Macroeconomic Conditions and Soundness of UAE Banking Sector

دراسة حول أثر ظروف الاقتصاد الكلي على سلامة القطاع المصرفي في دولة الإمارات

By

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DEDICATION

I dedicate this work to my family who always believed in me.

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Sincerely,

Dhuha M. Fadhel

ABSTRACT

Using a panel data for 19 UAE national banks covering the period 2005-2010, this research analyzes the impact of selected macroeconomic and bank-specific variables on financial soundness indicators (FSIs) related to banks. Capital adequacy, Assets quality and profitability are key indicators for banks' soundness and they are believed to have a robust correlation with business cycle and other macroeconomic indicators. The study finds that banks' FSIs are strongly related to the business cycle and inflation rate. Banks tend to increase their capital ratios in downturns while reducing them in upturns causing a pro-cyclical effect on the business cycle. Also, inflation rate has a strong negative relationship with capital ratios due to its impact on banks' costs and profitability. Probability of default tends to increase during adverse macroeconomic conditions and thus increases non-performing loans in the banking sector. Moreover, some bank-specific characteristics showed significant relationship with soundness indicators of banks. Cost of adjusting capital and risk appetite of banks have significant impact on the CAR ratios. Also, higher spread between lending rate and deposit rate increases the debt servicing burden on borrowers and thus increases the probability of default, while banks with lower leverage ratios can be more profitable due to their low cost of funding.

ملخص الدراسة

باستخدام بيانات جدولية (panel data) لـ 19 مصرفًا وطنياً في الإمارات تغطي الفترة 2005-2010، تقوم هذه الدراسة بتحليل آثار متغيرات الاقتصاد الكلي و المتغيرات الخاصة بالبنوك على مؤشرات السلامة المالية (Financial Soundness Indicators) المتعلقة بالمصارف. تعتبر نسبة كفاية رأس المال، و مدى جودة الموجودات و معدل الربحية مؤشرات رئيسية لقياس سلامة المصارف، كما يُعتقد بوجود ارتباط قوي بين هذه المؤشرات وبين الدورة الاقتصادية وغيرها من المؤشرات الهامة. خلصت الدراسة إلى وجود ارتباط قوي بين مؤشرات سلامة المصارف وبين الدورة الاقتصادية من جهة و معدل التضخم من جهة أخرى. كذلك فإن المصارف تميل إلى زيادة نسب كفاية رأس المال في أوقات الركود الاقتصادي بينما تقلّل من هذه النسب في أوقات الازدهار. كما أن معدل التضخم ذو علاقة عكسية قوية مع نسب كفاية رأس المال نظرًا لتأثير التضخم على كلفة البنوك و أربحيتها. إضافة إلى ذلك، فإن احتمالية التخلف عن السداد تميل إلى الزيادة في ظروف الاقتصاد الكلي المعاكسة مما يؤدي إلى زيادة نسب القروض المتعثرة في القطاع المصرفي. علاوة على ذلك، فإن الدراسة بينت وجود علاقة قوية بين بعض الخصائص الخاصة بالبنوك وبين سلامة المصارف. كما أن لكلفة تعديل رأس المال و الرغبة في المخاطرة تأثير ملحوظ على نسب ملائة رأس المال. إضافة إلى ذلك، فإن اتساع الفارق بين سعر الإقراض و الفائدة على الودائع يزيد من عبء خدمة الديون على الدائنين وبالتالي يزيد من احتمالية تخلفهم عن السداد، في حين أن المصارف التي تنخفض لديها نسب الرافعة المالية (leverage ratio) تكون ذات أربحية أكبر نظرًا لانخفاض كلفة الإقراض لديها.

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

Tables

Figures

Chapter 1

Introduction

1. INTRODUCTION

Banks are the most important channels to facilitate the financial intermediation process between savers and investors in the economy. They provide financial services to governments, households and small, medium and large-sized enterprises both at domestic and international levels to help them conduct their daily businesses. Thus, a sound banking sector is pivotal to the health of the entire economy especially in developing countries where financial systems are mostly bank-based (Naceur et al., 2011), and if the banking sector does not perform its role well, the economy will not be able to work efficiently and economic growth will be severely impacted.

1.1 Characteristics of banks

There are several characteristics that make banks special financial intermediaries. First, banks are the most leveraged corporations by nature because they heavily rely on other peoples' funds to run their business models, and combined with limited shareholders' equity this can create an incentive for banks' managers to take more risk since shareholders are the first to reap any gains and the last to bear any loss (i.e. principle-agent problem) (Gavin and Hausmann, 1998).

The second feature characterizing banks is their illiquidity. As financial intermediaries, they play a key role in transforming maturities between relatively short term liabilities (i.e. deposits) and longer-term assets (i.e. loans). The failure of a bank to meet its obligations timely when they come due may constitute a critical threat to the solvency of the bank and if things turn out to be extremely bad it could drive the bank towards insolvency and closure. This holds true

even with well-capitalized and highly profitable banks as was the case in the recent global financial crisis of 2008-2009.

A third feature of banks is their role in dealing with asymmetric information and the two problems arising from this asymmetry (adverse selection and moral hazard). In fact, "this is what financial intermediation is all about" (Gavin and Hausmann, 1998). Naturally, borrowers know more about the investments they want to undertake which gives them an informational edge over their lenders. This informational edge can result in adverse selection and the classical 'lemons' problem (Mishkin, 1991). The 'lemons' problem can be very costly on the economy since it could result in high-quality borrowers with potentially highly profitable investments dropping out of the market because of the mispricing of risk between good and bad borrowers. Here comes the role of financial intermediation -especially banks- to help managing these information problems since they come to learn more about their borrowers over time and they possess the needed expertise and techniques to help risk-price their good or bad borrowers more precisely (Mishkin, 1991).

1.2 The Banking Sector in UAE

Like most of the developing countries, the banking sector makes up the core of the financial system in UAE and it operates under the rules and regulations of the UAE Central Bank. With aggregated assets equivalent to 142% of GDP in 2008, the UAE banking sector was considered to be the second largest in GCC countries after Bahrain (Al-Hassan, et al., 2010). By 2010, the total number of licensed banks operating in UAE was 51, of which 23 were national banks and 28 were foreign owned. The UAE banking sector is still characterized by a predominant ownership by government and domestic shareholders. However, it is still the least

concentrated among all GCC banking sectors with the three largest banks (Emirates NBD bank, National bank of Abu Dhabi and Abu Dhabi Commercial bank) accounting for only 32% of the total banking assets (Al-Hassan, et al., 2010).

The UAE banking sector performed well during the 2003-08 oil boom, but it is also during the boom when the risks started to build up on banks' balance sheets. Flourishing economic activity and abundant liquidity resulting from higher oil prices promoted excessive credit growth, inflation and asset price increases especially in the real estate sector. During the same period, banks increased their exposure to real estate and construction sector as well as equity markets which led to a buildup of vulnerabilities on their balance sheets that materialized later when the global crisis took hold in 2008 (Khamis and Senhadji, 2010).

1.3 The Impact of the Global Financial Crisis of 2008 on UAE Economy and Banking Sector

The latest global financial crisis of 2008-2009 has clearly unveiled sources of vulnerabilities which the financial system and specifically the banking sector of UAE was largely exposed to. It has also underscored the inexorable linkages between macroeconomic stability and banking soundness in UAE. The devastating global crisis affected UAE economy through trade and financial channels. The decline in oil prices had a direct impact on government finances and external positions. Also, the sharp falls in Dubai and Abu Dhabi securities markets, tightened global liquidity conditions and widening credit default swaps (CDSs) spreads on sovereign debt exacerbated the impact of the latest crisis. Moreover, the reversal of capital inflows that entered the country earlier in 2007 and 2008 speculating on a revaluation of Dirham had further intensified the liquidity pressures since banks used a substantial part of these inflows to finance

long-term projects creating critical maturity mismatches on their balance sheets (Chailloux and Hakura, 2009).

These developments triggered a sharp decline in assets and real estate prices, weakened banks balance sheets and led to a slowdown in economic activity. This, together with wide global deleveraging, increasingly tightening international liquidity pressures and higher funding costs, led banks to draw down on their reserves with the central bank resulting in a significant jump in short term interest rates, though temporarily. Ultimately, banks became more reluctant to lend and some were forced to deleverage (Khamis et al., 2010).

To counter those unexpectedly severe shocks brought on by the global crisis, the UAE government and Central Bank took decisive actions that included an expansionary fiscal policy, capital and liquidity injections, interest rate cuts and blanket guarantee of deposits for three years. The measures enacted by the federal government helped moderate the impact of the financial crisis on the banking sector through strengthening their capital bases and injecting emergency liquidity into the system. However, the ratio of nonperforming loans is still at alarmingly high levels.

The latest crisis of 2008-2009 had clearly shown that there was a strong correlation between macroeconomic factors and the soundness of UAE banking sector. Thus, in order to maintain a well-functioning and sound banking sector in UAE, it is very important to study the macroeconomic context surrounding and impacting banks.

1.4 Motivation of the Study

Given the important characteristics of banks, the analysis of banking sector stability comes at the center of any macro-prudential analysis of the economy since banks' soundness and macroeconomic conditions are highly interrelated. In general, a healthy banking sector promotes broader financial stability and increases the resilience of economy to unfavorable macroeconomic shocks, while at the same time changing macroeconomic environment can influence the soundness and performance of the banking sector.

Favorable macroeconomic environment is usually associated with better loan repayments, lower probability of defaults and better quality of loans (i.e. lower shares of non-performing loans from total gross loans) (Festic´ et al., 2011). While on the other hand, adverse macroeconomic developments can reduce the profitability of borrowers making it difficult for them to repay their loans when they mature and thus increase the level of doubtful or non-performing loans which could put banks' solvency under serious threat.

To this end, it is quite important to maintain a sound financial system and stable economy by attempting to understand and quantify the relationship between macroeconomic conditions and soundness of the banking sector. Understanding the linkages between the two can help identify potential risks to the banking sector that might come from macroeconomic sources and thus be able to take precautionary measures and formulate monetary and fiscal policies more adequately so as to account for these important linkages.

1.5 Objectives of the study

The main objective of this research is to analyze the relationship between selected key macroeconomic variables (such as GDP growth rate, inflation rate, interest rate, broad money supply (M2) and real estate inflation rate) and bank –specific characteristics (e.g. Total assets, loans return on assets and non-performing loans) with banking soundness indicators that include capital adequacy ratio, asset quality and profitability. More specifically, the study attempts to:

1- Understand the structure and special features characterizing UAE banking sector and the macroeconomic context where it operates.

2- Explore the impact of the global financial crisis of 2008-2009 on the macroeconomic environment and banks' performance in UAE.

3- Investigate and quantify the relationship between the macroeconomic developments and bank-specific characteristics on the soundness of UAE banks.

1.6 Hypotheses of the Study

The study attempts to empirically test the hypothesis on whether a significant relationship exists between macroeconomic variables and the soundness of UAE banking sector. This general question is broken down into three main components. First, it tests whether a significant relationship exists between macroeconomic variables and indicators of banks 'capital adequacy ratios. Second, it investigates whether macroeconomic developments have a strong impact on the quality of banks' assets. Third, it tests whether macroeconomic environment is significantly influencing the profitability of banks.

1.7 Outline of Research Methodology and Procedure

The investigation undertaken through this study begins with a descriptive analysis for the key indicators of macroeconomic developments and performance of the banking sector throughout the pre- and post-crisis periods. This will help understanding whether a correlation exists between the macroeconomic variables such as GDP growth rate, inflation rate and broad money (M2) and banking financial soundness indicators (FSIs) related to banks like capital adequacy, quality of assets and profitability indicators.

Then, the empirical analysis using a panel data of 19 banks in UAE and covering the period 2005-2010 will attempt to analyze whether a significant relationship between the macroeconomic variables and soundness indicators for banks does exist. Also, using OLS multiple regression methods, the effect of bank idiosyncratic characteristics such as total loans, deposits, profitability, risk appetite and quality of assets portfolios on the soundness of UAE banks will be investigated.

1.8 Limitations of the Study

The main limitation of this study concerns the dataset used to draw the inferences and final conclusions. Due to the difficulty of obtaining a larger and complete set of data on UAE banks before year 2005, the empirical analysis was limited to the period from 2005 to 2010. Also, the unavailability of data on foreign banks related to the scope of this study has restricted the sample to national banks only. However, this did not constitute a significant impediment to the empirical analysis since the sample of national banks represented about 84% of the total banking assets in UAE.

1.9 The Structure of the Study

This research is structured as follows. Chapter 2 reviews the current literature regarding financial intermediation, economic growth and financial development nexus, soundness of the financial system, the relationship between macroeconomic developments and soundness of the banking sector and finally the earlier assessments on UAE banking sector. Chapter 3 presents some stylized facts about the macroeconomic conditions and financial soundness indicators of UAE banking sector. Data, methodology and econometric models are presented in chapter 4. Chapter 5 outlines the empirical results of the analysis, and chapter 6 presents the main findings.

Chapter 2

Literature Review

2. LITERATURE REVIEW

This chapter presents a survey for earlier works on the role of financial development in economic growth and the impact of macroeconomic conditions on the financial system. To provide a motivational background to this research, a brief discussion is presented on the important role played by the financial system in general and the banking sector in particular in economic activity. This part provides different views of economists on the nexus of economic growth and financial development. The second part reviews the sets of measures and indicators currently used by international and regional entities to assess the stability and soundness of financial systems. It also focuses on the set of indicators developed by the financial sector assessment program (FSAP) which are known as "Financial soundness indicators" as they provide the most comprehensive and firsthand measures on the state of financial system. Then, a review of available literature on the linkages between macroeconomic variables and financial soundness indicators is provided. Finally, earlier studies that were undertaken on UAE banking sector are surveyed.

2.1 The nexus between economic growth and financial development

A healthy and stable economy requires the existence of sound financial system (comprised of both financial intermediaries and financial markets) to channel the movement of funds from surplus units in the economy which do not have productive ideas to utilize their surpluses (i.e. savers) to deficit units (i.e. borrowers) which might have productive investment opportunities yet lacking the needed funds to finance them. The most important borrowers (spenders) are businesses and governments, yet households do also borrow in order to finance their purchases of cars, houses, education and others (Mishkin, 2006). As illustrated by figure

(2.1), the flow of funds in the financial system can take place either directly through the financial markets by selling securities to lenders or indirectly through the financial intermediaries (e.g. banks) through granting loans or other financial facilities (Mishkin, 2006).

Market imperfections (or frictions) have motivated the emergence of financial markets and intermediaries to facilitate a better allocation of resources, mobilize savings, pool and diversify risk, enforce sound corporate control, and facilitate the trading of goods and services. Levine (1997) proposes that the importance of financial intermediaries arises from the need for a system that helps alleviate problems related to information asymmetry and transactions costs. In fact, "This is what financial intermediation is all about" (Gavin and Husmann, 1998).

Figure 2.1: Flows of Funds through the financial system (Mishkin, 2006)
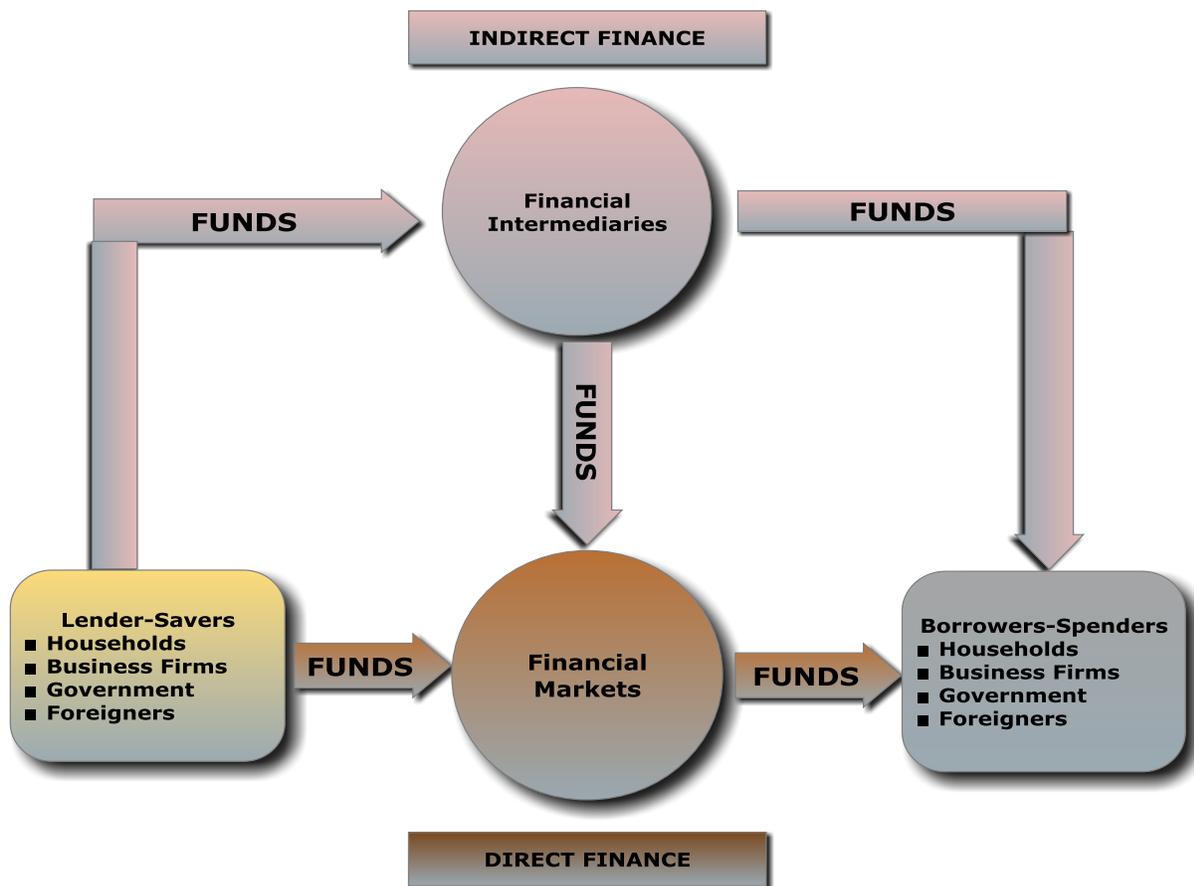
The relationship between financial system and economic growth constitutes a large body of theoretical and empirical literature among economists. The theoretical background of this relationship can be traced back to the early work of Schumpeter (1932), and later to Goldsmith (1969), McKinnon (1973), Shaw (1973) and more recently King and Levine (1993), Demirguc-Kant and Levine (1996), Levine (1997), Levine and Zervos (1998) and Beck and Levine (2002). These works underline the strong positive relationship between financial development and economic growth. They assert the importance of financial development for the long run growth through the impact on capital accumulation and technological innovation.

