Internal Determinants of Return on Equity: Case of the UAE Commercial Banks

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The purpose of this study is to examine the association between Return on Equity, a common measure of return to shareholders and long-term solvency, liquidity, efficiency, and risk in the United Arab Emirates (UAE) commercial banks. The sample comprises of twelve publically listed commercial banks and the data analysis period extends from 2008 to 2015. Panel data regression techniques are employed to estimate the association between the dependent variable, Return on Equity (ROE), and independent variables, Capital Adequacy Ratio (CAR), Assets Quality (AQ), Earnings Ability (EA) and Liquidity Ratio (LR). The findings of the study highlight a statistically significant positive relationship between ROE and AQ as well as between ROE and EA, indicating that riskier assets returned higher profitability. Interestingly, insignificant relationships are observed between ROE and CAR and ROE and LR. The results indicate that the returns to shareholders are highly dependent on the efficient and effective use of resources by the management and the quality of assets that the banks carry on their balance sheets.

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1. Introduction

The dual banking system[1] in the UAE is very competitive with 23 local and 26 foreign banks and more than 1,000 branches between them (Central Bank UAE, 2016a). The banking sector assets experienced a reasonable growth of 6.1% in 2015 in spite of negative oil shocks, suggesting that other sectors of the relatively diversified economy, such as tourism and hospitality and real estate, provided a buffer against the falling oil prices (Bank Audi, 2016). Subsequently, Moody's Investors Service (2016) maintained a stable outlook on the UAE's banking system, suggesting that the agency expected resilient capital and liquidity buffers in 2016. The Standard and Poor's rating Services (2015) also ranked the UAE banking system to be stable on economic and industry risk, despite high credit risk in the economy and declining oil prices. Although the industry was deemed resilient to economic instability, high competition was found to be detrimental to the banking sector (Standard and Poor's rating Services, 2015).

Studies such as Pradhan *et al.* (2014) and Uddin *et al.* (2014) provide evidence on the causal link between economic development and banking system development. While sound financial performance and continued operations of a bank are of interest to shareholders, the Return on Equity (ROE) which is determined by measures of

[1] A dual banking system comprises of both conventional and Islamic banks. Many conventional banks offer Shariah compliant services through their Islamic banking windows

efficiency, liquidity, capital, and risk is of greater importance to them.

The profitability of the banking industry can be determined at bank-level, micro-level, and macro-level (For example, Demirguc-Kunt and Huizinga, 1999; Bashir, 2003; Kosmidou et al., 2005; Vong and Chan, 2009; Sufian and Noor Mohamad Noor, 2012). The bank-level factors may include factors such as CAMEL parameters (Capital Adequacy Ratio (CAR), Asset Quality (AQ), Management capability (MC), Earnings Ability (EA), and Liquidity Ratio (LR)), banks size in terms of assets or equity, network embeddedness and operating expenses. The micro-level factors may include competitive forces in the industry such as concentration, bargaining power of customers and suppliers of capital, availability of substitutes, and barriers to entry. Lastly, profitability in the banking industry can also be a reflection of some external factors such as GDP growth, inflation, interest rates, regulatory environment, and monetary and fiscal policies.

The literature on the banking industry is largely focused on evaluating the financial soundness and performance of both commercial and Islamic banks globally. Researchers have used a variety of univariate ratios classified under various categories with mostly one prime objective to evaluate the financial performance or profitability of the institutions under consideration (Almazari, 2013; Naceur & Goaied, 2008; Alper & Anbar, 2011; Vong &Chan, 2009; Athanasoglou et al,2006; Sangmi & Nazir,2010; Fu & Heffernan, 2010; Kumar, 2016; Petria et al, 2015; Sufian & Habibullah, 2009; Maheshwara & Prasad, 2011). The most widely used measures of profitability referred to in the literature are Return on Equity (ROE) and Return on Assets (ROA). Kosmidou et al. (2005) argue that ROE is a reliable indicator of future earnings and is most relevant to the prime providers of equity capital, namely the shareholders.

In line with Petria et al. (2015), Singh (2010), Alper and Anbar (2011) and Almazari (2013), in this paper, we try to identify the main factors that affected the profitability in the UAE commercial banks over the period from 2008 to 2015. The contribution of this paper is to investigate the main bank-level determinants of UAE's commercial banks ROE along eight year period. The choice of ROE as an estimate for profitability is determined by the fact that most UAE banks are owned by majority shareholders (governments, institutions, high net worth individuals) and the return on investment is of prime consideration to maintain their ownership of banks. The four bank-level determinants (variables) that are used in this study are extracted from the CAMEL model. The ratio reflecting management capability (MC) has been excluded from the model due to its subjectivity and lack of clear definition in the literature. More model-specific reasons also lead to the exclusion of MC from the analysis. These reasons are discussed in section 3.

The paper is structured as follows: A survey of the literature assessing the financial performance of regional and international banks is presented in Section 2. Section 3 presents the details about the data collection and methods of analysis. The findings and discussion are provided in Section 4, followed by the conclusion,

implications and some avenues for future research in Section 5.

2. Literature Review

The literature on the performance of banks uses a variety of ratios as indicators of profitability, such as ROA, ROE, Net Interest Margin, and Net Profit Margin and their determinants (For example, Athnasoglou *et al.*, 2006; Naceur and Goaied, 2008; Sufian and Habibullah, 2009; Das and Ghosh, 2009; Fu and Heffernan, 2010; Alper and Anbar, 2011; Jasevičienė *et al.*, 2013; Petria, 2015).

This study entails four bank-level aspects discussed earlier, that possibly determine the profitability of commercial banks in the context of the UAE. Accordingly, the literature review is divided into sub-sections. Each sub-section provides a brief overview of the literature on each determinant of profitability considered in this study and subsequently compares and contrasts the findings presented by various researchers. The last sub-section highlights the contribution made by this study.

2.1. Capital Adequacy and Profitability

Berger (1995) found that the selected US banks were able to increase their ROE between 1983 and 1989 when they were well capitalized. This indicates that risk-averse investors may be willing to accept lower returns in exchange for the lower risk posed by banks that are equity capitalized, sufficiently. On the contrary, banks with less capital relative to debt are exposed to greater risk of failure, such as the commercial banks in the last century (Santomero and Watson, 1977). The literature also provides evidence that the high level of equity relative to the assets improves banks performance (Bourke, 1989; Goddard *et al.*, 2004; Naceur and Goaied, 2008; Pasiouras and Kosmidou, 2007; García-Herrero *et al.*, 2009). These studies suggest that the costs of funds reduce significantly due to lower prospective bankruptcy costs. The lower cost of capital due to higher CAR is then reflected in profitability ratios (Naceur, 2003; Kosmidou *et al.*, 2005; Flamini *et al.*, 2009; Vong and Hoi, 2009; Sufian and Habibbullah, 2009).

