

Innovations

Determinants of non-performing loans in Nigerian deposit money banks

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Abstract

This study focused on the NPLs in Nigerian DMB with reference to salient determinants. The study aimed at determining the effect of loan to total asset ratio on the NPL of Nigerian DMB, and finding out the effect of capital adequacy ratio on the NPL of Nigerian DMB. Cross-sectional research design was used. The study considered the fourteen (14) DMB that are listed on the NSE as at 2019. This study used panel data analysis. It is estimated through either fixed effect or random effect models. Descriptive Statistics, Correlation Matrix and Regression (Pooled, FEM and REM) were employed. Findings revealed that loan-to-total asset significantly influence NPLs of DMB in Nigeria. Finding further showed that CAR has a positive but insignificant influence on NPLs. The study recommended that Loan to Total Asset Ratio should be reduced, and that the CBN should encourage bank managers to invest more on less risky investments with fixed interest income such as government bonds, this will enable the bank to minimize the level of the bank risky assets and losses that may arise from NPL.

Keywords: 1.Non-Performing Loans, 2.Deposit Money Bank, 3.Loan to Total Asset Ratio, 4.Capital Adequacy Ratio, 5.Crude Oil Price

Introduction

The advent and accumulation of Non-Performing Loans (NPLs) has become a systemic issue affecting a significant portion of the financial system; challenging its stability and/or hampering its core role of fostering financial intermediation. A large rise in NPLs across the system can have adverse effect on the banking sector's resilience to shocks (rising systemic risk). NPLs can also be linked to increased borrowing costs as well as decrease in 'credit supply' to the 'real economy'. This may occur due to negative 'market sentiment' against banks with high rates of NPLs, which reduces 'banks' access to liquidity' and 'capital markets' (possibly resulting in credit-supply constraints).

Amah (2017) and Ozili (2019) were of the view that the recent upshot in the level of NPL is closely related to the challenging economic situation in the country. Considering the state of Nigeria economy within the period under study, Idewe, (2016) suggested that if the issue of NPL is not resolve, it can culminate into serious financial crisis. Curiously speaking, the study posited that a situation where the loans exceed bank capital in a relatively large number of banks, it will require a lot of financial innovation and creativity to avert the negative effect of bank crises. This is why this study considered the adequacy of capital to be very important to the survival of banks. Capital adequacy in this context means the minimum amount of capital a bank has to hold to absorb losses. Previous studies such as Islam and Islam (2018), Wood and Skinner (2018) shows that negative relationship existed between the variable of capital adequacy and NPL.

The CBN Annual Report (2017) shows that the ratio of loan to total asset has been on the increase since 2015. According to Ibrahim (2012), loan to asset ratio is a great determinant of NPL. The higher this ratio, the higher the exposure of the bank to the risk of default. Fourteen quoted commercial banks on the NSE (NSE Factsheet, 2019) shown that the loan to asset ratio of these institutions are somehow dwindling over the last decade. This has greatly been accorded as one of the drivers of NPLs.

Also, most of these studies conducted in Nigeria have not been able to look at the impact of insider lending on the growing rate of NPL in Nigeria. Insider lending is the amount of loans and advances granted to a person that is associated with the management of a bank either through shareholding or as an employee. Abioye (2017) asserted that a negative relationship exists between insider lending and NPL. The variable used to proxy for insider lending is the ratio of insider loan to total loan. Besides, most of the studies conducted in Nigeria have not been able to give adequate priority to the implications of rising loan default in the oil and gas sector of Nigeria economy. Loan to the oil sector accounted for a significant percentage of the total loan. However, due to the staggering and fluctuating prices of crude oil and its crash in the oil international market; repayment of loan given to this sector has become very difficult. Al-Khazali and Mirzaei (2017), as well as Idris and Nayan (2016), found a negative relationship between crude oil price and NPL. This study mainly investigated the NPLs in Nigerian DMB with reference to salient determinants. The study specifically aimed at:

1. Determining the effect of loan to total asset ratio on the NPL of Nigerian DMB
2. Finding out the effect of capital adequacy ratio on the NPL of Nigerian DMB
3. Investigating the effect of crude oil price on the NPL of Nigerian DMB.