Similarly, Barth et al. (2001) believe that efficient and sound financial systems are essential preconditions for stable growth and economic development. They argue that inefficient banking systems can hinder growth, aggravate poverty and undermine economic development, while sound banking systems might help speed the pace of long-term economic growth.

On the other hand, a different strand of literature advanced by prominent economists such as Robinson (1952) argues that financial development is actually following economic growth and not vise-versa or as Robinson (1952, p.86) puts it "where enterprise leads finance follows". This means that the expansion in real economy drives the demand for financial services which as a result leads to the growth of financial sector. Moreover, there is another stream of thought that was originally proposed by Lucas (1988) that goes even further by arguing that the role of financial development in promoting economic growth is "overstressed" by economists.

In spite of the different views of economists on who is driving the other, economic growth or financial sector, it is beyond dispute that the soundness of financial sector and macroeconomic stability are closely related to each other. That is, having well-functioning

financial and banking sectors without sound macroeconomic conditions is almost impossible as it is also difficult for the macroeconomy to remain stable and vigorous in the absence of healthy and robust financial and banking systems. Although the direction of causality between the two cannot be traced easily, the evidence from many countries suggests that vulnerabilities usually emerge from instable macroeconomic environment and from there it spills over to the financial and banking sector whose instability feeds back to the macroeconomy exacerbating the cost and losses and intensifying the instability of macroeconomy (Kaufman, 2004).

2.2 Assessing the Soundness of Financial System

The wave of financial and banking crises of the 1980s and 1990s that hit countries like the United States, Latin America, Asia, Nordic countries and others spurred regulators' and policy makers' interest in searching for a broad set of indicators that help in assessing the strengths and vulnerabilities of the financial system in general and the banking sector in particular, and thus provide effective early warning signals to help identify and contain any possible breakdown in the functioning of the financial system. To this end, many initiatives have been undertaken by a number of international and regional bodies to detect potential sources of financial and banking sectors' risks and vulnerabilities that can be monitored by authorities in charge of maintaining financial and macroeconomic stability. These bodies include the International Monetary Fund (IMF), Organization for Economic Cooperation and Development (OECD), European Central Bank (ECB), Eurostat, Bank for International settlements (BIS), US Federal Reserve, banks of England and other central banks as well as individual efforts by market analysts (see Morttinen et al., 2005).

An initial work on this subject was undertaken by the IMF to identify key Macro-Prudential Indicators (MPIs) that covered aggregated prudential factors, macroeconomic variables related to the soundness of the financial system and other market-based indicators (see Sundararajan et al., 2002). Macro-prudential analysis intends to deal with the broad picture of the financial system as a whole and attempts to highlight common risks in the financial system (i.e. systemic risks). These risks can affect a large proportion of the financial institutions and constitute contagion risk to the other parts of the system that may threaten the stability of the financial system and the economy as a whole (Morttinen et al., 2005).

Generally, the analysis of banking sector constitutes a central piece in macro-prudential analysis due to the systemic importance of a healthy banking sector to the stability of the financial system and the whole economy. Banks are exposed to different sources of risks that include credit risk, liquidity risk, operational risk and market risk (the latter comprises of interest rate, exchange rate, equity and commodity risks) making banks' balance sheets highly vulnerable to unexpected shocks to the financial system. Banking system vulnerabilities are exacerbated when banks' assets are not liquid, hedged or sufficiently diversified or when the bank has no sufficient capital to absorb unexpected shocks (Sundararajan et al., 2002).

There is also some evidence that banks behavior could actually amplify financial crises. Since the core business of all banks is to provide credit to their customers, their risk appetite is largely subject to changing economic conditions which makes its business model inherently pro-cyclical. Pro-cyclicality implies that banks tend to underestimate risks in good times and overestimate it in bad times and therefore amplify the losses resulting from unexpected shocks to the system (Maratheftis, 2009). For that reason, banks have to be regulated and closely

monitored by regulatory authorities. Therefore, the analysis of banking sector comes at the center of any financial stability analysis.

Recently, a more prudent and operationally useful set of indicators known as the Financial Soundness Indicators (FSIs) have been identified by the financial sector assessment program of the IMF and World Bank. The set of indicators that are divided into two main subgroups of core and encouraged indicators provides and extended and improved version of the old macro-prudential indicators (MPIs) that were developed earlier by the IMF.

2.3 An Overview of the IMF Financial Soundness Indicators

The IMF and other regional and international bodies undertook further work to develop a more-focused set of financial indicators that provide pivotal firsthand information on the soundness of financial institutions, related markets such as financial and real estate markets, corporate sector and households. (Babihuga, 2007). This exhaustive set of indicators is referred to as financial soundness indicators (FSIs) and currently used in the context of the financial sector Assessment Program (FSAP). [1] The IMF defines financial soundness indicators as:

Indicators compiled to monitor the health and soundness of financial institutions and markets, and their corporate and households counterparts. FSIs include both aggregated information on financial institutions and indicators that are representative of markets in which financial institutions operate. (Sundararajan et al. 2002, p. 2)

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1 The FSAP is a joint IMF-World Bank effort that was launched in May 1999 and designed to provide a comprehensive and deep analysis on the countries' financial systems.

These indicators alongside other macroeconomic variables (e.g. GDP growth and inflation rate) and information on the regulatory and institutional infrastructure are main components to any macro-prudential analysis (Sundararajan et al., 2002). Under FSIs, two sets of indicators are introduced: core and encouraged indicators. The core indicators are mainly directed towards the assessment and monitoring of banking sectors, while the encouraged indicators comprise of additional banking indicators beside other indicators on non-bank institutions and markets that are associated with the financial sector such as real estate as well as corporate sector and households (IMF, 2006).

The core indicators – also known as CAMELS indicators- imply the analysis of six subsets of indicators related to the soundness of banks, namely: capital adequacy, asset quality, management soundness, earnings and profitability, liquidity as well as sensitivity to market risk (Evans et al., 2000). These subsets of indicators are believed to cover a variety of risks to which banks are exposed. Generally, banks' portfolios are vulnerable to shocks arising from credit, liquidity, operations, or market risks. The latter risk includes interest rate, exchange rate, equity price and commodity price risks. Financial systems' vulnerability increases by and large when shocks hit financial institutions that are not sufficiently liquid, well-hedged against their portfolio' risks, appropriately diversified, and when they are not adequately capitalized to withstand shocks (Sundararajan et al., 2002).

A survey on financial stability reports of central banks around the globe finds that almost all these reports are making use of macro-prudential indicators (specially the indicators proposed throughout the FSIs framework) to undertake their stability assessments (Oosterloo et al., 2007). According to the survey that was conducted on 40 banks around the world over the time period 1996-2005, a central bank publishes about 53% of the core FSIs in its financial stability report,

25

while 37% and 40% of the encouraged FSIs on households and real estate markets, respectively are being published. The percentage for other classes of indicators ranges between 14% and 20% (Čihák and Schaeck, 2010). This refers to the growing importance received by these indicators as reliable indicators to the stability and soundness of financial systems.

In the following lines we provide brief discussion on each set of indicators comprising the core indicators (or CAMELS indicators); their definitions, methods of measurement and the types of risks they help to identify.

2.3.1 Capital Adequacy Indicators

The first set of FSI's core indicators intends to track the adequacy and availability of capital that is believed to determine the resilience and robustness of financial institutions to any adverse shocks to their balance sheets (Evans et al., 2000). To date, the best practices in banking supervision and regulation have been introduced by the Basel Committee on Banking Supervision (BCBS) through its sets of banking regulations series known as Basel I, Basel II and most recently Basel III.

Since 1988 the BCBS has worked continuously on developing and revising its proposals on banking regulations to accommodate the emerging needs of banks' regulators around the world (Blundell-Wignall and Atkinson, 2010). Regulations on the minimum capital requirements that should be maintained by banks come at the heart of all Basel accords (BIS, 2010a). The set of indicators being proposed by all Basel accords are important parts in many assessments undertaken by supervisory authorities across the globe as well as the Financial Sector Assessment Program (FSAP). FSIs framework now includes aggregated risk-based capital ratios

(namely: regulatory capital to risk weighted assets (CAR)[2] and regulatory Tier1 capital to risk-weighted assets[3]) (Sundararajan et al., 2002).

Pillar 1 of the Basel system defines minimum capital to absorb unexpected losses resulting from shocks (i.e. capital adequacy ratio ratio (CAR) using this formula: $\frac{\text{Total Capital}}{\text{Risk-weighted assets}}$, where the denominator (RWA) is based on a complex method for risk weighting the different assets based on the credit, market and operational risks to which the balance sheet of the bank is exposed. Tier 1 capital is also calculated as a ratio of risk-weighted assets $\frac{\text{Tier 1 Capital}}{\text{Risk-weighted assets}}$ (BIS, 2010a), where Tier 1 capital is largely composed of high quality common equity.

On the other hand, the recent financial crisis of 2008-2009 has raised a lot of skepticism among analysts about the effectiveness of these indicators as a means to monitor banks' soundness, especially that many of the banks which became insolvent during the crisis were well-capitalized and profitable till the quarter that preceded their collapse (e.g. Northern Rock and Bear Stearns) (Barfield and Venkat, 2010). Furthermore, the credibility of credit ratings usually provided by credit rating agencies (e.g. Moody's, Standard & Poors and Fitch) to assess the creditworthiness of borrowers and riskiness of portfolio assets (especially structured products) have lost much of their credibility as well due to their failure in capturing the exact

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[2] The Basel Committee on Banking Supervision has set the minimum CAR at 8% (including Tier1, Tier2) under Basel II banking regulations, and later on was revised up to 10.5% under Basel III(constituent of Tier1 and Tier2 capital plus a new capital conservation buffer requirement equal to 2.50%). As regards UAE banking sector, the Central Bank of UAE is currently requiring all operating banks in the country to achieve a minimum regulatory CAR of no less than 12% effective from June 30, 2010 (till end-2008, the ratio was set at 10% and was revised to 11% in June 2009 and revised again to the current 12% ratio).

[3] Under Basel II, the minimum Tier1 capital was set at 4%, but now revised up to 6% under Basel III and will be largely constituent of common equity (4.5%). The current Tier 1 minimum requirement set by CBUAE is 8%.

levels of risk attached to different financial products (e.g. derivatives) (Demirgüç-Kunt and Detragiache, 2009).

2.3.2 Asset Quality Indicators

Risks to the insolvency of banks usually come from the impairment of their loan portfolios. Therefore, it is important for regulators to assess the quality of banks' assets through looking at indicators that reflect the current position of banks' loans portfolios. The ratio of non-performing loans to total gross loans is one of the most useful indicators to assess the quality of banks' assets, where assets are considered non-performing according to the regulations of CBUAE when "(1) principal or interest is due and unpaid for 90 days or more; or (2) interest payments equal to 90 days or more have been capitalized, refinanced, or rolled over" (CBUAE, 2010)

An increasing trend in the ratio of non-performing loans to total gross loans signals a decline in the quality of loans portfolio, and thus in banks' cash flows, profits and thus their ability to repay their financial obligations. Assets quality indicators should also take into account credit risk embedded in off-balance sheet activities such as guarantees, derivatives, letters of credit and contingent lending commitments (Evans et al., 2000).

Furthermore, the level of provisions a bank sets aside to withstand adverse shocks and stress should be also considered in the assessment of the assets quality. Provisions are usually classified as general – for unidentified losses – or specific – for identified losses. [4] The ratio of provisions to Non-performing loans – also known as coverage ratio- provides an indication to the share of bad loans for which provisions have been set aside. Another useful indicator that can be

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[4] On 11th November, 2010, the Central bank of UAE has issued circular No 28/2010 on the classification of loans and their provisions. Under this classification, a loan can be classified as normal, watch-list, sub-standard, doubtful or loss loans with minimum specific provisions of 25%, 50% and 100% of the net exposure amount for the bottom three categories while the other two categories will be subject to general provisioning.

used to assess the quality of assets is the ratio of non-performing loans net of provisions to bank capital. It gives an indication to the capacity of bank capital to withstand possible losses related to non-performing loans.

Another source of vulnerability in the loans portfolio of any bank can emerge from the lack of diversification where a large portion of total loans are concentrated in specific economic sector or activity, especially real estate sector. Also, concentrating credit in a small number of borrowers especially those granted through connected lending (e.g. in multi-activity conglomerate) might constitute another source of vulnerability to banks. Moreover, banks have to pay attention to whether borrowers have obtained loans from other banks, thus increasing the total credit risk exposure of the banks as a group while it is underestimated if being considered as an individual case by each bank (Sundararajan et al., 2002).

In UAE, most of the banks that were significantly hit by the crisis of 2008 and 2010 were those of high exposure to the real estate market such as emirates NBD, Emirates Islamic bank and Dubai bank. The continued correction in this market is expected to increase the ratio of nonperforming loans in these banks. For that, banks will have to increase their provisioning to be able to sustain any deterioration in their assets portfolios.

2.3.3 Management Soundness Indicators

This type of indicators is generally bank-specific and cannot be easily aggregated across sectors. These indicators are mostly qualitative in nature especially when it comes to evaluating the functioning of internal control systems. They include indicators such as Expense ratios – expenses to total revenues – and Earnings per employee (Evans et al., 2000).

2.3.4   Earnings and Profitability Indicators

It is widely believed that banks which are unable to be profitable for persistently long time might risk insolvency at some point. However, it could also be the case that highly profitable banks are engaged in excessive risk taking activities (Evans et al., 2000).

The two key indicators commonly used in the analysis of profitability are return on assets (ROA) and return on equity (ROE) ratios. The nominators in both ratios are calculated using data from banks' income statements while the denominators are given through banks' balance sheets. However, ROE and ROA are not effective in capturing the level of risk involved in generating the profit, and normally very high profits are associated with greater leverage and excessive risk taking. In this case, it is also important to study the reasons behind significantly high profitability values (Morttinen et al., 2005).

2.3.5   Liquidity Indicators

The devastating financial crisis of 2008-2009 highlighted the importance of having stable liquidity to the adequate functioning of the banking sector and the financial system as a whole. The crisis proved that a strong capital base alone dose not provide sufficient buffer against unexpected losses. More specificly, liquidity risks related to interbank money markets became significantly important, and banks are now heavily dependant on interbank funds to finance their short term operations. Therefore, turbulences in interbank money market can constitute a source of contagion risk where a failure of a single counterparty - if significant enough- could trigger crucial credit losses on other banks (Morttinen et al., 2005). The latest crisis of 2008-2009 has provided strong evidence on how the 'credit crunch' can paralyze banks and economic activities, thus leading to a deep economic recession (Lucas and Stokey, 2011).

For all these considerations, the Basel committee on Banking Supervision introduced a consultative document entitled "International Framework for Liquidity Risk Measurement, Standards and Monitoring" in which it proposed a detailed guidance for a better liquidity risk management framework. In this document, two minimum standards for monitoring banks liquidity were introduced. The first is known as Liquidity coverage ratio (LCR) and is intended to help promote short term liquidity in banks while the second one is Net Stable Funding Ratio (NSFR) which aims at promoting banks' liquidity over a longer time horizon (BIS, 2010b).

As far as the regualtory authorities current practices concerned, the level of liquidity in the banking system can be monitered through a number of important indicators. Most commonly used indicators include liquid assets to total assets ratio (known as liquid assets ratio), loans to deposits[5] ratio and liquied assets to short terms liabilites ratio. Generally, the definition of liquid assets dose not follow a consistent pattern across different regimes, but generally, a liquid asset would refer to cash or any asset that can be readily converted into cash. These indicators are very useful in reflecting the maturity mismatch between the assets and liabilites of banks' portfolios (Sundararajan et al., 2002).

2.3.6 Sensitivity to market Risk

Most of the financial market-related risks to banks arise from their proprietary trading activities which usually takes the forms of asset management and investment banking. The latter besides offering great opportunity for banks to maximize their ROEs, constitutes a crucial source of market risks to banks. The failure of Barings bank in the nineties provides a classical example

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[5] The ratio of loans-to-deposits is the only liquidity indicator currently observed by the Central Bank of UAE. However, the bank has also taken measures to enforce the new two liquidity indicators introduced by Basel III in its regulatory framework of the UAE banking sector.

on how risky banks' engagement in derivatives market can turn out to be which can possibly lead to the collapse of the financial institution as it was the case with Barings bank (Morttinen et al., 2005). A latest example of failing market risk strategies is given by Northern Rock Bank whose assets and liabilities' duration was mismatched as they grew more mortgage products (Blundell-Wignall et al., 2008).

Generally, the interest rate and exchange rate provide the most two relevant components of market risks. There is also the equity price risk that results from trading in stock exchanges. At a lesser extent comes the risk of fluctuations in commodity prices (e.g. gold, silver and others). Basel committee on Banking supervision has proposed a methodology to assess the risks that can arise from interest rate, exchange rate, equity prices and commodity prices through calculating the duration of assets and liabilities and the net open positions in foreign currencies and equities (Sundararajan et al., 2002).

Blundell-Wignall et al. (2008) argue that the change in the business model of banks which allowed for a greater mixture of credit with equity and switching more towards securitization activities to magnify their earnings along with poor risk modeling and misleading credit ratings by agencies, all together have played key roles in triggering the latest financial crisis of 2008-2009.

2.4 Macroeconomic and Financial Sector Linkages

The development of banking sector was often been associated with crises. The recent banking and financial crises of 1990s and more recently the global financial crises of 2008-2009 showed how a devastating financial crisis can cause profound and costly impact on the entire economy. For that reason, a pressing need has emerged to analyze the different linkages or

channels linking the soundness of the financial system with the macroeconomic stability. A number of studies have been undertaken to investigate the different channels and mechanisms through which the interaction between financial instability and adverse macroeconomic conditions could create a source of systemic risk which might translate into 'contagion effect' that characterizes most of the banking crises (Blejer et al., 2002). According to De Bandt and Hartmann (2000), a contagion is a "particularly strong propagation of failures from one institution, market, or system to another", and nowadays with the highly integrated financial systems, systemic risks and associated contagions can easily transmit from one part of the financial system to another and thus placing considerable threat to the entire system.

