in the IIF report. In both cases, bankers and supervisors have reflected on the role to be played by public sector entities, central banks and supervisors. They have highlighted the gaps existing in the measure and analysis of liquidity risk, offered suggestions to strengthen the reporting and governance framework within commercial banks, and reviewed the amendments necessary for the monetary policy implementation framework to handle better the macro-liquidity stress environment.<sup>7</sup> International fora like the G20 have, in recent months, taken note of some of these limitations, and have set up an agenda to strengthen the analysis of systemic liquidity and draw up plans for necessary remedial action.

The analysis of systemic liquidity issues in the case of the U.A.E. offers an interesting picture. Liquidity tensions were pervasive in the fall of 2008, and receded gradually following various measures taken by the central bank. These tensions have illustrated the fact that even systems underpinned by state-of-the art infrastructure, comprised of well-managed banks and hinging on simple but robust monetary frameworks (i.e. a peg vis-à-vis the US dollar), and made credible by considerable resources, large external holdings and stable governance, could be subject to considerable tensions. A more in depth review suggests that these strengths concealed some vulnerabilities.

U.A.E. banks’ liquidity risk management capacity is constrained by an insufficient diversification of the liability base, stemming from an embryonic money market and a growing reliance on external funding. Some risks were insufficiently identified, notably in the case of off-balance sheet commitments and the risks stemming from substantial reliance on cross-currency funding. There also appears to be scope to enhance the authorities’ analysis of the banking sector’s liquidity risks, e.g. by complementing the use of conventional yardsticks with a more risk-based analysis of potential sources of liquidity stress.

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liquidity are viewed as a single discipline, concerns about leverage and leverage ratios will be substantially mitigated.

<sup>7</sup> The IIF report in particular insisted on the need to have broader collateral eligibility frameworks in cruise-speed, called for a greater transparency on the lender-in-last-resort operations, and suggested that central banks contribute to the testing of banks Contingency Funding Plans by “dry-runs” of last-resort operations.

## **B. Analyzing the Systemic Liquidity Management Framework: the Case of the U.A.E.**

### **Commercial banks liquidity management and local money market development**

The features of the U.A.E. money market and of the CBU's liquidity management operations have been shaped by the tight constraints set by the fixed exchange rate regime.<sup>8</sup> The large U.S. dollar balances held by local banks, their easy access to the U.S. dollar market, and the credibility of the dirham's peg to the U.S. dollar, have always allowed U.A.E. banks to manage their liquidity globally and to regard USD and AED financing as fungible and readily available. With U.S. dollar liquidity readily available, banks did not have to worry about raising cash in domestic currency. This, in turn, limited the authorities' resolve to develop a more active money market in local currency.<sup>9</sup>

Likewise, the protracted situation of ample liquidity in the system has contributed to limit money market operations to essentially short-term tenors, and also limited the need of local banks to diversify the potential funding sources and instruments used in the interbank market. Hence the absence of a local repo market for government paper or on any other private debt instrument. This lack of diversification in terms of interbank funding instruments and in terms of tenors, has contributed to the vulnerability of the local banking system to a bout of liquidity stress, particularly for banks not supported by an overseas parent. While foreign banks can use a more diversified set of instruments to fund their asset expansion, thanks to their franchise and the support from their parent bank, local banks had to rely on the growth of their deposit base, and had to borrow abroad but with little insurance on the rollover prospects in case of tensions (unlike subsidiaries of foreign banks). The chart below shows that U.A.E. banks have become gradually stretched relative to their retail deposit base with loans to deposit ratios of several banks moving well above 100 percent in 2008.<sup>10</sup>

Indeed, as illustrated in the previous section, the chronology of the liquidity squeeze that began in the summer of 2008 suggests that tensions on the international U.S. dollar market triggered the dirham liquidity tensions, and there is little doubt that the lack of depth of the dirham money market contributed to exacerbate these tensions, as local Treasurers could not easily find local funding alternatives nor could they rely on sufficient holdings of genuinely liquid assets (Figures 7 and 8).

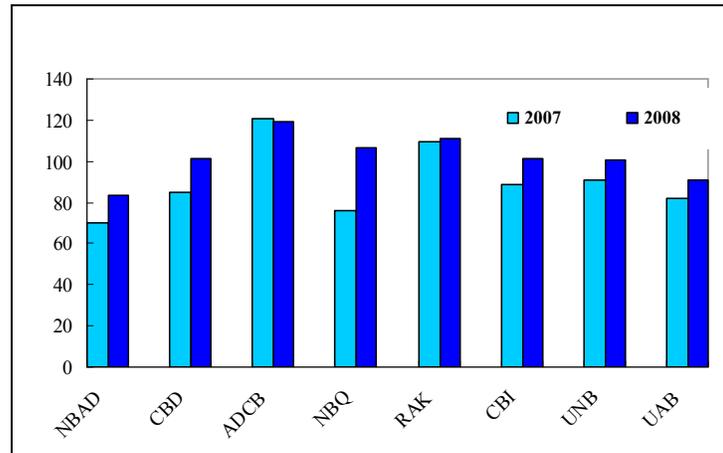
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<sup>8</sup> A regression of U.A.E. three-month interbank rates on U.S. three-month interbank rates with monthly data for the January 2007–March 2009 period yields a coefficient smaller than one (0.68), thereby suggesting that there is some scope for independent monetary policy action.