Demirguc-Kunt and Huizinga (1999) investigated the determinants of bank profit by using bank-level data for 80 countries in the years 1988-95. The study shows that foreign banks perform better than domestic banks in developing countries, a commonly observed occurrence that has been investigated widely in marketing literature for banking industry and is mostly attributed to the better reputation of foreign banks (for example, Jabnoun and Khalifa, 2005; Sayani and Miniaoui, 2013). The study documented a positive relationship between asset capitalization and profitability and an inverse relationship between reserves and profitability.

A study by Almazari (2013) based in the GCC comprised of nine Saudi banks and employed regression analysis to model the performance of Saudi banks with respect CAR. The results affirmed a negative association between profitability (ROE and ROA). The period of analysis of the study (2007 -2011) entailed a turbulent environment due to the GFC. The results may, therefore, be a reflection of

deteriorating profitability complemented by increased regulatory interventions due to crisis.

2.2. Asset Quality and Profitability

While capital adequacy is essential for sustainable operations and profitability of banks, the efficient utilization of capital is also paramount. Here the efficient allocation of capital refers to determining a balance between risk and returns on assets. Risky assets may produce high returns; however, they may lead to heightened levels of toxic assets during adverse situations. With respect to the relationship between profitability and AQ, the findings are rather mixed.

Athanasoglou *et al.* (2006), Pratomo and Ismail (2006), Navapan and Tripe (2003) and Wasiuzzaman and Tarmizi (2010) documented a significant negative relationship between the efficient utilization of capital and profitability. Also, the studies conducted by Kahane (1977) and Koehn and Santomero (1980) using a mean-variance model demonstrate that higher capital ratios employed by banks can lead to greater asset risk as the banks may engage in the practice of extending potentially toxic loans with an expectation for higher returns, which may not be profitable in the long-run. Singh (2010) found that the AQ and MC ratios do not affect the profitability of Indian banks. Wasiuzzaman and Tarmizi (2010) found a negative relationship between asset quality and profitability in Malaysian banks. The study by Vong and Chan (2009) also had similar results for banks in Macao.

On the contrary, the studies conducted by Kosmidau *et al.* (2005) and Athanasaglou *et al.* (2006) proved a positive relationship between asset quality and profitability. The findings reported by Heffernan and Fu (2008) for a large sample of Chinese banks' documented both negative and positive impact of AQ on profitability. These mixed findings can be interpreted in several ways. Theoretically, a lower AQ ratio is considered to be better as it suggests the superior quality of assets. However, banks' returns on high-quality assets are lower, which may weigh down on the profitability of the banks. On the other hand, low-quality assets bear higher rates of return for banks, which may lead to greater profitability at least in the short to medium term. Heffernan and Fu (2008) argue that the expected sign of this ratio is indefinite due to higher provisioning signals that may lead to higher possible loan losses in the future.

2.3. Earnings Ability and Profitability

Earnings Ability (EA), which can be measured by various ratios is considered to be a key determinant of banks' profitability. It is not surprising that Bashir (2003), Naceur (2003), Barth *et al.* (2003), Athnasoglou *et al.* (2006), and Vong and Chan (2009) found a significant positive relationship between profitability and EA. However, it appears that the choice of ratio to measure Operating efficiency (OE) which impacts the EA also plays an important role in determining the direction and significance of association with profitability. The use of cost-to-income ratio as a measure of OE by Kosmidau *et al.* (2005), Guru *et al.* (1999), Pasiouras *et al.* (2006) and Fu and Heffernan

(2010) revealed a negative relationship between the two variables under consideration in the UK, Malaysia, China, and Australia respectively. Interestingly, the literature also provides evidence that most banks do not operate on optimal operational efficiency (Sherman and Gold, 1985; Vassiloglou and Giokas, 1990; Izah Mohd *et al.*, 2009; Srairi, 2010). This suggests that increasing operational efficiency would lead to utility maximization, which in turn would have a positive impact on the profitability of banks.

2.4. Liquidity and Profitability

Maintaining an acceptable level of LR is also crucial for banks. The literature presents contrasting findings on this aspect of the profitability of banks. Al-Tamimi and Hussein (2010) analysed the performance of UAE conventional and Islamic banks using traditional financial ratios such as ROA and ROE and by employing the regression model during the period 1996-2008. The results affirmed that liquidity and level of competition in the industry (measured by concentration ratio) were the significant determinants of profitability of conventional national banks in the UAE. Vong and Chan (2009) documented a significant positive association between liquidity and profitability. Similarly, Sufian and Habibullah (2009) found a positive relationship between liquidity and profitability in state-owned Chinese banks, suggesting that higher levels of liquidity result in improved profitability for banks.

In contrast to the studies mentioned above, Kosmidau *et al.* (2005) suggested that LR and Return on Average Assets (ROAA) present a significant positive association in the UK banks during 1995- 2002. This implied that higher risks were assumed by the UK banks by maintaining lower LR which resulted in higher margins.

It appears that the origins of banks play a role in determining banks' profitability with respect to LR. For example, Pasiouras and Kosmidou (2007) document a positive association between LR and domestic banks' profitability and a negative relationship between LR and foreign banks' profitability. Contrasting results were reported by Sufian and Noor (2012) in Indian commercial banks, whereby high LR negatively affected the profitability of domestic commercial banks and positively impacted the profitability of foreign commercial banks

2.5. Contribution

Despite the availability of literature on the topic, the findings of the studies vary greatly and seem to be dependent on the unique macro and regulatory environments, sample sizes, period of analysis, selection of variables, and data analysis methods employed. Accordingly, the findings appear to be less generalizable. Although there are studies that have evaluated the financial performance and soundness of UAE commercial banks, we are unaware of any paper that has examined the determinants of ROE in UAE commercial banks. The study may enable researchers to draw relevant conclusions and may enable regulators to identify factors that play a crucial role in determining returns to shareholders, especially in an environment where governments are majority shareholders in most conventional banks. Moreover,

financial institutions that operate in a particular region such as the GCC (which includes UAE) may be subject to similar macroeconomic factors and are therefore expected to exhibit similar traits. This study may also help in drawing regional inferences. While most studies use time series data for the analysis, this study employs panel data techniques to understand the component of time along with banks as the cross-sectional component.