A great body of literature exists on determinants of banking crises which focus on the role of macroeconomic factors to explain specific episodes of banking crises. The first strand of this literature focuses on the demand side (i.e. banks' borrowers) and draw upon the experience of the great depression of the thirties of last century in US. Miskhin (1978) suggests that bad macroeconomic conditions will start by an adverse impact on bank borrowers which will have an impact on their ability to repay debt and thus affect bank's solvency. This could trigger bank runs which will ultimately lead to the closure of the bank.

A second strand of studies focuses on the supply side (banks' depositors) to explain the routes of banking crisis. Economists who belong to this stream view banking crisis as "sunspot" or self-fulfilling events. A distinguished work by Diamond and Dybvig (1983) tries to explain the causes of banking crises away from changes in business cycle. They suggest that sudden shifts in depositors' expectations can trigger bank runs that could ultimately lead to banking crises.

A third strand of studies investigated the relationship between the quality of regulations and supervision with the soundness of banking sector. Some of these works showed a positive relationship between regulations and the soundness of banks, while others argued that compliance with regulations was not significantly correlated with banks soundness. A pioneering work of Barth, Caprio and Levine (2001, 2004, and 2006) provided the first compilation and assessment of a comprehensive database on the rules and regulations of the banking sector based on surveys of regulatory authorities in many countries. They attempted to evaluate the relationship between different governmental approaches to banking supervision and their outcomes. The key findings of this research suggest that regulatory strategies that help improve bank stability and soundness are those most effective in enforcing the disclosure of reliable and timely information, allowing private sector to monitor banks and fostering incentives to private agents to exercise corporate control. They also suggest that giving more weight to the official supervision of banks through tightening capital requirements are not effective in promoting the development of banking sector, nor does it foster sound performance of banks or alleviate banking system fragility.

These findings are in contrast with Basel committee guidelines on capital requirements and regulatory supervisions, especially the latest set of requirements proposed by Basel III accord which imposes higher capital adequacy ratios and better quality. Opponents to higher capital requirements believe that increasing capital adequacy ratios might help provide extra cushion to absorb potential losses for banks, but it is also likely to increase borrowing costs for end-users and reduce bank profitability (Buehler et al., 2009). That is why regulators and policy makers should carefully examine "how high is high enough" for minimum capital ratios.

In the same vein, Sandararajan, Martson and Basu (2001) studied the relationship between an overall index of banks' compliance with the Basel Core Principles (BCPs) and the ratio of non-performing loans and loan spreads. The study found that compliance with Basel principles was not a significant factor determining banks' soundness. However, the study conducted by Podpiera (2004) on the relationship between the performance of the banking sector (i.e. non-performing loans and net interest margins) and the quality of regulations and supervision (measured by compliance with BCIs[6]). In contrast to Barth, Caprio and Levine (2001, 2004, and 2006) and Sandararajan, Martson and Basu (2001), the study showed a significant positive impact of higher compliance with BCIs on the performance of the banking sector (after controlling for macroeconomic and structural factors).

Also, Demirgüç-Kunt, Detragiache and Tressel (2006) found a significant and positive relationship between banks soundness and compliance with principles related to information disclosure. The study revealed that countries which require a regular and accurate financial data reporting by banks to market participants and regulatory authorities usually maintain healthier banks. Their findings highlighted the importance of transparency as a first priority to improve the effectiveness of supervision and reinforce market discipline.

However, a more recent research undertaken by Demirgüç-Kunt and Detragiache (2009) has casted doubt on the usefulness of Basel Core Principles in ensuring bank soundness. Using data for more than 3,000 banks in 86 countries, the study found that the overall index of

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[6] Basel Core Principles (BCP) is a set of universally applicable principles that are defined by the Basel Committee of Banking Supervision to provide a framework of minimum standards for sound supervisory practices. They are generally classified into seven categories that cover "Objectives, independence, powers, transparency and cooperation", "Licensing and structure", "Prudential regulation and requirements", "Methods of ongoing banking supervision", "Accounting and disclosure", "Corrective and remedial powers of supervisors" and "Consolidated and cross-border banking supervision" (see "Core Principles for Effective Banking Supervision", BIS, 2006)

compliance with the Basel Core Principles was not robustly associated with bank risk measured by Z-scores.

On another hand, there is a separate strand of studies that focuses on techniques of stress testing to analyze the relationship between macroeconomic variables and financial stability. This type of studies are country-specific and makes use of market-based indicators (e.g. probability of default, distance to default, subordinated debt spread or other indicators) to provide forward looking information (known as early warning indicators) on potential financial system risks and vulnerabilities that might emerge from macroeconomic sources. Prominent studies in this area include stress testing conducted on UK banks (Hoggarth et al., 2005), EU banks (European Banking Authority, 2011), German banks (Dovern et al., 2010) and others.

Another strand of studies attempts to investigate banking crisis in relation to the boom and bust cycles of the economy. Capiro and Klingebiel (1996), Demirguc-Kunt and Detragiache (1998), Kaminsky and Reinhart (1999) attempted to explain episodes of banking crises and financial instability by changes in macroeconomic conditions. For instance, Kaminsky and Reinhart (1999) suggest that banking and currency crises happen when the economy undergoes a recession following a prolonged expansion in economic activity that was driven by capital inflows, credit boom and overvalued currency.

An early work by Arpa et al. (2001) investigates the effects of macroeconomic developments on risk provisioning and earnings of Austrian banks during the 1990s. The paper concludes that Austrian banks increase their risk provisioning when real GDP growth rates are falling and when banks' net income is increasing. It also shows that net interest income is uncorrelated with real GDP growth and changes in interest rates except that at very low interest

rates, net interest income tends to decline. Moreover, falling interest rates both in the short- and long-terms along with increasing real estate prices and/or high inflation rates raise banks' operating income and vice versa. The overall conclusion is that macroeconomic variables (e.g. interest rates, real estate prices and inflation) have an impact on Austrian banks' income, profitability and financial stability. It also suggests that structural changes like joining the European single market, the liberization of Eastern European markets and increased competition, altogether have certainly impacted Austrian banks throughout the 1990s.

In the same vein, Fofack (2005) investigates the main determinants of nonperforming loans in Sub-Saharan Africa in the 1990s. The study reveals a significant impact of macro- and bank-specific factors on banks' performance. Specifically, it found that there is a robust causality between non-performing loans and economic growth, real exchange rate, real interest rate, interbank loans and net interest margins. The significant increase in non-performing loans is largely determined by macroeconomic instability which reflects the vulnerable undiversified economies of African countries, thus remaining highly exposed to external shocks.

Also, Gerlach et al. (2005) studies the extent to which macroeconomic and financial conditions affect the performance (i.e. net interest income and non-performing loans) of the banking sector in Hong Kong SAR. Using a panel data for 29 retail banks covering the period 1994-2002, the study finds that macroeconomic and financial developments have an impact on banks' performance. The empirical evidence suggests that the net interest income of smaller banks is exposed to fluctuations in real GDP growth while their non-performing loans are less exposed to them. The drastic decline in property prices may have also put banks that are largely exposed to property lending under stress. However, property-related lending seem to be less risky than other types of lending since they are less sensitive to changes in macroeconomic

environment and property prices as proved by the study. This might be largely due to the a number of factors that helped mitigating property-lending risks such as Hong Kong Monetary Authority's guidelines that set a low gearing ratio for property developers and a maximum loan to value ratio of 70% for residential mortgage loans.

Another study on the determinants of capital level in banks in Hong Kong by Wong et al. (2005) reveals that capital adequacy ratio and real GDP growth rate are negatively correlated. The study also suggests that CARs of small banks are more responsive to fluctuations in the economic cycles than large banks.

A study by Babihuga (2007) investigates the relationship between selected macroeconomic variables and financial soundness indicators using panel data of FSIs for 96 countries between 1998 and 2005. The study finds that financial soundness indicators strongly fluctuate with business cycle and inflation rate. Specifically, it finds that the business cycle (proxied by real GDP) has a strong negative relationship with capital adequacy (CAR) and nonperforming loans (NPLs), while having a robust positive relationship with return on assets (ROA) – an indicator of profitability-. Moreover, inflation rate, real interest rate and real effective exchange rate also appear to be important factors affecting financial soundness indicators by varying degrees. Several cross-country and industry-specific differences including income, financial system sophistication, market concentration and the quality of banking supervisions explain cross-country variations in financial soundness indicators.

Another study by Zeman and Jurca (2008) make use of multivariate regression method in which the explanatory variables include real GDP, output gap, oil prices, M1, CPI, exports, nominal exchange rate and nominal interest rate to explain dynamics of nonperforming loans

(NPLs) in Slovakia. The study suggests that real GDP, nominal interest rate and nominal exchange rate are the most important variables impacting nonperforming loans. They also suggest that an economic slump will not critically threaten the banking sector whereas exposure to interest rate and exchange rate is attributable to the high level of openness.

A study by Graeve et al. (2008) analyzes the interactions between twin (in)stability in banking sector and real economy and attempts to investigate the extent to which macroeconomic policy and financial stability impacts each other. It develops an integrated reduced form micro-macro model that incorporates bank-level stability indicators of German banks throughout the period 1995-2004 and allows for feedback mechanisms between macroeconomy and stability of banks at a micro-level. The study finds that an unexpected tightening of monetary policy increases the probability of bank distress by 0.44%. The effect is economically significant and shows a modest trade-off between monetary policy and banks stability. It also suggests the need for close collaboration between monetary policy and financial stability.

Also more recently, a study by Festic et al. (2011) attempts to investigate the macroeconomic sources of systemic risks in the banking sectors of five new European Union member countries (i.e. Estonia, Latvia, Lithuania, Bulgaria and Romania) through analyzing the relationship between non-performing loans (NPLs) and a combination of macroeconomic and banking sector variables as sources of systemic risk. More specifically, the paper tests the hypothesis that growth of credit and available finance might harm the performance of the banking sector and deteriorate quality of loan portfolio (NPLs). Using the panel regression method and quarterly time-series data spanning the first quarter of 1995 to the second quarter of 2009, the empirical results support the hypothesis that the oversupply of credit may overheat the economy and consequently damage the performance of the banking sector. The study also

provides evidence that gross fixed capital formations in the selected countries may contribute to an increase in the economic activity and thus lower the ratio of non-performing loans.

The available literature on this subject suggests that macroeconomic conditions have significant impact on the stability or soundness of the banking sector. Almost all these studies agreed that there was a significantly negative correlation between banks' performance and business cycles. This means that during economic upturns, borrowers have more chances to make profits through their economic activities and therefore become more likely to settle their bank loans. While during adverse economic conditions, making profit becomes very difficult for many borrowers and thus they start defaulting on their bank loans. As the amount of non-performing loans mounts, the banks start to have difficulties repaying their debts to depositors. This can constitute a serious threat to the solvency of bank that can go as worse as declaring bankruptcy and closing the business.

Moreover, many of these studies stressed that favorable economic conditions are associated with credit booms and lower sense of risk. As a result, banks tend to decrease their capital ratios during booms while increasing them during slumps which cause a pro-cyclical impact on the economy. In fact, banks are expected to do exactly the opposite, that is to strengthen their capital bases during upturns while decrease them during downturns. In other words, banks should follow counter-cyclical rather than pro-cyclical actions in order to provide an effective monetary policy that helps overcoming economic crises.

2.5 UAE banking Sector Assessment

In general, efforts to study the performance of UAE banking sector are very little which leaves a huge vacuum for future research on this subject. Other than the work undertaken by IMF's financial sector assessment program on evaluating the stability of UAE banking sector, there is almost no significant work undertaken to investigative the dynamics and vulnerabilities of this crucial sector and its linkages with the entire economy. In fact, the central bank of UAE which is supposed to be in charge of maintaining the stability of the financial system and macroeconomy has never conducted (or at least published) a financial stability report that attempts to investigate the strengths and potential risks to this sector.

The IMF country report no. 03/20 (2003) titled "United Arab Emirates: Financial System Stability Assessment, including Reports on the Observance of Standards and Codes on the following topics: Monetary and Financial Policy Transparency, Banking Supervision and Payment System" concluded that UAE banking sector appeared to be strong and banks were broadly profitable and showing signs of improving credit quality. The series of stress tests that were conducted on local and foreign banks showed that banks are resilient to deterioration in the quality of loans unless it was substantially high leading to problems in a number of banks. It also showed that foreign exchange risk that could arise from maintaining or removing the peg to US dollar was minimal on banks. The stress tests also concluded that banks were facing little interest rate risk since most assets were short term and well matched to their liabilities. In addition, there was sufficient liquidity in the system.

In its second financial system stability assessment that was conducted in October, 2007 (IMF Country Report No. 07/357), the IMF concluded that the UAE banking sector has shown

comfortable levels of capitalization and profits that largely benefited from the rapid expansion in the economy at that time. It also showed that the banking sector would be resilient to a variety of shocks, especially that 2006 decline in UAE stock markets was easily absorbed by banks. However, the assessment pointed out that some banks might be vulnerable to sever correction in real estate market given their high exposure to the sector which accounted for about 25% of their total assets portfolio.

In a stress test that was conducted by Shuaa Capital (El Boury et al., 2010) in the aftermath of global financial crisis 2008-2009, the UAE banking sector was sufficiently capitalized and ready to absorb significant deterioration in the quality of their assets. However, the report showed that an additional capital injections ranging USD 669 million in a base case scenario to USD 4.3 billion in the worst case scenario were probably needed to strengthen the capital bases of UAE banks. The report also suggested that the government should take additional measures to clean up banks' balance sheets in order to restore confidence in the markets and encourage banks to resume their lending to enterprises and consumers.

More recently, the 2011 "Article IV Consultation—Staff Report and Selected Issues and Statistical Appendix" that was prepared by the IMF has pointed out to the fiscal and financial risk posed by government related entities (GREs). The size and restructuring of some of these entities' debt and their short and medium term rollover needs might pose significant risk on UAE banks in future. The report recommended better governance as well as regular reporting, assessing and monitoring of GREs contingent liabilities in government accounts. Also UAE banks with high exposure to GREs should be adequately provisioned against any possible loss in future.

2.6 Conclusion

This chapter has reviewed the available literature on the role of financial system in the functioning of economic activity where most of the studies had agreed that sound financial and banking sectors are crucial to the stability and prosperity of the economy as a whole. In contrast, changing macroeconomic environment can have a significant impact on the functioning and stability of the banking sector which if situation turned to be critically unfavorable might lead to episodes of banking crises. For that reason, studying the macroeconomic determinants of banks' soundness has attracted a great deal of attention in the past couple of years.

This study belongs to the stream of research that attempts to understand the linkages between the macroeconomic environment and financial soundness indicators as well as bank-specific characteristics that might have an impact on the soundness of the whole banking sector. To our knowledge, no studies have attempted to explore the impact of macroeconomic conditions on the soundness of UAE baking sector till date. The available work of the IMF and its financial stability assessment program (FSAP) was directed towards the descriptive analysis of macroeconomic variables and financial soundness indicators without going deeper into studying the linkages between the two sets of variables. This study attempts to fill this gap by analyzing the determinants of FSIs in UAE banking sector using panel data on UAE banks.

This research attempts to understand the casual relationship between macroeconomic variables and financial soundness indicators. More specifically, it intends to explore how macroeconomic dynamics such as GDP growth rate, inflation rate, interest rates, and other macroeconomic variables in addition to bank-specific variables like assets, ROA, overhead costs, exposure to real estate sector are impacting the soundness of UAE banking sector.

Chapter 3

Overview of the Macroeconomic

And Banking Soundness Indicators in UAE

2005-2010

3. OVERVIEW OF THE MACROECONOMIC AND BANKING SECTOR INDICATORS IN UAE

This chapter provides an overview of the macroeconomic and financial conditions in UAE economy throughout the period 2004-2010. It is divided into three main parts. The first part discusses the developments in key macroeconomic variables including real GDP growth rate, inflation rate, current account balance and other indicators describing macroeconomic performance. The second part provides an overview of the structure and size of UAE banking sector followed by a discussion on financial soundness indicators and finally a comparison with the banking sectors in other GCC countries.

3.1 Macroeconomic developments in UAE throughout the period 2005-2010

UAE is the fifth largest oil and gas producer in the world with 95% of these reserves being found in Abu Dhabi, the capital, (World Bank, 2010). Abu Dhabi also owns one of the largest sovereign wealth fund in the world (under the management of Abu Dhabi Investment Authority, ADIA) which according to the Sovereign Wealth Fund Institute has about US$ 627 billion of assets. Dubai on the other hand makes the second largest emirate in the federation with a non-oil based diversified economy driven by services, trade, exports and re-exports and real estate sector.

Because of its government related entities (GREs), Dubai is highly leveraged with its gross debt to GDP ratio exceeding 100% (The IMF estimates the ratio at about 102.6%). The UAE economy also relies heavily on expatriate labor, constituting around 80% of its total population.

The UAE has established itself as a global player in trade, services and finance with an outward-oriented development strategy backed by high oil and gas prices and continuous efforts

to improve its business climate. As a result of its prudent macroeconomic policies, nominal GDP has almost doubled from AED 542.89 billion (US $ 147.93 billion) in 2004 to about AED 1,109.24 billion (US $ 302.24 billion) in 2010 (see figure 3.1). In 2010, nominal GDP per capita was AED 244,682 (US$66,670) up from AED 144,346 (US $ 39,331) in 2004, which places the UAE as the second largest economy in the Arab world after Saudi Arabia.