Research Hypotheses

The following hypotheses were drawn in their null form that:

- H0₁:** Loan-to-total-asset ratio has no significant effect on the NPL of Nigerian DMB.
H0₂: Capital adequacy ratio has no significant effect on the NPL of the Nigerian DMB.
H0₃: Crude oil price has no significant effect on the NPL of the Nigerian DMB.

Review of Related Literature

The definition of NPLs varies by region. In one nation, a loan could be regarded as NPL, and in the other, it may not be. However, views in some cases do coincide. As such, the “International Monetary Fund’s (IMF) Compilation Guide on financial soundness indicators” (2015) states that:

“a loan is non-performing when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons such as a debtor filing for bankruptcy to doubt that payments will be made in full”.

According to the Basel Committee on Banking Supervision (2019), a loan is considered default when a bank announces that a borrower (that is, debtor) is unable to fulfil his/her promise and repay the loan, or, similarly to the first meaning, the borrower is overdue for repayment for more than 90 days. These definitions offer a sensible framework for identifying NPLs. In addition, the Nigeria banking regulation also defines NPL as follows:

“NPL and advances are loans whose credit quality has deteriorated and the full collection of principal and/or interest as per the contractual repayment terms of the loan and advances are in question” (CBN, 2015).

NPLs, in general, are “loans that have been unpaid in both principal and interest for an extended period of time due to a disagreement with the terms and conditions of the loan contract” (Gezu, 2014). NPLs are loan facilities that are not current in repayment terms (both principal and interest), and are in violation of the agreed terms of the loan. As a result, the value of NPLs determines the efficiency of a bank's assets (Tefaye, 2012). When the “principal or interest on a loan is due and unpaid for six months or more from the first day of default, the loan is classified as non-performing” (NDIC, 2019).

However, the “CBN prudential guidelines for commercial banks issued in 2010” categorized NPLs into three distinct categories (such as sub-standard, questionable, and lost). According to the guideline, if the amount of principal and interest is overdue by 90 days, it will be termed as substandard, if it is overdue for 180 days, it will be termed as doubtful and if it is overdue for a year then, is a loss”. According to the CBN, a bank must normally present loans classified as "losses" in their entirety, in addition to the amount of estimated losses in accounts classified as "poor" and "doubtful". The prudential guidelines also listed two categories of provisions: "specific" and "general," both of which are regarded as critical. As per the 2010 directives, specific provisions should be made based on the risk of default apparent on specific lines of credit, while general provisions are made with respect to the fact that even the existing credit line carries some risk of loss (regardless of the amount). As a result, all approved banks would be required to make clear provisions for NPLs. For facilities classified as substandard, doubtful or damaged, CBN (2017) opined that “unpaid interest more than 90 days must be deferred and accepted in cash only. The original amount unpaid for more than 90 days must be presented in full and accepted in cash only”. For principal repayments not hither to or due on NPL facilities, provision should be made as follows: “Substandard Credit Facilities: 10 percent of the outstanding balance; Doubtful Credit Facilities: 50 percent of the outstanding balance Lost Credit Facilities: 100 percent”.

The CBN Prudential Guideline (2014) relates to “Commercial banks, commodities financing, corporate loans, retail and consumer credits and facilities granted to federal, state and local governments and their parastatals”. Other loans that are not classified as specialized loans are however susceptible to provisioning. Banks, on the other hand, are required by CBN prudential guidelines to report total loans overdue in each specialized loan only at end of the financial year and to make provision for such loans as soon as humanly possible. In addition, banks must report NPLs by loan category in their financial statements, as well as the amount or proportion of the total loans (as well as the measure of basic provision under each classification).

NPLs is measured by “the ratio of defaulting loan (payments of interest and principal past due by 90 days or more) to TGL (ie, the total value of loan portfolio)”.

The loan amount “recorded as non-performing includes the gross value of the loan as recorded in the balance sheet, not just the amount that is overdue” (International Monetary Fund, 2009). According to IMF, the “NPL is calculated by using the value of NPLs as the numerator and the total value of the loan portfolio (including NPLs, and before the deduction of specific loan loss provisions) as the denominator”. The ratio of NPLs to Total Gross Loans (TGLs) is often used as a proxy for asset quality, with the aim of identifying asset quality issues in the loan portfolio.

