Journal of Business Insight and Innovation

Volume 5 Issue 1, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

ANALYSING PROFITABILITY: THEORY & EVIDENCE FROM PAKISTAN CORPORATE SUGAR INDUSTRY

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Article History:
Received: 18.12.2025
Accepted: 30.12.2025
Published: 15.01.2026

Abstract

This study analysing the profitability of 24 Pakistani sugar companies over 20 years (2003–2023) provides critical insights into the financial challenges and drivers of sugar companies listed at Pakistan stock exchange (PSX). The findings showed that 11 companies had negative Net Profit After Tax (NPAT), while 13 companies had positive NPAT. Companies were divided into four NPAT per total Assets groups; negative profit, 5%, 10%, and 15% profit rate. Regression analysis revealed that cost of sales (CSA), administrative (AEX), financial (FEA), and tax expenses (FEA); all negatively affected NPAT. Dummy-variable Approach represented a true comparison of the difference in profitability between positive and negative NPAT companies, it reveals that Companies with positive NPAT showed an average net profit increase at 4.20% of total assets, while companies with negative NPAT experienced an average annual profit decline of 0.03% in the last 10 years signalling systemic challenges. Trend analyses were used in order to empirically assess whether the net returns of the 24 companies declined over time. It is recommended to enhance total sales through better marketing and branding strategies. Cost reduction measures are essential to prioritized by private and public policymakers to improve profitability.

Keywords: Sugar Companies, Profitability Levels, Reasons for Differences, Dummy Variable Approach, Pakistan
JEL classification: D23, G10, G30, H32, M41, N25

Introduction

Financial statements represent the overall financial performance (Rao, 2011; Nakao et al., 2007). The financial information of any entity presented in financial reports assist the users to analyse and is necessary in making financial decisions. The financial performance of any company may be observed and well-presented precisely in their financial accounts, thus it is helpful for decision makers to judge the goods or bad position of any company traded on stock exchange. it includes both financial and non-financial firms (Monea, 2019: 64; Permatasari, et al., 2019). Sugar industry is one of the important industrial sectors listed in KSE, still, no any major study has been conducted to determine its financial viability. so, in this study, we have taken corporate sugar industry listed KSE. There are more than 31 companies listed in Stock Exchange of Pakistan. These companies are such which provide their respective financial data in the form of financial statements to the Pakistan Stock Exchange (PSX) and State Bank of Pakistan (SBP), wherein the latter institution compiles all relevant financial data, and issues its own annual audited report for all non-financial listed companies in stock exchange. This study also downloaded and compiled data for 20 years (2004-2023) from the four annual financial statements (Asif & Asghar, 2025; FSA, 2023).

The financial decision about profitability and overall performance is important for all stakeholders, and therefore these decisions must be carefully implemented. many internal and external factors which include operating cost as well as non-operating expenses have large influence on the profitability. especially operating expenses are generally cost of sales, administrative expenses, tax expense, while non-operating expense

Journal of Business Insight and Innovation

Volume 5 Issue 1, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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includes interest expense and general expenses. if all these expenses are greater than their assets value, the company will face negative profit (loss) conversely, if all these expenses are less, the company achieves positive net profit(gain) (Said & Tumin, 2011; Lesakova, 2007; Hashmi et al., 2024).

In economics, company financial strength is measured through maximizing net profit and reducing cost (A. E. Bausch, et al., 2003; Aurangzeb et al., 2021). The famous economist Alfred Marshall in 1880 defined economic profit as the true indicator of measuring economic performance, where all cost associated with production is subtracted to achieve net profit of a company (Kyriazis, 2007; Gitman, 1998)

Out of 31 sugar companies, 7 companies excluded due to incomplete data, so we have left with 24 companies. These left over companies are categorized into 4 major profit groups based on Net profit, which is the bottom-line return (Ismail, 2011). these groups consist of 11 companies which having Negative NPAT (loss), contrary, profit generating companies consists of 10 companies, 2 companies and only one company generates net profit up to 5%, 10% and 15% respectively (FSA, 2004-2023).

Problem Statement

Corporate sugar industry in Pakistan comprises both positive and negative returns. But even profitable companies have widely varying profit rates (ranging from below 5% to 15%**)**. However, it is needed to identify the key factors responsible for and to implement corrective measures. A systematic approach is required to investigate the variation in profitability.