Figure 3.1: Real and Nominal GDP in UAE
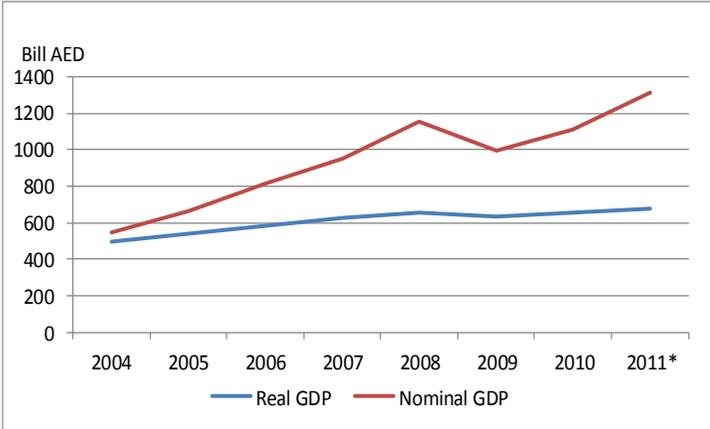
Source: World Economic Outlook, 2011

The global financial crisis of 2008-2009 resulted in a significant decline in economic activity in the UAE with growth rate of real GDP falling by -3.15% in 2009, thus putting a halt to a decade of rapid economic growth (see figures 3.2 and 3.3)

Figure 3.2: Oil and non-oil GDP growth rates in UAE

Source: World Economic Outlook, 2011

46
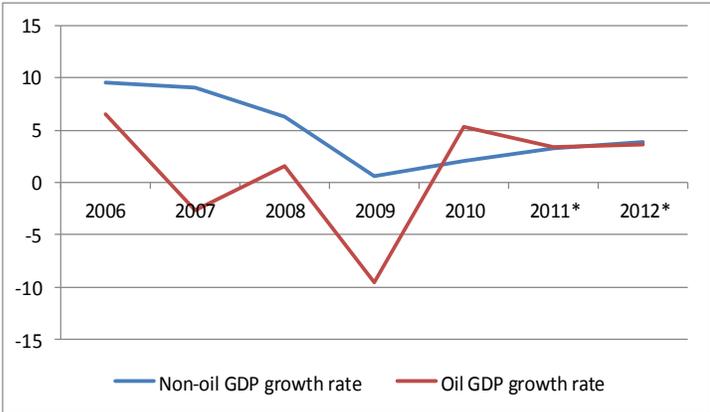
Figure 3.3: Real GDP growth rate and inflation rate
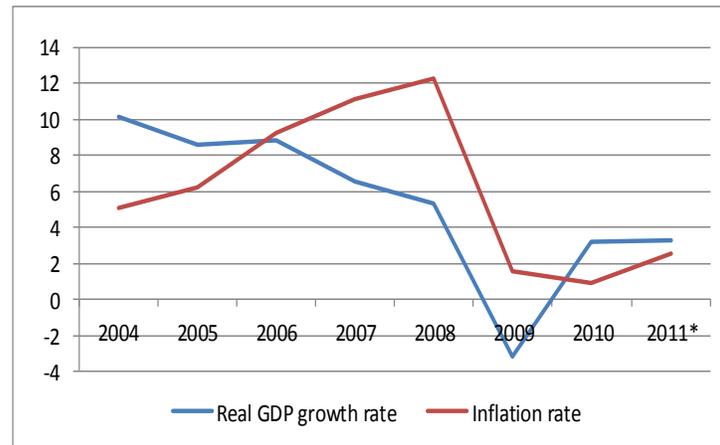
Source: World Economic Outlook, 2011

The slump of 2009 was driven by declining oil prices and global credit markets freeze, in addition to the significant correction in Dubai real estate market. Also, the debt standstill announced by Dubai World (DW), a prominent GRE, on November 25, 2009[7] raised a lot of uncertainties about the solvency of the remaining GREs, thereby causing significant increase in the cost of short term borrowing. However, because of the higher oil prices in the 2009-2010 period in addition to robust demand from trading partners, real GDP started to recover in 2010 with a growth rate of 3.2%, still below the average growth rate expected for its neighboring GCC economies at around 5% in 2011(IMF, 2011). This was largely due to the ongoing correction in real estate and the uncertainties related to the solvency of GREs. Further, inflation rate has dropped to 1.6% and 1% in 2009 and 2010, respectively, down from its peak of 12.3% in 2008. The lower inflation reflected weaker growth recovery and continuing decline in real estate prices.

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[7]   For   further   details,   see: http://www.ft.com/intl/cms/s/0/8a7a78e6-d9b9-11de-ad94-00144feabdc0.html#axzz1hkNlSZ33

Figure 3.4: Global Oil prices (US$/barrel), 2002-2011
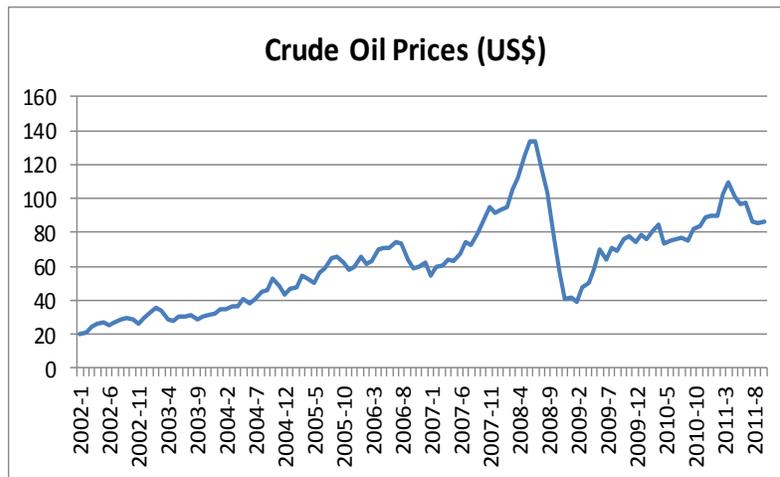
Source: Dow Jones & Company

Moreover, according to figure 3.5, the current account balance[8] has improved in the post-crisis period where it increased from its lowest level (3% of GDP in 2009) to 7% in 2010 and it is expected to reach 10.3% in 2011 driven by high oil prices and improved production (IMF, 2011).

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[8] Defined as the sum of net exports of goods and services, net income and net current transfers (See: http://data.worldbank.org/indicator/BN.CAB.XOKA.CD)

**Figure 3.5: Current account balance, General government gross debt and
Government fiscal balance in UAE**
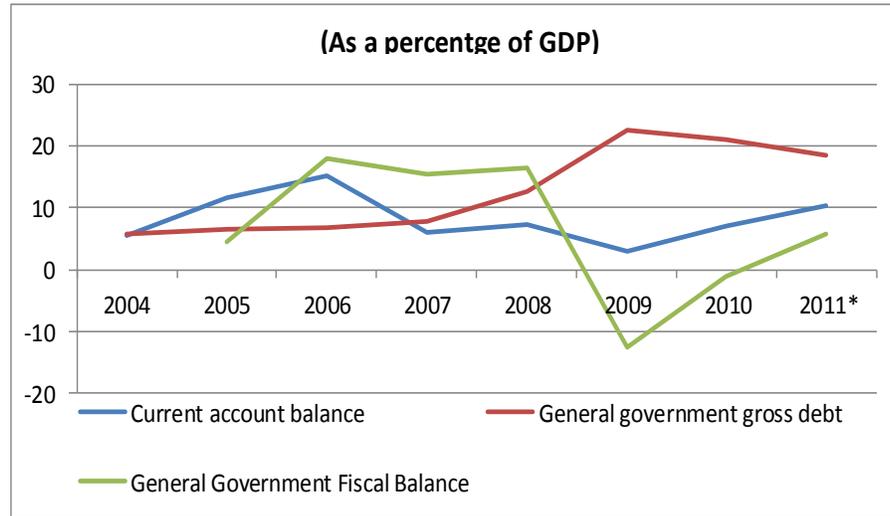
It is worth noting that before the global crisis the UAE had maintained higher levels of current account balances with the highest being recorded in 2006 (15.3% of GDP) which declined to 6% of GDP in the aftermath of the global financial turmoil. The improved current account balances will allow UAE to strengthen its investment position abroad (IMF regional economic outlook, 2011). On the other hand, the bailouts of banks and GREs are believed to have caused a reduction in the government fiscal balance (a negative -12.6% of GDP was reported in 2009). However, high oil prices and production levels have helped improving fiscal balance in 2010 (-1.1% of GDP) and are expected to further improve it in 2011 according to the IMF.

With regards to the governmental debt (excluding the public debt related to GREs), figure 3.6 shows that the general gross government debt has maintained low levels throughout the period 2004-2007 with an average of 6.7% of GDP. However, in 2008 this number has almost doubled to 12.5% and further increased to 22.5% and 21% in 2009 and 2010 after the financial

crisis. Sovereign debt is relatively small both in Abu Dhabi and Dubai (it is around 6.1% of GDP in Abu Dhabi and 21.4% of Dubai's GDP), but when accounting for GRE's debt, public debt problems become far more visible.

Figure 3.6: GRE and Sovereign Debt in Dubai, Abu Dhabi and UAE
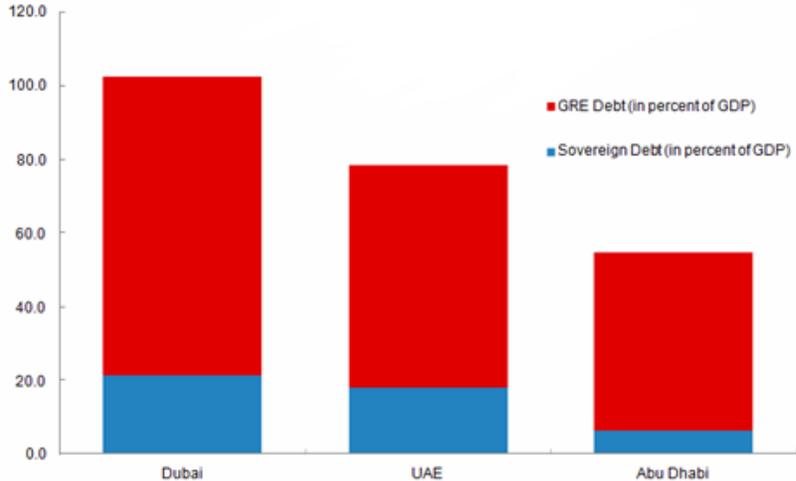
In Abu Dhabi, the percentage approximates 54.8% of GDP while in Dubai it becomes more significant at about 102.5% of its GDP. Regardless of the important contribution of GREs to UAE's economic growth, the recent bailouts by the government, substantial size of Dubai's GRE debt and huge short and medium term rollover cost constitute growing risk that needs to be addressed through better governance in these entities as well as better measures of risk management and disclosure of their contingent liabilities (IMF, 2011).

3.2 The Structure of UAE Banking Sector

Over the years, the UAE banking sector has experienced significant growth and sophistication. With aggregated assets equivalent to 142% of GDP in 2008, the sector is considered to be the second largest among GCC countries after Bahraini banking sector in relative terms.

Table 3.1: Total Banking Sector Assets in GCC countries

(In percent of GDP)

	Bahrain	Kuwait	Oman	Qatar	Saudi	U.A.E.
2002	106	120	52	85	68	111
2003	106	103	52	84	64	105
2004	108	94	50	76	65	107
2005	105	81	45	80	61	120
2006	123	84	50	85	61	133
2007	254	101	64	103	71	162
2008	258	84	66	94	68	142

Sources: IFS and IMF, 2010

By the year 2010, the total number of licensed banks operating in the UAE was 51 banks, of which 23 national banks and 28 foreign banks (See table 3.2). Overall, the number of banks has remained quite stable for a number of years largely due to the ban on new foreign banks entrants.

Emirates NBD is the largest bank with total assets of about AED 286.2 billion in 2010 making about 18% of total UAE banking assets followed by National bank of Abu Dhabi (NBAD) with total assets of AED 211.42 billion (about 13% of UAE banking assets). While the largest Islamic bank with AED 90.14 billion of total assets in 2010 was Dubai Islamic bank followed by Abu Dhabi Islamic Bank which reported total assets of about AED 75 billion in the

51

same year (about 5% of total banking assets for each bank). According to the Emirates Banks Association (EBA), the largest foreign banks operating in the UAE in terms of assets were HSBC and Standard Chartered Bank respectively (HSBC has reported AED 96 billion of total assets while AED 78 billion were reported by Standard Chartered Bank in 2010).

Figure 3.7: Market shares of UAE banks in terms of assets in 2010
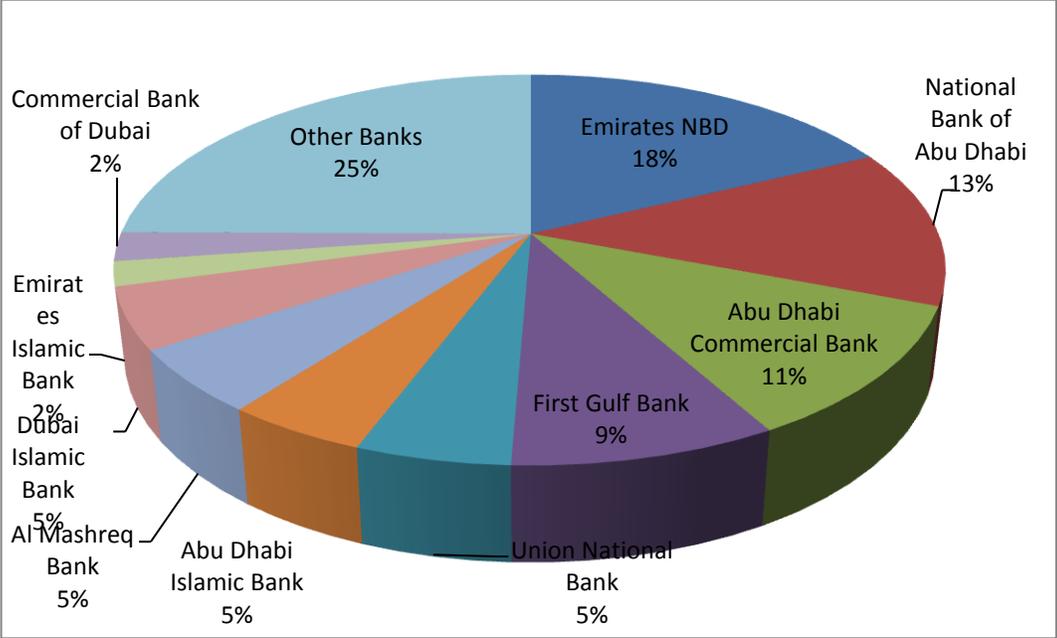
Source: Emirates Banks Association, 2010.

Although foreign banks have outnumbered national banks (see table 3.2), the share of foreign banks in total assets of the banking sector didn't exceed 18.6% in 2010, dropping from its highest level of 22.6% in 2007. In contrast, the share of state-owned banks in the total banking assets have witnessed a steady increase since 2007 reaching its highest level in 2010 of about 65%. Islamic banks have been also expanding their share of total assets with new Islamic banks entering the sector resulting in a total number of 8 banks (all of which are nationals).

52

Table 3.2: UAE Banking System Structure, 2006-2010

	2006	2007	2008	2009	2010
Number of Banks	46	49	52	52	51
National banks	21	22	24	24	23
Foreign Banks	25	27	28	28	28
Islamic	4	6	8	8	8
Non-Islamic	42	42	44	44	43
Private	31	33	35	35	35
National	6	6	7	7	7
Foreign	25	27	28	28	28
State-owned	15	16	17	17	16
Total Assets (Bill AED)	826	1,202	1,448	1,521	1,610
Total Deposits (Bill AED)	519	716	912	983	1,050
Assets Share (Percent)					
Private	36.4	38.2	36.8	35.5	34.6
Local	14.5	15.6	16.3	16.6	15.9
Foreign	21.9	22.6	20.6	18.9	18.6
State-owned	63.6	61.8	63.2	64.5	65.4
Islamic	14	14.2	15.7	16	16.8
Non-Islamic	86	85.8	84.3	84	83.2
Deposits Share (Percent)					
Private	40.1	39.9	37.7	37.2	35
Local	15.6	16.7	16.6	17.2	16.2
Foreign	24.5	23.2	21.1	20	18.7
State-owned	59.9	60.1	62.3	62.8	65
Islamic	16	17.1	18.1	18.7	18.8
Non-Islamic	84	82.9	81.9	81.3	81.2

Source: Central Bank of UAE and IMF

By and large, the size of UAE banking assets has experienced a substantial increase in 2007 and 2008, largely driven by strong growth performance in most of the economic sectors led by construction and services and followed by manufacturing (see table 3.2). The increase in assets was also reflective of the high global oil prices and strong domestic demand fueled by growing population and large infrastructure projects in Dubai and Abu Dhabi. Total banking assets continued to increase in 2009 and 2010 though at a decelerating pace due to the impact of the global financial turmoil on banking sector and the economy as a whole.

3.3 Soundness Indicators of UAE Banking Sector

The UAE banking sector as a whole has shown comfortable levels of capitalization that complied by all capital requirements set by CBUAE as well as Basel II and the new capital requirements as stipulated by Basel III . This was evident even during the financial crisis period 2008-2009 thanks to the financial support extended by the federal government. However, with the new Basel III strict definitions of the capital base in general, and Tier I capital in particular, more emphasis should be placed on the quality of bank's capital along the quantitative requirements. A solid capital base largely consisting of common equity is now believed to provide the best buffer against any future shock to the financial system.

In addition, the UAE banks' profitability has remained at high levels even during the financial crisis but started to decline in post-2009 crisis, due to the increasing provisions for non-performing loans and loan losses. Also, banks with greater proportions of the debt restructuring of Dubai's GREs should be more prepared to absorb the roll-over risk when the loans start to mature in 2014. Liquidity profile of banks has also shown signs of improvement thanks to their efforts to attract deposits and their cautious approach to lending. However, banks might need to

extend the maturity of their loans and improve their stability as put forward by the Basel III liquidity requirements.

Moreover, loan portfolios of many banks that were profoundly hit by the latest financial crisis remained highly exposed to the real estate and construction sector, which has put these banks under a real concentration risk that makes them subject to higher non-performing loans in case that the sector remained fragile. To cushion themselves from shocks in the economy, the UAE banks should therefore consider diversifying their loans portfolio through lending to more stable sectors within the economy and improve their risk assessment tools in order to minimize the volume of their non-performing loans.

The following parts provide a detailed analysis on the soundness of UAE banks using key financial soundness indicators related to the capital adequacy, assets quality, profitability, liquidity and other soundness indicators.

3.3.1 Capital Adequacy and leverage ratio

According to figure (3.8), UAE banks have maintained sufficient levels of capital adequacy ratios over the 2005-2010 period.

