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Macroeconomic and Bank Specific Determinants of Non-Performing Loans in UAE Conventional Bank

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ABSTRACT

This paper uses panel data methodology including Random Effects model to identify the bank-specific determinants and macroeconomic determinants of non-performing loans in the United Arab Emirates (UAE) conventional banks for the period 2008-2015. Among the bank-specific determinants, non-performing loans (NPL, t-1) indicate a significant positive relationship with NPL and liquidity ratio indicate a significant negative relationship with NPL, whereas capital adequacy ratio and return on assets was found to have an insignificant relationship due to the robust banking regulations in UAE. All the macroeconomic determinants, namely, gross domestic product, growth, inflation, domestic credit to private sector, unemployment and government debt appeared to be insignificant in determining the level of NPLs, suggesting that the crisis is more intrinsic to internal issues within the corporates and not related to macroeconomic factors.

Keywords: *Non-performing Loans, Panel Data, Bank Specific Determinants, Macroeconomic Determinants, United Arab Emirates*

INTRODUCTION

The credit quality of loan portfolios across most countries in the world have been unstable since the global financial crisis (GFC) in 2007– 2008 and therefore the bank asset quality has deteriorated sharply over the years [1]. A surge in non -performing loans (NPL) signifies not only a deteriorating balance sheet of banks [2] but also a banking crisis [3,4] and the slowdown of economy [5-7]. Many banking analysts have cited NPLs as "financial pollution" as it hampers economic growth [7,5].Louziset al [8] have pointed out that exploring the determinants of NPL is of substantial importance to regulatory authorities as well as for bank's management. However, any policy implementation by the regulatory authorities to minimize the NPL predicament first requires an in-depth analysis of the underlying macroeconomic and bank specific determinants of NPL.

United Arab Emirates (UAE) was upgraded to emerging market from frontier market in 2013 by Morgan Stanley Capital International (MSCI) marking a new era of capital flows;90% of the firms in UAE are Small and Medium Sized Enterprises (SMEs) [9] and they account for nearly 60% of the UAE's GDP [10].SMEs in UAE rely on loans from commercial banks as the main source of working and long-term capital. In developing countries, commercial banks' lending behavior affects the monetary policy more than in developed countries [11]. Therefore, the UAE commercial banks play a crucial role of collecting valuable information from borrowers, evaluating the feasibility of proposals and supervising investment projects.

In the UAE, there are 23 local and 28 foreign banks and more than 1,000 branches between them [12]. The World Bank [13] has provided data for the UAE's NPL from 2008-2015, and the average value of NPL during that period was 5.69 percent with a minimum of 2.3 percent in 2008 and a maximum of 8.4 percent in 2012. In line with Louziset al[8], Kjosevskia and Petkovskib[1],Ghosh [2] and Bussoliet al[14], this study examines the macroeconomic and bank specific determinants of NPL across 12 UAE conventional banks spanning the time period of 2008-2015. It is interesting to consider the extent to which NPL is influenced by the economic conditions in UAE. Similarly, it is worthwhile to draw attention to the links between internal characteristics of banks and the performance of the asset quality. This exercise will also help to evaluate the importance of bank

specific determinants versus the macroeconomic factors in influencing the NPLs.

The present study aims to contribute firstly, to the literature of NPL, secondly, will be of practical use in the macroeconomics analysis of the dynamics of lending and asset quality in UAE banking industry, andthirdly, may enable the regulatory authorities to design macro-prudential and fiscal polices in UAE,

THE DETERMINANTS OF NPLS

This section explains the determinants of NPLs, and the selected variables provide a strong framework for analyzing the determinants of NPL in the UAE commercial banks.

Bank-Specific Determinants

Some authors have argued that the banks with a low capital base apply "moral hazard" hypothesis [15] and indulge in risky lending, leading to increase in NPLs [16,17,1,18,19], and yet others contend that banks with high capital base tend to adopt liberal credit policy and therefore end up with high NPLs[20,2,21,22].