Theoretical Framework

The moral hazard theory was developed by Akerlof (1970) later advanced by Keeton and Morris (1987) which was later reviewed by Berger and DeYong (1997). The theory put forward that small banks in term of capital respond to moral hazard inducement by raising loan portfolio riskiness, which in the process lead to higher NPL on average in the future (Klein, 2013).

The moral hazard theory argues that low capitalized banks are inclined to raise their earnings by increasing risk of the loan portfolio through advancing loans to borrowers that are not meeting quality threshold leading to future growth of NPLs. This practice by banks can be qualified as moral hazard since banks understand that their enterprises are properly capitalized and still decide to increase the loan portfolio riskiness. Thus low financial capital can result in the future growth in NPLs (Ahmad & Bashir, 2013).

According to the moral hazard hypothesis, nonperforming increases when the capitalization of bank is decreasing. Bank managers under capital pressure (low-capital banks) also respond to the incentive of moral hazard by guaranteeing subprime loans at a high interest rate, assuming that a higher interest rate increases profits and the capital base. High-risk loans, on the other hand, lead to a higher level of NPLs, as high interest rates can have a similar negative motivation for borrowers. Moral hazard is typically related to bank management behavior by balance sheet items such as bank size, loan growth, asset growth, deposit growth, and capital adequacy ratio since changes in all of these items are connected with bank management decisions.

Empirical Review

Ogundipe, Akintola and Olaoye (2020) investigated interest rates and loan performance of DMB in Nigeria for the period 2010 to 2015. The research used descriptive, correlation, and regression analysis to investigate the nexus between dependent and independent variables. The study found a substantial association between interest rates and loan repayment, as measured by credit quality (through the use of NPL ratio). This means that a rise in interest rates would almost certainly result in an increase or decrease in credit quality. It also demonstrated that any small improvement in the lending rate would result in a rise in NPLs. The study discovered a positive but insignificant correlation between bank CAR and NPLs.

Ayunku and Uzochukwu (2020) reported on credit management and bad debt issues of listed Nigerian DMBs. The study's independent variables comprised loan loss allowance, loan to deposit ratio, equity to asset ratio, and loan write off. The study's focus was confined to a five-year duration from 2014 to 2019. They used descriptive statistics, correlation, and the ordinary least square regression method. In both the return on asset and Tobin-Q models, the random effect models developed that NPL, loan loss provision, and equity to asset have an influence on bank performance.

Ademola (2018) conducted a study on determinants of NPLs of listed DMB in Nigeria. The scope of the study was limited from 2006 to 2016. Panel regression estimate was adopted by the study. Findings from the study revealed that loan loss provision ratio, loan to asset ratio and crude oil price have a positive and significant impact on the NPLs of banks while capital adequacy ratio and exchange rate show a positive but insignificant impact on the NPLs.

Inekwe (2013) looked at the relationship between real GDP and NPLs in Nigeria from 1995 to 2009. The time series analysis showed that there is a significantly positive relationship between real GDP and NPLs in the Nigerian banking industry, based on the Pearson Product-Moment Correlation Coefficient. He recommended that the government adopt policies that will create an enabling environment for desired increase in real GDP, and that the government's regulatory agencies guarantee that banks and financial institutions follow due process and adhere to the standards of good lending.

This research differs from previous studies that attempted to shed light on the factors that influence NPLs in financial institutions. A number of past studies have tried to review the issue of bad debts and clarify key influencing factors that have contributed to banks' continuous rise in NPLs over time. This study examined the impact of five selected factors (loan to total assets ratio, capital adequacy ratio and crude oil price) on NPLs. These factors have been selected because of the perceived influence they will have on the NPLs in Nigerian DMB.

Methodology

Research Design

For the purpose of this study a cross-sectional research design was used. A cross-sectional design according to Ameer (2015) contains multiple variables that captures a specific point in time.

Population of the Study

Twenty-four (24) DMBs operating in Nigeria as of June 2019 were the core population for the study. These commercial banks are considered to be a fair representative of the entire banking industry because they are known to contribute the largest market share in term of assets and liabilities among financial institutions as they rightly accounted for a total asset value of ₦35.40 trillion as at December, 2018 (NDIC 2018).

