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IMPACT OF FINANCIAL RISK ON PROFITABILITY: A COMPARATIVE STUDY OF MANUFACTURING AND SERVICES SECTORS OF PAKISTAN

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ABSTRACT

This study has examined the impact of financial risk on profitability in the manufacturing sector and services sector from 2010 to 2019. This study has used profitability as a dependent variable, the profitability of the manufacturing sector and services sector has been measured with the help of ROA and ROE. Whereas time interest earned, debt to equity ratio, liquidity, total assets, and age have been selected as independent variables. The results show that time interest earned has a positive and significant impact on the profitability of the manufacturing sector and services when profitability has been measured with the help of ROA. But time interest earned has an insignificant impact on the profitability of the manufacturing sector and services when profitability has been measured with ROE. The results show debt to the equity ratio has a positive and significant impact on the profitability (ROA and ROE) of the manufacturing sector. But the debt to equity ratio has a negative and significant impact on the profitability (ROA and ROE) of the services sector. The outcomes show that age has an insignificant impact on the profitability (ROA and ROE) of the manufacturing sector. The results show that age has an insignificant impact on the profitability of the services sector when profitability has been measured with ROA, but age has a positive and significant impact on the profitability of the services sector when profitability has been measured with the help of ROE. The results explain that liquidity has a positive and significant impact on profitability (ROA and ROE) of the manufacturing sector and services sector. The results show that total asset has an insignificant impact on the profitability of the manufacturing sector when profitability has been measured with the help of ROA. But total assets have a positive and significant impact on the profitability of the manufacturing sector when profitability has been measured with the help of ROE.

Keywords: return on assets, return on equity, profitability, service sector, manufacturing sector
JEL Codes: L80

1. INTRODUCTION

Financial performance is one of the key indicators for investors to consider for making decisions about the company and is one way to see the condition of a company. The purpose of measuring the company's financial performance is to find out the level of profitability (profitability) of the company (Munawir, 2002). Good financial performance will also increase the value of the company. For this reason, the company's financial performance needs to be considered by company management to see whether the company managed is in good or bad condition. One way to assess whether the company is in good or bad condition is management can calculate various financial ratios, and the data can be taken from the company's financial statements. Financial reports form the basis for evaluating company performance (Ujiyantho and Pramuka, 2007). Financial ratios that are often used in measuring a company's financial performance are using profitability ratios. The profitability ratio shows the ability of a company to get a certain profit by maximizing the use of assets and capital owned. To increase profitability ratios over time, a company needs to increase profits. This condition is not easy, given that competition between companies is increasingly tight, and the company's resources are increasingly limited. Companies must continue to have a competitive advantage in any situation to keep attracting the interest of stakeholders in using products and services produced by the company to maintain profitability.

The manufacturing and services sectors are important sectors of our economy. It influences the decision for other important economic segments of the nation. There is a general perception that a relationship exists between financial leverage and the performance of the companies. Both sectors have provided stable support to Pakistan's economic

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growth. Manufacturing and services sectors give protraction in the growth of the economy in general and improvement in trade and generation of employment in particular (Shaferi et al., 2020). The developing countries are transferred from agriculture through manufacturing to a services economy and regulated in the international market by hook and crook. The manufacturing industry cannot function without the services sector. There is a main role in our economy the service sector grows the trading activities and going to betterment procedure and become the source to improve the economic condition in past few decades. The significance of the manufacturing and service sectors can be recognized by the degree of growth and their connection with other sectors of the economy. Both sectors give stability to the economy, most important distributing sector falls short to deliver a smooth economy; the service sector provided great change for Pakistan's economy, in terms of getting more foreign exchange. All over the world including in developing and underdevelopment countries rising phase of current development is the contribution of large production of the service sector in economic activity. Primarily, there was the supremacy of the agriculture sector later on the manufacturing sector which comes out of the industrial revolution (Ahmed and Ahsan, 2011).

2. LITERATURE REVIEW

But most relevant and recent studies have been selected as a review of the literature. Solomon and Muntean (2012) analyze the assessment of financial risk in the firm profitability. They said the existence of a company is related to risk in the business world. The nation of risk is intimately related to return. The return includes confirming the payment of production factors and invested equity but also managing the resources with adeptness and effectiveness. Financial risk realized the use of specific indicators such as financial breakeven point, leverage ratio, and financial leverage and presents a major interest to adjust the financial structure and viability of any organization under a genuine market economy.

Khan et al., (2012) examined the impact of financial leverage on agency cost of cash flow in the manufacturing companies of Pakistan. The objective of this study is to determine how manufacturing companies diminish the cost of free cash flow by using leverage. Non-financial sector data has been collected from 54 Pakistani manufacturing companies from 2006 to 2010. Panel data are used and these firms are in Karachi 100 stock index. The result is linked to the free cash flow theory. The result revealed that firms' leverage plays an important role in decreasing the agency cost of free cash flow by reducing the cash flow under the control of the manager.

Winantea (2013) discussed the influence of capital structure on profitability which a study held on hotel and tourism companies listed on the Indonesia stock exchange. For this purpose, long-term debt to equity and time interest earned as the independent variable and return on equity as the dependent variable. The population of the sampling is twenty-one hotel and tourism companies that are listed on Indonesia Stock Exchange and only six companies that have the criteria for the research. The result is the long-term debts to equity and time interest earned have simultaneous significant influences on return on equity. Long-term debt to equity has the strongest impact on the return on equity. The contribution of each variable is LTD hurts ROE and TIE have a positive impact on ROE.

Ariffin and Tafri (2014) explained the impact of financial risks on Islamic banks' profitability. This study aims to study the effect of financial risks on Islamic banks' profitability. The data for this study is obtained from the annual reports of Islamic banks worldwide obtained from the bank scope database from 2004 to 2011. Results show that credit risk and rate of interest risk have a significant negative impact on the return on assets which is the proxy for an Islamic bank's profitability. Inflation rates and bank size have an insignificant positive impact on the profits of Islamic banks. Nevertheless, the results of this study recommend that credit risk has a highly negative significant effect on profitability. This finding shows that the greater the exposure of banks to go for high financing, the more financing will be recorded.

Barakat (2014) studied the impact of financial leverage, structure, and profitability of Saudi Industrial companies. The study tells future companies to value as long term in the light of mentioned variables in external environment analysis. Data is taken from Saudi industrial companies from 2009 to 2012. This study used of statistical method to define the effect of study variables that reflect the financing, operational, and investment features of a company to ultimate increasing shareholder wealth. The study concludes that weak and inverse relationship between financial leverage and stock. There is a positive relationship between capital structure and return on equity using multiple regressions.