Berger and DeYoung [15] used Granger-causality technique on a sample of US commercial banks suggested that the bank's performance indicator such as return on assets and return on equity are negatively related to NPLs due to "bad management" hypothesis. This is attributed to the fact that strong profitability is less likely to participate in unsafe activities, such as granting risky loans[23]. On the contrary, higher profits could lead to higher NPLs according to the model cited by Rajan [24]. Ezeoha[19] found that the relationship between the level of non-performing credits and bank profitability as negative and very significant in Nigerian banks;and an important factor in controlling the quality of bank's assets.

Festic and Repina[25] examined the growth of gross loan in the Baltic states the findings reported the positive relationship between credit growth and NPLs, which could be due to soft-loan constraints and slowdown in economic activities. The studies by Klein [17], Ghosh [2] and Vithessonthi[26] also had similar findings between credit growth and NPLs in CESEE, USA, and Japan. Alodayni[27] used a Panel Fixed Effect Model to estimate the response of NPLs in Gulf Council Countries (GCC) and the findings indicated that bank-specific credit growth rates are an insignificant determinant of NPLs in the region. The insignificance can be due to the macro-prudential measures and the strong financial regulation in the GCC region.

Macroeconomic Determinants

Louziset al[8] found a significant negative relationship between NPLs and gross domestic product (GDP) growth in the Greek banking sector. This result shows that the business sectors are dependent on the economic growth for the repayment of loans. This relationship was also confirmed by Kjosevskia and Petkovskib[1];Alodayni[27];Dimitrioset al[23];Khemraj and Pasha [28]; Jimenez and Saurina[29];Messai and Jouini[30]; Rajan and Dahl [31] and Us [20]. However, Filip [32] has cited the reverse condition indicating that a reduction in NPL makes usable finance available, which leads to increase in production and GDP of Romania.

Inflation is seen as a significant determinant of NPL, but its effect is ambiguous. On the one hand, the study conducted by Ghosh [2] on US commercial banks showed a positive impact of inflation on NPLs denoting a negative effect on borrower's real income and thus lowered the debt repayment capacity. On the other hand, Nkusu [33] has examined the NPL determinants of 26 advanced countries and has concluded a negative impact of inflation on NPLs. In yet another study,Kjosevskia and Petkovskib [1] indicate a mixed relationship between inflation and NPLs.

Dash and Kabra[34] and Kjosevskia and Petkovskib[1] study showed a significant positive association between domestic credit to private sector and NPLs. It criticized the unsustainable lending boom as a factor that leads to financial instability. The work of Alodayni[27] on GCC banks confirms an insignificant impact of credit growth on NPLs, an evidence of the macro-prudential measures and the strong financial regulation in the GCC region.

A significant positive impact of unemployment to NPLs was found in Louziset al[8] study on Greek banks, which indicated that a rise of unemployment affects households' ability to service their debts. This result was consistent with the finding of Nkusu[33];Messai and Jouini[30];Salas and Suarina[18]; Rajan and Dhal [31];Fofack[35] and Jimenez and Saurina[29].

Reinhart and Rogoff [4] have suggested in their study that the public debt crisis leads to a banking crisis and thereby, the banks become

hard-pressed for liquidity. The positively significant coefficient of public debt with NPLs is evident in the findings of Makriet al [21];Louziset al[8] and Ghosh [2]. In rebuttal, the findings of Us [20]in Turkey region suggest that the foreign banks NPLs are positively affected by sovereign debt before and after GFC.Bofondi and Ropele[36] examined the Italian banks and found out that the increases in interest rate worsened the quality of loans as higher debt servicing costs made it harder for borrowers to honour their debt. The study by Messai and Jouini[30]; Kalirai and Scheicher [37]; Arpa et al [38]; Louzis, Vouldis and Metaxas [8] and Filip [32]showed a positive influence of interest rates on NPLs. Espinoza and Prasad [16] and Alodayni [27] investigated banks in the GCC region and found NPLs to worsen as economic growth lowered, while interest rates and risk aversion increased.

RESEARCH METHODOLOGY

This empirical study hypothesizes an association between NPL and the bank specific determinants, and between NPL and macroeconomic determinants in the UAE commercial banks. The data for the bank specific determinants (bank capitalization, bank profitability and credit growth) were collected from audited financial reports available on websites of the candidate banks and the stock exchanges' websites. The data for macroeconomic determinants, including GDP growth, inflation, domestic credit to private sector, unemployment and UAE government debt was obtained from the World Bank database and CBUAE [12].