<sup>9</sup> Anecdotal information suggests that U.S. dollar/dirham foreign exchange swaps and forwards are substantially more liquid than straight dirham interbank unsecured loans. For instance, the daily turnover in the dirham unsecured interbank market is estimated in the Dh. 2-3 billion range, essentially on short-term tenors, while the turnover in the market for foreign exchange swaps is in the Dh. 4-7 billion range, with peaks up to 10 billion, and with a broader set of maturities being actually traded. This discrepancy suggests a fair degree of reliance on foreign banks for a smooth functioning of the market.

<sup>10</sup> Funding shortfalls have been met through foreign borrowing and large public sector and wholesale deposits,

**Figure 6. Selected U.A.E. Banks Loan to Deposit Ratios, 2007 and 2008**  
(in percent)

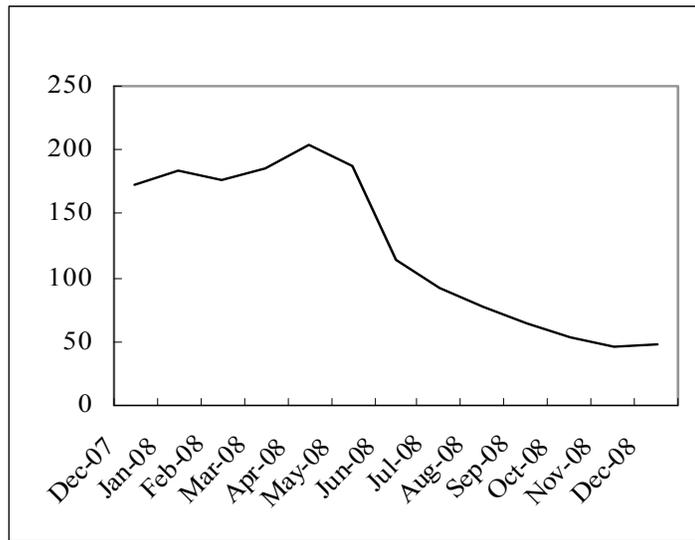


Source: Bankscope database

See Appendix I for abbreviations of bank names. The definition of the loan to deposit ratio used here is not exactly the same as the one used by the Central Bank of the U.A.E.

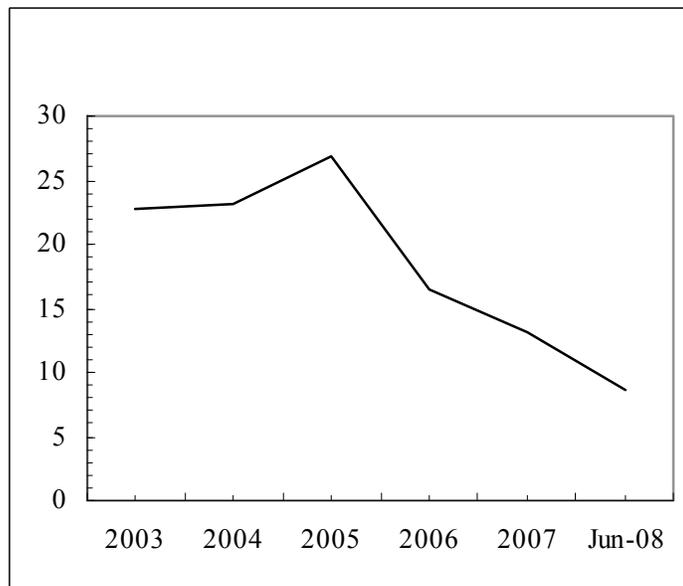
The only dirham-denominated public sector securities available in the U.A.E. on an ongoing basis are the CBU's certificates of deposits (CDs). The government does not issue securities, in spite of a readily available high-quality infrastructure, including a Real Time Gross Settlement system and a Central Security Depository. The CDs issued by the central bank are widely used but their supply is tightly connected to the global systemic liquidity environment, and this irrespectively of the level of demand for high-quality assets by commercial banks. The subjection of CDs' issuance to liquidity conditions (i.e. CDs' outstanding mechanically increase when commercial banks liquidity is favorable, and diminishes when their liquidity gets tighter) can have a pro-cyclical impact in the event of liquidity stress coupled with an increase in counterparty risk. The inverse correlation between the overall liquidity situation and the supply of public sector high-quality assets is one of the key weaknesses of the AED money markets. The recent experience indeed shows that the outstanding amount of CDs decreased as liquidity tensions were building-up in the U.S. dollar and later AED market, coincidentally with the pullback of foreign funds from the U.A.E..

**Figure 7. Certificates of Deposit**  
(in billions of AED)



Source: Central Bank of the U.A.E.

**Figure 8. Banking System Liquid Assets to Total Assets**  
(in percent)



Source: Central Bank of the U.A.E.

Central banks in other countries tried, during the first stage of the turmoil, to ease liquidity tensions and unlock their money markets by increasing the supply of high-quality public sector instruments, at a time when commercial banks' increasing risk aversion propped-up the demand for safe-haven types of assets.<sup>11</sup> The U.S. Federal Reserve set up the TSLF (Treasury Security Lending Facility) and the Bank of England set up the SLS (Special Security Lending Scheme) to meet these needs. No such option was available in the U.A.E. and the central bank had to resort to direct liquidity injections via cuts in the reserve requirement scheme.<sup>12</sup>

### **Performance of the CBU liquidity management framework under stress**

Some features of the CBU "normal" liquidity management framework can in some circumstances exacerbate the impact of some of the limitations created by the low degree of development of the money market described above. For instance the current reserve requirement scheme does not provide enough leeway to commercial bankers to face episodes of liquidity tightness. The maintenance period of reserve requirements is too short to provide a sufficient liquidity cushion to Treasurers in normal times. U.A.E. commercial banks are obligated to meet reserve requirements on average over a weekly cycle. A maintenance period of two weeks (Federal Reserve) or one month (ECB, Bank of England) gives more space to exploit the averaging facility of reserves.