Research Question

1. What are the four profitability levels and the five determinants prevailing on average in the corporate sugar industry in Pakistan?
2. Where are and due to what factors/reasons profitability problems, if any exist?

Research objectives

1. To analyse the net returns of sugar industry in Pakistan.
2. To determine the key factors enabling a huge variation in profitability rates of sugar industry in Pakistan.

Literature Review

International financial reporting standards & financial statements

International Financial Reporting Standards (IFRS) are developed to regulate financial transactions both locally and globally. They provide a common accounting language. The International Accounting Standard Committee (IASC) formed these standards provides 17 reporting and 41 accounting standards. These standards must be reflected in their annual statements. (IFRS, 2023; Foerster, S. et al., 2016).

Almost 150 member countries including Pakistan are accountable to implement financial standards for all listed companies pacter (2017). According to (SECP, 2014; DeFond, 2012, 176) any entity must present and disclosed its financial information based on the international accounting standards. The state bank of Pakistan receives that information and publically issue its own reports for 6 continuous years. recently, a report has been published by Karachi stock exchange for all non-financial firms (Asif et al., 2025; SBP, 2024).

Profitability measures

To provide a complete and detail picture of the study, numerous studies contributed to gain further insight in financial performance, such as, (Riftiasari, 2024) examined the a sample of 40 PT, Midi utama manufacturing companies listed at Indonesia stock exchange (IDX) for a period of 2014-2023 using the linear regression analysis, results clearly indicated that income tax expense and revenue have impact on net profit. Moreover, net profitability is followed by increase in revenue, but decreases, with tax expense. Mareta, F. et al. (2021) collected secondary data for all the explanatory variables which included Debt to Equity Ratio; Current Ratio; Total Assets Turnover; Earning Per Share; Price Earning-Ratio; Sales Growth; Net Profit Margin; for the five cigarette companies listed at IDX. Results shows that all the explanatory variables effect return on equity (ROE). Ali et al. (2020) empirically investigated a sample of 86 listed companies taking financial and nonfinancial factors such as general and administrative expenses, labour cost, corporate

Journal of Business Insight and Innovation
Volume 5 Issue 1, 2026
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https://insightfuljournals.com/

governance, leverages and total sales for a period of 2014 to 2018. The panel data approach was used. results of Fixed effect regression techniques clearly mentioned that selling & administrative expenses, productive assets and firm size has significantly but negative impact on competitiveness of firms while total sales have positive and significant relationship. Yahya & Hidayat (2020) determined the effect of total assets turnover, debt to total assets(D/A) and net profit after tax (ROA) for a period of 6 years 2014-2018. the data of all listed automotive industry in Indonesia was first converted into ratio scale to make it comparable, The analytical techniques such as F & T tests, and multiple regression was applied. Results shows that all the factors have no significant relationship with net income. Hayek, M. A. (2018) examined the relationship among financial and economic factors like total sale, total assets, cost of goods sold, operating profit, and net profit using multiple regression, heteroscedasticity, autocorrelation analysis for three largest Jordanian industrial companies for the years 2010 to 2017.

The results indicates that total sale, total assets and earnings before taxes are directly related while cost of sales and cost of goods sold negatively related with firm profit. Khalid et al. (2017) first provided the evidence to determine the effect of operational cost, production cost and operating revenue on net profit. the quarterly data was extracted for a period of 14 years from 2002-2015; for the sample of Fauji fertilizer company listed at Pakistan stock exchange (PSX). The data was analysed using simple linear regression model. the results suggest that production cost, operational costs have significant but negative impact on net profit after tax, which means that net profit decreases with increase in cost of goods sold and administrative expenses (Asif et al., 2025; Aslam & Asghar, 2025). Ali et al. (2016) showed that the determinants of profitability, such as firm size, firm growth, financial leverages, firm age, productivity and electricity crisis for a sample of 16 firms in energy sector in Pakistan. Panel data approach and random effect model was applied. Results suggest that firm's size, growth, and electricity crisis have significant impact on profitability while firm's productivity and financial leverages have negative impact on profitability. Firm profitability and firm size are the key determinant of profitability. Leisz and Maranville, (2008) have used a simple calculation for the DU Pont model in analysing profitability. They largely assist the financial managers and sole proprietor for their valuable insight with the use of original DuPont (ROA) model.