The CBUAEwebsite provides a list of thirteen publically listed conventional banks. The sample size of the study is 12 conventional banks in UAE (data for one bank was not listed). The period of analysis extends from 2008 to 2015. Data before 2008 was not available for all the banks. Table 1 provides the details of banks included in the study.

Table1. *Conventional Banks in the UAE and Their Market Capitalization*

Bank	Symbol Used	Listed on	Market Capitalization	Non-performing Loans
CB	ADCB	ADSM	18,503,583	6,344,887
Bank of Sharjah*	BoS	ADSM	3,020,000	1,524,442
Commercial Bank International*	CBI	ADSM	3,457,000	800,067
Emirates NBD	ENBD	DFM	18,100,051	15,091,904
Invest Bank Sharjah*	IBS	ADSM	3,494,000	722,746
Mashreq Bank	MB	DFM	9,318,429	2,766,169
National Bank of Abu Dhabi	NBAD	ADSM	42,708,106	83,699
National Bank of Fujairah	NBF	ADSM	4,210,673	1,054,223
National Bank of Umm Al-Quwain	NBUQ	ADSM	2,966,109	424,500
Ras al Khaimah Bank	RAK	ADSM	6,566,119	744,600
Union National Bank	UNB	ADSM	8,402,607	2,707,913
United Arab Bank	UAB	ADSM	3,045,296	786,480

Source: *Financial Statements of Banks (2015); [37-41]*

Notes: *1) ADSM (Abu Dhabi Securities Market); DFM (Dubai Financial Market)*

*2) *Market Capitalization extracted from Bloomberg in USD (1 USD = 3.68 AED)*

Drawing from Boudriga et al [22];Dimitrioset al [23];Klein [17];Morris et al [42];Polodoo et al [43] andVithessonthi[26],the following baseline regression will be estimated:

$$Y_{it} = \beta_0 + \beta_1 Y_{i(t-1)} + \beta_2 (B_{i(t-1)}) + \beta_3 (M_{it}) + \varepsilon_{it}$$

Where Y_{it} represents the log transformation of NPLs at period t and $Y_{i(t-1)}$ represents a single period lag; $B_{i(t-1)}$ denotes a vector of bank specific variables with a single period lag; M_{it} represents the vector of the macro-economic variables and ε_{it} is an independently and identically distributed error term.

Polodoo et al [43] explain that log transformations ensure that the variable spans over the interval $[\infty,-\infty]$ as opposed to [0, 1] and is distributed symmetrically and therefore other variables are also in logs.

The potential problem of endogeneity can be dealt with by lagging the bank determinants by one period. This approach is in line with Chang

et al [44];Polodoo et al [43] and Vithessonthi[26].

Dependent variable

NPLs: ratio of non-performing loans to total loans [45,23,46]

Independent Variables

Bank Specific Determinants

Capital Adequacy Ratio (CAR):ratio of equity to total assets, also known as Bank Capitalization[17,8,21]

Liquidity Ratio (LR): ratio of loans to total assets, also known as Credit Growth[2,17] **Return on Assets (ROA)**: ratio of net income divided by total assets, also known as Bank Profitability [19,2,23]

Macro-Economic Determinants

GDP growth: the annual percentage growth of real GDP[43,2]

Inflation (INF): annual percentage change of the consumer price index (CPI)[2,23]

Domestic credit to private sector (DOMC): percentage of GDP[1]

Unemployment (UNEM): percentage of total labour force [23,1]

UAE government debt/sovereign debt (DEBT): the general gross government debt as percentage of GDP[23]

Table 2. *Determinants: Measure and Expected Sign*

Variable	Measure	Notation	Expected Sign
NPLs	$\frac{\textit{Non-Performing Loans}}{\textit{Total Loans}}$	NPL	Dependent Variable
Capital Adequacy Ratio	$\frac{\textit{Shareholders' Equity}}{\textit{Total Assets}}$	CAR	-
Liquidity Ratio	$\frac{\textit{Total Loans}}{\textit{Total Assets}}$	LR	+
Return on Assets	$\frac{\textit{Net Income}}{\textit{Total Assets}}$	ROA	-
GDP Growth	*As a percentage of real GDP*	GDP	+
Inflation	*As a percentage of CPI*	INF	+/-
Domestic Credit to Private Sector	*As a percentage of real GDP*	DOM	+
Unemployment	*As a percentage of labour force*	UNEM	+
Government Debt	*As a percentage of real GDP*	DEB	+

The study uses commonly accepted definition on NPL,that loans and other assets are classified as nonperforming when the payments, representing the principal, and the interests are past due by 90 day or more [47].