The daily issuance of CDs undermines somewhat the operations of the money market, as Treasurers each day have an option to place their cash holdings on a full set of maturities. For the asset side of their books, Treasurers can operate daily without having to maintain credit lines with their banking counterparts, as they can invest their liquidity surplus on a daily basis in CBU securities. Less frequent operations, via a weekly or bi-weekly issuance calendar, would encourage banks to diversify their lending operations and better manage their cash-flow mismatches over time, thereby contributing to support interbank exchanges. The shift to an auction mechanism in November 2007 for the issuance of CDs (from a "tap" system) is a welcome development, as it has strengthened the transparency of the price-discovery process for the CDs primary market.

Another drawback of a liquidity management framework used to accommodate recurrent amounts of excess reserves, that is, to run under-dimensioned sterilization operations, is that market participants get used to operate in an environment where inefficient liquidity management is not economically sanctioned.<sup>13</sup> The management of liquidity in the context of

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<sup>11</sup> See Chailloux, Gray, Klüh, Shimizu, and Stella, 2008.

<sup>12</sup> It should be noted, though, that even a deeper U.A.E. interbank market could have dried up during the crisis owing to counterparty risk perceptions.

<sup>13</sup> In an excess liquidity environment banks holding larger excess reserves than others are sanctioned by an opportunity cost of keeping idle cash that is any case bound by zero. In a liquidity shortage environment the treasurer falling repeatedly short of reserves on its account with the central banks (overdraft) generally has to pay large penalty rates, bears a reputational costs and sometimes undergo higher supervisory scrutiny (because

(continued...)

an overall liquidity surplus (as was the case for the CBU in recent years) has specific drawbacks that have resurfaced recently: (i) the lack of operational preparedness of banks to a general tightening of liquidity conditions and the absence of contingency funding plans; (ii) limited diversification of funding instruments; and (iii) difficulties to smooth out interest rate developments in the context of unstable demand for excess reserves.<sup>14</sup> One way to deal with this asymmetry is to achieve in normal times more balanced incentives via a structural rebalancing of the liquidity situation. Such a rebalancing would help bring about a more active money market and more effective liquidity management operations by commercial banks. In this perspective, it could be useful for the central bank to aim at creating a given level of reserve money shortage which would enhance its control of money market interest rates and overall money market conditions. This liquidity deficit would not only make the market dependant on the CBU liquidity injections but also have the merit of enhancing the functioning of money markets and improving commercial banks' liquidity management standards (see Section VII).

#### **V. ASSESSMENT OF THE CBU AND MOF CONTINGENCY LIQUIDITY INSTRUMENTS AND LIQUIDITY RISK MONITORING**

The terms of the emergency AED 50 billion liquidity facility set up by the U.A.E. central bank (on September 22) were somewhat restrictive. Although penalty rates were lowered after the initial announcement to make the facility more attractive to banks, the facility continues to be considered fairly restrictive in terms of its conditions and because drawings in excess of 20 percent of reserve requirements require administrative approval and, therefore, bear a stigma. This is also evidenced by the fact that, at the time of writing, banks have reportedly only drawn up to 15 percent of the AED 50 billion facility.

The government's announcement in October 2008 that it will guarantee all deposits and interbank lending for three years as well as the AED 70 billion facility were important to boost confidence in the U.A.E.'s financial system. The blanket guarantee can in principle be expected to reduce the credit risk to bank deposits and other borrowing and hence, facilitate access to unlimited low cost funding by the banks. However, international experience suggests that the blanket guarantee and liquidity support can induce moral hazard. Barring a closer real-time monitoring of banks, these measures could contribute to a deterioration of banks' assets and to further imprudent build-up of risky assets.

The issues raised by the blanket guarantee and liquidity support facilities underscore the potential merit of a strengthening of the CBU's approach to liquidity risk oversight, and the

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inefficient liquidity management may be a leading sign of mismanagement for supervisors). This highlights a fundamental asymmetry of incentives between liquidity surplus and shortage environments.

<sup>14</sup> Banks tend to plan more carefully their cash flow patterns, and determine more carefully their demand for idle cash balances, when they are at risk of running an overdraft on their account with the central bank.

need to bring it more in line with internationally recommended best practices.<sup>15</sup> The CBU primarily monitors one liquidity indicator—the loans and advances to stable resources ratio. As part of the CBUs contingency measures to enhance banks' oversight, the bank supervision unit has increased the frequency with which banks collect and report information on the loans and advances to stable resources ratio to a monthly basis and are requiring banks to provide information on banks deposits to the CBU on a daily basis.

While these are welcome steps, there is some scope for strengthening the monitoring of liquidity risk in the spirit of the Basle Committee work on liquidity risk management and the various industry reports. For instance, the CBU could review a more comprehensive set of liquidity risk management indicators, which includes indicators that capture the maturity structure of liabilities by currency and the tenor of assets—so as to ensure availability of highly liquid assets—as well as the potential contingent liability from off-balance sheet items. It could also consider requiring higher frequency commercial banks reporting of these liquidity indicators to the off-site supervisory units of the central bank, and ask banks to prepare and submit contingency funding plans to the central banks off-site supervisory units. Another crucial improvement would be to adopt a more risk-based approach to liquidity risk and conducting regular and comprehensive liquidity stress-tests to the system.