Hassan et al., (2015) discussed the performance and financial risk of Golf Cooperation Council Islamic banks and the very important type of risk. In the presence of data, this study covers 11 of the 47 Islamic banks of the Golf Cooperation Council region from 2000 to 2012. Data was acquired from the bank scope database. There are two measures for bank performance return on assets and return on equity. Credit risk, operational risk, liquidity risk, and capital risk were used for financial risk. The result indicates that significant negative relationship between Gulf

Cooperation Council Islamic bank's performance, operational risk, and capital risk. Additionally, the result shows that capital risk is followed by operational risk.

Acaravci (2015) studied the determinants of capital structure in manufacturing companies in Turkish by using panel data methods. Data is taken from Istanbul Stock Exchange from 1993 to 2010 of 79 firms. This study also investigates the comparison of the capital structure according to sectors and firm size of variables used in this model. Non-debt tax shields, tangibility, profitability, growth opportunities, and size are used for capital structure decisions. This study result shows that there are significant relationships between size, growth opportunities, tangibility, profitability, and leverage, but the non-debt tax shield explanatory variable has an insignificant effect on the leverage 1 (book value of total debt / total assets) variable.

Alghusin (2015) examined the impact of financial leverage, growth, and size on the profitability of Jordanian industrial listed companies. The main purpose of this study is to investigate the influence of leverage, growth of the company, and firm size as independent variables on profitability. Return of assets uses a dependent variable. A sample of twenty-five industrial companies listed on the Amman Stock Exchange for a period of ten years (1995-2005) in Jordanian. The results of this research show that significant and positive relationship between leverage and growth in profitability of industrial companies. In interpreting the results, it may be kept in mind that debt has a positive effect on profitability but there is no significant relationship between other variables.

Al-Jafari and Samman (2015) discussed determinants of profitability: evidence from industrial companies listed on the Muscat Securities Market. This study investigates the factors of profitability of industrial firms in Oman. For this purpose, sateen industrial companies are selected to work in the Muscat securities market covering the period of 2006 to 2013. Panel least square model reveals that positive and significant relationship between profitability, the firm size, growth, working capital, and fixed assets.

Ali (2015) examined the internal and external determinants of the Pakistan banking sector, specifically after the recent financial crisis of 2008. The sample data comprises of total 26 banks which include 17 conventional, 5 Islamic and 4 public banks. The selected sample covers the period of five years from 2009 to 2013. We find operating efficiency, liquidity, and non-performing loans to total assets and real GDP has a negative impact, whereas financial risk, gearing ratio, asset management, bank size, deposits, loans to total assets, and inflation show a positive impact on the assets side. On the other side, operating efficiency, gearing ratio, asset management, liquidity, deposits, and real GDP have a positive impact while financial risk, bank size, asset quality, and inflation exert a negative impact on the equity side.

Aissa and Goaied (2016) investigated determinants of Tunisian hotel profitability, the role of managerial efficiency. In this article twenty-seven hotel companies operating in Tunisia analyze the hotel profitability. To check the hotel profitability, twenty-seven hotel companies operating in Tunisia were used. Panel data is used for the ten years (2000 to 2010). Data analysis environment and return on assets are important when geographical and operating deals as constants. Several internal and external factors are also inspected. Some important implications for hotel profitability like hotel size, level of acknowledgment, level of managers' education, and exposure to crisis events. Regression results show that hotel profitability depends on efficiency. At the policy level, it is commanding that decision-makers increase the country’s attractiveness and promote learning consciousness in the hotel sector to increase hotel profitability. This information is valuable for the government, policy makers, and mangers. This study needs to compliment that studied the other empirical macro and micro factors on hotel profitability.

3. THE MODEL

The development of modern financial theory is based on the study of the financial structure of two Nobel Prize-winning economists Modigliani and Miller (M&M theory). The theory of modern capital structure begins with the paper of Modigliani and Miller (1958). According to the M&M theory, the choice between equity and debt is related to the value of enterprises. The optimal capital structure is the one that balances risks and profits and thus maximizes the company’s share price. Initially, this theory works without considering the impact of corporate income tax, and M&M theory proposes no optimal capital structure for businesses. In a follow-up study in 1963, when considering corporate income tax, Modigliani and Miller (1963) show that the value of the company with debt is greater than the value of the company without debt by the tax rate multiplied by the value of debt, so M&M theory says that increasing the use of financial leverage will enhance the value of businesses. Rehman et al., (2020) examine the impact of financial leverage on firm’s profitability of the listed textile companies of Bangladesh. They have shown a significant negative relationship between leverage and firm profitability. This result implies that a firm’s profitability is negatively affected by the firm’s capital structure. The study concludes that maximum textile firms use external debt as a source of finance as they don’t have sufficient internally generated funds. The tradeoff theory was initiated by Kraus and Litzenberger (1973) and after that theoretical developments were made by Myers and Majluf (1984). The trade-offs theory was created to counter Modigliani and Miller (1958), because in many cases

the benefits of using debt will be zero or negative. According to Frank and Goyal (2003), a company chooses how much debt finance and how much equity finance to use by balancing the benefits and the costs of using debts. This implies that optimal capital structure is derived only by matching the benefit of tax against the cost associated with debts. The theory explains that a corporation is usually financed partly with debt and partly with equity. The Trade-off Theory of leverage is that in which firm's trade off the benefits of debt financing against the cost of debt. A firm's optimal debt ratio is usually viewed as determined by a tradeoff of the costs and benefits of borrowing, holding the firm's assets and investment plans constant. The firm is portrayed as balancing the value of interest tax shields against various costs of bankruptcy or financial embarrassment (Myers, 1984). This theory was postulated by Donaldson (1961) and was later modified by Myers (1984), it states that companies follow a hierarchy when considering their sources of financing. This theory states that finance can be obtained from three different sources; internal sources (Company's retained earnings), debt, and lastly through equity. The theory states that firms prefer to finance new investment first internally because it is seen to be the least expensive while, second with debts, which is more expensive, and by issuing new equity as a last resort which is the most expensive of all available options. Abubakar (2017) argues that company would rather have their source of funds raised internally first than raise debts externally and finally raise funds through external equity. The theory explained why debt is considered the best option during adverse selection about a company's value. Debt finance has been argued to be cheap, attractive, and more profitable due to its flexibility. Hence, the pecking theory expects an inverse relationship between leverage and profitability.