The selection of variables comes from the most commonly studied variables, which are expected to have an impact on NPLs.Dimitrioset al [23], Ezeoha[19],Kjosevskia and Petkovskib[1] and Vithessonthi[26] use OLS along with GMM Models to quantify the relationship.

Panel data techniques were employed since it offers many advantages. As the number of observations increase, so do the degrees of freedom, reducing collinearity between the explanatory variables, which in turn helps achieve robust results. Furthermore, pooling enables control for exogenous shocks common to all the banks (time effect) and reduces the omitted variable bias (unit effect) [22].

Panel data techniques includingPooled Ordinary Least Squares (POLS), Fixed Effects (FE), Random Effects (RE), Instrumental Variables 2 Stage Least Squares (IV 2SLS) and General Method of Moments (GMM) were conducted. According to Sayani et al [48],while it is possible to use ordinary multiple regression techniques on panel data, this may not be optimal if 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 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.

Findings And Discussion

Initial Analysis

The panel under investigation has a sample size of 96 and the summary statistics show that there isn't much variation in the average NPL figures. The bank specific variables have also remained similar over the years, pointing towards stability

in the banking sector. This is reconfirmed in the annual figures as presented in Table 3 and 4. The macro-economic variables, however, show high variation, indicating rapid development in the economy.

Table 3. *Summary Statistics*

Variable	Obs	Mean	Std. Dev.	Min	Max
NPL	96	.0425	.0310178	0	.14
CAR	96	.1622917	.0486552	.09	.3
LR	96	.99875	.1351354	.71	1.44
ROA	96	.0198958	.0132581	-.03	.05
GDP	96	3	3.441787	-5.2	6.4
INF	96	3	3.764991	.7	12.5
DOMC	96	6.44	3.806326	.42	14.7
UNEM	96	4.0375	.1323869	3.8	4.2
DEBT	96	17.48125	3.616812	12.5	24.1

The balanced panel reveals some interesting facts: NBAD has had consistently low levels of NPL, standing at 0.00 in the years 2014 and 2015. NBAQ and RAK bank have had higher CAR, LR and ROA as compared to the other banks, indicating positive financial health. UAE has seen highest GDP in 2012 while maximum unemployment, domestic credit to private sector and debt were seen in 2009 during the financial crisis. The results depict a clear picture of the economy and the banking sector in line with initial expectation.

Table 4. *Annual Bank Descriptive Statistics*

		NPL	CAR	LR	ROA
2008	Mean	0.0258	0.1445	1.1517	0.0217
	SD	0.0219	0.0475	0.1576	0.01403
2009	Mean	0.0375	0.1607	1.0399	0.0192
	SD	0.0308	0.0467	0.1516	0.0138
2010	Mean	0.0417	0.1650	1.0084	0.0200
	SD	0.0346	0.0468	0.1440	0.0154
2011	Mean	0.0408	0.1686	0.9941	0.0208
	SD	0.03147	0.0490	0.1098	0.0124
2012	Mean	0.0475	0.1675	0.9606	0.0225
	SD	0.0311	0.0484	0.1046	0.0114
2013	Mean	0.0500	0.1675	0.9567	0.0217
	SD	0.0330	0.0535	0.1038	0.0119
2014	Mean	0.0500	0.1613	0.9409	0.0192
	SD	0.0352	0.0527	0.0993	0.0090
2015	Mean	0.0467	0.1607	0.9419	0.0142
	SD	0.0300	0.0522	0.0877	0.0183