A more thorough and real-time supervisory oversight of liquidity risk would also help to ease some of the constraints set by the conventional liquidity ratio, as monetary authorities and supervisors could rely on other indicators to detect looming liquidity tensions. The sole reliance on a conventional liquidity ratio like the loan and advance to stable resources or deposits (LD) ratio can have undesirable effects through the cycle. For instance, the need to restore a 100 percent LD ratio when banks fall under liquidity stress can annihilate the impact of liquidity support operations, and have no impact in terms of asset expansion. The relative lack of impact of the various liquidity measures taken to encourage bank lending have been attributed by some to the pro-cyclical effect of this ratio in situations when regulatory forbearance is not permitted.<sup>16</sup> Data as of end-January 2009 show that banks were on average running an LD ratio of 113 percent that would require, barring any alternative incremental funding source, a \$31.7 billion additional liquidity support by the CBU. As observed in most countries in the context of the financial turmoil, conventional liquidity prudential ratios not only have little predictive value on a forward-looking basis, but can also have adverse effects when compliance has to be ensured in the face of adverse developments.

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<sup>15</sup> See “Principles for Sound Liquidity Risk Management and Supervision,” Basel Committee on Banking Supervision (September 2008).

<sup>16</sup> Such restrictions were part of these measures in the U.A.E. since the conditions attached to the first (AED 50 billion) liquidity support package provided that the liquidity relief should not be used to expand credit, and urged beneficiary banks to fall back into line within 3 months. See for instance, Standard Chartered Bank “U.A.E.: fixing liquidity,” November 2008, and “GCC, pro-cyclical, recession and the way out,” February 2009.”

## **VI. THE LINK BETWEEN U.A.E. BANKS' LENDING RATES AND LIQUIDITY INDICATORS**

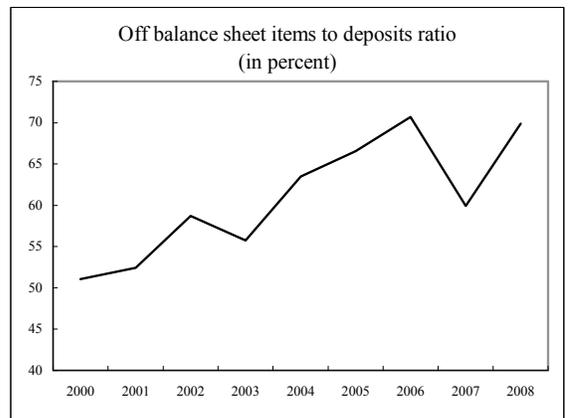
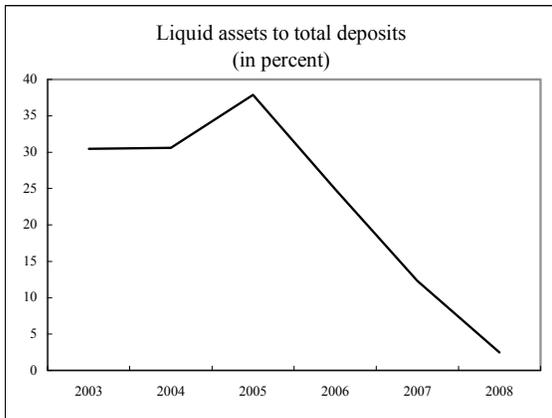
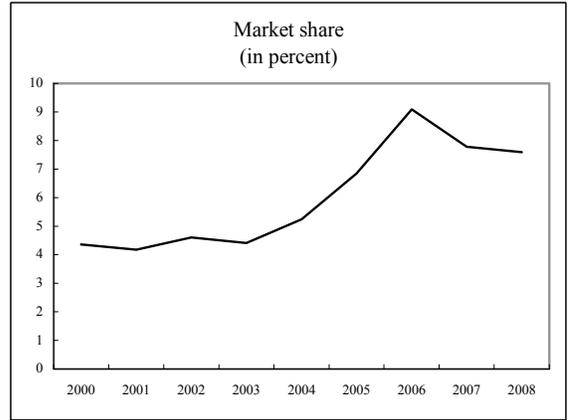
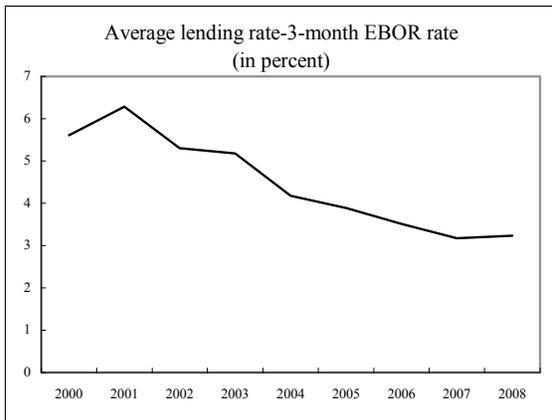
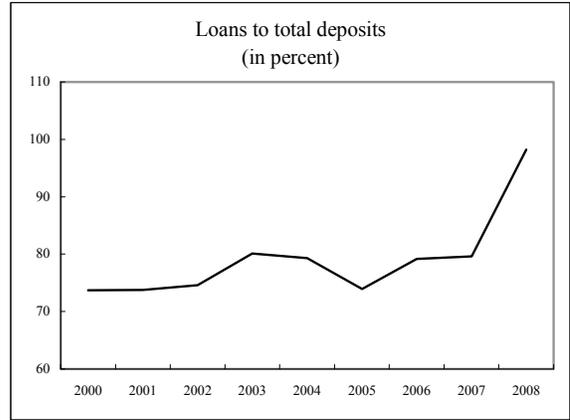
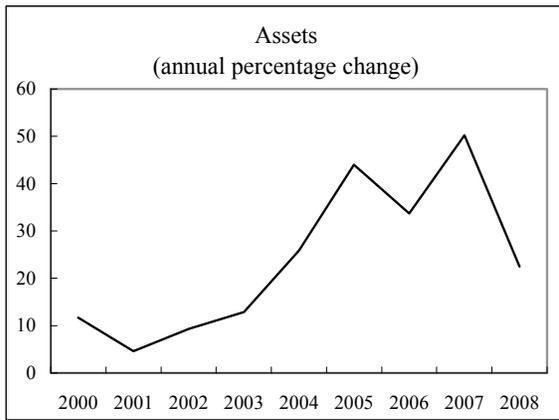
To support the analysis of the U.A.E.'s liquidity management framework presented in the previous two sections, this section empirically examines the relationship between bank lending rates and various indicators of liquidity. Conventional wisdom would suggest that tight liquidity conditions or excessive reliance on one single source of funding may have an impact on banks' lending behavior, and notably influence somewhat pricing conditions. Lending rates vary widely among the U.A.E. banks. For instance, at end 2007, bank lending rates ranged from 6.7 to 12.8 percent. This wide spread reflects different features and strategies of individual banks.