3. Data and Methodology

The empirical study hypothesizes that there is an association between ROE and other widely used measures of financial health of banks that is CAR, AQ, EA and LR. The selection of independent variables is based on the literature (Bashir, 2003; Wasiuzzaman and Tarmizi, 2010; Alper and Anbar 2011; Athanaslaglou et al., 2008; Sufian and Noor, 2012; Almazari, 2013; Jasevičienė et al., 2013; Kumar, 2016). Each ratio measures some aspect of banking operations. CAR measures the long-term solvency of the bank; AQ and EA provide insight into risk associated with debtors and the efficiency of the bank respectively while LR measures the liquidity of the bank. While there is a long list of ratios that might be considered to be contenders for inclusion in the model, the aforementioned ratios cover the most important aspects of banking operations, avoid redundancy, and help maintain the parsimony of the model. While it may be a preference to include more variables in the model, it may not be advisable to do so as the quality of results may be compromised due to spurious results.

The four ratios, CAR, AQ, EA, and LR are a part of the CAMEL model. One variable from the CAMEL model is excluded from the equation due to its subjective nature, difficulty in measurement, and unavailability of an appropriate definition in literature (Sangmi and Nazir, 2010; Sarker, 2006, Maheshwara and Prasad, 2011, Dang 2011). Moreover, it is argued that ROA or EA reflect management's capability in maximizing the profitability of the firm (Singh 2010). Another reason for excluding MC from the analysis is model-specific. While estimating the correlation coefficients between variables, a high correlation was observed between EA and MC, leading to potential multicollinearity between these variables, which would have produced spurious results. Accordingly, it was deemed appropriate to exclude MC from the model specification.

The details of majority ownership in the UAE banks are presented in Table 1. Given that a handful of investors own control blocks in these banks, the return on equity capital is of extreme relevance to determine the feasibility of investment.

The Central Bank of UAE (2016a) website provides a list of thirteen publically listed conventional banks. The sample for this study constitutes twelve of those banks, representing nearly 92% of the population of conventional banks in the UAE. The period of analysis extends from 2008 to 2015. Unavailability of data restrained the inclusion of one listed conventional bank (Al Masraf Bank) and data prior to 2008. Table 2 provides the details of banks included in the study. Data is collected from the audited financial reports either available on websites of the candidate banks or

on the stock exchanges websites. The data is analysed with the help Stata 14.

Table 1: Ownership Structure of Conventional Banks in the UAE

Banks	Government Holding	Other Majority Holders (10% or more)
ADCB bank	58.08%	-
Bank of Sharjah	15.02%	10.07%
Commercial Bank International	-	62.12%
Emirates NBD	55.64%	
Invest bank Sharjah	-	15.02%
Mashreq Bank	-	82.50%
National Bank of Abu Dhabi	69.77%	
National Bank of Fujeirah*	49.20%	20.00%
National Bank of Umm Al-Qaiwain	30.00%	32.37%
Ras al Khaimah Bank	52.77%	-
Union National Bank**	60.00%	-
United Arab Bank	0.00%	40.00%

Notes: *Cumulative ownership of Government of Fujeirah and Government of Dubai
**Cumulative ownership of Government of Abu Dhabi and Government of Dubai
Source: Central Bank of UAE (2014a)

3.1 Hypothesis Development

The study aims at testing ROE as a function of internal aspects of solvency (CAR), liquidity (LR), efficiency (EA), and operational risk (AQ). With four independent variables in the model, the null and alternative hypotheses are presented as follows:

H_0: $\beta_1 = 0$; $\beta_2 = 0$; $\beta_3 = 0$; $\beta_4 = 0$

H_A: $\beta_1 \neq 0$; $\beta_2 \neq 0$; $\beta_3 \neq 0$; $\beta_4 \neq 0$

where

β_1 = Coefficient of X_1 (CAR)
β_2 = Coefficient of X_2 (AQ)
β_3 = Coefficient of X_3 (EA)
β_4= Coefficient of X_4 (LR)

The hypothesis, therefore, claims that there is no relation between ROE and the aforementioned variables while panel data techniques are used to establish the relation, if any.

Table2: Conventional Banks in the UAE and Their Market Capitalization

Bank	Symbol Used	Listed on	Market Capitalization	Total Assets	Total Liabilities	Book Value of Equity
			AED'000 (as of December 2015)			
ADCB	ADCB	ADSM	18,503,583	228,267,101	199,534,298	28,732,803
Bank of Sharjah*	BoS	ADSM	3,020,000	27,586,918	22,964,474	4,622,444
Commercial Bank International*	CBI	ADSM	3,457,000	16,477,070	14,211,801	2,265,269
Emirates NBD	ENBD	DFM	18,100,051	406,560,175	355,811,648	50,748,527
Invest Bank Sharjah*	IBS	ADSM	3,494,000	14,907,411	12,083,322	2,824,089
Mashreq Bank	MB	DFM	9,318,429	115,157,181	96,671,453	18,485,728
National Bank of Abu Dhabi	NBAD	ADSM	42,708,106	406,563,807	363,354,154	43,218,653
National Bank of Fujeirah	NBF	ADSM	4,210,673	30,033,156	25,753,539	4,279,617
National Bank of Umm Al-Qaiwain	NBUQ	ADSM	2,966,109	13,383,428	9,388,454	3,994,974
Ras al Khaimah Bank	RAK	ADSM	6,566,119	40,553,054	32,835,606	2,824,089
Union National Bank	UNB	ADSM	8,402,607	101,886,514	83,991,267	17,895,247
United Arab Bank	UAB	ADSM	3,045,296	23,681,623	21,093,668	2,587,955

Notes: 1) ADSM (Abu Dhabi Securities Market); DFM (Dubai Financial Market) 2) *Market Capitalization extracted from Bloomberg in USD (1 USD = 3.68 AED)

Source: Financial Statements of Banks (2015); Bloomberg (2016 a,b,c)

Table3: Variables Tested in the study

Variable	Measure	Notation	Expected Sign
Return on Equity	Net Income / Total Shareholders' Equity	ROE	Dependent Variable
Capital Adequacy	Shareholders' Equity / Total Assets	CAR	+
Asset Quality	Non-Performing Loans (NPLs) / Total Loans	AQ	-
Earnings Ability	Operating Profit / Average Assets	EA	+
Liquidity	Net Loans / Deposits	LR	+

Previous studies have shown mixed results with respect to the relationship of the aforementioned variables. This could have happened due to several reasons, including the time period or region selected. The state of the economy is an important determinant of returns and profitability while different geographic regions follow diverse regimes and business practices in terms of investment and therefore have the corresponding impact on profitability. Based on existing literature and logic, a positive association is expected between CAR, EA, LR and ROE while a negative relation is expected between AQ and ROE. These expectations have also been summarized in Table3.