Figure 3.8: Capital Adequacy ratios
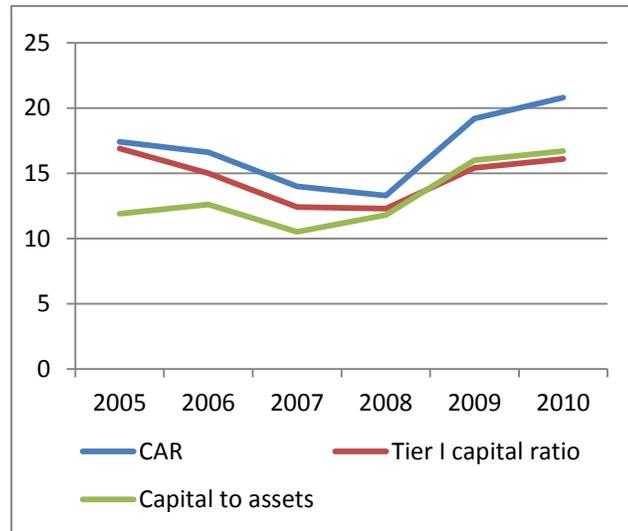
Source: IMF, 2011

From an average of 17.4% in 2005, capital adequacy ratio has been steadily declining till it reached its bottom (13.3%) in 2008 in the wake of the global financial crisis that resulted in a drastic drop (i.e. write-downs) in the valuation associated with mark-to-market financial assets. This crisis has also triggered a drop in the cross-border funding (i.e. liquidity crisis and credit crunch) in conjunction with rising non-performing loans. However, following government intervention to increase liquidity and financial support to the troubled banks, average capital adequacy ratio significantly recovered in 2009 and 2010 (the ratio was 19.2% in 2009 and 20.8 in 2010). The same pattern was observed in Tier1 capital ratio where the average ratio dropped from a high average of 16.95% in 2005 to 12.3% in 2008, then recovered to 15.4% and 16.1% in 2009 and 2010, respectively (see figure 3.8).

On the other hand, the increasing capital to assets ratio in figure (3.8) suggests that banks are continuously attempting to reduce their reliance on borrowing (leverage) and focus on strengthening their capital bases. From 11.9% in 2005, the average capital to assets ratio has increased to 16.7% in 2010. The extent of leverage is one of the aspects that were strongly stressed by the Basel III accord as it proved to be one of the weaknesses characterizing the banking sectors around the globe (BIS, 2010a).

3.3.2   Assets Quality

Figure (3.9) illustrates the evolution of asset quality over the period 2005-2010. The figure clearly indicates that over the period that preceded the financial crisis, banks have witnessed high levels of non-performing loans (i.e. the ratio was 8.3% in 2005 and 6.3% in 2006) which started to drop in the following years reaching a minimum of 2.9% and 2.5% in 2007 and 2008, respectively). However, the latest financial crisis of 2008-2009 and the associated adverse macroeconomic environment caused an increase in the level of non-performing loans to 4.8% in 2009 and 6.3% in 2010. It was exacerbated by the collapse in real estate market and associated decline in growth and employment. This was more evident in the case of Dubai banks due to their higher exposure to the troubled real estate sector where the average non-performing to total gross loans doubled from 4.1 % in 2009 to around 8% in 2010, while in Abu Dhabi banks, the average jumped from 3.1% in 2009 to 6% in 2010. According to the IMF latest staff consultation report 2011, the ratio of non-performing loans is expected to increase further due to the continuing correction in the property market while Dubai-based banks are expected to endure greater levels of non-performing loans due to their higher exposure to GREs whose a large portion of their debt is expected to mature in the short run (see figures 3.10 and 3.11)

Figure 3.9: Non-performing loans to total gross loans
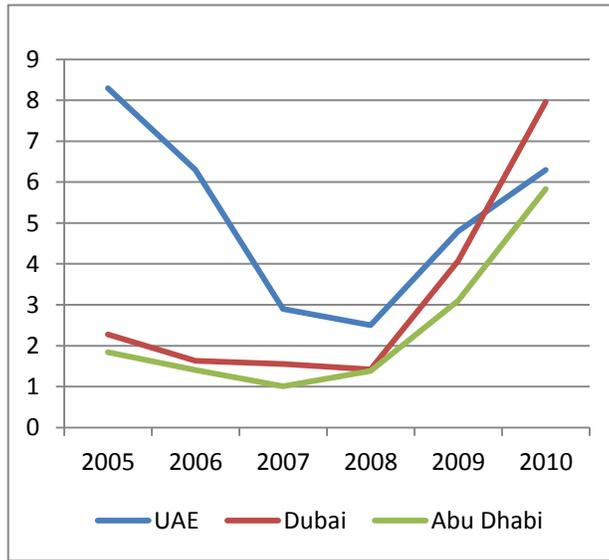
Source: IMF, 2011

Figure 3.10: Real estate index and NPLs
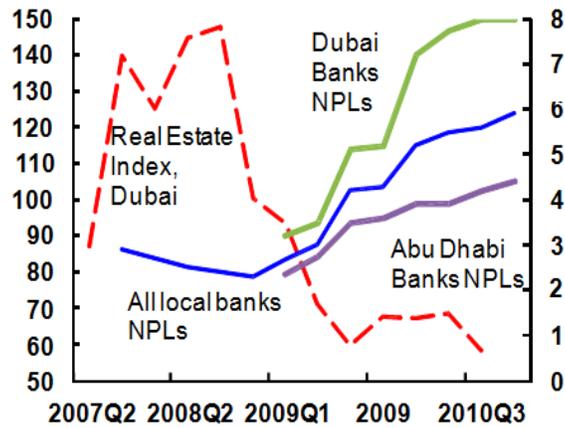
Source: IMF, 2011

Figure 3.11: Banks' exposure to real estate market
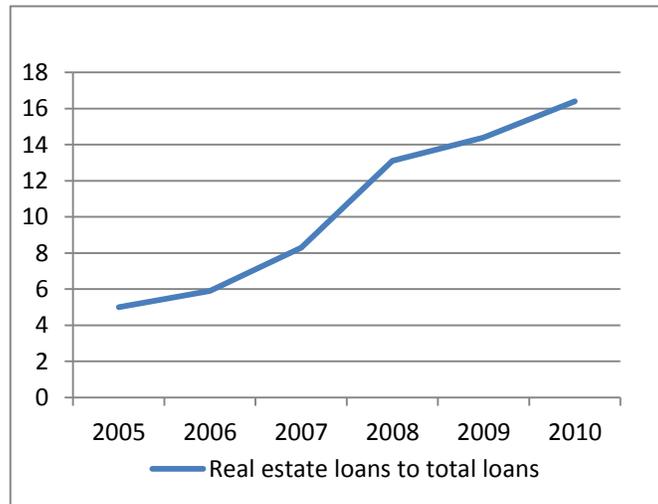
Source: IMF, 2011

3.3.3 Loan loss reserves to non-performing loans

Figure (3.12) suggests that although there is an increase in the level of non-performing loans, banks' loan loss provisioning does not correlate with these developments. From its high levels in 2005-2008 which approximated 100%, average loan loss reserves to non performing loans have declined in the post crisis period (i.e. 85% in 2009 and 83.3% in 2010). This could be attributable to the declining results of banks' profits that encouraged banks to cut their loan loss provisioning in order to project a better picture on their profits.

In line with this, the central bank of UAE has issued new guidelines on loan classification and provisioning aiming to enforce greater consistency across UAE banks and promote forward-looking provisioning practices (Circular 28/2010 of November 11th, 2010). These guidelines are intended to complement the already used International Financial Reporting Standards (IFSR) which classifies the loan provisions into collective and specific impairments provisioning.

Figure 3.12: Loan loss reserves to non-performing loans
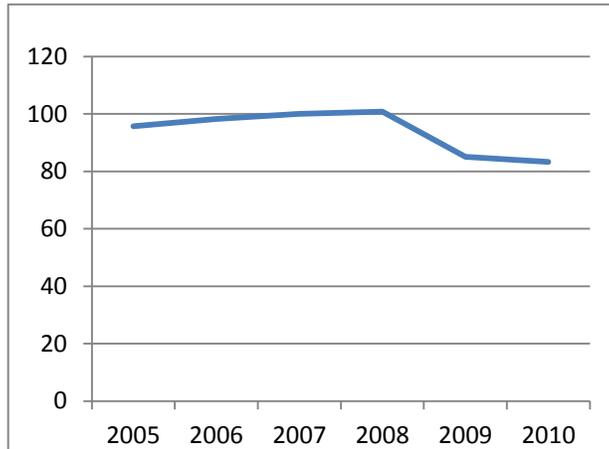
Source: IMF, 2011

3.3.4 Profitability Indicators

Figure (3.13) shows that the earnings and profitability of UAE banks have been declining over the 2005-2010 period though interest margin to gross income was increasing. The return on equity (ROE) indicator shows that profitability of banks dropped from their highest level of 22.5% in 2005 to their lowest levels in 2009 and 2010 (7.9 % and 8.4%, respectively).

Figure 3.13: Profitability indicators
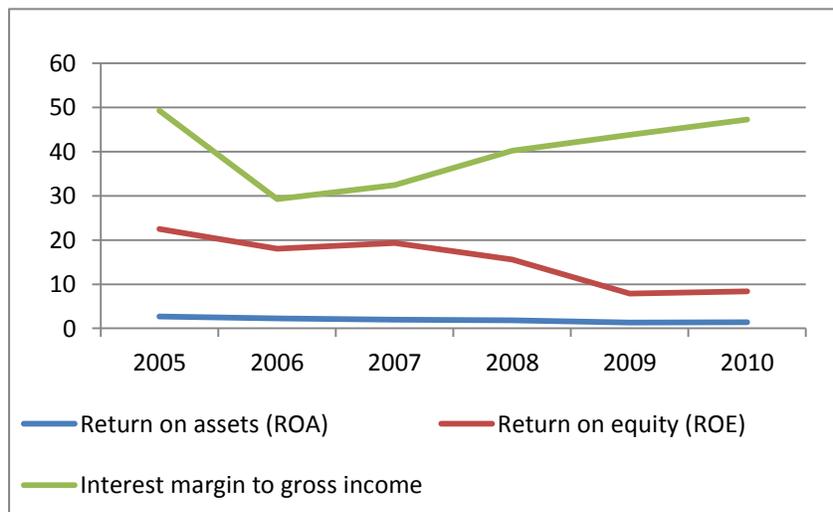
Source: IMF, 2011

In 2005, banks benefited from sizeable fees and margin interest income as a result of the flourishing stock market. However, the boom did not last for long as the equity market and initial public offerings (IPO) operations sharply contracted in 2006 resulting in adverse impact on the profitability of UAE banks. However, the diversification strategy as well as strong retail banking have helped UAE banks reduce their direct losses from this correction (Chaillouxand and Hakura, 2009). The UAE banks' profits continued to decline dramatically in the subsequent years due to the adverse implications of the global financial crisis. Similar pattern can be observed in ROA profitability indicator.

3.3.5 Liquidity Indicators

The financial crisis of 2008-2009 period also revealed that complying with the regulatory capital requirements is not enough to ensure the stability of financial system. More attention should be given to the amount of liquidity available in the market as a key indicator to the soundness of the banking sector. For this reason, Basel III has included new measures for monitoring banks' liquidity both in the short and long time horizons (i.e. Liquidity coverage ratio (LCR) and net stable funding ratio (NSFR)) (BIS, 2010b)

As illustrated in figure (3.14), Liquidity in the system (measured by liquid assets to total assets) declined from 16.4% and 13.2% in 2006 and 2007, respectively.

Figure 3.14: Liquidity Indicators
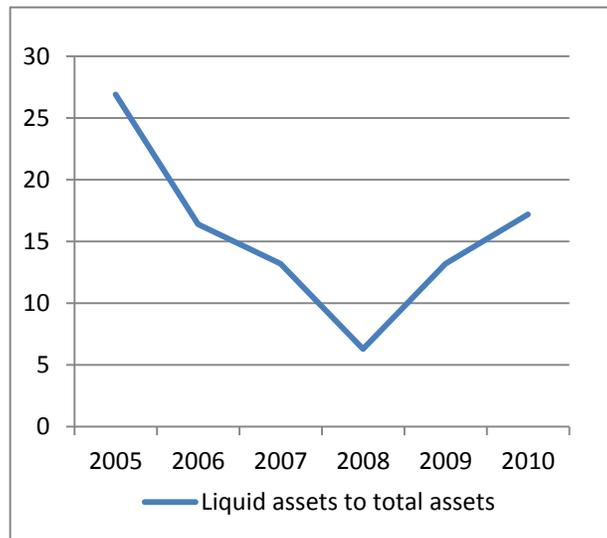
Source: IMF, 2011

This implies that the UAE financial system witnessed significant liquidity pressures even before the onset of the global financial crisis in 2009. This can largely be explained by the substantial decline in Dubai and Abu Dhabi stock markets in 2006. However, liquidity pressures intensified in following years in the wake of the global financial crisis where it reached the bottom 6.3% in 2008. The post-Lehman brothers period was characterized by a decline in the external financing and an increase in the cost of borrowing, making it difficult for UAE banks to get access to external sources of funding. Liquidity conditions have exacerbated further with the reversal of short run capital inflows that have entered the domestic markets earlier driven by speculation on a revaluation of US-Dirham peg. Moreover, the sharp correction in Dubai real estate market has also added to the liquidity crunch since many banks have been highly exposed to this market (Chailloux and Hakura, 2009 and IMF Country Report No. 11/112, 2011)

In 2008 and early 2009, the CBUAE took swift and decisive actions to improve the tightened liquidity conditions in the financial system through introducing several measures aimed at supporting local banks. First, the CBUAE introduced a swap facility in March, 2008 to

ease US dollar funding pressures that resulted from the capital outflows which have previously entered the markets for speculative purposes. To remedy this, the CBUAE provided commercial banks with US $8 billion (AED 29.4 billion). Further, the CBUAE added US$ 1.2 billion (AED 4.4 billion) to the financial system. In order to ease dirham funding pressures, starting from September 22nd, 2008 the CBUAE allowed banks to borrow against their reserve requirements. However, this facility was underutilized since most of the banks drew on their reserve requirements only about 20% of the total amount (about AED 50 billion).

In addition, a liquidity support facility was introduced in September, 2008 to supplement previous CBUAE initiatives. Under this facility, commercial banks could obtain dirham facility against certificates of deposits (CDs) of up to 14 days maturities. Further, the CBUAE allowed banks to borrow against any security collateral. To some extent, these measures succeeded in alleviating liquidity pressures, but the deteriorating global financial situation reduced the positive impact of all the measures that were introduced. Therefore, in 2009 the Ministry of Finance announced a blanket guarantee of deposits and interbank lending for three years and provided an additional US$ 19.1 billion (AED 70 billion) as emergency liquidity support fund that took the form of interest-yielding government deposits to provide long-term support to banks (Chailloux and Hakura, 2009).

Overall, these measures helped to restore confidence in the banking sector, thereby improving liquidity. This is shown in figure (3.14) where the ratio of liquid assets to total assets increased from 6.3% in 2008 to 13.2% and 17.2% in 2009 and 2010, respectively.

However, most of the UAE banks' operations remained concentrated on overnight segment while EIBOR[9] rate continued at high rates. This can be largely attributed to the increasing risk aversion behavior in the global financial market arising from higher perceived systemic risk rather than the lack of effectiveness of the measures that have been taken by the central bank and government.

3.3.6 Banks' lending to the private sector

Banks' loans to the private sector declined from about 71% in 2005 to 60.4% in 2006 because of the sharp decline in Dubai and Abu Dhabi stock markets. However, in the 2007-2008 period, banks increased the share of loans made to the private sector to 61.5% in 2007 and 71.3% in 2008. This was a reflection of the strong growth that characterized UAE economy during the same period. Moreover, the USD-dirham pegged exchange rate regime forced the CBUAE to pursue similar expansionary monetary policy pursued by the US Federal Reserve since mid 2007, adding stimulus to the economy with negative real interest rate and thus providing further boost to the already flourishing private sector. However, in 2010 and as a result of the global credit crunch and subsequent risk aversion mood that increased in the market, banks reduced their credit to the private sector to almost 63% of their total loans.

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[9] EIBOR rate or Emirates interbank offer rate is the interest rate charged by UAE banks for interbank transactions and it is the most commonly used by lenders and borrowers to conduct financial transactions in the UAE. EIBOR rate is being determined by the daily offers from ten major banks in the UAE (5 of which are local).

Figure 3.15: Banks' loans to private sector (% of total deposits)
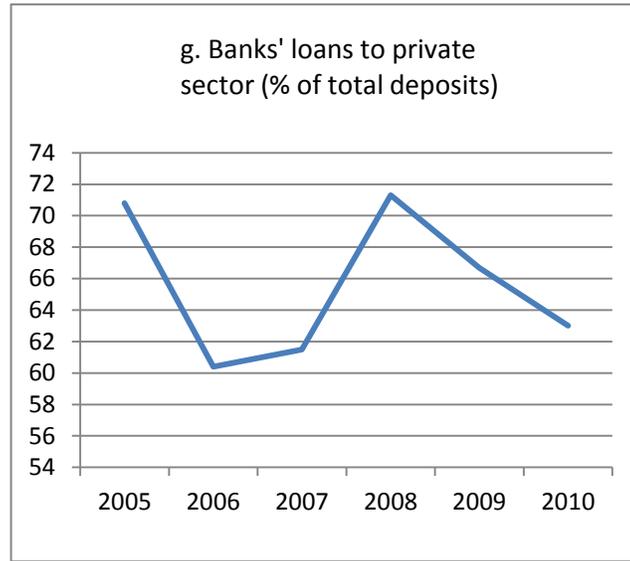
Source: IMF, 2011

3.4 Comparisons with other GCC banking sectors

Table 3.3 shows that UAE banks have maintained the highest capital adequacy ratios in the post-crisis era (21% compared to 20% in Bahrain, 18% in Kuwait, 17% in Saudi Arabia, 16% in Qatar and 16% in Oman). However, the ratio of nonperforming loans in UAE banks are among the highest in the GCC region with almost 6% in 2010 compared to 2% in Qatar, 3% in Saudi Arabia, 4% in Oman, 4% in Bahrain, but still lower than the ratio in Kuwait which amounted to 10% from the total gross loans.