The table below shows key trends in selected banking indicators. U.A.E. banks' loans to deposit ratios gradually increased over time, probably reflecting increased competition among the banks.<sup>17</sup> The size of U.A.E. banks balance sheets have expanded continuously by an average annual median of 62 percent over the 2004-06 period before slowing markedly in 2007 and 2008. At the same time there has been a trend decline in banks lending rates. The ratio of liquid assets to total deposits has declined from a peak in 2005. At the same time, the ratio of off-balance sheet items to deposits increased from about 50 percent in 2000 to about 70 percent in 2008.

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<sup>17</sup> See also Boyd, De Nicolò, and Jalal (2009) who found a similar trend for U.S. banks in 2003 and for banks in 134 nonindustrialized countries for the period 1993-2004.

**Table 1. Trends in U.A.E. Banking Indicators 1/**



Source: Bankscope database

1/ The charts reflect the median observation for the 15 banks included in the sample (see Appendix 1).

The aim of the regression estimations is to get a better understanding of some of the factors influencing the lending-rate setting behavior of banks. The dependent variable is individual bank's lending rate. The regressions are estimated on a panel of 15 U.A.E. banks for which data is available in Bankscope for the period from 2000 to 2008. The regressions are estimated using ordinary least squares and feasible generalized least squares assuming the presence of cross-section heteroskedasticity. The OLS estimates account for about 82 percent of the bank-by-bank variation in the lending rates. The data appendix sets out how the variables are defined and constructed.

**Table 2. Effects of the Liquidity Indicators on Bank Lending Rates 1/**

Explanatory variable: Lending Rate	OLS	GLS
Average deposit rate	1.13 ** (0.22)	1.38 ** (0.14)
Log(assets)	-0.60 ** (0.23)	-0.49 ** (0.18)
Loans to deposit ratio	-0.073 ** (0.01)	-0.07 ** (0.01)
Off balance sheet items to deposits ratio	-0.005 (0.004)	-0.003 (0.002)
Liquid assets to deposits ratio	-0.005 (0.006)	0.001 (0.005)
Loan loss provisions to total loans	0.25 (0.29)	0.50 ** (0.17)
Market share	0.03 ** (0.03)	-0.01 (0.02)
Total capital ratio	0.11 ** (0.03)	0.07 ** (0.02)
Constant	13.63 ** (2.44)	12.77 ** (1.80)
Three-month interbank offer rate	31.91 * (18.87)	7.88 (10.14)
R-squared	0.8159	.
N	103	103

1/ \*\* denotes significance at the 5% level and \* denotes significance at the 10 % level. Standard errors are in parentheses.

The regression results indicate that the sensitivity of U.A.E. bank lending to various indicators of liquidity varies substantially. Lending rates are the most responsive to loan to deposit ratios,<sup>18</sup> the only indicator for which the central bank currently imposes prudential regulations. But lending rates do not appear to respond in a statistically significant way to variations in the ratio of off-balance sheet items to total deposits and to variations in the ratio of liquid assets to deposits and short term funding.