$ROA_{it} = F(DE_{it}, TIE_{it}, LNTA_{it}, LNLIQ_{it}, AGE_{it})$ (1)

$ROE_{it} = F(DE_{it}, TIE_{it}, LNTA_{it}, LNLIQ_{it}, AGE_{it})$ (2)

Where

ROA = Profitability of the manufacturing sector and the service sector

ROE = Profitability of the manufacturing sector and the service sector

DE = Debt to Equity Ratio

TIE = Time Interest Earned

LNTA = Total Assets

LNLIQ = the level of Liquidity

AGE = Age of the firm

α_0, β_0 = Constants/Intercepts coefficients for the both equations

$\alpha_1 \ldots\ldots \alpha_5$ and $\beta_1 \ldots\ldots \beta_5$ = Slope coefficients for the both equation

i = set of across section selected from the manufacturing sector and the service sector

t = time period (2010-2019) for the selected the manufacturing sector and the service sector

μ_1, μ_2 = error terms supposed to be white noise

4. PANEL UNIT ROOT TEST

By the time, unit root has become one of the main issues in dynamic panel analysis, thus, it is necessary to check the stationarity of the panel data. PP - Fisher Chi-square (PP-FC), ADF - Fisher Chi-square (ADF-FC), Im, Pesaran and Shin W-stat (IP&S) and Levin, Lin & Chu t*(LLC) unit root tests have been applied.

Levin et al., (2002) have developed panel unit root with the help of unique specifications. LLC unit root test is based on the homogeneity of the panel, unlike others. LLC unit root test follows the procedure of ADF in the process of unit root problem in the data set the common form of an LLC is as:

$$\Delta y_{i,t} = \gamma_{0i} + \rho y_{it-1+} \sum_{i-1}^{\rho i} \gamma 1i \, \Delta y_{i,t-j} + \mu_{i,t}$$

$$\mu_{i,t} = \sum_{j-0}^{\infty} \gamma 1i \, \Delta y_{i,t-j} + \varepsilon_{i,t}$$

The equation follows the ARMA stationary process for each cross-section becomes as:

$$\mu_{i,t} = \sum_{j-0}^{\infty} \gamma 1i \, \Delta y_{i,t-j} + \varepsilon_{i,t} \quad (3)$$

Following the equation above, the null and alternative hypotheses can be developed as:

$H_o: \rho_{i=}\rho_{=}0$

$H_o: \rho_{i=}\rho_{<}0$ For all i

LLC model is based on t-statistics, where p is supposed to fix across the entities under the null and alternative hypothesis.

$$t_p = \frac{\hat{p}}{SE\,(\hat{p})} \quad (4)$$

In this whole procedure, we have supposed that the residual series is white noise. Further, the regression of the panel has $t_p the$ test statistic, which presents the convergence of standard normal distribution when N and $T \rightarrow \infty \sqrt{\frac{N}{T}} \rightarrow 0$. On the other hand, if any selection unit is not independent, then the residual series are corrected and have the issue of autocorrelation.

Under such these circumstances LLC test proposed a modified statistic as:

$$t_p = \frac{t_p - N\,T\,S_N \hat{\sigma}^{-2}(\hat{p})\mu_m^*}{\sigma_m^*} \qquad (5)$$

Where μ_m^* and σ_m^* are modified the error term of the error term and standard deviation of the error term, the values of these are generated from Monte Carlo Simulations by LLC (2002).

IM et al., (2003) develop a panel stationarity test in the case when panel data is heterogeneous. This panel unit root test is also based on ASF unit root methodology, but this test is based on the arithmetic mean of individual series, this test is followed as:

$$\Delta y_{i,t} = \bar{w}_i + \rho y_{it-1+} \sum_{i-1}^{\rho i} \gamma 1i\, \Delta y_{i,t-j} + v_{i,t} \qquad (6)$$

The IPS test allows for heterogeneity in v_i value, the IPS unit root test equation can be written as:

$$\bar{t}_T = \frac{1}{N} \sum_{i-1}^{N} t_{i,T}\ (p_i) \qquad (7)$$

Where $t_{i,T}$ the ADF test statistic, pi is the lag order. For the calculation process, this test follows:

$$A_t -= \frac{\sqrt{N\,(T)[\bar{t}_\gamma - E(t_T)]}}{\sqrt{Var\,(t_T)}} \qquad (8)$$

5. HAUSMAN TEST FOR FIXED AND RANDOM EFFECT MODEL

Following the existing literature, researchers consider panel data analysis the most efficient procedure for data handling in econometrics. Our selected panel data are balanced panel data set, and following the properties of selected data, we have used the fixed-effect method. The intercept is considered group-specific in the case of the fixed effect method. It reveals that the selected model can provide different intercepts for every group. Following the procedure of fixed-effect analysis, it is also known as a dummy variable, because when every group has a different intercept in one equation then a specific dummy has been introduced for every group. So, the following equation becomes:

$$Y_{it} = \alpha_i + \beta_1 X_{1it} + \beta_2 X_{2it} + \cdots + \beta_k X_{kit} + \mu_{it} \qquad (9)$$

This can be written in a matrix notation as

$$Y = D\alpha + X\beta' + \mu \qquad (10)$$

$$Y = \begin{bmatrix} Y_1 \\ Y_2 \\ . \\ . \\ . \\ Y_N \end{bmatrix}, \text{D=} \begin{pmatrix} i_T & 0_{\dots} & 0 \\ 0 & i_T & 0 \\ 0 & 0 & i_T \end{pmatrix} NTxk$$

$$X = \begin{pmatrix} x_{11} & \cdots & x_{1k} \\ \vdots & \ddots & \vdots \\ x_{N1} & \cdots & x_{NK} \end{pmatrix} NTxk$$

$$\alpha = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ . \\ . \\ . \\ \alpha_N \end{bmatrix} NTxk\ , \beta' = \begin{bmatrix} \beta_1 \\ \beta_2 \\ . \\ . \\ . \\ \beta_N \end{bmatrix} NTxk$$

Here dummy variables take different groups' specific estimation procedures in the case of each section separately. For checking the validity of the fixed effects method, we can apply the Hausman test.

