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The Impact of Credit Ratings on Financial Performance (ROA) and Value Creation (Tobin's Q)

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Introdução
This study investigated the influence of credit ratings on the financial performance of companies listed in the S&P 500 index. The researchers discovered a lack of research in this area, with only two studies found, one proposing the use of credit ratings as a measure of financial performance and another applying this concept. Most existing research predominantly relies on measures such as leverage, profitability, liquidity, and share return to explain financial performance. To address this gap, the study conducted an empirical analysis using panel data regression models.
Problema de Pesquisa e Objetivo
The study aims to evaluate the impact of credit ratings on financial performance measures. The dependent financial performance variables considered in this study are Return on Assets (ROA) and Tobin's Q (TQ). The independent variables include Credit Ratings, Total Debt to Total Assets (TDTA), Total Shareholder Return (TSR), EBITDA Interest coverage (EBITDAICOV), Quick Ratio (QR), Altman's Z-Score (AZS), and macroeconomic factors
Fundamentação Teórica
The credit default theory, as advocated by Sy (2007), underscores the importance of understanding lending risk and effectively measuring and managing credit risk for maintaining financial system stability. Eisenhardt (1989), concluded that agency theory provides valuable insights into information systems, outcome uncertainty, incentives, and risk. Burton (2018), argued in favor of the Efficient Market Theory (EMT) in finance. He assumed that financial markets are efficient, meaning that asset prices fully mirror all available information.
Metodologia
Panel regression is a statistical method commonly employed when studying data collected over multiple periods for multiple individuals, firms, countries, or any other observation unit. Our study opted for fixed effects models as the most appropriate after comparing (1) fixed effects versus Pooled, (2) random effects versus Pooled, and (3) fixed effects versus random. As we advanced, heteroscedasticity was tested using the Breusch-Pagan test. In this test, the null hypothesis of homoscedasticity was rejected as Prob>chi2=0.0000 is lower than 0.05. Finally, The Wooldridge test was applied.
Análise dos Resultados
Regarding ROA, the fixed effects panel regression initially indicated a strong positive association between credit ratings and ROA, suggesting that an improvement in credit ratings is reflected in a more robust financial performance. For TQ, the findings revealed that credit ratings, EBITDAICOV, AZS, and GDP had a negative impact on TQ, showing statistical significance at 1%. Conversely, the CPI and the FDRI positively influenced TQ, with statistical significance at 1% and 5%, respectively. Meanwhile, Liquidity (QR) and TSR were not statistically significant to TQ.
Conclusão
Similar studies could be conducted for future research using credit ratings from other major CRAs such as Moody's and Fitch. Additionally, exploring other dependent variables to measure financial performance, such as Return on Equity (ROE), Market Share, and Return on Invested Capital, could provide further insights in future studies.
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Palavras Chave
credit ratings, financial performance, risk management

Agradecimento a orgão de fomento
ANPAD

THE IMPACT OF CREDIT RATINGS ON FINANCIAL PERFORMANCE (ROA) AND VALUE CREATION (TOBIN'S Q)

ABSTRACT

This study investigated the influence of credit ratings on the financial performance of companies listed in the S&P 500 index. The researchers discovered a lack of research in this area, with only two studies found, one proposing the use of credit ratings as a measure of financial performance and another applying this concept. Most existing research predominantly relies on measures such as leverage, profitability, liquidity, and share return to explain financial performance. To address this gap, the study conducted an empirical analysis using panel data regression models with a dataset comprising 292 companies rated by S&P Global Ratings from 2009 to 2013. The study employed Return on Assets (ROA) and Tobin's Q (TQ) as dependent variables and considered credit ratings in conjunction with variables such as Total Debt to Total Assets (TDTA), Total Shareholder Return (TSR), EBITDA Interest coverage (EBITDAICOV), Quick Ratio (QR), Altman's Z-Score (AZS), as well as macroeconomic factors including GDP growth, inflation (CPI), and the Federal Reserve Interest Rate (FDRI) as independent variables. The study argued that credit ratings, incorporating historical data and confidential information about companies' strategies, provide reliable forward-looking assessments of creditworthiness to the market. The findings indicated that firms with higher credit ratings tend to perform better. To extend this research, future studies could explore ratings issued by other credit rating agencies while incorporating additional independent variables such as Return on Equity (ROE), Market Share, and Return on Invested Capital.