- Banks with high loan to deposit ratios on average tended to have lower lending rates. In the context of the fast growing U.A.E. economy, this finding suggests that the U.A.E. banks tried to aggressively expand their loan portfolios over the 2000-2008 period to the point that several banks exceeded the prudential limit—a loan to deposit ratio of 100 percent—set by the central bank. This suggests that the loan-to-deposit ratio is a good proxy of banks’ commercial aggressiveness and as such, a good leading indicator of potential liquidity risk.
- Banks appear not to have reflected off-balance sheet commitments in the price-setting for their loans as the ratio of off-balance sheet items to total deposits did not significantly affect lending rates. The ratio of off-balance sheet items to deposits can be regarded as an indicator of “future” liquidity given that the off-balance sheet liabilities could give rise to a drain on liquidity in the future. Ideally, the framework for prudential supervision of banks should be designed in such a way that it forces banks to take into account the effect of potential drains on their liquidity emanating from off-balance sheet commitments in the pricing of their lending. This result may also reflect the fact that on average banks off-balance sheet commitments have not reached a magnitude that would give them a driving role in the determination of their lending condition (because of the limited potential magnitude of contingent liquidity draw downs). In any case, this result suggests that supervisory policy amendments that would give incentives to factor in the impact of off-balance-sheet commitments in the pricing behavior of banks would be desirable.
- The ratio of liquid assets to short term deposits did not significantly affect lending rates. Typically, banks with substantial liquid assets, which can act as a buffer against sudden withdrawals of deposits, would, *ceteris paribus*, tend to lower their lending rates relative to the prevailing interbank interest rate. However, the estimation results suggest that U.A.E. banks lending conditions, did not, on average, reflect this relationship. Unlike what is the case in many countries the supply of highly liquid paper is completely exogenous and determined by capital inflows and outflows stemming from the interest rate differential with the Federal fund rate. The outstanding amount of CDs is determined by the level of demand by the banks which in turn depends on the overall liquidity of the banks. There is, therefore, no role for

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<sup>18</sup> The definition of loans to deposits used here is not exactly the same as the one used by the CBU.

liquid assets to influence bank lending behavior because the supply of CDs is too procyclical to be used by commercial banks in a risk cushioning perspective.<sup>19</sup>

The coefficients for the variables that capture average deposit rates, the three-month EBOR rate, bank size, market share, and loan loss provisioning are broadly in line with expectations and in line with findings for other countries from other studies (e.g. IMF, 2004). In particular,

- Higher deposit rates are associated with higher lending rates. Also, as expected higher interbank rates which could control for variation over time of inflation and other common exogenous factors that raise interest rates--including changes in U.S. interest rates, owing to the peg of the dirham to the U.S. dollar--are associated with higher lending rates.
- Larger banks tended to have lower lending rates, reflecting economies of scale. The coefficient estimates indicate that the tripling of a bank's balance sheet was associated with a reduction in lending rates by about 0.34-0.41 percentage points, with all other things equal. At the same, the OLS estimation results suggest that lending rates rose with larger market share. This implies that banks with larger market shares tried to use their market power to achieve higher lending rates.
- Lending rates increased with the loan-loss provisioning ratio, but the coefficient is only significant on the GLS estimation. Banks which have to provision a larger fraction of their loans against losses have higher costs which are in turn reflected in higher lending rates.

The results also show that higher capital adequacy ratios are associated with higher bank lending rates suggesting that banks with higher capital adequacy ratios tended to be less aggressive in their pricing of liquidity.

## **VII. MANAGING LIQUIDITY SMOOTHLY ACROSS THE CYCLE WHILE SUPPORTING MARKET DEVELOPMENTS: AMENDING THE CBU MONETARY POLICY IMPLEMENTATION FRAMEWORK**

### **A. Supporting the Operation of the Money Market: Changing the Features of Sterilization Instruments**

As discussed previously, the issuance of CDs by the CBU has two main drawbacks. First, the high frequency of issuances of CDs creates a *de facto* reliance of the market on its daily operations. Second, given the pegged exchange rate regime, issuances of CDs are

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<sup>19</sup> It is interesting to note that in most other countries the supply of high-quality risk-free securities in a context of banking crisis is countercyclical, as the involvement of the government in managing the crisis brings about short-term fiscal shortfalls that have to be financed via debt issuance, thus increasing the supply and hence the relative amount of debt securities in the system.

mechanically determined by the structural liquidity situation. For instance, a protracted period during which foreign exchange reserves would decrease (keeping other autonomous factors unchanged) mechanically results in a depletion of the outstanding amount of CDs. This depletion of the amount of CDs available reduces commercial banks' ability to borrow at the repo facility (CD is the only collateral accepted), and this in spite of the looming liquidity tensions. In this context, the central bank would have to either cut reserve requirements to release some liquidity (which is a static way to deal with changes in the liquidity situation<sup>20</sup>), or to lend without collateral, both options having operational drawbacks. Another drawback is the inverse correlation between liquidity and highly liquid assets: the decrease in CDs outstanding when the systemic liquidity situation tightens goes against commercial banks' need to beef-up their holdings of high-liquidity credit-risk free assets.

### **Increasing and stabilizing the supply of high-quality assets**

Increasing the supply of high quality assets and, hence, of potential sterilization instruments and reducing the dependency on the structural liquidity situation would help to improve the operations of the money market. One possible way forward for the CBU to address these issues would be to gradually substitute CDs with a scheme of T-bills issuance handled by the CBU in coordination with the Treasury, and determine the outstanding amount of T-Bills to meet liquidity draining needs and the goal of maintaining a stable cushion of short-term government securities. This type of approach is used in many countries where the fiscal situation does not require the existence of a public sector security market (e.g. Australia and Singapore),<sup>21</sup> but where short-term Treasury paper issuances are sometimes used for sterilization purposes.<sup>22</sup> The way to achieve proper sterilization is to keep the auction proceeds on a separate account of the Treasury with the central bank.<sup>23</sup> This account would be a convenient substitute to the issuance of CDs. The merit of this solution would be to achieve a steady issuance of short-term public sector securities, as different issuance motives would kick-in and contribute to keep the supply of securities constant.