Panel data (also known as longitudinal or cross-sectional time-series data) is a dataset in which the behavior of individuals is observed across time, in this case, banks. Panel data regressions are considered to be most useful when it is suspected that the outcome (dependent) variable depends on explanatory variables which are not observable directly but correlated with other observed variables. If these unobserved variables are constant over time, panel data estimators allow to consistently estimating the effect of observed explanatory variables. Panel data has copious advantages over purely cross-sectional or purely time series data as the sample size increases considerably, thereby increasing degrees of freedom and improving efficiency of the model.

The Ordinary Least Squares (OLS henceforth) models the relationship between metric dependent and independent variables.

The model can accommodate several independent variables and can be written as

$$Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots\ldots\ldots + \beta_n X_n + u_t$$

3.2 Data Analysis

The data analysis entails several steps. Preliminary analysis is performed through longitudinal and industry-wise descriptive statistics, followed by a calculation of correlations between the variables used in the study. The magnitude of correlation coefficients facilitates the determination of whether or not multiple regression analysis can be employed. Finally, panel data techniques including POLS, FE and RE (Pooled Ordinary Least Squares, Fixed Effects and Random Effects) models are used to quantify the relationship between dependent (ROE) and four independent variables (CAR, AQ, EA, and LR). While it is possible to use ordinary multiple regression techniques on panel data, this may not be optimal as the data exhibits panel characteristics. The estimated coefficients may be subject to omitted variable bias, a problem that arises when there is an unknown variable or variables that cannot be controlled for and also affect the dependent variable. With panel data, it is possible to control for some types of omitted variables even without observing them, by only observing changes in the dependent variable over time. This controls for omitted variables that differ between cases (banks) but are constant over time. It is also possible to use panel data techniques to control for omitted variables that vary over time but are constant between cases.

4. Findings and Discussion

4.1. Preliminary Analysis

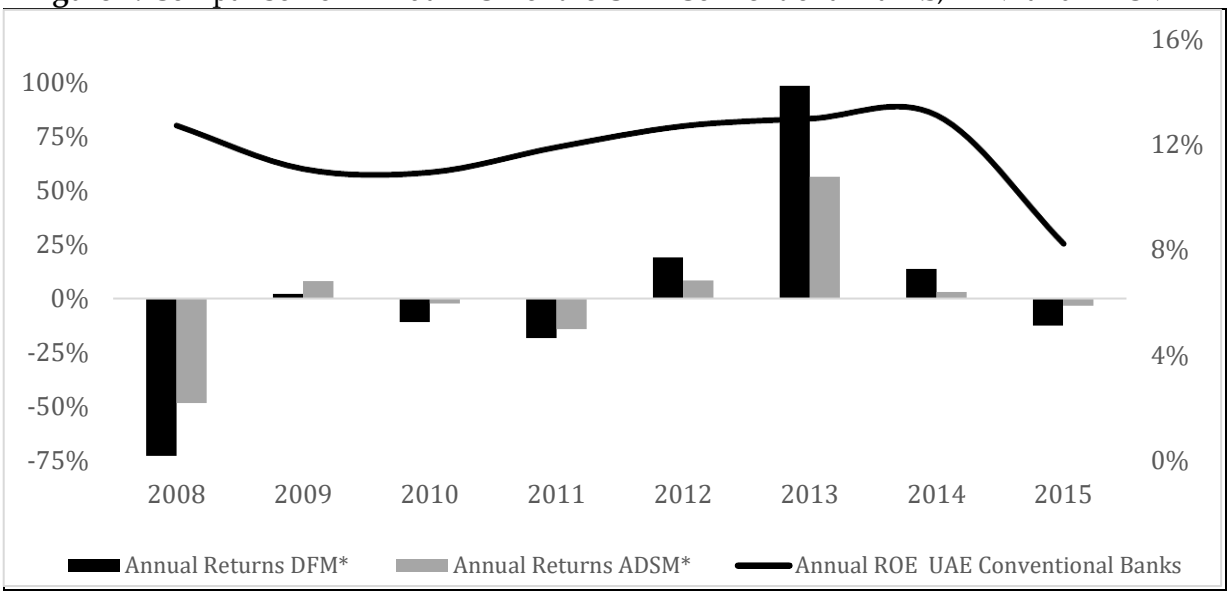
Table 4 presents the descriptive statistics of all the variables under consideration, explaining the annual mean returns and Standard Deviations (SD) of the industry while Table 5 and 6 present descriptive statistics for the industry for the complete period of analysis. Figure 1 presents a detailed insight into the data and the variability of ratios between peers. The ratios under consideration for each bank in the sample are plotted on the graphs and compared with overall ± 3 SD across the sample in Figure 2.

Return on Equity

With respect to individual banks, it is apparent that RAK has the highest average ROE of 24.30% amongst its peers with a modest SD. It is interesting to note that the ROE of RAK Bank far exceeded the ROE of its peers, as it has been beyond +3 SD from 2008 to 2013. However, in 2014 and 2015 the ROE fell below +3 SD, although it is still well above the industry average. The annual ROE mean has gradually increased over the years from 2012 to 2015 (Table 5) which the Central Bank of the UAE (2014b, p. 22) attributes to the "robust economic recovery in the UAE resulting in higher profits, lower NPLs, and the improvement in asset utilisation and capital allocation," However, a downfall in 2015 can be attributed to the unstable economic conditions in the UAE.

As exhibited in Figure 1, the annual ROE for the conventional banking industry has been greater and stable as compared to the returns provided by the Dubai Financial Market (DFM) and Abu Dhabi Securities Market (ADSM).

Figure 1: Comparison of Annual ROE of the UAE Conventional Banks, DFM and ADSM



Notes: *Authors' Calculations 1) Annual Returns on Indices are calculated as Closing Price (last day of the year) - Closing Price (first day of the year) Closing Price (first day of the year). 2) ROE is plotted on the right axis and the returns of DFM and ADSM are plotted on the left axis

Capital Adequacy Ratio

The longitudinal analysis of descriptive statistics indicates that some banks have much higher CAR not only in comparison to their peers but also from a regulatory perspective. For example, NBUQ has an average CAR of greater than 26.34% with a low SD of 3.68%. In contrast, NBAD has the lowest average CAR of 10.32 % with an SD of less than 1% suggesting that the bank has maintained this level of CAR throughout the period of analysis. As per the Central Bank of the UAE (2016 b) report, banks are expected to maintain a CAR of 12% (as against 8% requirement by BASEL III). A high CAR provides a shield to the depositors and promotes stability to the financial economy of the country. Maintaining reserves beyond regulatory requirements indicates a bank's inability to utilize the available resources efficiently. This can either be attributed to the lack of investment opportunities (Dietrich and Wanzenried, 2011), innovation in product development and marketing efforts, technological impediments (unavailability of mobile or internet banking), or low network embeddedness.