Key words: credit ratings; financial performance; risk management.

RESUMO

Este estudo investigou a influência das classificações de crédito no desempenho financeiro de empresas listadas no índice S&P 500. A pesquisa uma lacuna no conhecimento, com apenas dois estudos encontrados, um propondo o uso de classificações de crédito como medida de desempenho financeiro e outro aplicando esse conceito. A maioria das pesquisas existentes depende predominantemente de medidas como alavancagem, lucratividade, liquidez e retorno de ações para explicar o desempenho financeiro. Para abordar essa lacuna, o estudo conduziu uma análise empírica usando modelos de regressão de dados em painel com um conjunto de dados composto por 292 empresas classificadas pela S&P Global Ratings de 2009 a 2013. O estudo utilizou o Retorno sobre Ativos (ROA) e o Q de Tobin (TQ) como variáveis dependentes e considerou as classificações de crédito em conjunto com variáveis como Dívida Total sobre Ativos Totais (TDTA), Retorno Total para Acionistas (TSR), Cobertura de Juros do EBITDA (EBITDAICOV), Razão Rápida (QR), Escore Z de Altman (AZS), bem como fatores macroeconômicos, incluindo crescimento do PIB, inflação (IPC) e Taxa de Juros do Federal Reserve (FDRI), como variáveis independentes. O estudo argumentou que as classificações de crédito, incorporando dados históricos e informações confidenciais sobre as estratégias das empresas, fornecem avaliações confiáveis de capacidade de crédito para o mercado. Esse argumento é apoiado por agências de classificação especializadas que empregam suas metodologias. Os resultados indicaram que empresas com classificações de crédito mais altas tendem a ter um melhor desempenho.

Palavras-chave: classificações de crédito; desempenho financeiro; gestão de risco.

1 INTRODUCTION

Researchers in the field of corporate finance are interested in understanding the relationship between credit ratings and organizational performance. Although there is a continuing debate about the most appropriate measures to evaluate firm performance, commonly used dimensions include accounting returns, stock market returns, and growth prospects (Combs; Crook; Shook, 2005). However, it is important to consider additional measures that can capture the multidimensionality of organizational performance.

The continuous monitoring of a company's financial performance has become crucial for lenders and investors in their decision-making process. To aid this process, lenders and investors rely on credit rating analysis to gain a better understanding of a company's financial performance, aiming to mitigate the risk of potential losses.

Credit ratings play a crucial role in the financial landscape as they provide an assessment of an entity's creditworthiness and its ability to fulfill its financial obligations. These ratings are issued by credit rating agencies (CRAs) such as Standard and Poor's (S&P), Moody's, and Fitch. The significance of credit ratings lies in their impact on a firm's financial performance, cost of debt, capital structure, and stock returns.

Investors, intermediaries, financial institutions, and nonfinancial institutions utilize credit ratings to assess credit risk and make informed investment decisions. CRAs base their ratings on publicly available information as well as private information, combining objective data with their subjective views of a company. Cantor and Packer (1996), emphasize the key role of rating agencies in providing financial information about issuers' creditworthiness to investors, helping to reduce bond issuance costs. Similarly, Vipond (2020) explains that rating agencies assess the ability of private and governmental enterprises to make principal and interest payments, providing ratings for structured finance transactions and sovereign borrowers.

A company's credit rating represents a forward-looking opinion regarding its creditworthiness for a specific financial obligation. It considers the creditworthiness of guarantors, insurers, or other forms of credit enhancement associated with the obligation, as well as the currency in which the obligation is denominated. This opinion assesses the company's capacity and willingness to meet its financial commitments as they due, also considering terms such as collateral security and subordination that could affect payment in the event of default (S&P Global, [2021]).