6. EMPIRICAL RESULTS AND DISCUSSION

The results of the descriptive statistic of the manufacturing sector for the ROA model have been given in table 1. The descriptive statistic provides information on intertemporal properties of the data series such as mean, median,

and standard deviation for minimum and maximum values of the data set. The results reveal that the return on assets has a maximum value of 0.330000, a minimum value of -0.170000, with a mean of 0.114111 and a median of 0.100000. The standard deviation of return on assets is 0.094749. The results show that the return on assets is positively skewed. Time interest earned has a mean value of 52.15217 and a median of 4.570000, the minimum and maximum values are -27.12000 and 1355.060, respectively. The standard deviation of the time interest earned is 190.4406. The data on the return on assets is positively skewed. The result demonstrates the debt to equity ratio has a maximum value of 10.93000 and a minimum value of -0.480000 with a mean of 0.417667 and a median of 0.200000. The standard deviation of the debt-to-equity ratio is 0.909755. The debt to equity ratio has also been positively skewed. Age has a mean value of 36.23333 and median of 36.50000, with minimum and maximum values of 9.000000 and 71.00000 respectively. The standard deviation of age is 19.47010. The data on age is positively skewed. The estimated results show that liquidity has a mean value of 0.237656 and a median of 0.258503. The standard deviation value is 0.444077. Whereas, the maximum value is 1.528228 and the minimum value is -0.967584. The liquidity is positively skewed. The total assets have a mean value of 23.8614, with a standard deviation of 1.2553 but the results show positively skewed. The results of all selected variables show positive kurtosis values, and the data of selected variables is normally distributed based on Jarque-Bera values.

Table 1

Descriptive statistics of ROA for the Manufacturing Sector

	ROA	TIE	DE	AGE	LNLIQ	LNTA
Mean	0.114111	52.15217	0.417667	36.23333	0.237656	23.86144
Median	0.100000	4.570000	0.200000	36.50000	0.258503	23.90500
Maximum	0.330000	1355.060	10.93000	71.00000	1.528228	26.84000
Minimum	-0.170000	-27.12000	-0.480000	9.000000	-0.967584	21.41000
Std. Dev.	0.094749	190.4406	0.909755	19.47010	0.444077	1.255301
Skewness	0.078641	4.934787	8.828211	0.220920	0.098131	0.081780
Kurtosis	2.984905	28.07251	100.5241	1.497259	3.174576	2.846736
Jarque-Bera	0.187239	5445.296	73670.27	18.40089	0.517467	0.376815
Sum	20.54000	9387.390	75.18000	6522.000	42.77799	4295.060
Sum Sq. Dev.	1.606958	6491902.	148.1502	67856.20	35.29966	282.0648
Observations	180	180	180	180	180	180

Table 2

Descriptive statistics of ROE for the Manufacturing Sector

	ROE	TIE	DE	AGE	LNLIQ	LNTA
Mean	0.125278	52.15217	0.417667	36.23333	0.237656	23.86144
Median	0.160000	4.570000	0.200000	36.50000	0.258503	23.90500
Maximum	2.330000	1355.060	10.93000	71.00000	1.528228	26.84000
Minimum	-2.080000	-27.12000	-0.480000	9.000000	-0.967584	21.41000
Std. Dev.	0.305216	190.4406	0.909755	19.47010	0.444077	1.255301
Skewness	-0.723069	4.934787	8.828211	0.220920	0.098131	0.081780
Kurtosis	34.27805	28.07251	100.5241	1.497259	3.174576	2.846736
Jarque-Bera	7353.056	5445.296	73670.27	18.40089	0.517467	0.376815
Sum	22.55000	9387.390	75.18000	6522.000	42.77799	4295.060
Sum Sq. Dev.	16.67509	6491902.	148.1502	67856.20	35.29966	282.0648
Observations	180	180	180	180	180	180

The results of the descriptive statistic of the manufacturing sector for the ROE model have been given in table 2. The results reveal that return on equity has a maximum value of 2.330000, a minimum value of -2.080000, with a mean of 0.125278 and a median of 0.160000. The standard deviation of return on equity is 0.305216. The results show that the return on equity is negatively skewed. Time interest earned has a mean value of 52.15217 and a median of 4.570000, the minimum and maximum values are -27.12000 and 1355.060 respectively. The standard deviation of the time interest earned is 190.4406. The data on the return on equity is positively skewed. The result demonstrates the debt to equity ratio has a maximum value of 10.93000 and a minimum value of -0.480000 with a mean of 0.417667 and a median of 0.200000. The standard deviation of the debt-to-equity ratio is 0.909755. The debt to equity ratio has also been positively skewed. Age has a mean value of 36.23333 and median of 36.50000, with minimum and maximum values of 9.000000 and 71.00000 respectively. The standard deviation of age is 19.47010. The data on age is positively skewed. The estimated results of the table show that liquidity has a mean

value of 0.237656 and a median of 0.258503. The standard deviation value is 0.444077. Whereas, the maximum value is 1.528228 and the minimum value is -0.967584. Liquidity is positively skewed. Total assets have a mean value of 23.8614, with a standard deviation of 1.2553 but results show positively skewed. The results of all selected variables show positive kurtosis values, and the data of selected variables is normally distributed based on Jarque-Bera values.

The results of the correlation matrix of the manufacturing sector for the ROA model have been given in table 3. The outcomes of correlation give the degree of association among the variables and it also provides the level of multicollinearity between the independent variables. The results show that return on assets has a positive and significant correlation with time interest earned and liquidity in the manufacturing sector. On the other side, return on assets has an insignificant correlation with age, debt to equity, and total assets. The estimated results explain that time interest earned has a positive and insignificant correlation with age. Time interest earned has a negative and significant correlation with debt to equity ratio and total assets. Time interest earned has a positive and significant correlation with liquidity in the manufacturing sector. The debt to equity ratio has a negative and significant relationship with age while a total asset has a negative and significant relationship with the debt to equity ratio. There is a negative and significant relationship between debt to equity ratio and liquidity. On the other side, age has a positive and insignificant relationship with liquidity, the results also indicate age has a negative and insignificant correlation with total assets. The results show that total assets have a positive relationship with liquidity. The results of the correlation matrix of the manufacturing sector for the ROE model have been given in table 4. The results show that return on equity has a positive and significant correlation with time interest earned, debt to equity ratio, and liquidity. Whereas, return on equity has an insignificant correlation with age and total assets. The results of both tables 4.3 and 4.4 show that all the selected explanatory variables for the regression analysis have a weak correlation to create the issue of multicollinearity. Hence, there is no issue of multicollinearity.