Sampling Procedure and Sample Size

This study purposely considers the fourteen (14) DMB that are listed on the NSE as at 2019. The study selected the banks as they represent Strategic Position in the entire banking industry based on their approved criteria of size, interconnectedness, complexity and substitutability. Therefore, the sampled banks are of interest to this study

because their failure could have a multiplier effect on the entire economy by posing a severe systematic risk to the entire banking industry and subsequently cause financial instability and total collapse of the financial system.

Method of Data Analysis

This study used of panel data analysis. It is estimated through either fixed effect or random effect models. In the fixed effect model, the individual specific effect is a random variable that is allowed to be corrected with explanatory variables while the random effect model is uncorrelated with explanatory variables. For the purpose of analysis, the STATA statistical software was used to analyze the data gathered for this study.

The modified model that was used for this study is presented below:

$$NPL_{it} = \alpha + \beta_1 LTAR_{it} + \beta_2 CAR_{it} + \beta_3 COP_{it} + \epsilon_{it} \dots \quad (1)$$

Where: $\beta_1, \beta_2, \beta_3$ are the coefficient of the explanatory variables.

NPL =NPL

LTAR = Loan to Asset Ratio

CAR = capital adequacy ratio

COP = Crude oil price

Data Analyses and Results

The mean, standard-deviation, maximum, and minimum values for each dependent and independent variables are shown in the descriptive statistic table. The analysis of descriptive statistics can be found in Table 1.

Table 1 Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum	OBS
NPL	0.68	0.46	0	1	280
LTAR	0.20	0.43	0.00	5.13	280
CAR	1.24	2.99	0.00	21.51	280
COP	1.81	6.27	-3.93	3.11	280

Source: Output obtained from STATA, 2020.

The table 1 reports the descriptive statistics for the dependent and explanatory variables. The average NPLs for the listed DMB during the study period is about 0.68 with standard deviation of 0.46; this implies that there exists significant variation among the determinable factors influencing NPL by most banks in Nigeria. Loan to total Asset ratio (LTAR) which shows the average of 0.20, minimum value of 0.000 and maximum value of 5.13 has standard deviation of 0.43 which explains the level of variability in loan/total assets being generated by the DMB, and the rate at which it is influencing the NPL is high. Capital adequacy (CAR) which has a minimum value of 0.00, maximum value of 21.5 and average value of 1.23 with equivalent standard deviation of 2.98 has the highest maximum value affecting the growth of NPLs in Nigerian DMBs. Crude oil prices (COP) has the minimum value of -3.93, maximum value of 3.11, average value of 1.81 and standard deviation of 6.27 which has the highest rate of deviation from the mean value among the variables under consideration.

Table 2 Correlation Matrix of Variables

	NPL	LTAR	CAR	COP
NPL	1.0000			
LTAR	0.0115	1.0000		
CAR	-0.2806	0.2583	1.0000	
COP	0.1231	0.0297	0.1129	1.0000

Source: Output obtained from STATA, 2020.

The correlation result in Table 2 shows that capital adequacy ratio (CAR) is negatively correlated to NPLs while loan to total assets (LTAR) and Crude oil price (COP) have positive correlation with NPLs of Nigerian DMB. In general, while correlation analysis reveals the strength and direction of relationships between variables, it does not enable the researcher to draw causal inferences about the relationship that exists between the variables. If it is stated that ‘y & x’ are correlated, it means that ‘y & x’ are being treated in a completely symmetrical way (Kothari & Garg, 2014). As a result, there is no implication that changes in x cause changes in y. It basically states that there is justification for a linear-relationship between the two variables and that shifts in the variables are on average linked to the correlation coefficient to a certain degree. Thus, in examining the effects of selected independent variables (loan to total asset ratio, capital adequacy and crude oil prices) on NPLs, the economic regression analysis (post-estimation tests) gives assurance to overcome the shortcomings of correlation analysis.