Therefore, this study aims to evaluate the impact of credit ratings on financial performance measures. The dependent financial performance variables considered in this study are Return on Assets (ROA) and Tobin's Q (TQ). The independent variables include Credit Ratings, Total Debt to Total Assets (TDTA), Total Shareholder Return (TSR), EBITDA Interest coverage (EBITDAICOV), Quick Ratio (QR), Altman's Z-Score (AZS), and macroeconomic factors. Through this research, the study aims to contribute to the to the existing literature and provide valuable insights for investors and decision-makers.

2 LITERATURE REVIEW

S&P Global ([2021]) defines credit rating as a forward-looking opinion about the creditworthiness or obligor's capacity and willingness to meet its financial commitments as they come due.

Milidonis (2013), states that credit ratings are the opinions of rating agencies about the probability of an issuer meeting its financial obligations in due time. The rating agencies use their methodology to assess the creditworthiness of companies and their default risk reducing the information asymmetry and helping lenders and investors in the making decision process.

White (2013), mentions that CRAs play a crucial role in the debt bond markets as before deciding whether to lend to a borrower, lenders would look for information about the borrower's current financial position; financial prospects; and track record of how it has addressed its debt obligations. Additionally, when the lender has already made the decision, there is an ongoing need to monitor the borrower's financial performance to be able to intervene early to save partially or all the borrowed amount if the company's financial performance deteriorates.
Following this thinking Thune ([2022]), mentions that before assigning credit ratings, CRAs research the financial health of the respective enterprises and assess their ability to meet debt obligations by using multiple metrics, including the entity's financial statements, competition, financial outlook, and macroeconomic factors. He also adds that credit rating provides guidance on credit quality and risk of enterprises issuing bonds, helps determine the cost of borrowings, provides outlooks on what is expected regarding financial performance, and enables governments to issue bonds worldwide to find their infrastructure projects.
The top 3 Global CRAs are S&P Global Ratings, Moody's, and Fitch Ratings. Providing a historical background on this issue, Crouhy, Galai and Mark (2006), informed that after the beginning of bonds issuance, rating agencies such as Moody's (1909), Standard & Poor's (1916), along with others started to provide independent assessment on how bonds issued would repay investors. They added that all over the decades, the introduction of new financial products has led rating agencies to develop new methodologies and criteria to mensurate credit risk.
Out of the top 3 CRAs, S&P Global Ratings is considered the largest with a rating scale consisting of 11 total grades ranging from the highest grade of AAA down to the lowest grade of D, followed by Moody's rating scale with a total of 21 notches, which range from a high of Aaa to a low of C, and Fitch Ratings whose scale consists of 11 total grades ranging from the highest grade of AAA, down to the lowest grade of D.
By incorporating credit ratings into financial performance analysis, researchers and analysts can gain insights into companies' creditworthiness and potential risk of bankruptcy. This information can be helpful for investors, lenders, and other stakeholders to assess the risk associated with investing or extending credit to a particular firm.

3 THEORETICAL FRAMEWORK

3.1 Default risk theory

Default risk theory suggests that credit ratings are determined based on the likelihood of a borrower defaulting on their loan or debt obligations. A higher probability of default leads to a lower credit rating. Credit default risk relates to the possibility that a borrower will fail to fulfill their contractual repayment obligations, and it is a crucial element of credit risk associated with lending money or extending credit to individuals, companies, or governments.
The credit default theory, as advocated by Sy (2007), underscores the importance of understanding lending risk and effectively measuring and managing credit risk for maintaining financial system stability.
Altman (1968), introduced the Altman Z-score, a widely utilized model for predicting corporate bankruptcy. The Z-score incorporates multiple financial ratios to evaluate a firm's creditworthiness and bankruptcy risk.
Merton (1974), developed structural credit risk models, which established a framework for analyzing the relationship between a company's debt and its underlying assets while considering the possibility of default. Merton's model became foundational for subsequent research on corporate debt pricing.