Asset Quality

The average annual AQ ratio has been mostly constant since 2010. With respect to individual banks, nearly 50% of the banks in the sample have maintained a ratio close to 2.00% with relatively lower data dispersion. The BOS appears to hold a higher percentage of toxic assets in the recent years with an overall average of 5.58% and SD of 3.41%. On the other hand, CBI has held a greater amount of NPLs in most years of analysis; however, a decline is witnessed in 2015. Some banks such as NBAD

and NBUQ have AQ close to 0.00% in some years of analysis. Interestingly, both the banks have more than 50% shareholding by the governments. It remains to be examined whether this plays a role in determining AQ of the banks.

Higher AQ ratios suggest that toxic assets or non-performing loans comprise a larger portion of the total loan. Hence, having a smaller AQ ratio is in favor of the banks and portrays a better quality of banks assets. As an aftermath of the financial crisis and real-estate bubble burst in 2008 and 2009, the regulatory authorities have become extra cautious and have promulgated regulations that ensure the long-term operational viability of banks[2]. The major decline in the AQ ratio in 2015 is primarily due to the re-classification of Dubai World Loans as performing loans (NBAD, 2015).

Earnings Ability

The average annual EA reduced during 2008 and 2014, potentially due to operational inefficiencies; however, an increase in EA is observed in 2015. The EA of individual banks ranges from 1.16% (ENBD) to 6.29% (RAK). While all other banks have a ROE of approximately 3%, CBI has an average EA of nearly 5%. Although the EA is high as compared to the competitors, it may be difficult to sustain above average profits in the long run in an extremely competitive and crowded banking industry.

Liquidity Ratio

The industry appears to maintain an average LR ratio of approximately 100% with an SD of 13.53%. With respect to the Central Bank of UAE regulations (2012), the bank should be able to meet its obligations with eligible short-term assets and therefore must maintain a minimum LR. Moreover, the BASEL III requires the LR to be close to 100%. A glance at the cross-sectional descriptive statistics suggests that most banks prefer to keep the LR close to one, with a few exceptions. ADCB's average LR is the highest (117.48%) amongst its peers, followed by ENBD (112.44%). On the contrary, BOS and MB have maintained an average LR of 85%. The SD across banks ranges between 3.69% and 17.12%, indicating that banks with majority shareholding by the government tend to have higher LRs as compared to banks owned by private majority shareholders due to the decline in government and public deposits (NBAD 2015). This may also be associated with a lower cost of borrowing for government-owned banks, which may, in turn, enable them to increase profitability through higher banking spread. Moreover, government-owned banks may be able to withstand adverse circumstances due to the availability of government funding.

[2] Any loan that is in arrear for more than 90 days is considered as NPL (Central Bank of the UAE, 2014b).

Table 4: Longitudinal Descriptive Statistics

Banks	Return on Equity		Capital Adequacy Ratio		Liquidity Ratio		Earnings Ability		Asset Quality	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
ADCB	0.1008	0.0707	0.1229	0.0109	1.1748	0.0957	0.0252	0.0071	0.0393	0.0126
BoS	0.0802	0.0227	0.1981	0.0275	0.8310	0.1033	0.0298	0.0191	0.0558	0.0341
CBI	0.0260	0.1002	0.1439	0.0125	0.9784	0.0938	0.0494	0.0042	0.1048	0.0281
ENBD	0.0983	0.0310	0.1175	0.0116	1.1244	0.1131	0.0116	0.0041	0.0188	0.0052
IBS	0.1174	0.0506	0.1963	0.0133	0.9681	0.0383	0.0307	0.0095	0.0793	0.0152
MB	0.1101	0.0341	0.1522	0.0224	0.8578	0.0781	0.0370	0.0205	0.0454	0.0194
NBAD	0.1494	0.0264	0.1032	0.0076	0.9686	0.1262	0.0321	0.0031	0.0201	0.0137
NBF	0.1005	0.0607	0.1365	0.0075	0.9716	0.0586	0.0272	0.0073	0.0518	0.0119
NBUQ	0.1043	0.0159	0.2634	0.0368	1.0467	0.1712	0.0322	0.0072	0.0220	0.0140
RAK	0.2430	0.0395	0.1874	0.0234	1.0183	0.0565	0.0629	0.0116	0.0200	0.0038
UNB	0.1218	0.0268	0.1571	0.0213	0.9563	0.0369	0.0303	0.0136	0.0239	0.0131
UAB	0.1542	0.0907	0.1653	0.0536	1.0952	0.1364	0.0348	0.0199	0.0238	0.0126

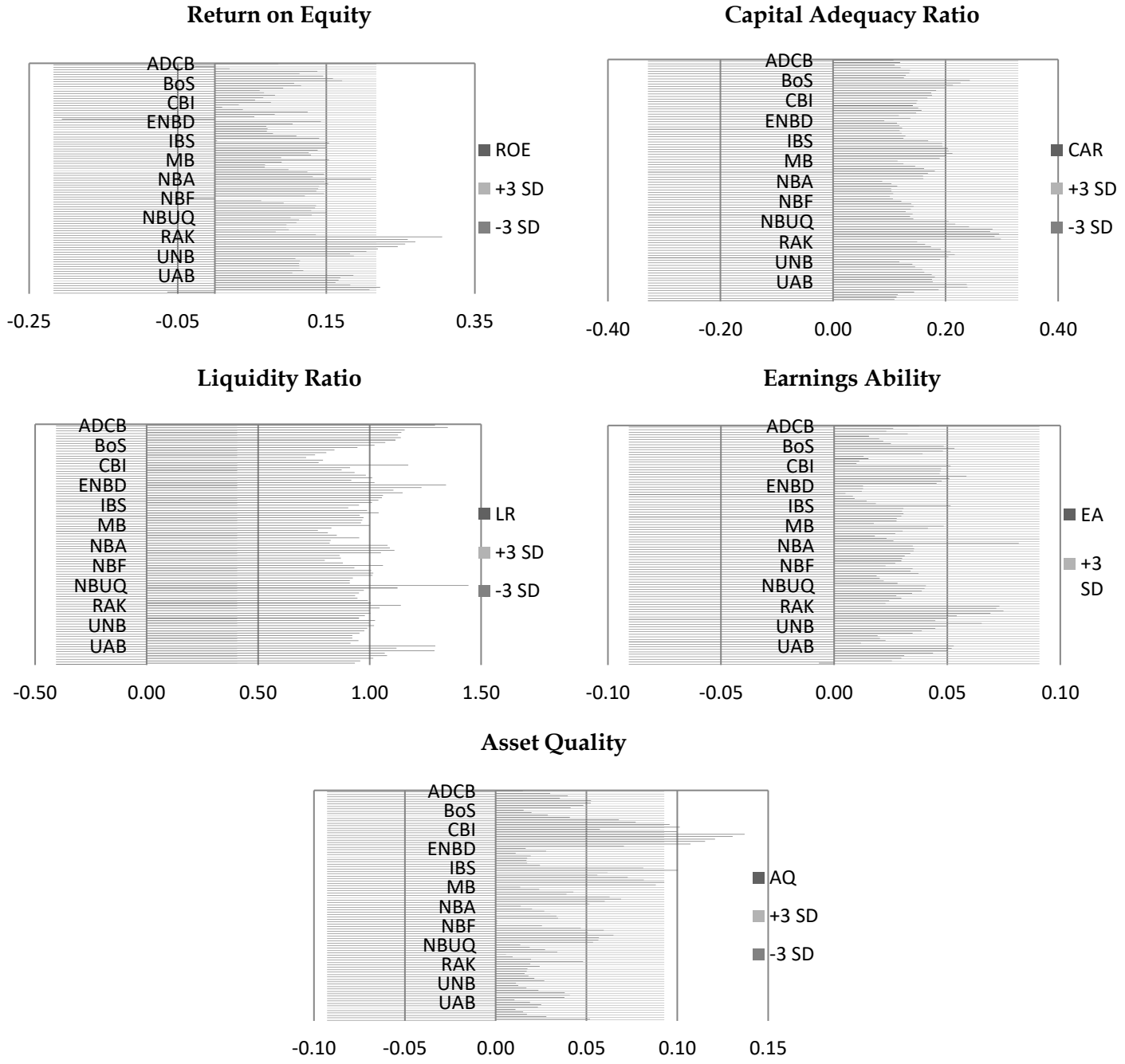
Table 5: Annual Industry Descriptive Statistics