Table 3.3: Financial Soundness Indicators in GCC countries 2007 vs. 2010

	Nonperforming Loans		Capital Adequacy		Provisioning Rate		Return on Assets		Return on Equity	
	2007	2010	2007	2010	2007	2010	2007	2010	2007	2010
Bahrain	2.3	3.9	21	19.6	74	60.3	1.2	1.2	18.4	10.6
Kuwait	3.2	9.7	19.4	18	48.2	38.5	3.6	0.8	29.4	6.9
Oman	3.2	3.5	15.8	15.5	111.8	104	2.1	1.4	14.3	10
Qatar	1.5	1.7	13.5	16.1	90.7	84.5	3.6	2.6	30.4	19.3
Saudi Arabia	2.1	3.3	20.6	16.5	142.9	89.8	2.8	2	28.5	25.8
UAE	2.9	5.9	14	20.8	100	88.6	2	1.4	19.3	8.4

Source: IMF

The high level of non-performing loans in UAE and Kuwait is largely attributable to the loan concentration in real estate market. Yet, the considerable losses by Gulf bank as well as the troubled investment companies made the problem even more severe in Kuwaiti banking sector (Khamis and Senhadji, 2010). Though banks were supposed to increase their provisioning in tandem with increasing levels of non-performing loans, it is noticeable that all GCC banks have instead cut their provisioning ratios.

Moreover, despite the sharp drop in their profitability, banks in the GCC countries have remained profitable. Qatar and Saudi Arabia banks reported the highest profitability among all GCC banks though slightly lower in 2010 because of the impact of the global financial crisis. According to table 3.3, UAE banks have also been profitable though less than their peers in the GCC - Saudi Arabia, Qatar and Bahrain

3.5 Conclusion

The descriptive analysis in this chapter provided a firsthand examination for the macroeconomic developments and financial indicators of the UAE banking sector throughout the period 2004-2010. We showed how macroeconomic conditions and banking soundness indicators evolved before and after the global financial crisis of 2008-2009. The chapter presented evidence on the interrelation between macroeconomic conditions and banking soundness indicators.

In the following chapters we are going to establish the methodology and empirical investigation on the significance of these relationships in light of the above analysis and available literature on the subject.

Chapter 4

Data, Methodology and Model Specification

4. DATA, METHODOLOGY AND MODEL SPECIFICATION

In this chapter we put forward the methodology and econometric models used to test our hypothesis about the relationship between macroeconomic variables and financial soundness indicators. We also provide a description of the data used to conduct the empirical investigation. Then, we show how we tested the data for the four assumptions about multiple regressions, namely: normality, linearity, homoscedasticity and independence of errors.

4.1 Data

The empirical analysis in this paper is based on a panel data comprising a sample of 19 national banks from a total of 51 banks currently operating in the UAE (of which 23 are national banks and 28 foreign banks). The selected sample makes up to 84% of the total banking assets in UAE and covers the period between 2005 and 2010, providing a total number of observations of 114. The selected time period will help assessing the impact of macroeconomic dynamics and bank-specific characteristics on the soundness of UAE banking sector. The sample selection is bound by availability of data on relevant information on banks especially variables that are used to assess banks soundness (such as capital adequacy ratio, non-performing loans to total gross loans and return on assets).

On the macroeconomic variables, we make use of data obtained from the World Economic Outlook (WEO) of the International Monetary Fund (IMF). This database provides regular information on the macroeconomic performance of individual countries. In this research, we use variables such as real GDP, GDP per capita, GDP growth rate, inflation rate, broad money supply (M2) and domestic credit to the private sector that covers the period 2005-2010. We also try to investigate the impact of Dubai real estate market on UAE banks performance.

Thus, we include a variable on real estate price change for the period 2007-2010 (we call it real estate inflation rate) obtained from Dubai Land Department. Also, to study the impact of interest rate on UAE banks, we use Emirates interbank offer rate (EIBOR) for six months covering the period 2006-2010 obtained from UAE Central Bank.

As for the bank-specific characteristics, we make use of data obtained from bankscope database on banks annual financial results such as total assets, deposits, gross loans, interest margin, non-performing loan, spread rate (the difference between lending rate and borrowing rate) and bank's exposure to real estate market (the percentage of real estate and construction loans to total bank loans) . Also, to measure banks financial soundness, we use the same indicators used by FSAP such as capital adequacy ratio (total capital as a percentage of risk-weighted assets), the percentage of non-performing loans to total gross loans (as a proxy for asset quality) and return on assets (ROA) to measure bank profitability.

4.2 Methodology and Model Specification

The general model adopted in this study will have the bank soundness indicator as a dependent variable while bank specific characteristics and macroeconomic variables will be used as independent explanatory variables to run linear multiple regression models as follows:

$$FSI_{i,t} = f(\text{bank-specific}_{i,t}, \text{macroeconomic variables}_{i,t})$$

Where i denotes bank and t denotes year. The bank-specific and macroeconomic variables used in our econometric models have been included in several studies and shown to be instrumental to explain changes in the financial soundness indicators. Babihuga (2006) shows that the relationship between macroeconomic conditions and FSIs varies across countries depending on the interaction between business cycle and dummy variables that control for cross-

70

country variations in income, sophistication of financial system, quality of supervision (measured by adherence to Basel core principles) as well as market concentration. However, since the focus in this paper is mainly on UAE banking sector, introducing interaction terms to control for such cross-country variations is not relevant. Rather, we control for cross-bank variations by total assets or total loans.

Since the FSAP provides a comprehensive list of financial soundness indicators (comprised of core and encouraged ratios), three of these indicators will be used in this research to conduct the empirical analysis (namely: Capital adequacy, asset quality and profitability). According to other studies (.e.g. Arpa et al. (2001), Wong, et al. (2005), Fofack (2005), Babihuga (2006)), these indicators provide ideal measures for the soundness of banks.

Ordinary Least Square method (OLS) is used to run multiple linear regressions using different model specifications of explanatory variables. However, for this type of statistical tests to be reliable, certain assumptions about the variables used in the regressions should be met (Osborne and Waters, 2002). Testing the data for these assumptions is important to assure that the outcome of the regression analysis is unbiased and does not result in a type 1 or type 2 errors. These assumptions include: linearity, independence of errors, equal variance (homoscedasticity) and normality.

1. Linearity: this assumption states that the relationship between dependant and independent variables should be linear in order to produce accurate estimates for relationships. A preferable method to assess linearity is through plotting residuals against predicted values (Osborne and Waters, 2002).

2. Independence of errors: this assumption implies that errors (ε_i) are independent of one another, and this is particularly important when data are collected over a period of time.

In some cases, the errors for a specific time period are correlated with those of previous time periods (autocorrelation). When a set of data has significant autocorrelation, the reliability of the regression model could be in a serious doubt (Levine et al., 2008). To test the data for autocorrelation we may plot the residuals in the sequence in which they were collected against lagged residuals to determine whether or not they follow any sort of pattern. There is also a statistical test for autocorrelation called Durbin-Watson (D) statistic defined as:

$$d = \frac{\sum_{i=2}^{n}(e_i - e_{i-1})^2}{\sum_{i=1}^{n} e_i^2}$$

where e_i = residual at the time period i. The null hypothesis (H_0) in this test is: No autocorrelation. Like other hypothesis tests, there are acceptance and rejections regions to decide on the validity of the null hypothesis. But generally, a d statistics closer to 2 means no autocorrelations exists in the data, while a d statistic closer to 0 indicates a positive autocorrelation and a d closer to 4 indicates a negative one (Levine et al., 2008).

3. Equal variance (Homoscedasticity): This assumption states that the variance (σ^2) of residuals (e_i) across all levels of explanatory variables is constant. Homoscedasticity is important to justify t tests, F tests and confidence intervals for OLS regressions models even with large samples sizes (Wooldridge, 2006). To evaluate this assumption, we may plot the residuals (e_i) against the predicted values from regression. If the plot does not show major differences in the variability of these residuals, we can conclude that there is no evident violation for this assumption.

4. Normality: this assumption requires that the errors are normally distributed at each value of the independent variables. To evaluate this assumption (that is checking the data for skewness, kurtosis and outliers whose existence can distort relationships and

significance of results), we may plot the residuals (e_i) into frequency distribution and display the results in histogram (Levine et al., 2008).

4.3 Econometric Models

4.3.1 Capital Adequacy

The general form of panel data model used to examine the relationship between capital adequacy ratio (the ratio of total capital to risk-weighted assets) and relevant variables can be modeled as a function of bank-specific variables including lagged CAR (CAR in previous year), size of the bank (proxied by bank total loans), return on assets (ROA), risk weighted assets to total bank assets in addition to macroeconomic variables that include real GDP growth rate, changes in inflation rate, real estate inflation rate and EIBOR rate.

$$CAR_{it} = \alpha_0 + \alpha_1\,CAR_{i,t-1} + \alpha_2\,LOAN + \alpha_3\,ROA + \alpha_4\,RWA\_ASSETS + \alpha_5\,GROWTH + \alpha_6$$

$$INFLAT + \alpha_7\,REALES + \alpha_8\,EIBOR + \varepsilon_{it} \qquad\qquad (4.1)$$

Where i and t denote bank and year, respectively. Capital adequacy ratio ($CAR_{i,t}$) is the dependent variable. a_0 is a constant while $\alpha = (\alpha_1, \alpha_{2,\ldots}, \alpha_8)$ are fixed vector coefficients and ε_{it} is a random error. The explanatory variables used in this model are described in table (4.1) along with the expected effect according to the theoretical and empirical literature.

Table 4.1: Determinants of Bank CAR ratio: Description of explanatory variables

Variable	Description	Expected sign	Explanation
CAR_{t-1}	One-period lagged CAR ratio	+	The higher the cost of raising capital, the more capital buffer a bank will hold.
Log (Loan)	Logarithm of bank loans – a proxy for bank size	-	Larger banks tend to hold less capital.
ROA	Return on assets, an indicator of bank profitability	+	The higher the profitability of the bank, the more capital is expected to be reserved.
RWA_ASSETS	Risk-weighted assets/total assets ratio	+/-	It depends on bank views on the appropriate level of capital to cover its risks which may differ from the minimum requirement set by regulators.
GROWTH	Real GDP growth rate	-	Banks tend to increase their capital base during downturns and cut them during upturns (procyclicality).
INFLAT	Inflation rate	+/-	The effect depends on what happens to bank income under high inflation rates.
REALES	Real Estate inflation rate	+/-	The effect might be similar to the impact of inflation rate. It also depends on bank exposure to the real estate market.
6 month EIBOR	Emirates interbank offer rate – a proxy for interest rate	+/-	It depends on the dominating effect either the pass-through to lending rate or deposit rate. The dominating effect will determine bank profit.

4.3.2 Assets Quality

During financial distress, the quality of loan portfolio appears to be one of the important sources of system vulnerabilities since non performing loans ratios tend to accelerate more quickly before bank collapses. There are a number of factors upon which a deteriorating asset quality can be attributed. These factors generally include macroeconomic instability and economic slumps, deteriorating terms of trade, insider lending[10], high interest rate, highly-priced interbank loans and moral hazard (Goldstein and Turner, 1996). The latter refers to the adverse

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[10] A financial transaction in which the lender (i.e. bank) is directly or indirectly related to the borrower. According to Caprio (1997), insider lending was identified as the major driver behind banks failure in most of the banking sectors around the world.

incentives built on the implicit bailout of governments for troubled banks. It was identified as one of the leading causes for the substantial increase in the level of non-performing loans, for example, this was one of the main drivers behind the 65% of impaired loans that were accumulated by four banks in Nigeria that had been liquidated in 1995 (Brownbridge, 1998).

The determinants of asset quality (proxied by the ratio of bank's non-performing loans[11] to total gross loans) used in our model consist of macroeconomic and bank-specific variables. On the macroeconomic level, we investigate the impact of variables such as real GDP growth rate, inflation rate, broad money supply (M2) and domestic credit to private sector. While on bank level, we use return on asset (ROA), interest rate spread (the difference between deposits rate and lending rate), loans to assets, lagged non-performing loans ratio and exposure to real estate market. These variables have been chosen in light of theoretical background and availability of data.

The model is specified as follows:

$$NPL_{i,t} = \alpha_0 + \alpha_1 NPL_{t-1} + \alpha_2 LOANS\_ASSETS + \alpha_3 ROA + \alpha_4 SPREAD + \alpha_5 REALES + \alpha_6$$

$$GROWTH + \alpha_7 INFLAT + \alpha_8 MONEY + \alpha_9 PRIVT\_CREDT + \varepsilon_{it} \qquad (4.2)$$

Where i and t denote bank and year, respectively. The dependent variable $NPL_{i,t}$ is the ratio of non-performing loans to total gross loan. α_0 is a constant while $\alpha = (\alpha_1, \alpha_{2,....,} \alpha_9)$ are fixed vector coefficients and ε_{it} is a random error. The explanatory variables used in this model are described in table (4.2) along with the expected effect according to the available literature.

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[11] Also known as impaired loans.

Table 4.2: Determinants of Bank Asset Quality: Description of explanatory variables

Variable	Description	Expected sign	Explanation
NPL_{t-1}	One period lagged non-performing loans ratio	+	The stock of non-performing loans does not change quite significantly between two consecutive periods.
LOANS_ASSETS	Ratio of bank loans to total assets	-	The larger the size of bank loans, the lower the impact of non-performing loans.
SPREAD	The difference between lending and borrowing rate	+	Increasing interest rate spread means more cost imposed on borrowers and thus more difficulties to repay.
ROA	Return on Assets	-	A bank which reports higher profitability is more likely to have lower non-performing loans ratio.
REALES	Bank exposure to real estate sector (real estate loans % of total loans)	+/-	The real estate sector in UAE and Dubai in particular played a significant role in economic growth in the periods preceding the financial crisis of 2008-2009. Also, the sharp correction in this sector during the crisis is believed to have impacted the soundness on UAE banking sector, especially the ones which maintained a higher exposure to real estate market within their loans portfolios.
GROWTH	Real GDP growth rate	-	Non-performing loans ratio is expected to decline in economic booms and increase in busts since borrowers' profitability usually increase during upturns and thus their ability to repay debt becomes better and vise-versa.
INFLAT	Inflation rate	+/-	It depends on whether higher inflation rate would coincide with general unfavorable economic conditions or not.
MONEY	Broad Money Supply (M2 % of GDP)	-	Higher broad money supply (credit boom) is normally associated with economic upturns characterized by favorable conditions that help repaying loans.
PRIVT_CREDT	Domestic Credit to private sector (% of GDP)	+/-	In theory, credit to the private sector increases more rapidly in the pre-crisis periods leading to a credit boom which will turn to a credit crunch when the crisis outbreaks.

4.3.3 Profitability

We model profitability - proxied by return on assets (ROA) - as a function of bank-specific variables such as equity, non-performing loans ratio (as a proxy for credit risk), overhead costs, lending rate and the exposure to real estate sector in addition to the macroeconomic variables that include real GDP growth rate, inflation rate and interest rate (EIBOR). In this model we followed the framework adopted by Demirguc-Kunt and Huizinga (1999), Abreu and Mendes (2002) and Babihuga (2007).

We estimate the following equation:

$$ROA_{it} = \alpha_0 + \alpha_1 \, CAPITAL_{it} + \alpha_2 \, NPL_{it} + \alpha_3 \, COST_{it} + \alpha_4 \, LEND\_RATE_{it} + \alpha_5 \, REALES_{it} + \alpha_6$$

$$GROWTH_{it} + \alpha_7 \, INFLAT + \alpha_8 \, EIBOR_{it} + \varepsilon_{it} \qquad (4.3)$$

Where i and t denote bank and year respectively. α_0 is a constant while $\alpha = (\alpha_1, \alpha_{2,\ldots}, \alpha_8)$ are fixed vector coefficients and ε_{it} is a random error. The explanatory variables used in this model are described in table (4.3) along with the expected effect as per the theory.

Table 4.3: Determinants of bank profitability: Description of explanatory variables

Variable	Description	Expected sign	Explanation
EQUITY_ASSET	The ratio of bank equity to assets	+	Higher capital helps banks cutting on their funding costs and thus gaining higher net interest margin and profits.
NPL	The ratio of non-performing loans to Total gross loans	-	Higher non-performing loans imply putting aside more loss provisions that leads to lower profits.
COST	Overhead cost as a ratio of total assets	-	Higher overhead costs result in lower profits for banks.
LEND_RATE	The interest rate charged by banks on their loans	+	The higher the lending rate, the greater the bank's profit.
REALES	Exposure to Real estate sector (% of Total Loans)	+/-	It depends on how well the real estate sector is performing. But generally, it might follow the sign of economic growth since real estate sector usually moves in tandem with economic activity.
GROWTH	Real GDP growth rate	+	Positive economic growth is associated with higher profits and vise-versa.
INFLAT	Inflation rate	+/-	Generally, higher inflation rate is associated with higher net interest margins and profits. However, higher inflation might also cause greater costs and thus reduce profits.
EIBOR	Emirates Interbank offer rate for 6 month maturity - used as a proxy for prevailing interest rate	+/-	It depends on the pass through effect on deposit rates and lending rate. The dominating effect among these two will decide the sign of the effect.