3.2 Agency theory

Agency theory emphasizes the potential conflicts of interest between principals and agents within an organization. The theory suggests that agents may prioritize their self-interests over the best interests of the principals who hired them, leading to agency costs such as moral hazard and adverse selection. To align both principals and agents interests, various mechanisms such as performance-based incentives, monitoring, and contracts can be employed.
Jensen and Meckling (1976), highlighted the separation of ownership and control in corporations as key factor contributing to agency problems. They discussed how conflicting interests between shareholders (principals) and managers (agents) could arise.
Panda and Leepsa (2017), identified several factors that contribute to a conflict of interest and agency costs, including the separation of ownership from control, differing risk preferences, information asymmetry, and moral hazards.
Eisenhardt (1989), concluded that agency theory provides valuable insights into information systems, outcome uncertainty, incentives, and risk. She also noted that agency theory is empirically valid, particularly when combined with complementary perspectives.

3.3 Efficient market theory

Burton (2018), argued in favor of the Efficient Market Theory (EMT) in finance. He assumed that financial markets are efficient, meaning that asset prices fully mirror all available information. According to Burton (2018), this implies that it is impossible to consistently achieve above-average returns by using publicly available information, as the prices of financial instruments already incorporate all relevant information.
Fama (1970), defined an efficient market as one in which prices fully reflect all available information. He categorizes market efficiency into three forms: weak-form efficiency, semi-strong-form efficiency, and strong-form efficiency.
Weak-form efficiency, according to Fama (1970), suggests that current asset prices already incorporate all past market data, such as historical prices and trading volume. This means that analyzing historical price patterns and trading volumes, known as technical analysis, would not consistently enable investors to outperform the market.
Semi-strong form efficiency, as discussed by Fama (1970), posits that asset prices already reflect all publicly available information, including news announcements and corporate earnings reports. Therefore, fundamental analysis, which involves examining financial statements and other public information, would not consistently provide investors with an advantage in beating the market.

3.4 Capital structure theory

Capital structure theory examines the optimal combination of debt and equity financing for a company to maximize its value. It analyzes how the proportion of debt and equity used by a company, known as its capital structure, can affect its cost of capital, financial risk, and overall value.
According to capital structure theory, a company's capital structure decisions can have an impact on its credit ratings. For instance, maintaining a conservative capital structure with lower levels of debt and higher equity may lead to higher credit ratings. This is because it suggests lower financial risk and a greater ability to fulfill debt obligations. In a study by Cerkovskis, Gajdosikova and Ciurlau (2022), it was found that capital structure and decision-making in corporate financing are vital for the functioning of a business.

4 DATA AND SAMPLE

To examine the impact of credit ratings on financial performance, we analyzed a dataset comprising 2398 observations of 292 companies rated by S&P Global Ratings, all listed on the S&P 500 index. The study period covered the years 2009 through 2013.
The primary statistical technique employed in this study was a panel regression model. The data variables used in the analysis were obtained from S&P Capital IQ PRO. The dependent variables examined in this study were ROA and TQ.
Our study, in the Table 1 utilizes the entire S&P Global rating grade, which consists of 22 categories ranging from D/SD through AAA.

Table 1 – S&P Global Ratings Scale

Grade	S&P	CLASS
Investment Grade	AAA	22
	AA+	21
	AA	20
	AA-	19
	A+	18
	A	17
	A-	16
	BBB+	15
	BBB	14
	BBB-	13
Speculative Grade	BB+	12
	BB	11
	BB-	10
	B+	9
	B	8
	B-	7
	CCC+	6
	CCC	5
	CCC-	4
	CC	3
	C	2
	D/SD	1

Source: S&P Global ([2021]).

We treated credit ratings as continuous variables to incorporate them into the regression analysis. This approach follows the suggestion made by Gujarati (2006), that categorical variables with inherent ordering, such as credit ratings, can be treated as ordinal variables in statistical analysis. By treating them as ordinal, we preserved the ordering information of the categories. Moreover, if there is a linear relationship between the ordinal variable and the dependent variable, in that case, it is possible to include the ordinal variable as a continuous variable in a regression analysis. This inclusion can enhance the precision of estimated coefficients and simplify the interpretation of results. This concept can be applied to credit ratings, categorized from D through AAA, and can be viewed as a reflection of a company's continuous creditworthiness capacity.
Table 2 provides the proxies, and previous studies that the independent variables were tested.