		ROE	CAR	LR	EA	AQ
2008	Mean	0.1273	0.1445	1.1517	0.0437	0.0251
	SD	0.0921	0.0475	0.1576	0.0156	0.0216
2009	Mean	0.1108	0.1607	1.0399	0.0408	0.0374
	SD	0.0718	0.0467	0.1516	0.0150	0.0304
2010	Mean	0.1095	0.1650	1.0084	0.0385	0.0410
	SD	0.0703	0.0468	0.1440	0.0157	0.0342
2011	Mean	0.1191	0.1686	0.9941	0.0362	0.0406
	SD	0.0591	0.0490	0.1098	0.0147	0.0313
2012	Mean	0.1271	0.1675	0.9606	0.0271	0.0472
	SD	0.0492	0.0484	0.1046	0.0156	0.0330
2013	Mean	0.1299	0.1675	0.9567	0.0271	0.0491
	SD	0.0483	0.0535	0.1038	0.0126	0.0324
2014	Mean	0.1311	0.1613	0.9409	0.0265	0.0488
	SD	0.0489	0.0527	0.0993	0.0106	0.0346
2015	Mean	0.0825	0.1607	0.9419	0.0289	0.0474
	SD	0.1113	0.0522	0.0877	0.0245	0.0297

Table 6: Descriptive Statistics for the UAE Conventional Banks

	Return on Equity	Capital Adequacy Ratio	Liquidity Ratio	Earnings Ability	Asset Quality
Observations	96	96	96	96	96
Mean	0.1172	0.1620	0.9993	0.0336	0.0421
SD	0.0711	0.0484	0.1353	0.0167	0.0309
Minimum	-0.2060	0.0872	0.7149	-0.0067	0.0009
Maximum	0.3060	0.2985	1.4436	0.0816	0.1370

Figure 2: Cross-sectional and Time Series Analysis of Ratios and Comparison with ±3 Standard Deviations



4.2 Advanced Analysis

4.2.1 Correlations

The correlation between dependent and independent variables provide evidence of lack of multicollinearity between variables under consideration. The magnitude of correlation between ROE and LR, CAR is noticeably small. On the other hand, the correlations between ROE and EA, and ROE and AQ are approximately equal albeit with opposite signs. This indicates that multivariate analysis is plausible and likely free of spurious correlation. Table 7 below summarises these findings:

Table 7: Correlations between dependent and Independent Variables

	Return on Equity	Capital Adequacy Ratio	Liquidity Ratio	Earnings Ability	Asset Quality
Return on Equity	1				
Capital Adequacy Ratio	0.0971	1			
Liquidity Ratio	0.1223	-0.1303	1		
Earnings Ability	0.3660	0.2024	0.0718	1	
Asset Quality	-0.3653	0.0016	-0.3482	-0.0371	1

4.2.2 Panel Data Regression

Several models were developed to explore plausible relationships between the aforementioned variables. These include Pooled Ordinary Least Squares, Fixed Effects & Random Effects Models, with and without time dummies. Table 8 summarizes the findings of Models 1, 2 and 3, while Table 9 summarizes the findings of Models 4, 5 and 6.

Model 1: POLS

The entire dataset was pooled and multiple regressions were carried out to estimate the Return on Equity as a function of Capital Adequacy, Asset Quality, Earnings Ability and Liquidity Ratio.

$$ROE = \beta_0 + \beta_1 CAR + \beta_2 AQ + \beta_3 EA + \beta_4 LR + u_i \quad \text{.....(1)}$$

$$ROE = 0.11 + 0.03CAR - 0.83AQ + 1.5EA - 0.13LR \quad \text{.....(2)}$$

The overall fit of the model is good, as the p-value is 0.000, accordingly, the model is statistically significant at 1% significance level. Since a multivariate model is employed, it is appropriate to report the adjusted R^2, which is 22.65%. This suggests that more than 22% of the variation in the dependent variable can be explained by the four independent variables included in the model. It is also observed that there is a marginal difference between R^2 and adjusted R^2, which implies that variables under consideration are relevant for the estimation of this model. As the panel collates various categories of data for long periods of time, a small R^2 is expected and acceptable. Moreover, the tolerance and Variance Inflation Factor (VIF) statistics are within acceptable limits, suggesting a lack of multicollinearity between the predictors.

Equation 2 highlights that two independent variables (AQ and EA) with opposite signs are statistically significant at 1% significance level. The EA ratio with the highest coefficient in the model appears to be the most important determinant of the ROE of the UAE conventional banks.