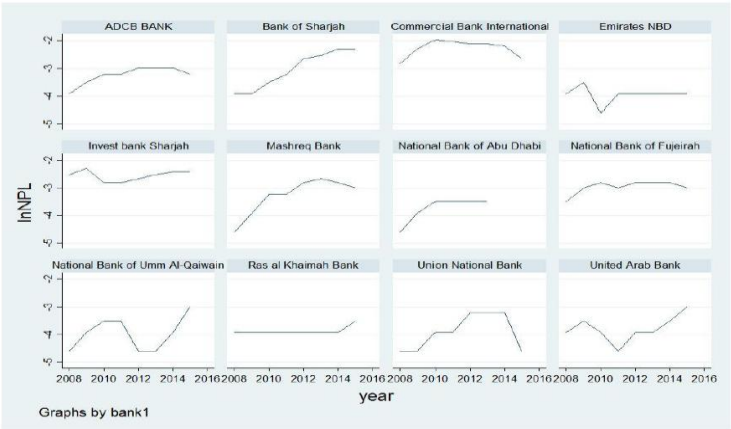

Figure 1. *Line Graph for Conventional Banks*

As exhibited in Figure 1, conventional banks have had different levels of NPL through 2008 – 2015. Some banks such as RAK, CBI, ENBD and NBFhave been quite stable, others have seen vast fluctuations (NBUQ, BoS, UNB, MB and UAB). The dissimilarpatterns indicate that

perception of NPLs is not the same among all the banks. While some may prefer to write off the NPLs as soon as possible, others may see a potential of recovery. It should be clarified that liquidation can be determined on the basis of the bank's own experience [49].

Table 5: *Correlation Matrix*

	NPL	LR	CAR	ROA	GDP	INF	DOMC	UNEM	DEBT
NPL	1.000								
LR	-0.339	1.000							
CAR	0.006	-0.125	1.000						
ROA	-0.253	0.093	0.534	1.000					
GDP	0.083	-0.165	0.040	0.042	1.000				
INF	-0.185	0.374	-0.14	0.001	0.007	1.000			
DOMC	0.063	-0.129	0.053	-0.057	-0.749	-0.562	1.000		
UNEM	0.000	0.017	0.058	0.086	-0.43	-0.60	0.492	1.000	
DEBT	0.008	-0.023	0.053	-0.004	-0.707	-0.606	0.784	0.852	1.000

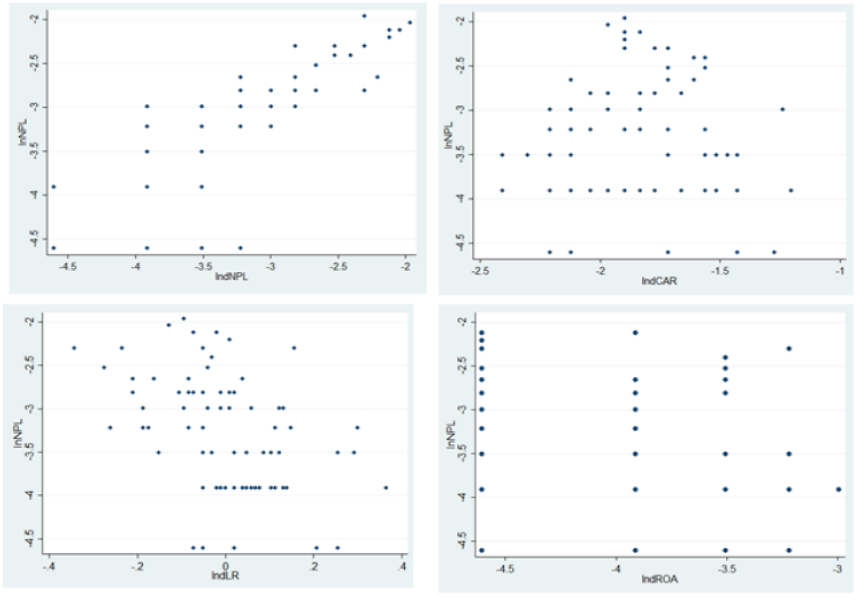

Figure 2. *Pairwise Correlation*

The correlation matrix confirms weak correlation between the determinants suggesting that multicollinearity problems were either not severe or non-existent. While the relationship between NPL and CAR is positive, a negative relationship is seen between NPL and LR as well as between NPL and ROA. The finding is consistent with Ghosh [2] and Ezeoha[19].