Table 2 – Independent Variables (continues)

Variables	Proxy	Reference Literature
Debt to Total Asset	Total Debt/Total Assets	Yahya and Hidayat (2020)

Variables	Proxy	Reference Literature
QR	(Current Assets - Inventory)/Current Liabilities	Fauzi and Anisah (2022); Wijaya and Sedana (2020)
EBITDAICOV	EBITDA/Interest Expenses	Foss (1995); Hung *et al.* (2013)
TSR - Total Return Shareholders	[(Ending Stock Price - Begining Stock Price) + Dividends]/Beginning Stock Price	Desai, Egan and Mayfield (2022); Makhija and Trivedi (2021)
Altman' Z-score	Z = 1.2x1 + 1.4x2 + 3.3x3 + 0.6x4 + 1.0x5 Where: x1 = Working capital / Total Assets, x2 = Retained earnings / Total Assets, x3 = Earnings before interest and taxes / Total Assets, x4 = Market Value of Equity / Bool Value of Total Liabilities, and x5 = Sales / Total Assets.	Kablan (2020); Nelissen (2018)
GDP		Agu *et al.* (2022); Gaertner, Kausar and Steele (2020)
CPI		Naqvi, Bagaba and Ramzani (2018)
FDRI		Basha, Zhang and Hart (2021); Hoang, Thi and Minh (2020)

Source: Own authorship.

5 PANEL REGRESSION

Panel regression is a statistical method commonly employed when studying data collected over multiple periods for multiple individuals, firms, countries, or any other observation unit.
In panel regression, the dependent variable is regressed on one or more independent variables while accounting for both individual-specific effects (fixed effects) and time-specific effects. This allows researchers to control for unobserved heterogeneity among the individuals in the panel and examine the relationship between the independent and dependent variables while controlling for these effects.
Panel regression models can take different forms, such as fixed, random, or mixed effects models. The model's choice depends on the data's assumptions and characteristics. Fixed effects models assume that individual-specific effects are correlated with the independent variables, while random effects models assume that the individual-specific effects are uncorrelated with the independent variables. Mixed effects models combine both fixed and random effects.
Our study opted for fixed effects models as the most appropriate after comparing (1) fixed effects versus Pooled, (2) random effects versus Pooled, and (3) fixed effects versus random.
To reach this conclusion, firstly, fixed effects versus Pooled was compared using the Chow test, where Prob>F < 0.05 indicated that fixed effect models are more adequate than Pooled.
Secondly, random effects versus Pooled compared by using Breusch and Pagan Lagrangian multiplier test that resulted in a Prob > chibar2 > 0.05, indicating that the Pooled model is more adequate than random effects.
Thirdly, fixed effects versus random were compared by using the Hausman test where Prob > chi2 = 0.0000, therefore lower than 0.05 leading to the fixed effects as the most appropriate model.
As we advanced, heteroscedasticity was tested using the Breusch-Pagan test. In this test, the null hypothesis of homoscedasticity was rejected as Prob>chi2=0.0000 is lower than 0.05. This indicates evidence of heteroscedasticity in the model.

Finally, The Wooldridge test of serial correlation in panel data models was applied, resulting in a Prob > F = 0.9859, greater than the significance level of 0.05. In this case, no substantial evidence suggests a serial correlation.
After running all the above tests, we concluded that the final model was of fixed effects with heteroscedasticity but no autocorrelation. To fix this problem, a final regression was run in Stata using the following robust command: xtreg Y X1 X2 X3, fe robust.

6 DESCRIPTIVE STATISTICS

As mentioned earlier, we used a regression panel model to examine the effect of credit ratings as a measure of financial performance. In the study, ROA and TQ are considered the dependent variables, followed by nine independent variables grouped into six subcategories. The independent categories are as follows:

- Credit Ratings (Ratings);
- Liquidity: (QR) liquidity;
- Total Debt to Total Assets: TDTA;
- Interest coverage: EBITDAICOV;
- Market: TSR;
- Survival: AZS;
- Macroeconomic: Gross Domestic Product (GDP), Consumer Price Index (CPI), Federal Reserve Interest Rate (FDRI).