Table 8: Summary of Results for Models 1, 2 and 3 (without time dummies)

	(1)POLS	(2)FE	(3)RE
VARIABLES	roe	roe	roe
CAR	0.0347	0.1840	0.0930
AQ	-0.8300***	0.6940*	-0.2830
EA	1.4870***	1.7310***	1.3200***
LR	-0.0134	0.0110	-0.0004
Constant	0.1100*	-0.0111	0.0701
Observations	96	96	96
R-squared	0.259	0.140	
Number of banks		12	12

Notes: *** p<0.01, ** p<0.05, * p<0.1

Table 9: Summary of Results for Models 4, 5 and 6 (with time dummies)

	(4)POLS	(5)FE	(6)RE
VARIABLES	roe	roe	roe
CAR	-0.0309	0.0752	-0.0157
AQ	-0.900***	0.6510*	-0.3330
EA	2.0410***	2.321***	1.9670***
LR	0.0419	0.0379	0.0595
2009.year	0.00572	-0.0148	0.0002
2010.year	0.0138	-0.0122	0.00662
2011.year	0.0285	0.0033	0.0215
2012.year	0.0624**	0.0295	0.0516*
2013.year	0.0669**	0.0310	0.0551**
2014.year	0.0697**	0.0351	0.0584**
2015.year	0.0150	-0.0181	0.00466
Constant	0.0168	-0.0451	-0.0166
Observations	96	96	96
R-squared	0.372	0.276	
Number of banks		12	12

Notes: *** p<0.01, ** p<0.05, * p<0.1

Model 2: Fixed Effects Model

Fixed-effects (FE) models may be used in analyzing the impact of variables that vary over time. FE explores the relationship between predictor and outcome variables within a bank. When using FE we assume that something within the bank may impact or bias the predictor or outcome variables and we need to control for this (for example business practices of a bank may influence its stock price and eventually, profitability). For each bank, we can compute the 'within' mean of y and x to obtain the FE Estimator. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. FE removes the effect of those time-invariant characteristics so we can assess the net effect of the predictors on the outcome variable.

The same relationship is re-estimated:

$$ROE = \beta_0 + \beta_1 CAR + \beta_2 AQ + \beta_3 EA + \beta_4 LR + u_i \text{ ……..(1)}$$

$$ROE = -0.11 + 0.18CAR + 0.69AQ + 1.73EA + 0.011LR \text{ ……..(3)}$$

The model is suitable and the rho value is 0.5994, which confirms that 60% of the variation in ROE is due to differences across panels (banks).

Equation 3 highlights that two independent variables (AQ and EA) are still significant; however, the signs have changed. Both AQ and EA have a significant and positive relationship with ROE.

Joint Significance

F-Test for the model returns a p-value of 0.000 indicating that the 4 variables (CAR, AQ, EA and LR) are jointly significant, even if some of them are not independently significant. The overall fit of the model, therefore, is good. And therefore, all the variables must be included in the analysis.

Heteroscedasticity

Breusch-Pagan test confirms that the data is homoscedastic, further endorsing the suitability of this model. The results of the test are highlighted in table 10 below:

Table 10: Breusch-Pagan test for heteroscedasticity

H_0: Constant Variance
Variables: fitted values of ROE
Chi2(1) = 0.00
Prob › chi2 = 0.9727

The p-value is very high and we cannot reject the null hypothesis, confirming that the data is homoscedastic (has constant variance).

Model 3: Random Effects Model

The variation across banks is assumed to be random and uncorrelated with the independent variables included in the model. An advantage of random effects (RE) is that time-invariant variables (i.e. bank policies) can also be included. In the FE

model, these variables are absorbed by the intercept. RE allows generalizations of the inferences beyond the sample used in the model. If it is believed that differences across individuals have some influence on the dependent variable then random effects models may be used.

The same relationship is re-estimated:

$$ROE = \beta_0 + \beta_1 CAR + \beta_2 AQ + \beta_3 EA + \beta_4 LR + u_i \text{ ……..(1)}$$

$$ROE = 0.07 + 0.93CAR - 0.28AQ + 1.31EA - 0.00LR \text{ ……..(4)}$$

F-Test confirms that the model is suitable with a small p-value, while, as before, only EA and AQ are statistically significant. And, the differences across banks are assumed to be uncorrelated and random.

Equation 4 highlights that two independent variables (AQ and EA) are still significant, as before. Both AQ and EA have a significant and positive relationship with ROE.

Three models estimated above explore the relationship between ROE and 4 independent variables, namely CAR, AQ, EA and LR. As the three models give varying results, it is imperative to choose the most robust and reliable model. Further testing is done between models to select the most desirable model.

i) Lagrange Multiplier test – OLS or FE/RE

The LM Test is conducted to check if RE is a more suitable model compared to OLS. The null hypothesis states that there is no panel effect in the data or that there is no difference across banks. The test returns a very small p-value thereby rejecting the null to conclude that the data has panel effects and RE is superior to OLS.

ii) Hausman Test – FE or RE

Both FE and RE give similar results and to decide between the two models, Hausman Test is performed. The null hypothesis states that the difference in coefficients is not systematic and is easily rejected with the extremely small p-value, thereby concluding that in this case, Fixed Effects model is superior to Random Effects model.

Overall, for the data at hand, Model 2, FE Model is most suitable.

Models 4, 5 and 6: POLS, FE and RE with time dummies

It is important to include time dummies since the analysis spreads over a rather long period of 8 years and certain characteristics might be more dominant in a particular year, reflecting the general state of the economy. They will also reveal the influence on ROE of time, after controlling other factors. Time dummies have been included in all three models for consistency and entirety. However, since it has been established that FE model best describes the data at hand, for brevity, only Model 5 (FE with time dummies) has been discussed below.

The years 2012, 2013 and 2014 return a positive and statistically significant coefficient in Models 4 and 6 (POLS & RE) indicating special factors at play and

confirming suitability in inclusion of time dummies. This could be attributed to the economically stable scenario, indicating growth, especially post-GFC period. However, the Fixed Effect Model does not return any significant variables with regards to time dummies. Furthermore, interaction tests were performed to check the joint significance of time dummy variables (2009 - 2015), revealing a p-value of 0.0719. This indicates that the null cannot be rejected and hence all the time dummies are equal to zero, and therefore Model 2 is superior to Model 5.

In light of the above findings, it can be concluded that Model 2 (FE without time dummies) is the most robust model and is further discussed.

The relationship between ROE and AQ and ROE and EA was found to be positive and significant, while the relation between ROE and CAR and LR was found to be insignificant, even at 10% level of significance. However, all 4 variables are jointly significant. The null of no association between the ROE and EA, and ROE and AQ is rejected at 10% level; however, there is insufficient evidence to reject the null of association between ROE and CAR and LR. This may suggest that returns to shareholders or shareholder's wealth maximization are highly dependent on the quality and capability of management to employ assets efficiently and effectively.