All the studies discussed above, have largely contributed and acknowledged many factors relevant to their study; but a complete and detail picture, largely being associated with reference to Pakistan corporate sector is still missing. Therefore, following the theoretical framework and literatures discussed above; the relevant variable of this study is given in table 2.1 below.

Table 2.1

Definition of the selected variables of the study

No	Variables	Definition	Measurement	Sources
1	NPATA	It is obtained by dividing net income by total assets; npat=total sales - total cost	Net profit after tax / total assets	Ali, H., & Shafique, O. (2020) Wulandari, (2016). Leisz, T.J., & Maranville, S. J. (2008) Blumenthal, R. G. (1998)
2	CSA	It is the total cost of finished goods and the cost of goods available for sale	Cost of sales / Total assets	Hashmi, S. U., et al, 2024 Dermawan, E.S. et al. (2017) Edwards, J.B. (2016), Chiu, P. C., & Haight, T. (2014) Foerster, S.,*et al*., (2016), Ball, R., *et al.*,(2016),

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				Anderson, M. C.et al., (2003)
3.	AEA	Administrative expenses included labour cost, maintains expenses, raw material cost, overhead costs	Administrative expense / Total assets	Hashmi, S. U., et al, (2024) Ibrahim, A. E., (2018) Dermawan, E.S. et al. (2017)Bodla, B. S., & Verma, R. (2006),
4.	IEA	Interest/Financial expenses are the amount paid to the creditors on their total debt received. it is obtained by dividing interest exp. on total assets.	Interest expenses / Total assets	Averkamp, (2020), Kenton, (2020), Kagan, Investopedia, (2020), Khalid, W. et al. (2017) Chisti, K. A. et al., (2013)
5.	TEA	Tax expenses are the total liability paid on earning before tax, after interest being paid.	Tax expenses / total assets	Bodla, B. S., & Verma, R. (2006) Maryanti, C. S., & Munandar, A. (2024), Collins, J. H., & Shackelford, D. A. (1997) (Modigliani, F., & Miller, M. H. (1963)

Financial ratio analysis is a vital tool for evaluating a company's financial performance. By expressing various profitability components as fractions of total assets, comparisons become more standardized and meaningful on the basis of a rupee invested as of their total assets invested (Musleh et al., 2017). This approach involves dividing each profitability metric by the total asset value, effectively assessing performance per unit of asset invested. Consequently, after conversion these adjusted variables are renamed and usually denoted as GPA, EBITA, NPBTA and NPATA (He et al., 2025) (Stevany et al., 2022).

it can be mathematically measured and represented, as follows.

Gross profit (GP) = TS – COS

Earnings before interest and tax (EBIT) = GP –AX

Net profit before tax (NPBT) = EBIT – IX

Net profit after tax (NPAT) = NPBT – TX

where

TS= Total sales

COS = Cost of sales

AX = Administrative expense

IX = Interest expenses

TX = Tax expenses

To gain further insight into the status of various profitability levels, data is first gathered and compiled on the basis of net profit per total assets (NPATA). First group having 11 companies with negative net profit, while 13 companies were regrouped into 5%, 10% and 15% net profit after tax. ultimately, we have 10 companies lies in between 0-5%, 02 companies are in between 5-10% and only 1 company have 10-15% average net profit. The methodology including econometric tools adopted here for this study, have rarely been implemented for sugar companies-listed at the Pakistan stock exchange. This study will help to reexamine the profitability, based on the above-mentioned variables in table 2.1.

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https://insightfuljournals.com/