The Table 3 provides the Descriptive Statistics of all the variables used in this study.

Table 3 – Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Ratings	2,398	14.88	2.53	6.00	22.00
QR	2,398	1.13	0.89	0.01	11.67
TDTA	2,398	0.33	0.18	0.00	2.44
EBITDAICOV	2,398	15.84	14.68	-22.05	100.11
ROA	2,398	10.75	7.38	-12.91	59.44
TQ	2,398	0.33	0.18	0.00	2.45
TSR	2,398	15.49	28.05	-89.22	109.90
AZS	2,398	3.41	1.92	0.00	10.83
GDP	2,398	2.14	2.18	-2.77	5.95
CPI	2,398	1.91	1.20	0.12	4.70
FDRI	2,398	0.71	0.77	0.08	2.27

Source: Software Stata.

7 CORRELATION

The Table 4 we find the correlation analysis of the variables used in the study.

Table 4 – Correlation Matrix.

	CR	**QR**	**TDTA**	**EBITDAICOV**	**ROA**	**TQ**	**TSR**	**AZS**	**GDP**	**CPI**	**FDRI**
CR	1										
QR	0.091**	1									
TDTA	-0.336**	-0.085**	1								
EBITDAICOV	0.364**	0.147**	-0.313**	1							
ROA	0.243**	0.079**	0.203**	0.280**	1						
TQ	-0.333**	-0.083**	0.998**	-0.309**	0.206**	1					
TSR	-0.001	0.033	-0.027	0.064**	0.122**	-0.023	1				
AZS	0.349**	0.182**	-0.174**	0.358**	0.493**	-0.166**	0.063**	1			
GDP	0.007	-0.018	-0.032	0.074**	0.096**	-0.031	0.061**	0.058**	1		
CPI	-0.020	-0.030	0.062**	0.021	0.033	0.063**	0.153**	-0.009	0.634**	1	
FDRI	-0.007	-0.059**	0.045*	-0.037***	0.017	0.045*	-0.101**	0.002	0.133**	0.090**	1

Note. ** Indicates significance at 1% confidence level. * Indicates significance at 5% confidence level. *** Indicates significance at 10% confidence level
Source: Software Stata.

The correlation matrix indicates the existence of multicollinearity of 99.8% among TDTA and TQ. According to results, QR, EBITDAICOV, ROA, AZS, and GDP are positively correlated with credit rating. All the other variables tend to show a negative correlation with credit rating.

8 MULTICOLLINEARITY

Multicollinearity refers to the presence of high correlation among predictors, which can lead to shared predictive power and compromise the individual statistical significance of independent variables. In order to identify multicollinearity, researchers typically assess the intercorrelation between independent variables. A correlation value of 0.65 or higher is often considered indicative of multicollinearity (Bone, 2011).

In our analysis, we examined the correlation between the independent variables TQ and TDTA and found a correlation value of 99.8%. This high correlation indicates the presence of multicollinearity. To address this issue, we excluded the independent variable TDTA from the analysis. This exclusion was justified by the fact that TDTA is already incorporated in the calculation of TQ. By removing TDTA, we eliminated the problem of multicollinearity.
After excluding TDTA, we examined the remaining independent variables and found that none of them exhibited correlations above 65%. This suggests that multicollinearity is no longer a concern in our analysis.
In light of these adjustment, we arrived in the following equation to exam the impact of credit ratings on financial performance.

$$Perfit = \beta 0 + \beta 1CRit + \beta 1QRit + \beta 3EBITDAICOVit + \beta 6TSRit + \beta 7AZSit + \beta 8GDPit + \beta 9CPIit + \beta 10FDRIit + \in it \quad (1)$$

It is noticeable that ROA and TQ are commonly used to assess a firm's performance. This study utilized identical firm-specific variables to examine how credit ratings influence a firm's performance.