4.4 Testing the Data for the Four Multiple Regression Assumptions

4.4.1   First of all, we will evaluate the variables for *linearity* assumption by plotting the dependant variable (CAR_{it}) against each independent variable used in the regression. The plots below prove the existence of linear relationships between the dependant variable and all the other independent variables.
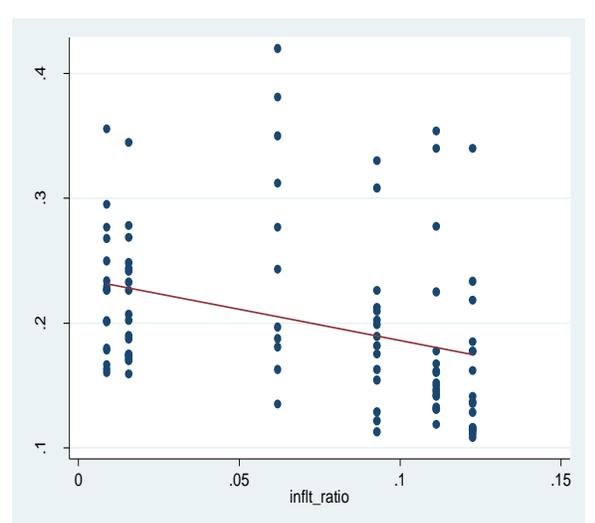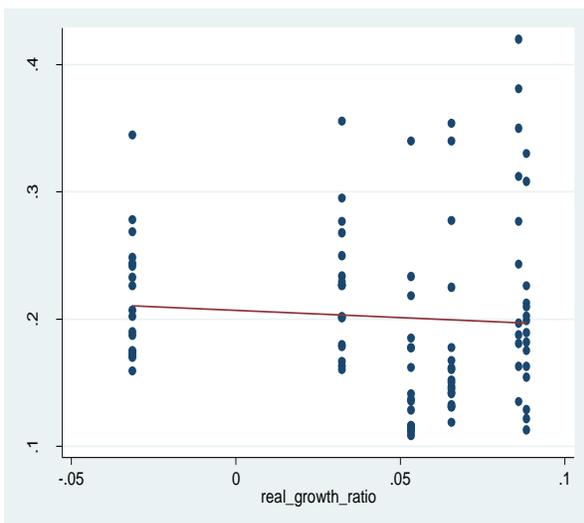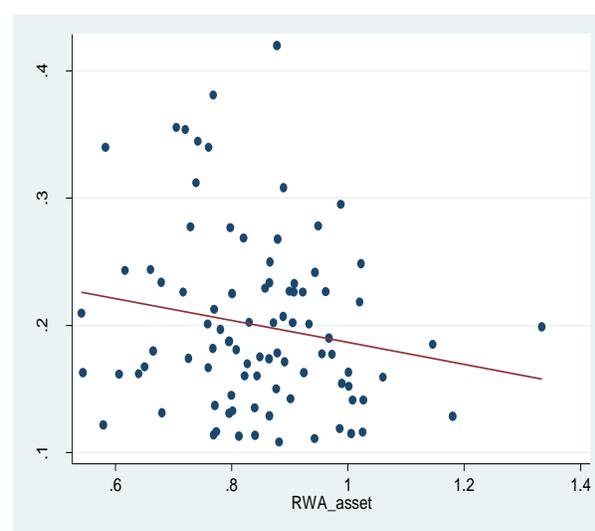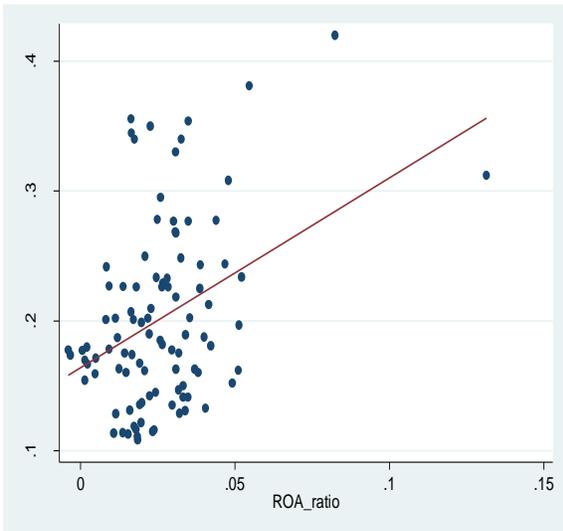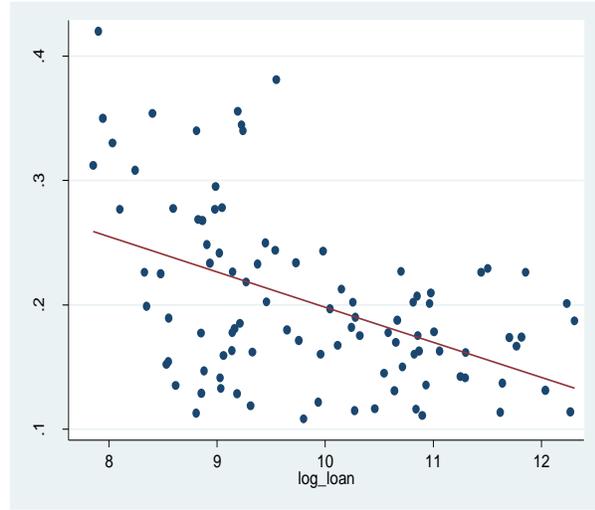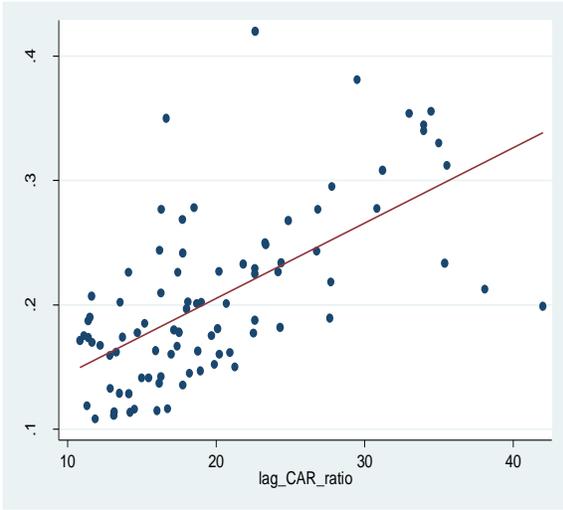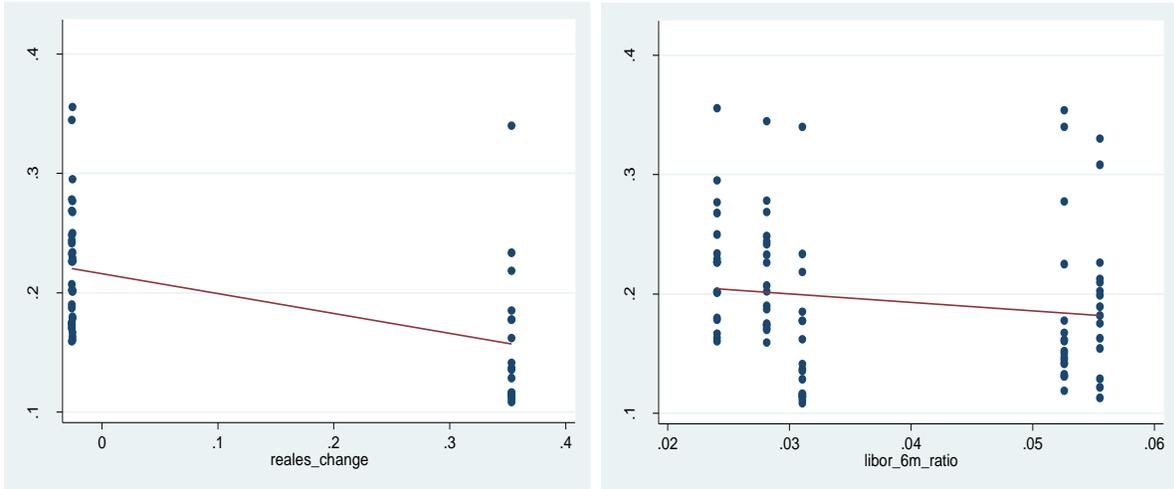
4.4.2 To examine the data for independence of errors or non-existence of autocorrelation, we plot the residuals (e_i) against lagged residuals (e_{i-1}). The below graph shows that the residuals and lagged residuals do not follow any sort of pattern which proves that autocorrelation does not exist in this data set. Also, the Durbin-Watson statistic $d = \frac{\sum_{i=2}^{n}(e_i - e_{i-1})^2}{\sum_{i=1}^{n} e_i^2} = (\frac{0.2864}{0.148}) = 1.94$ very close to 2 indicates that autocorrelation does not exist in the data.
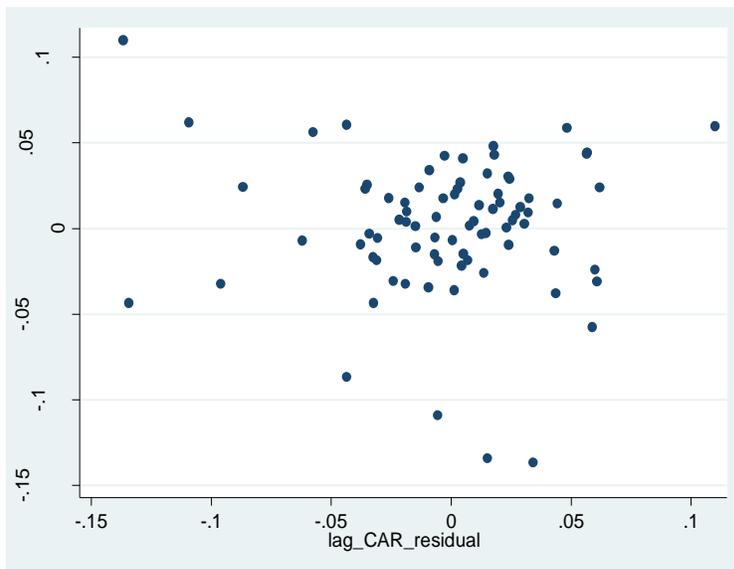
4.4.3 To check the data for equal variances (homoscedasticity), we will plot the residuals against predicted values from regression. The relationship depicted by the below scatter plot shows the residuals relatively evenly distributed around the horizontal line (0) except for few values, indicating that there is no strong proof for heteroscedasticity in the data set.
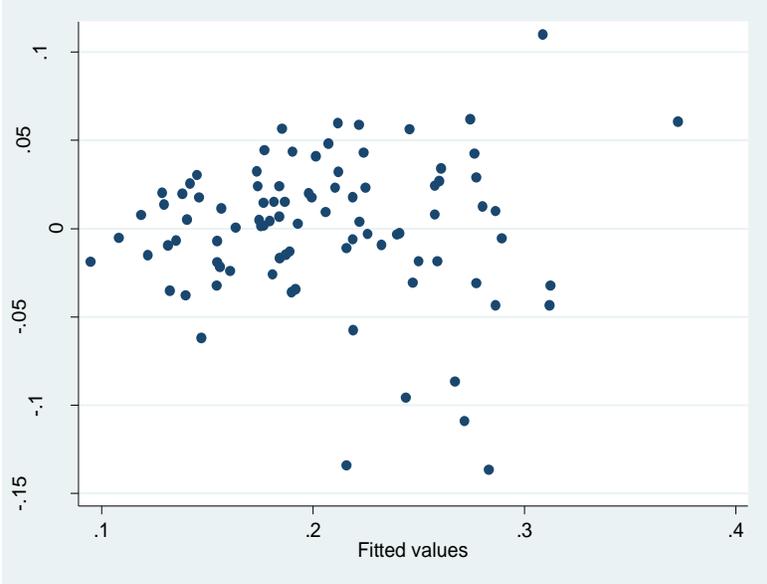
4.4.4 To examine the data for normality, we plot a histogram for residuals (e_i) like the one below. The plot shows the residuals follow a normal distribution.
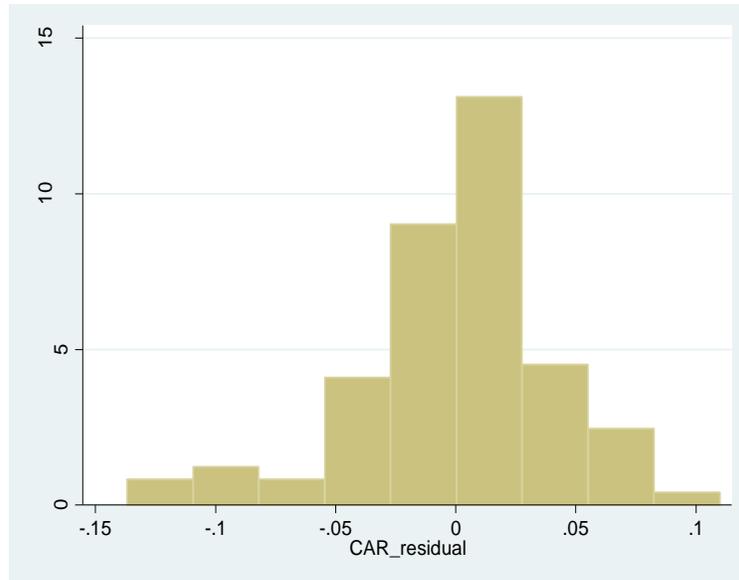
Variance	Skewness	Kurtosis
0.0517	-2.652	9.236

4.5 Conclusion

In this chapter, we have formulated the methodological framework and econometric models which we will use to test our hypothesis in the next chapter about the relationships between macroeconomic context and the soundness of UAE banking sector. We have selected three key indicators on the soundness of banks that are: CAR ratio, non-performing loans to total gross loans ratio and return to assets ratio. On the macroeconomic side, we selected key variables such as growth rate of real GDP, inflation rate, real estate inflation rate, EIBOR rate, broad money (M2) and credit to the private sector. We have also tested the data for the four multiple regression assumptions and found that they meet all these assumptions.

Chapter 5

Empirical Results

5. EMPIRICAL RESULTS

This chapter presents the findings of the empirical investigation that was undertaken according to the methodology and models specified in chapter 4. It is divided into three main subsections. The first of which presents the empirical results of the four model specifications on the macro and mirco determinants of banks'capital adequacy. While the second subsection shows the findings of the empirical analysis on the determinants of asset quality in UAE banks. The third subsection discusses the results of the empirical investigation on the relationship between macroeconomic factors and banks' profitability.

Tables 5.1, 5.2 and 5.3 below report the results of the various model specifications used to assess the impact of macroeconomic dynamics and bank-specific variables on the soundness of UAE banking sector. The coefficients of regressors show the dynamic relationship between each bank soundness indicator and its determinants. The significance of the explanatory variables in explaining the dynamics of all bank soundness over the reference period 2005-2010 can be tested using the results and p-values for the coefficients reported under each model.

5.1 Capital adequacy

Table 5.1 reports the results of 4 pooled OLS models on the determinants of banks' capital adequacy. The results show a strong negative relationship between the business cycle and capital adequacy across all model specifications given in table 5.1. The estimation results show a statistically significant negative relationship between bank CAR and macroeconomic variables such as real GDP growth rate, inflation rate and real estate inflation rate. The results also show a statistically significant relationship between bank CAR and bank-specific variables such as

equity to assets ratio, total loans and return on assets (ROA). These findings are consistent with the results from other studies such as Wong et al. (2005) and Babihuga (2007).

These results indicate that banks on average tend to hold little capital in booms, while during downturns, they tend to have higher ratios of capital as a precautionary action to protect themselves against possible increases in write-offs and loan loss provisions (Wong et al., 2005). That is why CAR is usually described as being pro-cyclical which means that it amplifies the effect of the economic cycle. For instance, banks in downturns, might cut on their lending in order to increase their capital adequacy ratio which could further slowdown the economy, or they might give excessive credit to different economic activities while assigning them lower risk wieghts during boom periods which leads to a lower bank CAR. Generally, this is a result of a common perception among all parties of financial system that risks are low during upturns while in reality it is during these periods where risks build up (Maratheftis, 2009). However, the issue of capital pro-cyclicality has been addressed through the latest Basel III accord as one of the potential sources of systemic risk that could threaten the stability of the banking sector. The new accord promotes the buildup of capital buffers (namely countercyclical capital buffers between the range of (0-2.5%) in good times that can be exploited in times of shocks.

Moreover, the results show that inflation rate has a strong negative correlation with CAR. The relationship could be explained by the negative impact of high inflation on banks' profitability which makes it difficult for bank to increase it CAR ratios. However, real estate inflation rate seems to have more statistically significant negative relationship with capital adequacy ratio that provides a better explanation for the changes in CAR ratios (i.e. goodness-of-fit measure is equal to 85% using real estate inflation rate compared to 79% and 72% in the two models that use the general inflation rate). Higher real estate prices are usually associated with a

booming economy where bankers perceive risk levels to be low (especially risk related to real estate sector) and therefore they reduce the amount of capital they put aside for times of distress. Also, EIBOR rate seems to have no significant impact on banks CAR.

On the other hand, some bank-specific variables show significant relationship with bank capital adequacy ratio. A one-year lagged CAR has a significant positive effect on current bank CAR indicating that the full adjustment in capital does not happen instantly due to the high adjustment cost of capital (Babihuga , 2007). Adjusting the level of capital can be so much costly for banks because of the time lag between taking the decision and the completion of these adjustments. These might include transaction costs such as fees to lending banks and lawyers for legal and procedural work. It might also include indirect costs arising from information asymmetry between bank and investors (Wong et al., 2005).

Also, there was an insignificant positive relationship between bank CAR ratio and its return on assets (ROA) suggesting that bank's profitability has no impact on bank's capital. On the other hand, the relationship between CAR and risk-weighted assets to total assets ratio was found negative and strong indicating that higher risk appetite encourages banks to reduce their capital and give more loans.

	Table 5.1: Empirical Results: Determinants of Capital Adequacy							
	Dependant variable: Capital to risk weighted asset ratio (CAR)							
	Model 1		Model 2		Model 3		Model 4	
Variable	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
CAR_{t-1}	0.005 (0.0006)	0.000	0.005 (0.0007)	0.000	0.007 (0.0007)	0.0007	0.007 (0.0007)	0.000
Log_Loan	-0.014 (0.004)	0.001	-0.0153 (0.0048)	0.002	-0.0063 (0.004)	0.126	-0.005 (0.0036)	0.197
Return on Asset	0.244 (0.321)	0.451	0.6018 (0.274)	0.031	0.329 (0.30)	0.277	0.393 (0.292)	0.185
Risk-weighted assets/total assets ratio	-0.1175 (0.028)	0.000	-0.106 (0.035)	0.003	-0.035 (0.033)	0.289	-	-
Real GDP Growth rate	-0.477 (0.142)	0.001	-0.359 (0.1596)	0.027	-0.536 (0.144)	0.001	-0.535 (0.143)	0.000
Inflation rate	-0.246 (0.108)	0.025	-0.374 (0.123)	0.003	-	-	-	-
Real Estate Price Index inflation rate	-	-	-	-	-0.075 (0.029)	0.012	-0.083 (0.028)	0.005
6 month EIBOR rate	-0.192 (0.418)	0.647	-	-	-	-	-	-
Constant	0.362 (0.062)	0.000	0.367 (0.074)	0.000	0.177 (0.068)	0.012	0.127 (0.045)	0.007
Number of Observations	74	-	81	-	53	-	54	-
R-Squared	0.79	-	0.72	-	0.85	-	0.85	-
Adj R-Squared	0.77	-	0.70	-	0.83	-	0.84	-
F	35.91	-	31.74	-	44.28	-	54.66	-

5.2 Assets Quality

Table 5.2 summarizes the results of 4 model specifications of equation 2 using pooled OLS regressions. The first model comprises all the variables specified under equation 4.2. Under this model, inflation rate is the only macroeconomic variable that shows a statistically significant relationship with asset quality while the rest of macroeconomic variables such as real GDP growth rate, broad money supply (M2) and domestic credit to private sector don't show strong correlation with asset quality. Also, under model 1, bank-specific variables (e.g. Lagged NPL ratio, loan to asset ratio, return on assets and spread rate) seem to have strong impact on the quality of assets, while exposure to real estate market −which was severely hit by the financial crisis of 2008-2009) doesn't show a strong relationship with asset quality.