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<sup>20</sup> And also administratively cumbersome for commercial banks.

<sup>21</sup> In addition to sterilization motives, there are several arguments for providing public debt instruments beyond meeting governments funding needs, including: (i) for ensuring a sufficient supply of high-quality (liquid) assets; (ii) fostering the development of the market for corporate bonds and short-term debt and providing the basis for a yield curve; and (iii) jump starting the secondary market for fixed income securities via the creation of repo and security lending markets. In the case of Australia for instance the decision to "overfund" the public debt and keep on issuing in the context of rising fiscal surpluses was based on (i) the intention to provide a risk-free yield curve to facilitate the pricing of private sector debt instruments (i.e. not "closing the government debt market"); and (ii) the need to create a cushion to brace for expected future fiscal shortfalls.

<sup>22</sup> T-Bills issuance for sterilization purposes are successfully used in Uganda and Tanzania.

<sup>23</sup> When the government issues the treasury bills, it incurs interest expenses. These could be borne either by the government or the central bank, if the latter has enough seignorage or its financial position is otherwise sufficiently sound.

The issuance of T-bills could also be an option worth pursuing to allow governments, quasi-government agencies and the private sector to diversify toward domestic sources of funding and reduce their reliance on external funding which is becoming increasingly difficult to obtain in the current global environment. The need for issuing securities as a mechanism to drain liquidity would decrease when reserve accumulation slows down (e.g. in the case of lower oil prices) but create some space to issue securities as a short-term means to mobilize fiscal resources in a context of lower oil prices.

The issuance of short-term securities would also accommodate an increased demand for high-quality collateral arising from increasing credit risk aversion. The “liquidity management-driven” component of the issuance of T-bills would correspond to the balance left in the Treasury sterilization account (the “fiscal need” component of the supply of T-bills would correspond to the outstanding amount minus the balance of the sterilization account). Additional issuances of T-bills would either be used in case of temporary cash shortages by the Treasury, or simply used as a cushion, to meet commercial banks higher demand. In that case the proceeds would be kept by the Treasury which could decide to spend them as it needs, or add them to the Sterilization Account balances (escrow account)/blocked account.

### **T-Bills for sterilization purposes: phasing-in strategy**

In a normal environment, the issuance of T-Bills for monetary policy purposes could be financed in two ways that would be neutral from the monetary standpoint. The T-bills could be financed either by (i) reducing an existing monetary liability of the central bank, or (ii) by creating a matching asset. In the first case, the sterilization account balances stemming from T-Bills issuance could simply replace the gradually maturing stock of CDs. In case there is no outstanding amount of CDs a reduction in reserve requirements would release the liquidity necessary for commercial banks to purchase the new issue.

If no monetary liability reduction is feasible, the issue of T-Bills for monetary policy will have to be balanced by a matching increase on the assets side. This provision of additional liquidity (neutral from the monetary standpoint) could be implemented *via* short-term repos, whose conduct would be facilitated by the expansion of the collateral pool materialized by the T-bills issuance. For example, the central bank of Brazil in 2002 gradually discontinued central bank papers issuance and replaced maturing central bank bills with an overfunding scheme whereby the Treasury maintains large positive balances on its account with the central bank (similar to a sterilization account). Coincidentally, the central bank purchased some government security papers to complement the structural sterilization needs with shorter-term fine tuning operations, these securities being used to drain or expand reserves in the short run. The size of this portfolio for the CBU could be determined in theory by the need for fine-tuning reverse operations like repos and reverse repos (unless it is used in a structural liquidity provision perspective). Holding enough T-Bills collateral would require to hold an outstanding amount of securities that would suffice to offset large variations in autonomous factors.<sup>24</sup> This open market portfolio could be backed by higher required

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<sup>24</sup> The calibration of this portfolio should be done on the basis of the usual volatility of autonomous factors (Treasury account, bank notes, seasonal drains on FX reserve), so that the targeted size of the portfolio would,

(continued...)

reserves so as to keep the overall liquidity impact neutral. Higher level requirements (as suggested in Section IV) could help achieve a better control of interest rates for it would create a structurally short reserve position for the system as a whole.

Given the current tight liquidity condition (which give no room to reduce reserve requirements nor to gradually replace the outstanding CDs that would have already matured), an alternative approach could be to phase-in the issuance of T-bills by placing the proceeds of the issuance not on the Treasury account with the CBU but with commercial banks. In this case, the issuance of T-Bills would simply result in a shift in reserve money holding within the system (commercial banks' balances spent to purchase the securities would be placed with another bank by the Treasury) and/or an asset re-allocation on commercial banks balance sheets.<sup>25</sup>

The 5-year treasury notes purchased by the CBU from the MoF in November to back the AED70 billion emergency facility could be a way to jump start these operations. Instead of issuing CDs, and without having to set-up the proposed framework for the issuance of T-bills for liquidity management purposes right away, the CBU could simply start to gradually sell its holdings of the MoF's AED 70 billion notes to commercial banks. It would be a good substitute to the issuance of CDs, provide long-term holdings of highly liquid securities to banks, and provide a stable structural sterilization cushion to the CBU (unlike CDs, these sales could potentially drain liquidity for 5 years). In addition, the CBU could also repurchase these holdings to provide liquidity to the system, if necessary, either outright, or via short-term repos, that could be used to accommodate short-term swings in commercial banks' reserve balances.