9 CREDIT RATINGS IMPACT ON ENTITY PERFORMANCE

The firm's performance in the current study is assessed using two measures: ROA and TQ.
To analyze the data, this model employs panel data regression techniques and estimates fixed effects models.
The Table 5 provides the analysis results of the impact of Credit Ratings on ROA.

Table 5 – Credit Ratings and ROA

Fixed-effects (within)	**regression**			**Number of obs**	=	**2398**
Group variable id				Number of groups	=	292
R-sq	Within	=	0.2309	Obs per group min	=	1
	Between	=	0.1617	avg	=	8.2
	Overall	=	0.1754	max	=	9
				F(8,291)	=	21.32
corr(u i, Xb)		=	0.2478	Prob>F	=	0.0000

ROA	**Coefficient**	**Robust std. err.**	**t**	**P>|t|**
CR	1.200359	0.2947667	4.07	0.000
QR	0.0329186	0.2697784	0.12	0.903
EBITDAICOV	0.0827792	0.0192762	4.29	0.000
TSR	0.021711	0.0032617	6.66	0.000
AZS	0.741653	0.2479206	2.99	0.003
GDP	0.2314608	0.0560672	4.13	0.000
CPI	-0.0574555	0.1376265	-0.42	0.677
FDRI	0.2387568	0.1233159	1.94	0.054
cons	-11.88	4.174333	-2.85	0.005

Source: Software Stata.

The initial result analysis reveals a highly positive relationship between credit ratings and financial performance, as measured by ROA. The coefficient for credit ratings is 1.20, statistically significant at the 1% level. This finding suggests that a 1% increase in credit ratings positively affects ROA by 120%. The positive impact of credit ratings can be attributed to several factors.

Firstly, higher credit ratings indicate lower credit risk, which instills confidence in lenders and investors regarding the company's ability to repay its debts. Consequently, companies with higher credit ratings can secure financing at more favorable interest rates. This reduces borrowing costs and lower interest expenses, boosting the company's profitability and ROA.

Secondly, companies with higher credit ratings often find it easier to raise capital from several sources, such as issuing bonds or obtaining loans from financial institutions. This increased access to capital allows them to invest in growth opportunities, expand operations, or pursue strategic acquisitions. These investments increase the chance of generating higher returns, thereby positively impacting the company's ROA.

Moreover, a higher credit rating provides reassurance to investors about the company's financial stability and lower risk of default. This increased investor confidence can result in an uptick in the company's stock price, which, in turn, positively affects ROA.

In addition to credit ratings, other independent variables such as EBITDAICOV, TSR, AZS, and GDP also exhibit positive coefficients with statistical significance at the 1% level. This suggests that a 1% increase in these variables will positively impact ROA.

In addition, FDRI positively impacts ROA by exhibiting a positive coefficient and statistical significance of 10%. Nonetheless, Liquidity (QR) and CPI proved to be not statistically significant to impact ROA.

The Table 6 provides the analysis results of the impact of Credit Ratings on TQ.

Table 6 – Credit Ratings and TQ.

Fixed-effects (within)	regression			Number of obs	=	2398
Group variable id				Number of groups	=	292
R-sq	Within	=	0.2075	Obs per group min	=	1
	Between	=	0.1253	avg	=	8.2
	Overall	=	0.1360	max	=	9
				F(8,291)	=	16.22
corr(u i, Xb)		=	0.2232	Prob>F	=	0.0000

Qtobin (TQ)	Coefficient	Robust std. err.	t	P>|t|
CR	-0.027317	0.0077489	-3.53	0.000
QR	0.002946	0.0063335	0.47	0.642
EBITDAICOV	-0.001302	0.0003012	-4.32	0.000
TSR	-0.000082	0.0000802	-1.02	0.310
AZS	-0.017589	0.0050564	-3.48	0.001
GDP	-0.007177	0.0012286	-5.84	0.000
CPI	0.017282	0.0031074	5.56	0.000
FDRI	0.009291	0.0036418	2.55	0.011
cons	0.791251	0.1129787	7.00	0.000

Source: Software Stata.