Table 3: Summary of Regression Result (Pooled, FEM and REM)

Variables	OLS		Fixed Effect Model		Random Effect Model	
	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Constant	17.01	0.000***	35.88	0.001***	15.88	0.01***
LTAR	0.10	0.004***	0.10	0.004***	0.10	0.004***
CAR	0.020	0.874	0.021	0.689	0.021	0.689
COP	-0.20	0.003***	-0.203	0.003***	-0.203	0.003***
R-squared	0.8169		0.8217		0.7892	
Adjusted R-square	0.8063		0.8047		0.7648	
F-statistic	326.31		121.11		88.74	
Prob (f-stat)	00.001		0.000		0.000	
Hausman test			0.857			
LM test of Random effect	chi-squ	0.429	prob<0.559			
Ramsey RESET	chi2	20.81	0.4310			

Source: Output obtained from STATA, 2020.

The analysis of the table above began with the interpretation of the combined effect of both the explanatory variables and the explained variable using the random effect model for interpretation. The R² which is the multiple co-efficient of determination gives percentage or proportion of total variation in the dependent variable measured by NPLs by listed DMB in Nigeria which is explained by the independent variables jointly (LTAR, capital adequacy ratio, crude oil prices, inflation rate and lending rate). Hence, the result of R² signifies that 78.92% of total variation in NPL of listed DMB in Nigeria is caused by LTAR, capital adequacy ratio, crude oil prices, inflation rate and lending rate of listed DMB in Nigeria. The adjusted R² of 76.48% also buttress the position of R². The cumulative result is the F-statistics of 88.74 with a significant value of 0.0000. This indicates the fitness of the model and means that the selected attributes are the main determinants of NPLs of the listed DMB in Nigeria.

Also, table 3 above shows that Loan- to- total assets of banks (LTAR) has a positive relationship with NPLs in Nigerian DMB. This is based on coefficient value of 0.10. This implies that a 1% increase in Loan- to- total assets of banks (LTAR) will lead to an increase in NPLs in Nigerian DMB by 0.10% and vice versa. The p-value of 0.004 which is less than the conventional alpha value of 0.05 shows that is very significant. This means that the null hypothesis that state that there is no significant effect of loan to total asset ratio on the NPL of Nigerian DMB was completely rejected. The rejection of the null hypothesis implies that there is significant effect of loan to total asset ratio on the NPL of Nigerian DMB. Also, the

Table 3 revealed that the relationship between LTAR and NPL in Nigerian DMB is positive.

Table 3 also indicates that CAR has a coefficient of approximately 0.020 which implies that a 1% increase in CAR will lead to an increase in NPL in Nigerian DMB by 0.02% and vice versa. Also, the result further revealed a corresponding p-value of 0.689 which is more than the conventional alpha value of 0.05 suggesting that the null

hypothesis that there is no significant effect of capital adequacy ratio on the NPL of Nigerian DMB could not be rejected at the 5% level of significance. The failure to reject the null hypothesis implies that there is no significant effect of capital adequacy ratio on the NPL of Nigerian DMB. From Table 3, it can be observed that this significant effect of CAR is positive in nature.

The coefficient (-0.203) of macroeconomic variable measure by Crude Oil Price (COP) shows significant negative effect on NPL of the listed DMB in Nigeria. The result further stress that falling in crude oil price has significant effect on the NPL given the p-value less than 5% critical level. The result implied that a unit percent falling in crude oil price will bring about 0.203% increase in the nonperforming in listed DMB in Nigeria. Therefore, based on the above findings the study rejects the null hypothesis which states that there is no significant effect of crude oil prices on the NPL of Nigerian DMB.

Table 4 Summary of Hypothesis Testing

Relationship	Expected sign	Reported sign	P-value	Observation	Decision
LTAR	Positive sign	Positive sign	0.004***	P-value<0.05	Reject null
CAR	Negative sign	Positive sign	0.689	P-value>0.05	Accept null
COP	Negative sign	Negative sign	0.003***	P-value<0.05	Reject null

Source: Researcher’s compilation from STATA output, 2020.

Discussion on Findings

This study on the determinants of NPLs in Nigerian DMB was carried out in order to ascertain the factors that influence NPLs in Nigeria. Variables selected for the study include LTAR, CAR and crude oil price. Using quantitative method, data for the study were sourced from a sample of fourteen (14) quoted DMB in Nigeria and panel regression technique was used for the analysis. From a well fitted model, the major findings of the study as revealed by the results of the regression analysis are as stated below.