Table 3

Correlation Matrix of ROA for Manufacturing Sector

Variables	ROA	TIE	DE	AGE	LNLIQ	LNTA
ROA	1.000000					
TIE	0.4761***	1.000000				
DE	-0.071653	-0.10998*	1.000000			
AGE	0.086118	0. 288021	-0.045682***	1.000000		
LNLIQ	0.690204***	0.483898***	-0.28571***	0.070572	1.000000	
LNTA	-0.053084	-0.111155*	-0.140270**	-0.014986	0.016261	1.000000
Note: The asterisks ***, ** and * denote the significant at 1%, 5% and 10% level, respectively						

Table 4

Correlation Matrix of ROE for Manufacturing Sector

Variables	ROE	TIE	DE	AGE	LNLIQ	LNTA
ROE	1.000000					
TIE	0.129027**	1.000000				
DE	0.303920***	-0.10998*	1.000000			
AGE	0.010951	0.288021***	-0.045682	1.000000		
LNLIQ	0.368024***	0.483898***	-0.28571***	0.070572	1.000000	
LNTA	-0.113095	-0.111155*	-0.140270**	-0.014986	0.016261	1.000000
Note: The asterisks ***, ** and * denote the significant at 1%, 5% and 10% level, respectively						

This study has used PP-Fisher Chi-square (PP-FC), ADF-Fisher Chi-square (ADF-FC), Im, Pesaran, and Shin W-stat (IPSW), and Levin, Lin& Chu t(LLC) unit root tests for examining the stationarity of the selected data set. The results of unit root tests of the manufacturing sector have been given in table 5. The results show that return on assets and return on equity, debt to equity ratio are stationary at level. Whereas, all the selected variables of the manufacturing sector are stationary at first difference. This urges us to apply a fixed effect or random effect model to examine the impact of explanatory variables on the explained variable.

The study analyses the impact of financial risk on profitability in manufacturing sectors. This study uses return on assets and returns on equity as the dependent variables, whereas debt to equity ratio, time interest earned, age, liquidity, and total assets have been used as explanatory variables. Normally, sequentially modified LR test statistic, Final prediction error, Akaike information criterion, Schwarz information criterion, and Hannan-Quinn information criterion are used for order selection. The results of lag order selection have been presented in table 6. Based on the

Schwarz information criterion and Hannan-Quinn information criterion lag length 1 has been used for empirical analysis.

Table 5

Unit Root test result for Manufacturing Sector

Variables	Test	Statistic	Prob**	Cross Section	Obs
	Levin, Lin & Chu t*	-5.89135	0.0000	18	144
	Im, Pesaran and Shin W-stat	-1.70837	0.0438	18	144
	ADF - Fisher Chi-square	55.3141	0.0208	18	144
ROA I(0)	PP - Fisher Chi-square	41.6175	0.2394	18	162
	Levin, Lin & Chu t*	-2.39861	0.0082	18	144
	Im, Pesaran and Shin W-stat	-1.42869	0.0765	18	144
	ADF - Fisher Chi-square	53.8654	0.0282	18	144
ROE I(0)	PP - Fisher Chi-square	72.2117	0.0003	18	162
	Levin, Lin & Chu t*	-2.45401	0.0071	18	144
	Im, Pesaran and Shin W-stat	-0.29222	0.3851	18	144
	ADF - Fisher Chi-square	43.1806	0.1913	18	144
TIE I(0)	PP - Fisher Chi-square	41.8337	0.2323	18	162
	Levin, Lin & Chu t*	-2.87609	0.0020	18	144
	Im, Pesaran and Shin W-stat	-2.51542	0.0059	18	144
	ADF - Fisher Chi-square	64.6125	0.0024	18	144
DE I(0)	PP - Fisher Chi-square	108.987	0.0000	18	162
	Levin, Lin & Chu t*	-8.19071	0.0000	18	144
	Im, Pesaran and Shin W-stat	-1.18699	0.1176	18	144
	ADF - Fisher Chi-square	46.2487	0.1178	18	144
AGE I(0)	PP - Fisher Chi-square	43.6924	0.1771	18	162
	Levin, Lin & Chu t*	-3.45730	0.0003	18	144
	Im, Pesaran and Shin W-stat	-0.13765	0.4453	18	144
	ADF - Fisher Chi-square	41.9430	0.2288	18	144
LNLIQ I(0)	PP - Fisher Chi-square	42.7890	0.2026	18	162
	Levin, Lin & Chu t*	-5.22883	0.0000	18	144
	Im, Pesaran and Shin W-stat	1.35835	0.9128	18	144
	ADF - Fisher Chi-square	30.6477	0.7209	18	144
LNTA I(0)	PP - Fisher Chi-square	46.1186	0.1204	18	162
	Levin, Lin & Chu t*	-7.07861	0.0000	18	126
	Im, Pesaran and Shin W-stat	-2.32730	0.0100	18	126
	ADF - Fisher Chi-square	65.8151	0.0018	18	126
dROA I(1)	PP - Fisher Chi-square	105.783	0.0000	18	144
	Levin, Lin & Chu t*	-6.54074	0.0000	18	126
	Im, Pesaran and Shin W-stat	-3.71977	0.0001	18	126
	ADF - Fisher Chi-square	77.9838	0.0001	18	126
dROE I(1)	PP - Fisher Chi-square	107.152	0.0000	18	144
	Levin, Lin & Chu t*	-9.54170	0.0000	18	126
	Im, Pesaran and Shin W-stat	-4.09616	0.0000	18	126
	ADF - Fisher Chi-square	86.3626	0.0000	18	126
dTIE I(1)	PP - Fisher Chi-square	99.0504	0.0000	18	144
	Levin, Lin & Chu t*	-6.35190	0.0000	18	126
	Im, Pesaran and Shin W-stat	-2.97180	0.0015	18	126
	ADF - Fisher Chi-square	73.0036	0.0003	18	126
dDE I(1)	PP - Fisher Chi-square	140.464	0.0000	18	144
	Levin, Lin & Chu t*	-5.63203	0.0000	18	126
	Im, Pesaran and Shin W-stat	-1.62126	0.0525	18	126
	ADF - Fisher Chi-square	50.3948	0.0561	18	126
dAGE I(1)	PP - Fisher Chi-square	98.8045	0.0000	18	144
d LNLIQ I(1)	Levin, Lin & Chu t*	-10.8603	0.0000	18	141