The data presented in Table 6 demonstrates that credit ratings have a negative influence on financial performance, as measured by TQ. The coefficient of -0.027 indicates that a 1% increase in the entity's credit rating will result in a roughly 2.73% reduction in TQ.

There are several reasons why credit ratings can negatively impact TQ. Firstly; credit ratings directly affect a company's cost of capital. A weak credit rating exposes a company to a higher risk of default, causing lenders and investors to demand higher interest rates and returns to compensate for the increased risk. This higher cost of capital can decrease a firm's market value, thereby negatively impacting TQ.

Another critical factor is that lower credit ratings can deter lenders and investors from providing capital to companies, limiting their ability to finance projects, expand operations, or invest in research and development. This lack of investment opportunities can lead to a decrease in TQ.

Additionally, credit ratings reflect the market's perception of a company's financial health and stability. A lower credit rating signifies higher financial risk, eroding investor confidence and declining the firm's market value. As TQ compares market value to net asset value, a decrease in market value due to adverse market sentiment can contribute to a lower TQ.

In line with that, Zhang (2019) stated that CRAs frequently downgrade financial assets from their initial AAA/Aaa ratings to below BBB during declining asset prices. This downgrade exacerbates the panic selling in the market, resulting in a further sharp decline in asset prices. As a result, a vicious cycle is formed within the market. Zhang (2019) a connection between this phenomenon and the subprime crisis, which caused a substantial decrease in the stock value of American companies and a significant decline in the Tobin Q value. Consequently, this weakened the motivation for enterprises to increase their investments.

Furthermore, a poor credit rating can restrict a firm's access to liquidity in financial markets, hampering its ability to manage cash flow and meet operational and financial obligations. Ultimately, this can affect the firm's market value and TQ.

Similarly, variables such as EBITDAICOV, AZS, and GDP also display a negative impact on TQ, with statistically significant negative coefficients. Conversely, the CPI and the FDRI exhibit positive coefficients with statistical significance, indicating that an increase in these variables positively influences TQ by approximately 1.72% and 0.92%, respectively.
However, both Liquidity (QR) and TSR do not show statistical significance, with P>|t| values greater than 10%.
Our research findings align partially with the study conducted by Rafay *et al*. (2018), which examined the effects of credit ratings on the performance and stock returns of companies listed on the Taiwan Stock Exchange (TSE). Similarly, to our study, Rafay *et al*. (2018), considered ROA and TQ as dependent variables. They also included independent variables such as credit ratings, Dividends per Share (DPS), Leverage, Size, Loss propensity, and Stock Price. However, our results differ from theirs. While our study found a positive influence of credit ratings on ROA and a negative influence on TQ, Rafay *et al*. (2018), observed a highly positive influence of credit ratings on both variables. Moreover, all remaining variables showed a positive and significant relationship with ROA in both studies. However, in the case of TQ, variables such as share dividends, debt intensity, and loss propensity displayed a negative association.

10 CONCLUSION

This study examined the relationship between credit ratings and financial performance, explicitly using ROA and TQ as measures.
Regarding ROA, the fixed effects panel regression initially indicated a strong positive association between credit ratings and ROA, suggesting that an improvement in credit ratings is reflected in a more robust financial performance. The results also showed that EBITDAICOV, TSR, AZS, and GDP positively influenced ROA with statistical significance at 1%. Additionally, the FDRI positively impacted ROA, although with statistical significance at 10%. However, Liquidity (QR) and CPI were found to have no statistically significant effect on ROA.
For TQ, the findings revealed that credit ratings, EBITDAICOV, AZS, and GDP had a negative impact on TQ, showing statistical significance at 1%. Conversely, the CPI and the FDRI positively influenced TQ, with statistical significance at 1% and 5%, respectively. Meanwhile, Liquidity (QR) and TSR were not statistically significant to TQ.
Similar studies could be conducted for future research using credit ratings from other major CRAs such as Moody's and Fitch. Additionally, exploring other dependent variables to measure financial performance, such as Return on Equity (ROE), Market Share, and Return on Invested Capital, could provide further insights in future studies.

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