The results for AQ are contradictory to our initial expectation, indicating that risky assets resulted in higher returns for UAE Banks. Empirically, as the quality of assets (AQ) falls by 0.694 units, the ROE increase by 1 unit. As low-quality assets bear higher rates of return for banks, this indicates greater profitability. The coefficient associated with AQ is the second highest in absolute terms, which indicates a direct and substantial positive association between the two variables. A smaller AQ indicates a smaller proportion of toxic assets as compared to overall assets that are loans. This suggests that debtors are able to fulfill their obligations (interest and principal payments) in a timely manner. Hence, the lower the magnitude of total loans, the higher the ROE.

The EA ratio with the highest coefficient in the model appears to be the most important determinant of the ROE of the UAE conventional banks. The results for EA are in line with the initial expectation. The findings confirmed statistically significant association between ROE and EA at 1% level of significance, indicating that returns to shareholders or shareholder's wealth maximization is highly dependent on the quality and capability of management to employ assets efficiently and effectively. Empirically, as the earning ability increases by 1 unit, the returns on equity increase by 1.73 units. The results are expected and intuitive because net income is derived from operating profit. A large amount of operating profit would result in larger net income. The primary reason for this could be contributed to the fact that banks in UAE are not subject to any taxation locally and are subject to minimal overseas taxation.

Interestingly, the model presents an insignificant association between ROE and CAR, and ROE and LR, with smaller positive coefficients. The insignificance of CAR in determining the ROE is rather counterintuitive. While higher reserve requirements

provide a buffer to the banking industry in adverse economic and financial situations, they hinder the ability of banks to extend loans on a larger scale. It is to be noted that lower reserve requirements lead to a higher money multiplier effect and theoretically lead to greater economic benefit. However, this can also lead to greater toxic assets in turbulent times due to increased consumer credit and corporate NPLs. In both cases, CAR is expected to have some impact on the ROE.

The coefficient associated with LR is very small, positive, and statistically insignificant. The UAE conventional banks are maintaining an LR of close to 100% due to regulatory and BASEL requirements. Some additional regulatory requirements, such as the Cash Reserve Ratios (CRR)[3] limit bank's capability of extending beyond liability and asset management to positively impact the profitability substantially. This may also be attributed to the nature of transactions in the UAE. Besides being an oil producing country, the UAE is considered to be a trading hub in the region. Trade finance[4] accordingly appears to be an integral part of domestic banks' businesses (Refer to Appendix 1 for details). Most trade finance instruments are classified as short-term assets (Alexander and Dhumale, 2012), resulting in higher LR for all the banks under consideration. Some of the trade finance transactions are classified as off-balance sheets transactions like letters of credit, and bank guarantees (Baker and Riddick, 2013). While these transactions generate revenues for the banks, they are not recorded on banks' balance sheets as financial obligations.

5. Implications and Conclusion

This study primarily focused on conventional banks in the UAE and attempted to model the relationship between the profitability, especially from the perspective of shareholders, and various bank-level aspects.

The results highlighted a positive and significant association between ROE and AQ, and ROE and EA which are in line with the findings already reported in the literature. However, CAR and LR were found to have insignificant association with ROE. The findings related to ROE and LR are in contrast to the study done by Al-Tamimi and Hussein (2010) on UAE banks. The contradicting findings can be attributed to different periods of analysis. Al-Tamimi and Hussein (2010) pertains to the pre-GFC period whereas this study analyzes both the GFC and post-GFC periods. However, the insignificant association between ROE and CAR was rather unanticipated, as the literature presents evidence that this ratio can significantly affect the profitability positively or negative (Pasiouras and Kosmidou, 2007; García-Herrero *et al.*, 2009; Dietrich and Wanzenried, 2011). One possible interpretation of this finding can be an indirect impact of CAR on ROE through AQ. It is possible that

[3] the CRR is 14% on Current and Savings Accounts (CASA) and 1% on Fixed Deposits

[4] Trade finance deals with short-term financing of import and export transactions. Products available include letters of credit (L/Cs), import financing, guarantees, L/C confirmation, pre-shipment export financing, invoice financing, and documentary collections.

higher CAR restrains the banks from extending potentially risky loans and therefore, the majority of banks have maintained a low AQ ratio.

The findings of the study have diverse implications for policy makers. While one set of implications is relevant to the depositors, the other relates to the majority shareholders of banks. With respect to the UAE, which is a considered to be a trading hub due to its strategic location, the expansion of the core banking business that is trade finance, would lead to greater profitability for banks. New regulations that permit relaxation of capital requirements for trade finance assets will pave the way for success of banks even with high capital requirements and other stringent regulations.

The limitations of this study were mostly related to the unavailability of data. An event study comprising pre-crisis, crisis, and post-crisis periods would have provided a better insight into the evolving profitability of banks with changing environmental dynamics and regulatory interventions.

Further research can be conducted using a larger set of variables, both internal and external, that may explain the variability in ROE to a greater extent while maintaining the parsimony of the model and deriving meaningful results.

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Appendix 1 - Revenue Generated Through Trade Finance Transactions (In AED'000)

Banks	2008	2009	2010	2011	2012	2013	2014	2015
ADCB	49,670,030	45,803,804	30,226,890	25,913,169	28,511,254	34,483,267	47,327,611	51,662,266
BoS	816,255	1,060,493	6,033,531	690,565	5,609,962	5,774,532	5,676,512	5,814,886
CBI	4,209,793	4,020,766	3,496,780	2,988,899	2,817,247	2,698,717	4,220,163	3,682,584
ENBD	95,714,156	58,660,237	51,242,130	56,185,976	52,150,007	69,382,068	68,343,200	78,876,842
IBS	5,406,326	5,624,911	5,736,553	5,889,959	6,404,183	7,358,907	8,035,730	9,224,954
MB	2,053,701	1,952,917	2,284,953	2,023,979	2,094,668	2,774,129	1,901,508	2,014,011
NBAD	107,504,326	113,778,248	119,030,492	110,129,729	118,528,485	111,839,748	144,183,411	147,231,404
NBF	125,911	113,562	96,610	95,082	75,570	104,928	113,389	213,052
NBUQ	217,909	116,273	174,380	197,644	264,584	106,137	191,701	1,023,563
RAK	4,236,585	4,745,684	5,404,895	5,858,454	6,615,635	7,311,091	844,612	872,232
UNB	32,647,138	26,663,906	27,839,696	24,909,977	23,550,469	25,052,197	28,944,286	33,264,533
UAB	6,562,613	6,364,148	6,057,736	6,200,664	5,583,636	5,941,326	4,003,528	3,485,333