Empirical Analysis

POLS, FE, RE, IV 2SLS and GMM results have been reported and discussed.

Breusch-Pagan test and White's test confirm absence of heteroscedasticity. Furthermore, Pesaran test for cross-section dependence in panel time-series data confirms the absence of unit roots [61]. Absence of unit roots is confirmedat 5% level of significance since P, Z, L* and Pm are 146.3924, -2.2096, -10.1213 and 17.6658 respectively.

Model 1: POLS

Since a multivariate model is employed, it is appropriate to report the adjusted R^2,which suggests that more than 65% of the variation in NPLs can be explained by the independent variables included in the model. According to this model, NPL(t-1) and LR are the only significant determinants of NPL although the relation is not as per initial expectation.

While the OLS coefficients seem valid, they may not be optimal in the presence of panel characteristics. FE and RE models can control for omitted variables and provide more reliable results.

Model 2: FE

FE models are used to better understand the relationship between predictor and outcome variables *within* a bank. The FE results are not strong with low values of R-squared (31%) and a very low F-Statistic.Also, the presence of a lagged NPL in the independent variables makes the FE model less reliable.Furthermore, the p-

value is quite high rendering the model inadequate and for brevity the model is not discussed further.

Model 3: RE

RE allows for generalizations of the inferences beyond the sample used in the model. If the differences *between* individual banks have some influence on the dependent variable then random effects models may be used. In this study, this seems to be the case as the RE results are quite strong with very high values of R-squared (97%) and a very high Chi(2)-Statistic. Also, the p-value is 0.00 rendering the model robust. Hausman test further affirms the theory. The potential endogeneity problem has been accounted for by lagging the bank specific determinants by one period. Such methodology is consistent with Chang et al [44] and Vithessonthi[26].

The results are congruent with Model 1, indicating only NPL(t-1) and LR are significant. NPL (t-1) has a positive relationship with NPL while LR is negatively related to NPL.

Model 4: IV 2SLS

Endogeneity could be a roadblock if it is believed that one of the explanatory variables is correlated with the error term. In such case, all the coefficients calculated using OLS will be biased and not reliable. The use of Instrumental Variables can solve the problem of endogeneity.

The 2SLS model is an extension of the OLS techniqueand has been used by Ghosh [2] and Sarath et al [11] in similar studies previously. Accordingly, the estimation procedure proceeds in two steps. In the first stage, NPLwas regressed on all the exogenous variables in the system plus the interest rate,this way, the predicted value of the variable is obtained, eliminated of its endogenous elements. To complete the two-stage procedure, the equations are estimated after replacing the relevant dependent variables by their predicted values.

The results are exhibited in Table 5.

The R-squared is 70.23% and the p value is 0.00 indicating that selected variables are jointly significant and explain more than 70% of the variation is NPLs.

Model 5: GMM

Endogeneity concerns and the possibility of the presence of simultaneity bias can be discerned by using the generalized method ofmoments (GMM) technique to obtain the estimation results. The methodologyregresses levels and changes in NPLs on the lags of the same variable aswell as other explanatory variables using lagged levels as instruments. This reducespotential biases in finite samples and any asymptotic imprecision associated withthe difference estimator[2].Hondroyiannis et al[50] argue that, random effects estimates could be superior to GMM and fixed effects since the common fixed coefficients provide insufficient approximation to the true model as it assumes homogeneity of intercepts. The GMM fails to provide consistent estimates as it is a tedious exercise to obtain instrumental variables to apply it.

In Model 5, all variables are specified as earlier,in line with prior studies such as those of Athanasoglouet al[51] and Vithessonthi[26],one-period lags of the dependent variable are used as the right-hand side variables to account for persistence in non-performing loans. Following the literature, one-period lagged values of the same explanatory variables are used as instruments. To remove the unobserved cross-section effects, regression equations are first differentiated and then period-fixed effects are used in all GMM regressions to control for unobserved time variant effects.

The results are consistent with those of OLS, RE and IV models. The only significant variables are NPL (t-1) and LR.