The quantitative analysis revealed that there is a positive and significant relationship between LTAR and NPLs with a coefficient value of 0.004 and a p- value 0.978 which signifies that loan-to-total asset is significantly influencing NPLs of DMB in Nigeria. The finding is consistent with the expectation of the study that NPL is highly correlated with LTAR and in line with that of Ademola (2018) who found out a positive and significant impact of LTAR on NPLs. The results showed that CAR has a coefficient value of 0.021 and a p-value of 0.689 which indicates a positive but insignificant relationship between CAR and NPLs of listed DMB in Nigeria. This finding signified that capital adequacy is not significantly influencing NPLs and it is not in agreement with the a priori expectation of the study. Consistent with this finding are the findings of Ogundipe, Akintola and Olaoye (2020), Mustafa and Jeffery (2020) and El-Maude, Abdul-Rahman and Ibrahim (2017) who found a positive but insignificant relationship between CAR and NPLs. However, the findings of this study are not in line with researchers such as Prasanth, Nivetha, Ramapriya and Sudhamathi (2020) who established a positive and significant relationship between capital adequacy and NPLs of banks.

Crude oil prices (COP) was found to have a negative relationship with NPLs. The finding revealed that crude oil price is negative and significant in influencing NPLs of quoted DMB in Nigeria. This result did not contradict the a priori expectation of the study. However, the findings is not consistent with the work of Ademola (2018) who found a positive and significant impact of crude oil prices on the NPLs of banks The data analysis found inflation rate (one of the explanatory variables of the study) have a negative and significant effect in explaining and predicting NPLs of quoted DMB in Nigeria. The finding from the analysis of inflation is not consistent with the expectation of the study. However, the finding is contrary to that of Ogechi and Fredrick (2017) and El-Maude, Abdul-Rahman and Ibrahim (2017) who found a positive but insignificant relationship between inflation rate and NPLs. Also, the

finding is contrary to Bhattarai (2016) who found a negative but insignificant relationship between inflation rate and NPLs. However, the findings of this study is in line with researchers such as Ademola (2018) who established a positive and significant relationship between capital adequacy, loan loss provision ratio, loan to asset ratio and crude oil price have a positive and significant impact on the NPLs of banks.

Conclusion

The study evaluated the determinants of NPLs of Listed DMB in Nigeria. Based on the findings of the study, the following conclusions are drawn. The study established that Loan-to-total assets (LTAR) have significant and positive effect on NPLs of Listed DMB in Nigeria. Based on the above finding, the study therefore concludes that LTAR has significant positive effect in influencing non-performing Listed DMB in Nigeria.

CAR has no significant effect on NPL of Listed DMB in Nigeria. This means Capital Adequacy does not play significant role in explaining NPLs of Listed DMB in Nigeria. Thus, the study concludes that CAR is not a significant determinant of NPLs of Listed DMB in Nigeria. Crude oil prices (COP) has a significant effect on NPL of Listed DMB in Nigeria. This implies that Crude oil prices (COP) has capacity to influence the rate of NPLs of Listed DMB in Nigeria. Thus, it is concluded that the level of Crude oil prices (COP) influences NPLs of Listed DMB in Nigeria.

Recommendations

In line with the findings and conclusions of this study, the following recommendations are made;

1. The study recommends that Loan to Total Asset Ratio should be reduced. Here, banks are advised not to be enticed by the high lending interest rate and the quest for profitability and grant more loans. In granting loans, they should always be cautious of the value of their assets. Reducing ratio of loan to asset would help banks generate greater profitability and enhance loan performance. This will help to prevent the losses that could arise as a result of NPL in the banking industry.
2. The CBN should encourage bank managers to invest more on less risky investments with fixed interest income such as government bonds, this will enable the bank to minimize the level of the bank risky assets and losses that may arise from NPL. More importantly, the banks themselves need to create a situation of relief from significant dependence on interest-based income and cushion their performance from movements in interest rate policy which mainly affects interest-based income. To attain this position, the banks should diversify their revenue sources by having an appropriate mix of interest and non-interest bearing assets in their portfolios. This will improve asset quality of the bank since decreases in NPL means that bank management have recorded good performance.
3. Banks' managers should take cognizance of the likely adverse effect of falling in crude oil price in the international market into consideration before granting loans and advance to their customers in oil and gas sector, since adverse changes in the price of their product could make it very difficult to repay bank their debt.

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