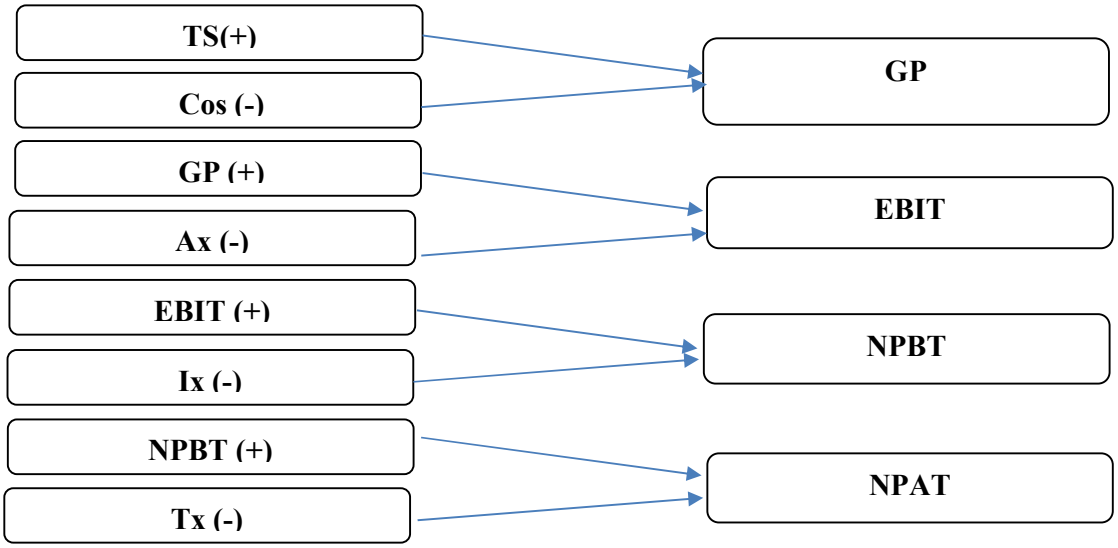
Research Methodology

Conceptual model for study

On the basis of profitability measures introduced by International Accounting Standards (IAS) and International Financial Reporting Standards (IFRS) in preceding section, the way State Bank of Pakistan issues accounting data, and motivated by theoretical framework, a conceptual model for this study may adopts the following form.

Figure 1

Conceptual Model



Analytical Tools

This study used mathematical models to calculate 4 profitability measures, as well as their comparative analysis in evaluating net returns. Moreover, factors affecting these levels were identified and analysed. Statistical techniques like descriptive statistics, regression analysis, and dummy variable analysis were used to compare profitability levels. The advantages of using dummy variable approach is to identify and predict the variables in various categories (Miller & Erickson, 1974: 426). Data was divided into two groups, comparing profitability levels from the first to the second periods (Brown, 1968: 515). the four profitability determinants mentioned earlier were evaluated for their positive and negative impact on net returns (Breuer & DeHaan, 2024).

Data & Data Sources

This financial data of 24 sugar companies from the State Bank of Pakistan's data source. the annual financial reports of listed industries are available at Statistics and DWH Department of the State Bank of Pakistan. The data, spanning 20 years, was used to analyse and access financial performance. Data is converted into the ratio of total assets in way to analyse and access financial performance of a company (Monea et. al., 2010: 1; Lesakova, 2007).

Results and discussions

Factors affecting net returns

The following econometric model evolved to identify the effects of the potentially important explanatory variables discussed in table 2.1. All relevant variables first converted into average per total assets for onwards computation. the model, we have constructed for dependent and independent variables is:

Econometric model

$$NPAT = f(b_{1A}\,ATS, b_2ACS, b_3AAx, b_4AFx, b_5ATx, e)$$

Where NPAT = Average net profit after tax

Journal of Business Insight and Innovation
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https://insightfuljournals.com/

ATS = average total sale
ACS = average cost of sale
AAx = average administrative expenses
AFx = average financial/interest expenses
ATx = average tax expenses
b = Regression coefficient for each independent variable
e = error term

Regression Analysis of 24 companies

Table 4.1

Factors affecting on A NPAT: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.000	.001		-.609	.550
	ATS	.992	.005	9.188	206.405	.000
	ACS	-.992	.005	-7.989	-197.156	.000
	AAE	-.975	.011	-.579	-85.560	.000
	AFE	-.993	.009	-.373	-105.186	.000
	ATE	-1.004	.009	-.457	-112.747	.000

a. Dependent Variable: ANPAT

Table 4.1 shows that almost every of the factors influencing NPAT have shown up as predicted, with the right signs, and they are all statistically significant at t-ratios with $p < 0.01$. It indicates that all of the variables, specifically average total sales (ATS) and all costs, are statistically in charge of deciding the NPAT values (both positive and negative). The result is in line with previous studies been done by (Ali & Shafique, 2020; Tauseef et al., 2015; Fathony et al. 2020; Riftiasari, 2024). If the cost of a company increases, net returns will decrease to pay those costs (Yahya, A. 2020; Fathony & Wulandari, 2020).