Table 6: *Estimation Results*

	(1)PLOS	(2) FE	(3) RE	(4) IV
VARIABLES	lnNPL	lnNPL	lnNPL	lnNPL
LndNPL	0.703***	0.193	0.703***	0.703***
	(0.0797)	(0.135)	(0.0797)	(0.0617)
lndCAR	-0.128	-0.600	-0.128	-0.128
	(0.234)	(0.393)	(0.234)	(0.284)
lndLR	-1.204**	0.387	-1.204**	-1.204**
	(0.502)	(0.904)	(0.502)	(0.490)
lndROA	-0.0224	-0.322	-0.0224	-0.0224
	(0.130)	(0.217)	(0.130)	(0.120)
lnGDP	-0.928	-1.026	-0.928	-0.928

	(0.941)	(0.848)	(0.941)	(0.718)
lnINF	-0.470	-0.535	-0.470	-0.470
	(0.606)	(0.546)	(0.606)	(0.466)
lnDOM	-0.801	-0.703	-0.801	-0.801
	(0.792)	(0.712)	(0.792)	(0.672)
lnUNEM	-1.281	-2.208	-1.281	-1.281
	(7.381)	(6.616)	(7.381)	(6.001)
lnDEB	-3.294	-4.271	-3.294	-3.294
	(2.871)	(2.629)	(2.871)	(2.163)
Constant	12.64	12.97	12.64	12.64
	(19.10)	(17.30)	(19.10)	(15.17)
Observations	66	66	66	66
R-squared	0.702	0.315		0.702
Number of bank1		12	12	

(5) GMM

b0	b1	b2	b3	b4	b5	b6	b7	b8	b9
12.64	0.703***	-0.128	-1.204**	-0.0224	-0.928	-0.470	-0.801	-1.281	-3.294
(15.17)	(0.0617)	(0.284)	(0.490)	(0.120)	(0.718)	(0.466)	(0.672)	(6.001)	(2.163)
66	66	66	66	66	66	66	66	66	66

Standard errors in parentheses

**** p<0.01, ** p<0.05, * p<0.1*

The results are consistent not only with the type of association, but also with the size of the coefficient when using POLS, RE, IV and GMM techniques. For all the specifications above, the main relations remain the same for all the variables of the model, indicating the robustness of our results. It can be confirmed that the main determinant of NPLs is its own previous year value along with the liquidity ratio, commonly known as credit growth [2,17]. It also shows that the macro-economic determinants are not optimal to reduce the incidence of NPLs.

Empirical analysis broadly confirms that bank-level factors play a critical role in determining the quality of loans. The macro-economic factors on the other hand, are not significant. NPLs in previous years tend to increase current NPL given the economic and financial uncertainty. SMEs faced difficulties in the last quarter of 2015, which led to new defaults by them [52]. The high value of lagged NPLs at +0.703 suggests that a shock to NPLs would be likely to have prolonged impact on the banking systems [1]. These results are consistent with most previous work such as that of Alodayni[27], Klein [17], Dimitrios et al [23] and Polodoo et al [43].

Bank Specific Determinants

Three bank specific determinants were studied to assess their relationship with NPL:

LR also known by some authors as credit growth is a significant (at 1% level) bank specific determinant, however the relationship is negative.This could indicate theUAE banks aim to promote a stable funding profile for banks by maintaining a lending to stable resources ratio as per regulatory and Basel III requirements. The results are in line with Klein [17] and Makri et al [21], but contrary to those of Ezeoha[19], Vithessonthi[26] and Filip [32], which suggest a positive relationship with NPL.

CARshows that the relationship is not significant, which is in line with Malimi [53].The insignificant relationship can be attributed to the guidelines laid out by CBUAE, for the implementation of Basel II, indicatinga 12% minimum CAR [54] to act as a buffer against any shocks in the financial system [55]. The findings iscontradictory to studies by Ezeoha[19] and Klein [17],which indicated a positive relationship and studies by Berger and DeYoung [15]showed a negative relationship.

ROA results confirm a negative relationship, but the variable is not significant [53].The robust regulation enforced by CBUAE has marked the increase in general provision representing 1.5% of the bank's credit risk weighted assets, which has led to an insignificant relationship [52]. In other words, this can be attributed to the declining results of banks' profits that led the banks to cut their loan loss provisions in order to show a better profit [55].Past empirical research

broadly confirms a negative relationship [19,2,23,14,1].