	Im, Pesaran and Shin W-stat	-4.48299	0.0000	18	141
	ADF - Fisher Chi-square	91.8422	0.0000	18	141
	PP - Fisher Chi-square	112.863	0.0000	18	144
dLNTA I(1)	Levin, Lin & Chu t*	-5.24222	0.0000	18	126
	Im, Pesaran and Shin W-stat	-2.07817	0.0188	18	126
	ADF - Fisher Chi-square	63.4712	0.0032	18	126
	PP - Fisher Chi-square	131.017	0.0000	18	144

Table 6

Lag Order Selection

Manufacturing Sector ROA Model						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1233.527	NA	0.071676	17.22954	17.37390	17.28820
1	-558.4612	1275.124	1.20e-05*	8.534183*	9.689110*	9.003480*
2	-521.3906	66.41801*	1.42e-05	8.699870	10.86536	9.579803
Manufacturing Sector ROE Model						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1359.838	NA	0.414255	18.98386	19.12823	19.04253
1	-687.0297	1270.861	7.16e-05	10.31986	11.47478*	10.78915*
2	-632.8316	97.10503*	6.69e-05*	10.24766*	12.41315	11.12759

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

This study is based on panel analysis, following the nature of the data, this study has used the random effects model or fixed effects model for empirical analysis. So, for this purpose Hausman test is used. Hausman test detects endogenous regressors in a regression model. Endogenous variables have values that are determined by other variables in the system. Having endogenous regressors in a model will cause ordinary least squares estimators to fail, as one of the assumptions of OLS is that there is no correlation between the predictor variable and the error term. Instrumental variables estimators can be used as an alternative in this case. In panel data analysis (the analysis of data over time), the Hausman test can help you to choose between a fixed effects model or a random effects model. The null hypothesis is that the preferred model is random effects; The alternate hypothesis is that the model is fixed effects. The results of the Hausman test have been presented in Table 7. The estimated results of the Hausman test reveal that random effect analysis is more appropriate for the manufacturing sector for ROA and ROE models.

Table: 7

Random Effects - Hausman Test

Sample for Manufacturing Sector			
Test cross-section random effects for Manufacturing Sector ROA			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross section random	5.231907	5	0.3882
Test cross-section random effects for Manufacturing Sector ROE			
Test summary	Chi-Sq statistic	Chi-Sq D.F	Prob
Cross section random	1.381571	5	0.9263

The estimated random effect outcomes of the manufacturing sector have been given in table 8. This study has used ROA and ROE for measuring profitability. The results show that time interest earned has a positive and significant impact on profitability when we measure profitability with the help of ROA. But time interest earned has a negative and insignificant impact on profitability when we measure profitability with the help of ROE. The results reveal that to raise profitability (ROA), the manufacturing sector should raise the level of time interest earned. Harmono (2009) mentions that time interest earned is one of the main indicators of the optimal composition of the capital structure of the firm. And time interest earned provides guaranteed profit and raises the company's ability to meet the long-term

debt payments. When time interest earned has a positive and significant impact on profitability (ROA), our findings are consistent with the findings of Harmono (2009).

The estimated results show that the debt to equity ratio has a positive and significant impact on profitability in the manufacturing sector, with both measures ROA and ROE. The results explain that to 1 percent rise in debt to equity ratio raises the profitability of the manufacturing sector by 0.016299 percent and 0.158343 percent (ROA and ROE respectively). Debt to equity ratio is one of the main leverage ratios that shows a comparison between total debt and a firm's amount of capital (Lisa, 2016; Syarif et al., 2016). This ratio provides information about the number of funds given by the creditors to the owner of the firm. Charitou et al., (2012), Nathania et al., (2021), Amanda (2019), Putri and Sudiartha (2015) find a positive relationship between debt to equity ratio and profitability. Our results are consistent with the findings of these studies.

The estimated outcomes show that age has a negative and insignificant impact on profitability (ROA and ROE) in the manufacturing sector. The longevity of the company/firm has become a topic of discussion among different policymakers and researchers across different subjects, it is comprised of the time and geographic locations, etc, (Blackford, 1991). Surprisingly, it has been approached from diverse perspectives using different methodologies, even to the point of defining longevity in different ways and debating whether to focus on survival or failure (Boyce, 2002). Many researchers have worked backward, taking a group of exceptional firms and searching for drivers of their success amongst a range of firm-specific factors (Panza et al., 2015). The findings of Yazdanfar (2013), Salman and Yazdanfar (2012), Mehari and Aemiro (2013), Malik (2011) show that age has a negative influence on profitability. Our results are consistent with the findings of these studies.

The estimated results show that liquidity has a positive and significant impact on profitability (ROA and ROE) in the manufacturing sector. Results show that a 1 percent rise in liquidity raises the profitability of the manufacturing sector by 0.143904 percent and 0.363348 percent, ROA and ROE respectively. The existing literature shows that there is a strong relationship between liquidity and profitability of the firm. No firm can be survived without a sufficient amount of liquidity. A firm that is not producing profit may be considered sick, but a firm having no liquidity may soon meet its downfall and ultimately die. Thus, the management of liquidity has become a basic and broad aspect of judging the performance of a firm (Vishnani and Shah, 2007). For the survival of the firm, it is essential to maintain an adequate degree of liquidity. Literature has highlighted that liquidity should be neither excessive nor so less. The excess liquidity represents the accumulation of idle resources, which are unable to earn any profit for the organization. Whereas, insufficiency of liquidity not only has dangerous impacts on the credit worthiness of the company but also disturbs the production process and hampers the earning capacity to a great extent. So, the need for efficient liquidity management in corporate businesses has always been significant for the smooth running of the business (Eke and Ringin, 2022). Our findings are consistent with Muthini (2013), Aniefor (2012), Ehiedu (2014) and Raykov (2017).

The estimated results show that total assets have a negative and insignificant impact on profitability (ROA) in the manufacturing sector. These findings are consistent with Niresh and Thirunavukkarasu (2014). This is assumed that some firms may not consider their assets too much important in the process of profitability. But estimated outcomes show that total assets have a positive and significant impact on the profitability (ROE) of the manufacturing sector. The results of ROE explain that a 1 percent increase in total assets brings a 0.039911 percent increase in the ROE of manufacturing sector firms. These findings are consistent with Akbas and Canikli (2012), Dogan (2013), Prasanjaya and Ramantha (2013), and Kartikasari and Merianti (2016). The findings of these studies explain that the more assets a firm has the more chances to raise the level of its income. So, utilization of assets is attached to higher profitability which we have found in the case of ROE of the manufacturing sector.