Variations in levels of Profitability

As discussed earlier four major determinants including both positive and negative returns are computed using 20-year accounting data from 2004-2023; However, we are also interested to investigate the possible causes responsible for variation in net returns of sugar industry. The study analysed 24 sugar manufacturing companies, based on total assets. 13 positive net return in 2003-23 and 11 had negative NPATs. it is important to identify the underlying causes for each industrial unit. Details are discussed in the following tables.

Table 4.2

11- Negative NPAT-bearing companies

INDUSTRY	CSA	TSA	GPA	TAEA	EBITA	IEA	NPBTA	TEA	NPATA
BabaFarid Sugar Mills Ltd.	0.632	0.655	0.023	0.032	-0.008	0.064	-0.072	0.004	-0.075
Deewan Mills	0.681	0.691	0.010	0.032	-0.022	0.021	-0.043	0.001	-0.043
Haseeb W. Mills Ltd.	0.506	0.527	0.023	0.016	0.007	0.054	-0.048	-0.002	-0.046
Husein Mills	1.329	1.443	0.114	0.064	0.050	0.046	0.004	0.013	-0.009
Khairpur Mills Ltd.	0.947	0.994	0.047	0.049	-0.002	0.034	-0.037	0.008	-0.044
Sakrand Mills Ltd.	0.886	0.931	0.045	0.044	0.002	0.034	-0.032	-0.007	-0.025
Sakarganj Sugar Ltd.	0.715	0.760	0.049	0.035	0.010	0.047	-0.037	-0.001	-0.036
Sindh Ab. Sugar Ltd.	1.040	1.117	0.077	0.053	0.024	0.041	-0.016	0.008	-0.024
The Premier Sugar Mills.	0.496	0.504	0.008	0.022	-0.015	0.026	-0.041	-0.002	-0.039
Mirpur Khas- Sugar Mills	0.819	0.914	0.095	0.037	0.058	0.052	0.005	0.010	-0.004
Tandlianwala Mills	0.750	0.822	0.072	0.035	0.036	0.057	-0.021	0.004	-0.025

Journal of Business Insight and Innovation
Volume 5 Issue 1, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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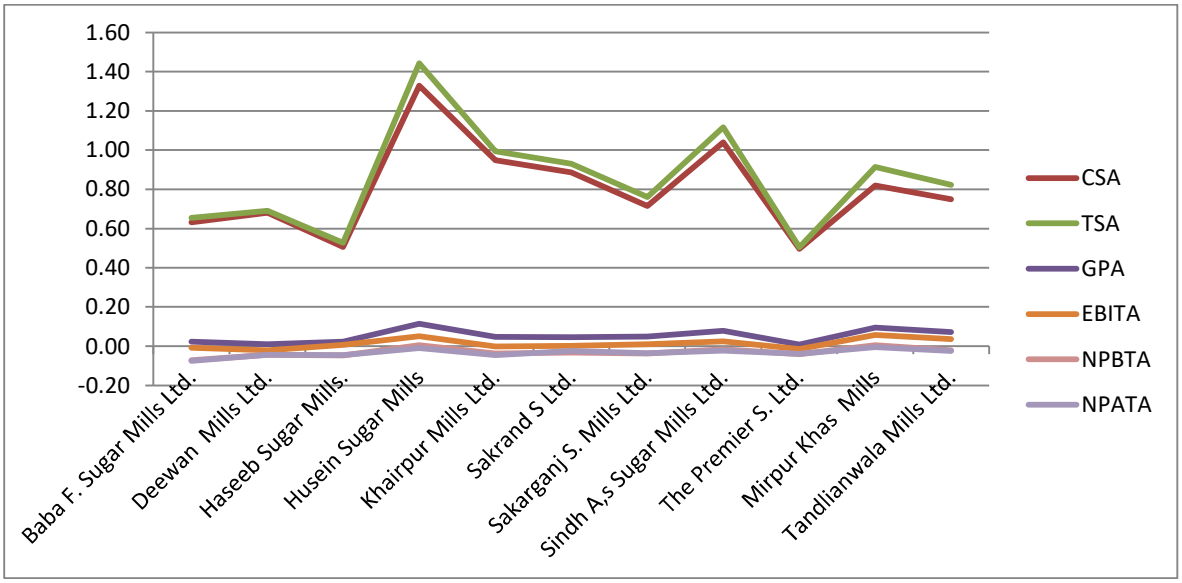
The aforementioned table 4.2 shows that the average profitability of almost all companies declined after the financial expenses being paid at NPBTs level; however, the Baba Fareed, Deewan, Khairpur and the Primer sugar mills becomes negative after the administrative expenses being paid. Out of the total 10 companies at NPAT level only 4 companies namely Haseeb, Sakrand, Sakarganj and Sindh AB companies received tax benefits. Figure 1 below shows variation in profitability levels related with particular industry.