Macro-EconomicDeterminants

The findings show an insignificant relationship of NPL with GDP, which is in line with the study conducted by Anjom and Karim [56]. In contrary to Stern and Feldman [57],which indicated that a large economy will have more demand for loans, and banks may extend loans to lower quality buyers.

The relation of inflation with NPL is rather ambiguous. High inflation would lead to higher interest rates thereby making repayment doubtful, indicating a negative relationship. A reasonable level of inflation is considered healthy and positive for the economy, indicating growth. Given this, one could expect a negative relation with NPL. However, this study confirmed the results of Anjom and Karim [56] showing an insignificant relationship between inflation and NPL.

Domestic credit to private sectorrefers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits [13]. An increase in such activity would undoubtedly increase the amount of NPLs and hence a positive relationship is expected, however the findings of this study show an insignificant relationship between NPL and domestic credit to private sector.

Unemployment is expected to have a positive relation with NPL as it reduces the ability of the individual to repay the loan raised. In contrary, the findings show an insignificant relationship between them. In the context of the UAE economy, this may not be a significant variable given the fact that the working class is mostly expatriates. In case of loss of job or retirement, the individual would repatriate to their own county. Dubai Statistics Centre [57] confirms that Dubai has one of the lowest unemployment figures in the world.

According to the CBUAE, the Government Debt peaked in 2009 at 24%. High levels of government debt affect business sectors thereby affecting their ability to repay their bank obligations. IMF [47] commented that UAE is among the top countries in the world in terms of net financial assets as a result of major holdings in its sovereign wealth funds. It is probably due to this, that government debt although expected to have a positive relationship with NPL is not significant.

The regulatory channels are perhaps not optimal to reduce risk taking and problem loans. The insignificance of all the macroeconomic factors tested in our study corroborates with the growing literature on the absence of any relationship between macroeconomic determinants and NPLs.Polodoo et al [43] and Boudrigaet al [22]confirm that macro-economic determinants are insignificant in determining NPLs.

Implications And Conclusion

A strong evidence is seen on the association between NPLs and the bank-specific variables, particularly previous year NPL and credit growth. As NPL is a symbol of banking distress, banks with already high levels of NPL continue the trend in the following year, due to continued financial and economic uncertainty. Credit growth however, is seen to have a negative association with NPL as the increase in credit results from the repayment of loans in the first place. Increased lending activities are seen to mitigate deterioration in asset quality. CAR and ROA were found to be insignificant in determining NPL, due to the regulations laid down by CBUAE. Although CAR and ROA were insignificant in determining NPLs in UAE, it cannot be concluded that they are not important.

All the macroeconomic indicators appeared to be insignificant in determining the level of NPLs, suggesting that the corporates inability to repay the corporate loans and their ongoing delinquency rates are not stemming from macroeconomic factors. Also, UAE has been upgraded from frontier market to emerging market only in the last two years and hence the real impact will be seen in the future.Furthermore, UAE banks have been resilient to external economic and financial shocks [43,58]. However, the insignificant association between NPL and macroeconomic factors was rather unanticipated, as the literature presents evidence that these ratios can significantly affect NPL positively or negatively [20,23,1].

The limitations of this study were mostly related to the unavailability of data for the period before the financial crisis. Additional data would have helped study the changing environmental dynamics.

The above findings have several policy implications for UAE and other developing economies with similar circumstances,

particularly in the GCC. First, it is the bank-specific determinants that ultimately have an influence on the level of NPLs and therefore stricter regulation and guidelines would support healthier investment. Newer guidelines in the form of caps on lending may be proposed in cases of very high credit risk asbanking sector soundness is imperative in stimulating economic growth. Finally, the regulatory authorities can use the results of this study and detect banks that face a higher potential of NPLs. Early detection, support and risk management could avert future financial instability.

It might be interesting to study the sectors that are most affected by NPLs. This would help plan policies and caps for different sectors. Rather than studying different banks with similar policies, looking at different sectors with diverse policies will add further insights. However, sectoral data is not available now and with the increase in availability of statistics, their impact could probably be included in future research.

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