Table 8

Manufacturing Sector

Dependent Variable: Return on Assets					Dependent variable: Return on Equity				
Random Effect Standardized Coefficients					Random Effect Standardized Coefficients				
Variables	Coefficient	Std. Er	t-Stat	Prob.	Variables	Coefficient	Std. Er	t-Stat	Prob.
TIE	7.04E-05	3.90E-05	1.805007	0.0728	TIE	-9.78E-05	0.000120	-0.81174	0.4180
DE	0.016299	0.005204	3.132013	0.0078	DE	0.158343	0.022058	7.178493	0.0000
AGE	-0.000178	0.000442	-0.40218	0.6880	AGE	0.000239	0.001025	0.233121	0.8159
LNLIQ	0.143904	0.015383	9.354859	0.0000	LNLIQ	0.363348	0.051050	7.117505	0.0000
LNTA	-0.005426	0.005992	-0.90548	0.3665	LNTA	0.039911	0.015450	2.583214	0.0106
C	0.209520	0.143980	1.455200	0.1474	C	-0.983100	0.372160	-2.64160	0.0090

The results of the descriptive statistic of the services sector for the ROA model have been given in table 9. The descriptive statistic provides information on intertemporal properties of the data series such as mean, median, and standard deviation for minimum and maximum values of the data set. The results reveal that the return on assets has a maximum value of 0.980000, a minimum value of -145471.4, with a mean of -808.1134 and a median of 0.0300000. The standard deviation of return on assets is 10842.80. The results show that the return on assets is negatively skewed. Time interest earned has a mean value of 71.07272 and a median of 2.970000, the minimum and maximum values are -21.54000 and 5970.330 respectively. The standard deviation of the time interest earned is 501.9782. The data on the time interest earned is positively skewed. The result demonstrates the debt to equity ratio has a maximum value of 4.540000 and a minimum value of -11.48000, with a mean of 0.192611 and a median of 0.070000. The standard deviation of the debt to equity ratio is 1.162116. The debt to equity ratio has also been negatively skewed. Age has a mean value of 28.61111 and median of 20.00000, with minimum and maximum values of 1.000000 and 72.00000 respectively. The standard deviation of the age is 21.35138. The data on age is positively skewed. The estimated results of the table show that liquidity has a mean value of 0.255808 and a median of 0.412110. The standard deviation value is 1.204798. Whereas the maximum value is 5.011635 and the minimum value is -2.813411. Liquidity is positively skewed. Total assets have a mean value of 22.61261, with a standard deviation of 2.213465, but results show positively skewed. The results of all selected variables show positive kurtosis values, and the data of selected variables is normally distributed based on Jarque-Bera values.

Table 9

Descriptive statistics of ROA for the Services Sector

	ROA	TIE	DE	Age	LNLIQ	LNTA
Mean	-808.1134	71.07272	0.192611	28.61111	0.255808	22.61261
Median	0.030000	2.970000	0.070000	20.00000	0.412110	22.53000
Maximum	0.980000	5970.330	4.540000	72.00000	5.011635	26.57000
Minimum	-145471.4	-21.54000	-11.48000	1.000000	-2.813411	4.250000
Std. Dev.	10842.80	501.9782	1.162116	21.35138	1.204798	2.213465
Skewness	-13.30434	10.30868	-5.327531	0.884493	0.138318	-2.867794
Kurtosis	178.0056	114.4211	60.06171	2.359447	3.664032	27.67141
Jarque-Bera	235012.3	96298.00	25271.77	26.54716	3.859435	4811.814
Sum	-145460.4	12793.09	34.67000	5150.000	45.78966	4070.270
Sum Sq. Dev.	2.10E+10	45104799	241.7421	81602.78	258.3738	876.9975
Observations	180	180	180	180	179	180

Table 10

Descriptive statistics of ROE for the Services Sector

	ROE	TIE	DE	AGE	LNLIQ	LNTA
Mean	0.077722	71.07272	0.192611	28.61111	0.255808	22.61261
Median	0.040000	2.970000	0.070000	20.00000	0.412110	22.53000
Maximum	3.270000	5970.330	4.540000	72.00000	5.011635	26.57000
Minimum	-4.240000	-21.54000	-11.48000	1.000000	-2.813411	4.250000
Std. Dev.	0.513494	501.9782	1.162116	21.35138	1.204798	2.213465
Skewness	-2.886967	10.30868	-5.327531	0.884493	0.138318	-2.867794
Kurtosis	43.50784	114.4211	60.06171	2.359447	3.664032	27.67141
Jarque-Bera	12556.68	96298.00	25271.77	26.54716	3.859435	4811.814
Sum	13.99000	12793.09	34.67000	5150.000	45.78966	4070.270
Sum Sq. Dev.	47.19797	45104799	241.7421	81602.78	258.3738	876.9975
Observations	180	180	180	180	179	180

The results of the descriptive statistic of the services sector for the ROE model have been given in table 10. The results reveal that return on equity has a maximum value of 3.270000, a minimum value of -4.240000, with a mean of 0.077722 and a median of 0.040000. The standard deviation of return on equity is 0.513494. The results show that the return on equity is negatively skewed. Time interest earned has a mean value of 71.07272 and a median of 2.970000, the minimum and maximum values are -21.54000 and 5970.330 respectively. The standard deviation of the time interest earned is 501.9782. The data of the debt to equity ratio is positively skewed. The result demonstrates the debt to equity ratio has a maximum value of 4.540000 and a minimum value of -11.48000, with a mean of 0.192611 and a median of 0.070000. The standard deviation of the debt to equity ratio is 1.162116. The debt-to-equity ratio is also negatively skewed. Age has a mean value of 28.61111 and median of 20.00000, with

minimum and maximum values of 1.000000 and 72.00000, respectively. The standard deviation of the age is 21.35138. The data on age is positively skewed. The estimated results of the table show that liquidity has a mean value of 0.255808 and a median of 0.412110. The standard deviation value is 1.204798. Whereas the maximum value is 5.011635 and the minimum value is -2.813411. Liquidity is positively skewed. Total assets have a mean value of 22.61261, with a standard deviation of 2.213465 but results show positively skewed. The results of all selected variables show positive kurtosis values, and the data of selected variables is normally distributed based on Jarque-Bera values.