Figure 4.1

Total Sales



As can be seen in Figure 4.1, the total sales of all industry are lies in between 40% to 140%; however, the cost of sales significantly increases with total sales. Hence, the other profitability levels sharply declined with uncontrolled cost of sales.

Positive NPATs bearing companies

Table 4.3

13-Positive NPAT-bearing companies

INDUSTRY	CSA	TSA	GPA	TAEA	EBITA	IEA	NPBTA	TEA	NPATA
Chashma Mills Ltd	0.862	0.966	0.104	0.034	0.069	0.058	0.012	0.004	0.008
Faran Sugar-Mills Ltd.	1.301	1.410	0.109	0.027	0.082	0.036	0.046	0.014	0.032
Habib Mills Ltd,	1.032	1.373	0.342	0.164	0.178	0.006	0.171	0.029	0.143
Habib S. Mills.	1.028	1.201	0.172	0.045	0.127	0.004	0.123	0.027	0.096
Kohinoor Mills	0.596	0.665	0.069	0.031	0.038	0.033	0.006	0.004	0.002
Noon Sugar Ltd.	1.327	1.492	0.166	0.076	0.090	0.064	0.026	0.014	0.011
Shahtaj Sugar Ltd.	2.066	2.302	0.236	0.087	0.149	0.037	0.112	0.048	0.064
The Thal Insdustry C.	1.447	1.646	0.200	0.070	0.130	0.062	0.068	0.019	0.049
JDW Mills Ltd.	0.968	1.143	0.175	0.045	0.130	0.071	0.058	0.010	0.049
Mehran Mills.	1.974	2.204	0.229	0.079	0.150	0.080	0.070	0.027	0.044
Sanghar Mills.	1.355	1.490	0.135	0.059	0.076	0.047	0.029	0.018	0.011
Shahmurad Sugar Ltd.	0.820	0.965	0.144	0.049	0.095	0.061	0.034	0.008	0.026
Sakrand Mills.	0.886	0.931	0.045	0.044	0.002	0.034	-0.032	-0.085	0.053

Journal of Business Insight and Innovation

Volume 5 Issue 1, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
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A visual analysis mentioned in Table 4.3 reveals that only Sakrand sugar mill received tax cut and interest benefits at 8.5% and 3.20% respectively. The companies namely Chashma, Faran, Kohinoor, Noon, The Thal, Mehran, JDW, Sanghar, Shahmurad, and Sakrand sugar mills are generating profitability between 0-5%; while Habib sugar and Shahtaj sugar companies are generating net profit after tax between 5%-10%, and only single company namely Habib ADM having NPAT in between 10-15% .A detailed analysis of each industry is shows in Figure 2, below.