### **Modalities of the use of T-Bills for monetary policy purposes**

The technical modalities would be fairly simple. The issuance schedule of these securities could be less frequent, say once a week, and the issuance committee would make a decision on the amount of securities to offer to meet, taking into account the non-liquidity management related issuance. Prospective amounts would be kept within a range that would give some leeway to react to short-term changes to foreign exchange reserves holdings. Auction outcome announcements would detail the breakdown between liquidity management related securities and other issuance motives. The type of tenor to issue would depend on the liquidity management intentions of the CBU, and on the non-liquidity management-related

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for example, cover 2 standard deviations of autonomous factors' daily changes. A two standard deviation confidence interval would permit to absorb 95 percent of daily potential shocks in autonomous factors. This portfolio could also be adjusted not only to absorb the "noisy" component of autonomous factors daily changes, but also adjusted on a monthly or quarterly basis to reflect well-established balance of payments seasonal trends.

<sup>25</sup> It is worth noting that in this case the Treasury would have to support a counterparty risk that ought to be monitored and contained, either by a tight selection of counterparts and or by the use of collateralized operations (based on non-government collateral) and other risk mitigation techniques (concentration limits, margin calls, collateral substitution, etc.).

motives. Very-short-term liquidity management operations would be done using overnight repo auctions whereby the CBU would repurchase these securities over a short period (similar to the current repo).

### **B. Consistency of the Proposed Changes with the Prospects for Future Regional Financial Integration**

The U.A.E.'s current monetary and foreign exchange regime may not have to undergo far-reaching changes, were plans for future financial integration to materialize.<sup>26</sup> Monetary conditions in a fixed exchange rate regime with a fully open capital account are determined by the anchor currency. Although minor adjustments are conceivable, more far-reaching changes will have to be vindicated by the decisions made in the context of the GCC monetary union (GCCMU). In all likelihood the monetary regime of the GCCMU will consist in a merger of the regional pegs into one single fixed exchange rate against the US dollar. In this context, the vulnerabilities highlighted above (in particular the weaknesses of the money market) will have to be addressed too, in particular in the context of the competition between the regional markets to become the key regional financial center (most efficient regional center will gain an edge and attract operations).

As to the features of sterilization operations, the monetary union will require a central coordination so that liquidity management operations are based on the liquidity situation observed at the level of the GCC region. This would also force a unification of the features of liquidity management instruments towards one set of GCC-wide tools. In this context the regional central bank having put in place the most efficient framework will likely serve as a benchmark for the operations of the GCC monetary authority, and as such help prepare its local banks to the future environment. Such developments would necessarily have an impact on the U.A.E. monetary framework, were the GCC monetary union to become the favored alternative.

As to the use of T-Bills issuance for liquidity management purposes, it is difficult to foresee whether a similar arrangement could be adopted for the operations of the future currency union at the regional level. Irrespective of their membership in the monetary union the GCC governments will likely, however, have to put in place a more pro-active cash management to deal with risks of fiscal shortfalls without having to recourse to monetary financing, or to sell sovereign wealth funds holdings in an adverse environment of depressed asset prices. In addition, the monetary union and the extension of banks interbank operations to a regionally unified money market will certainly increase commercial banks' needs for high-quality collateral. For these two reasons contemplating the changes outlined above would seem opportune.

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<sup>26</sup> In the spring of 2009, the U.A.E. announced that it would not participate in the GCC Monetary Union project. Longer-term prospects are still uncertain though, as it is likely that a regional monetary union would still represent an important regional anchor, and certainly serve to catalyze further regional financial integration to which countries outside the union may not be completely immune. In addition, there would be competition between Gulf countries financial systems to improve their market infrastructures.

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### Appendix 1. Data Appendix

With the exception of total banking system assets which comes from the Central Bank of the U.A.E., the data for the empirical analysis is obtained from the May 2009 update of the Bankscope database. The construction of the variables is as shown in the table below.

#### Definition of Variables

Variable	Description
Average loan rate	Interest income divided by loans
Average deposit rate	Interest expense divided by deposits and short term funding
Log(assets)	Natural logarithm of bank assets
Loans to deposit ratio	Loans divided by deposits and short term funding
Off balance sheet items to deposits ratio	Offbalance sheet items divided by deposits & short term funding
Liquid assets to deposits ratio	Liquid assets divided by deposits and short term funding
Loan loss provisions to total loans	Loan loss provisions divided by loans
Capital ratio	Total capital ratio
Market share	A bank assets divided by total assets of the banking system from the monetary survey

Banks included in the sample are listed in the table below.

#### Banks in the sample

Bank name	Abbreviation
Abu Dhabi Commercial Bank	ADCB
Abu Dhabi Islamic Bank - Public Joint St	ADIB
Al Masraf-Arab Bank for Investment & For	Al
Bank of Sharjah	BS
Commercial Bank International P.S.C.	CBI
Commercial Bank of Dubai P.S.C.	CBD
Emirates Bank International PJSC	EBI
First Gulf Bank	FGB
Mashreqbank	Mashreq
National Bank of Abu Dhabi	NBAD
National Bank of Dubai Public Joint Stoc	NBD
National Bank of Fujairah	NBF
National Bank of Umm Al-Qaiwain	NBQ
RAKBANK-National Bank of Ras Al-Khaimah	Rak
Union National Bank	UNB