However, the second model that excludes inflation rate, broad money supply (M2) and domestic credit to the private sector shows negative and significant relationship between non-performing loans ratio and real GDP growth rate suggesting that macroeconomic volatility plays an important role in the deterioration of assets quality. During prolonged economic downturns, it is more likely that borrowers default on their loans especially those who are exposed to sectors most hit by recessions. But during economic booms, the quality of assets improves since most of economic sectors are expected to perform well and this will minimize the probability of borrowers' default. This conclusion is consistent with the evidence provided by a large body of empirical literature (e.g. Fofack (2001) and Babihuga (2007)).

On the other hand, the significant negative relationship between the ratio of nonperforming loans and inflation rate in all model specifications implies that higher inflation rate leads to a decline in the ratio of non-performing loans. This might be so because a higher

inflation rate erodes the real value of the loan and thus improves the borrowers' ability to meet the debt obligation (Gerlach et al., 2005). Moreover, inflation rate is positively correlated with the business cycle (growth rate of real GDP) suggesting that inflation rate might provide an additional indicator on the economic stance.

Model 3 shows a positive relationship between asset quality and broad money supply (M2) indicating that an increase in the aggregate stock of money might have contributed to the deterioration of asset quality. This is consistent with the findings of Fofack (2001). Likewise, domestic credit to the private sector shows a positive robust relationship with the quality of bank portfolio under model 4 implying that the higher the bank's exposure to private sector, the more likely the asset quality will deteriorate. The activities in private sector are highly correlated with the economic cycle. Therefore, a prolonged recession could lead to financial troubles for private firms and thus increases their probability of default.

Variables on bank level such as the spread rate and return on assets have strong relationship with asset quality. The negative coefficient of bank's return on assets (ROA) implies that higher bank profitability is associated with lower levels of non-performing loans. On the other hand, bank spread rate –that is the difference between its lending rate and deposit rate- is positively affecting bank loans portfolio implying that an increase in lending rate over deposits rate could increase the debt servicing burden and thus lead to higher probability of default by borrowers.

Moreover, banks with higher ratios of nonperforming loans from previous period are more likely to carry them out to the following periods. Also, though insignificant, bank's exposure to real estate as a percentage of its total loans shows a negative relationship with its

asset quality indicating that a higher exposure to real estate sector is associated with better non-performing loans. This could be true during booming periods, but in case of recessions, it is more likely that higher exposure to property market leads to a deterioration in asset quality.

<table>
<tr><td colspan="9" align="center">Table 5.2: Empirical Results: Determinants of Asset Quality
Dependant Variable: Ratio of Non-performing loans to total gross loans (NPLs)</td></tr>
<tr><td></td><td colspan="2" align="center">Model 1</td><td colspan="2" align="center">Model 2</td><td colspan="2" align="center">Model 3</td><td colspan="2" align="center">Model 4</td></tr>
<tr><td>Variable</td><td>Coefficient</td><td>p-value</td><td>Coefficient</td><td>p-value</td><td>Coefficient</td><td>p-value</td><td>Coefficient</td><td>p-value</td></tr>
<tr><td>NPL_{t-1}</td><td>0.692 (0.081)</td><td>0.000</td><td>0.773 (0.084)</td><td>0.000</td><td>0.652 (0.058)</td><td>0.000</td><td>0.653 (0.058)</td><td>0.000</td></tr>
<tr><td>Loans to Assets</td><td>-0.061 (0.035)</td><td>0.084</td><td>-0.063 (0.033)</td><td>0.064</td><td>-0.015 (0.027)</td><td>0.591</td><td>-0.025 (0.028)</td><td>0.361</td></tr>
<tr><td>Spread rate</td><td>0.188 (0.073)</td><td>0.015</td><td>0.204 (0.071)</td><td>0.006</td><td>0.127 (0.067)</td><td>0.060</td><td>0.135 (0.066)</td><td>0.045</td></tr>
<tr><td>Return on Assets</td><td>-0.677 (0.267)</td><td>0.015</td><td>-0.882 (0.262)</td><td>0.002</td><td>-0.480 (0.143)</td><td>0.001</td><td>-0.469 (0.145)</td><td>0.002</td></tr>
<tr><td>Exposure to Real estate sector (% of Total Loans)</td><td>-0.004 (0.030)</td><td>0.883</td><td>-0.0003 (0.0003)</td><td>0.391</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Real GDP Growth rate</td><td>0.137 (0.159)</td><td>0.393</td><td>-0.182 (0.068)</td><td>0.010</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Inflation Rate</td><td>-0.237 (0.098)</td><td>0.021</td><td>-</td><td>-</td><td>-0.088 (0.073)</td><td>0.232</td><td>-0.136 (0.06)</td><td>0.027</td></tr>
<tr><td>Broad Money (M2) as % of GDP</td><td>-0.00003 (0.0001)</td><td>0.764</td><td>-</td><td>-</td><td>0.0001 (0.00004)</td><td>0.015</td><td>-</td><td>-</td></tr>
<tr><td>Domestic Credit to private sector (% of GDP)</td><td>0.080 (0.073)</td><td>0.280</td><td>-</td><td>-</td><td>-</td><td>-</td><td>0.067 (0.027)</td><td>0.014</td></tr>
<tr><td>Constant</td><td>0.046 (0.075)</td><td>0.541</td><td>0.078 (0.021)</td><td>0.001</td><td>-0.022 (0.035)</td><td>0.526</td><td>0.006 (0.0262)</td><td>0.828</td></tr>
<tr><td>Number of Observations</td><td>50</td><td>-</td><td>50</td><td>-</td><td>89</td><td>-</td><td>89</td><td>-</td></tr>
<tr><td>R-Squared</td><td>0.83</td><td>-</td><td>0.83</td><td>-</td><td>0.72</td><td>-</td><td>0.72</td><td>-</td></tr>
<tr><td>Adj R-Squared</td><td>0.80</td><td>-</td><td>0.80</td><td>-</td><td>0.70</td><td>-</td><td>0.70</td><td>-</td></tr>
<tr><td>F</td><td>22.35</td><td>-</td><td>28.96</td><td>-</td><td>35.19</td><td>-</td><td>35.24</td><td>-</td></tr>
</table>

5.3 Profitability

Table 5.3 presents estimates of the profitability using four different model specifications of equation 4.3. We use ROA as a measure for bank profitability and pooled OLS to run the regressions. There is a positive significant relationship between banks' profitability and real GDP growth rate in models 1 and 2 while it is insignificant in models 3 and 4 though still positive. This implies that banks are generally more profitable during economic booms. The coefficient of inflation rate is negative and insignificant in all models suggesting that inflation rate might not have a direct nor clear effect on the banks' profitability.

The interest rate (proxied by 6 month EIBOR rate) has a significant positive relationship with bank's profitability in models 3 and 4 indicating that banks are able to benefit from higher interest rates as long as the effect passing through to lending rate exceeds that passing through to deposit rate.

Non-performing loans ratio (proxying risk exposure of banks) has a statistically significant coefficient with a negative sign implying that higher nonperforming loans are associated with lower profitability for banks. Also, the positive significant relationship between ROE and equity to assets variable across all models indicates that banks with higher equity (or lower leverage ratio) encounter lower funding costs and thus make more profits.

Bank's exposure to real estate market shows a positive but insignificant relationship with profitability in models 2 and 3. However, when combined with all explanatory variables in model 4, the relationship becomes significant implying that banks with higher exposure to property market can make higher profit or endure more losses depending on the performance of this market. Also, banks which charge higher interest rates on their loans are more likely to

realize higher profits. Moreover, the relationship between banks' profit and overhead expenses

shows a negative and significant relationship under model 1 which is in line with the theory.

Table 5.3: Empirical Results: Determinants of Profitability								
Dependant Variable: Return of Assets								
	Model 1		Model 2		Model 3		Model 4	
Variable	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Equity to Assets	0.0313 (0.0159)	0.052	0.167 (0.038)	0.000	0.182 (0.033)	0.000	0.211 (0.043)	0.000
Log (Loans)	-0.0042 (0.002)	0.009	-0.001 (0.002)	0.654	0.001 (0.0015)	0.622	0.002 (0 .0021)	0.366
Non-performing loans ratio	-0.152 (0.040)	0.000	-0.138 (0.038)	0.001	-0.096 (0.034)	0.007	-0.132 (0.037)	0.001
Overhead Costs to total Assets	-0.424 (0.211)	0.047	-	-	-	-	0.700 (0 .313)	0.031
Lending rate	0.322 (0.108)	0.004	-	-	-	-	0 .059 (0 .103)	0.568
Exposure to Real estate sector (% of Total Loans)	-	-	0.0001 (0 .0001)	0.531	0.0001 (0.0001)	0.372	0.0003 (0.0001)	0.038
Real GDP Growth rate	0.120 (0 .046)	0.010	0.134 (0.037)	0.001	0 .042 (0.037)	0.253	0.045 (0 .038)	0.239
Inflation rate	-0.001	0.110	-0.0003 (0.0003)	0.423	-0.0001 (0.0003)	0.843	-0.0001 (0 .0003)	0.709
6 month EIBOR rate	-	-	-	-	0.314 (0.108)	0.006	0 .3429 (0.119)	0.006
Constant	0.0513 (0.021)	0.019	0.0075 (0.0238)	0.753	-0.0228 (0.0213)	0.291	-0.054 (0 .033)	0.110
Number of Observations	97	-	55	-	52	-	49	-
R-Squared	0.47	-	0.58	-	0.65	-	0.67	-
Adj R-Squared	0.43	-	0.53	-	0.59	-	0.59	-
F	11.32	-	11.22	-	11.55	-	8.74	-

Chapter 6

Conclusion

6. CONCLUSION

While financial institutions, in particular commercial banks, continue to play an important role in the economy, the recent financial crisis demonstrated the capability of these banks generating systemic risk on the whole economy. On this premise, this research attempted to explore macroeconomic and bank-specific determinants of banks financial soundness indicators in UAE using a panel dataset for the period 2005-2010. The descriptive analysis and empirical investigation from this research provided strong evidence on the significant relationship between macroeconomic developments and the soundness of UAE banking sector.

Throughout the descriptive analysis, we observed the correlation between business cycle and financial soundness indicators before and after the financial crisis of 2008-2009.During the pre-crisis period, economic activities were booming especially in real estate and services sectors which spurred higher demand for bank loans. However, when the economic crisis took hold in 2008, nearly all sectors of the economy were impacted, especially the real estate and construction sector to which many banks were highly exposed.

Further, the macroeconomic recession and liquidity crunch that followed the global crisis had a deteriorating impact on the UAE banks leading to considerable write-downs in the value of their assets, substantial reduction in capital, increasing non-performing loans ratio and tightened lending standards from international markets. These were exacerbated by huge reversal of capital inflows that had entered the economy earlier in 2007 speculating on dirham revaluation. As a result, banks had to decrease their lending in order to improve their liquidity profiles and capital bases.

The decisive government intervention, which comprised of, liquidity measures, guarantee blankets and capital injections largely helped to cushion the commercial banks thereby confronting the severe impact of the global financial crisis on UAE banking sector. During the post-crisis period, there was resurgence in economic activities, leading to commercial banks strengthening their capital bases and liquidity profiles. However, non-performing loans continued to be on rise due to ongoing correction in real estate market and the high exposure to government related enterprises (GREs).

In addition, findings from the empirical investigation found that there was strong relationship between FSIs of banks and macroeconomic variables. The negative correlation between economic growth rate and capital adequacy ratio proved that banks tend to hold little capital ratios during upturns but higher capital ratios during downturns creating a pro-cyclical effect on the business cycle. Also, during economic booms, non-performing loans tend to be lower since most borrowers will benefit from flourishing economic activities and thus their probability of default will be lower. Moreover, the booming economy and lower non-performing loans will help banks realize more profits.

It is also important to note that, the inflation rate showed a strong negative correlation with capital adequacy ratio which might be explained by the negative impact of high inflation on the profitability of banks, making it difficult for them to increase their capital ratios. However, real estate inflation rate seems to provide better explanation for the changes in banks' capital ratios through their significant negative relationship. Inflation rate has been also shown to have a significant negative relationship with non-performing loans which might be attributed to the erosion of the real value of loans caused by higher inflation rate which might have improved the

ability of borrowers to repay their obligations. However, inflation rate seems not to have a significant impact on banks' profitability.

Moreover, while EIBOR rate did not have a significant relationship with bank CAR ratio, on the other hand, it had a significant positive relationship with banks' profitability. There was also some evidence that broad money supply (M2) and domestic credit to the private sector have a significant positive relationship with non-performing loans ratio. These results are consistent with the findings from other studies which suggest that an increase in the aggregate stock of money available in the economy can promote more lending to borrowers of different risk profiles which might eventually lead to deterioration in the quality of assets portfolios. Likewise, more lending to the private sector could expose the bank to more risky projects which will increase the level of nonperforming loans especially if the broader macroeconomic environment turns unfavorable.

On the other hand, there are some bank-specific factors that showed significant impact on the soundness of banks. In case of bank CAR ratio, factors such as lagged CAR ratio and risk appetite seem to be significantly correlated with bank CAR ratio. For example, a higher cost of adjusting bank capital could deter a change in CAR ratio while an increasing appetite for risk is likely to encourage banks to reduce their capital bases and give more loans.

As for the assets quality, bank-specific variables such as spread rate and return on assets seem to have greater impact on the level on non-performing loans. The higher the spread between lending rate and deposit rate, the greater the debt burden on borrowers and thus the more likely that they default. Also, banks' with lower levels of non-performing loans are more profitable than those with higher levels.

Finally, banks' profitability becomes higher in banks with lower leverage ratios (i.e. banks with greater ratios of equity to assets) since they encounter lower funding costs and thus they have more potential to make profits. Also, lower ratios of non-performing loans help improve the profitability results of banks since they generate income and reduce loan loss provisioning.

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APPENDEX

Table A.1: Descriptive Statistics of the sample

(Period: 2005-2010)

In Million AED

Variable	Number of Observations	Mean	Minimum	Maximum
Total assets	112	51419	3772	286216
Gross Loans	112	34618	2236	220563
Deposits	112	36259	2098	219721
Net Income	112	914	-513	3683
Overhead Costs	112	56	1	111
CAR ratio	98	21	10.83	42
Tier1 ratio	89	18	6.7	37.2
ROE (%)	112	16.6	-3	41.3
ROA (%)	112	2.7	-0.4	13.2
NPL to gross Loan ratio	102	4.3	0.5	18
Real estate loans to total loans	57	21.5	4.57	51.23
Real GDP per capita	114	139	131	146
Real GDP Growth rate	114	4.9	-3.15	8.9
Inflation Rate	114	6.88	0 .88	12.3
Real estate inflation rate	57	10	-2.6	35
M2 to GDP	114	602	488.56	746
Claims on Private sector (% of GDP)	114	191.47	177	212
EIBOR 6 month (%)	95	3.83	2.40	5.55

Table A.2: List of Banks in the sample

1. National Bank of Abu Dhabi
2. Abu Dhabi Commercial Bank
3. ARBIFT (Al-Masraf)
4. Union National Bank
5. Commercial Bank of Dubai
6. Dubai Islamic Bank PJSC
7. Emirates NBD Bank
8. Emirates Islamic Bank
9. Mashreq Bank PSC
10. Sharjah Islamic Bank
11. Bank of Sharjah PSC
12. United Arab Bank PJSC
13. The National Bank of R.A.K
14. Commercial Bank International
15. National Bank of Fujairah PSC
16. National Bank of U.A.Q PSC
17. First Gulf Bank
18. Abu Dhabi Islamic Bank
19. InvestBank PLC

Table A.3: Correlation between variables in the sample

	Real GDP Growth Rate	Inflation Rate	Eibor 6 month	Spread rate	NPL to loans	Equity to Assets	Private Claims to GDP	M2 to GDP	Real estate inflation rate	Overhead costs to Assets	Exposure to real estate	CAR	ROA
Real GDP Growth Rate	1.0000												
Inflation Rate	0.655	1.0000											
Eibor 6 month	0.136	0.837	1.0000										
Spread rate	-0.075	-0.229	-0.250	1.0000									
NPL to loans	-0.168	-0.490	-0.522	0.248	1.0000								
Equity to Assets	-0.168	-0.208	-0.151	0.419	0.287	1.0000							
Private Claims to GDP	0.916	0.297	-0.273	0.026	0.048	-0.102	1.0000						
M2 to GDP	-0.836	-0.963	-0.658	0.194	0.417	0.211	-0.545	1.0000					
Real estate inflation rate	0.696	0.999	0.806	-0.223	-0.478	-0.210	0.350	-0.976	1.0000				
Overhead costs to Assets	0.038	0.037	0.021	-0.418	0.188	-0.344	0.029	-0.041	0.038	1.0000			
Exposure to real estate	-0.088	-0.042	0.009	0.268	0.306	-0.057	-0.089	0.062	-0.046	-0.268	1.0000		
CAR	-0.468	-0.723	-0.610	0.309	0.488	0.739	-0.208	0.694	-0.722	-0.264	0.012	1.0000	
ROA	0.039	0.116	0.124	0.307	-0.193	0.614	-0.012	-0.098	0.113	-0.228	-0.067	0.314	1.0000