Figure 4.2

Net Returns

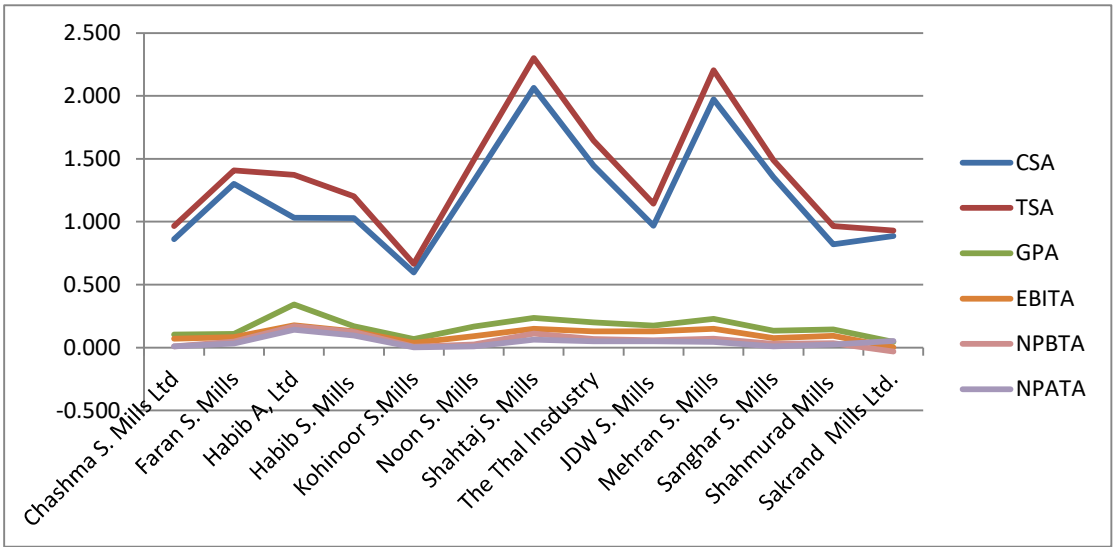

Figure 4.2 shows that net returns of all 14 industries are above zero, and the total sales varied between 50% to more than 200%. However, the cost of sales is lower than the total sales generating positive gross profit. All other relevant expenses such as administrative expenses, interest and tax expenses are comparatively lower than the companies generating negative returns. these computations provide only to identify the levels of profitability and factors responsible for decreasing the net returns. However, a true comparison and desirable results over time is still needed. Therefore, we need to conduct additional test to gain further insight.

Comparing the two major groups for net returns

Modupe (2012: 49) examined the application of Dummy variable analysis, when explanatory variable is divided into subgroups. In other words, dummy variables identify the relationship between quantitative dependent variable with one or more categorical independent variable. we are now analysing the net profit of the same 24 companies having zero is specified for loss and one is specified for positive returns (Gujarati, pp.302-310). Results of provided as follows.

Table 4.4

NPAT : Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	-.034	.010		-3.485	.002
	D	.079	.013	.789	6.014	.000

a. Dependent Variable: NPAT

Journal of Business Insight and Innovation

Volume 5 Issue 1, 2026
ISSN-p: 3006-2284, ISSN-e: 3006-0982
https://insightfuljournals.com/

Average returns of the positive NPAT companies are 7.90% times of their total assets in the period 2003-2023, while that of negative NPAT bearing companies are negative by 3.40% in the given period. The average profit is increased by 4.50% for the positive bearing companies; however, the increase in NPAT is statistically significant.

Trend Analysis in companies' Profitability

Ali & Shafique (2020) extended his study to differentiate the rising and falling of independent sales variable on net profit, with the use of dummy variable approach. In order to empirically assess whether the net returns of the 24 companies declined over time, Anderson et al. (2003) compare the first and second ten-year periods using a dummy variable (D = 0 is specified for 1st ten years; D = 1 is specified for latter ten years). The results of different company types show whether the two periods have increased or decreased (Gujarati, pp.308-316). Results are provided, in table 4.5 below.

Table 4.5

Trend Analysis of 24 sugar Companies: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.022	.007		2.970	.008
	D	-.025	.010	-.503	-2.469	.024

a. Dependent Variable: NPAT

The average NPAT of sugar companies in the first ten years is 2.20% positive, while in the latter decade, it decreases by 2.50%, indicating a statistically significant decrease.

Conclusions

1. The primary causes of negative profitability, which were not recoverable due to other expenditures (administrative, interest, and tax charges), were the low total sales (ATS) and the comparatively high cost of sale (ACS).
2. The regression analysis of net returns across all four groups generally indicates that tax expenses exert the most significant negative impact on returns (beta = -1.004), followed by administrative expenses (-.990), cost of sale (-0.97), and financial expenses (-0.997). It is important to highlight that these five factors contributed significantly.
3. A comparison of companies with positive and negative NPATs, was conducted using a dummy variable method. The average profit for companies with positive profits increased by 4.50%; however, this rise in NPAT is statistically significant (P=.000).
4. The average profitability level also experienced a significant decline during the second period (0.30% per year) of total assets; this reduction in net profit is statistically significant (P=.024).

Funding

No outside funding was obtained for this study.

Informed Consent Statement

Every participant in the study gave their informed consent.

Statement of Data Availability

The corresponding author can provide the data used in this study upon request.

Conflicts of Interest

The authors declare no conflict of interest.

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