The results of the correlation matrix of the services sector for the ROA model have been given in table 11. The results show the return on assets has a positive and significant correlation with time interest earned, debt to equity ratio, and liquidity in the services sector. Whereas return on assets has a negative and insignificant correlation to total assets. Return on assets has a negative and significant relationship with age. The estimated results explain the time interest earned has an insignificant correlation with debt to equity ratio, age, liquidity, and total assets in the services sector. Debt to equity ratio has also an insignificant relationship with age, whereas, liquidity, and total assets have a positive and significant correlation with the debt to equity ratio. Age has a negative and significant correlation with liquidity, and the results also indicate age has a positive and significant correlation with total assets. Liquidity has a negative correlation with total assets. The overall result shows that there is a significant correlation of most explanatory variables with the return on assets as an explained variable. The results explain that explanatory variables for the regression model have a moderate correlation with each other. Hence, there is no issue of multicollinearity.

Table 11

Correlation Matrix of ROA for Services Sector

Variables	ROA	TIE	DE	AGE	LNLIQ	LNTA
ROA	1.000000					
TIE	0.381547***	1.000000				
DE	0.123863*	-0.013159	1.000000			
AGE	-0.162214**	-0.064421	-0.045619	1.000000		
LNLIQ	0.320020***	0.021307	0.097741*	-0.256112***	1.000000	
LNTA	-0.089252	-0.047787	0.096391*	0.700241***	-0.43754***	1.000000
Note: The asterisks ***, ** and * denote the significant at 1%, 5% and 10% level, respectively						

The results of the correlation matrix of the services sector for the ROE model have been given in table 12. The results show the return on equity has a positive and significant correlation with time interest earned in the services sector. Whereas, return on equity has a negative and significant correlation with debt to equity ratio. Return on equity has an insignificant correlation with age, liquidity, and total assets. The estimated results explain the time interest earned has an insignificant correlation with debt to equity ratio, age, liquidity, and total assets in the services sector. The debt to equity ratio has a negative and insignificant correlation with age, but the debt to equity ratio has a positive and significant relationship with liquidity and total assets. Age has a positive and insignificant correlation with liquidity, but the results indicate that age has a negative and significant correlation with total assets. Liquidity has a negative and significant correlation with total assets. The results explain that most of the variables have a moderate correlation with each other. Hence, there is no issue of multicollinearity.

Table 12

Correlation Matrix of ROE for Services Sector

Variables	ROE	TIE	DE	AGE	LNLIQ	LNTA
ROE	1.000000					
TIE	0.165818**	1.000000				
DE	-0.181271***	-0.013159	1.000000			
AGE	-0.012655	-0.064421	-0.045619	1.000000		
LNLIQ	0.061115	0.021307	0.097741*	0.048209	1.000000	
LNTA	0.041077	-0.047787	0.096391*	-0.19164***	-0.43754***	1.000000
Note: The asterisks ***, ** and * denote the significant at 1%, 5% and 10% level, respectively						

The results of unit root tests of the services sector have been given in table 13. The results show that the return on equity and debt to equity ratio is stationary at this level. Whereas, all the selected variables of the services sector are stationary at first difference. This urges us to apply a fixed effect or random effect model to examine the impact of explanatory variables on the explained variable.

Table 13

Unit Root test result for Services Sector

Variables	Test	Statistic	Prob**	Cross Section	Obs
	Levin, Lin & Chu t*	505432.	1.0000	17	136
	Im, Pesaran and Shin W-stat	-1.17991	0.1190	17	136
	ADF - Fisher Chi-square	44.8027	0.1018	17	136
ROA I(0)	PP - Fisher Chi-square	60.7282	0.0032	17	153
	Levin, Lin & Chu t*	-4.75990	0.0000	17	136
	Im, Pesaran and Shin W-stat	-2.82451	0.0024	17	136
	ADF - Fisher Chi-square	61.1902	0.0029	17	136
ROE I(0)	PP - Fisher Chi-square	94.0308	0.0000	17	153
TIE I(0)	Levin, Lin & Chu t*	-0.84646	0.1986	17	136
	Im, Pesaran and Shin W-stat	-0.02733	0.4891	17	136
	ADF - Fisher Chi-square	33.4557	0.4941	17	136
	PP - Fisher Chi-square	56.8674	0.0083	17	153
	Levin, Lin & Chu t*	35.8439	1.0000	18	144
	Im, Pesaran and Shin W-stat	-1.55348	0.0602	18	144
	ADF - Fisher Chi-square	66.4326	0.0015	18	144
DE I (0)	PP - Fisher Chi-square	74.4170	0.0002	18	162
	Levin, Lin & Chu t*	-4.79500	0.0000	18	144
	Im, Pesaran and Shin W-stat	-0.44710	0.3274	17	136
	ADF - Fisher Chi-square	38.6881	0.2662	17	136
AGE I(0)	PP - Fisher Chi-square	50.6503	0.0330	17	153
	Levin, Lin & Chu t*	-6.58904	0.0000	18	143
	Im, Pesaran and Shin W-stat	-0.89002	0.1867	18	143
	ADF - Fisher Chi-square	47.1289	0.1014	18	143
LNLIQ I(0)	PP - Fisher Chi-square	41.2811	0.2508	18	161
	Levin, Lin & Chu t*	0.50803	0.6943	18	144
	Im, Pesaran and Shin W-stat	2.27941	0.9887	18	144
	ADF - Fisher Chi-square	22.9145	0.9555	18	144
LTA I(0)	PP - Fisher Chi-square	55.0640	0.0219	18	162
	Levin, Lin & Chu t*	-13.8855	0.0000	17	135
	Im, Pesaran and Shin W-stat	-6.35695	0.0000	17	135
	ADF - Fisher Chi-square	110.242	0.0000	17	135
ROA I(1)	PP - Fisher Chi-square	139.730	0.0000	17	136
	Levin, Lin & Chu t*	-8.26777	0.0000	17	119
	Im, Pesaran and Shin W-stat	-3.36867	0.0004	17	119
	ADF - Fisher Chi-square	70.0093	0.0003	17	119
ROE I(1)	PP - Fisher Chi-square	156.997	0.0000	17	136
	Levin, Lin & Chu t*	-10.2262	0.0000	17	133
	Im, Pesaran and Shin W-stat	-5.45901	0.0000	17	133
TIE I(1)	ADF - Fisher Chi-square	99.8091	0.0000	17	133
	PP - Fisher Chi-square	124.193	0.0000	17	136
	Levin, Lin & Chu t*	-260.450	0.0000	18	143
	Im, Pesaran and Shin W-stat	-47.5123	0.0000	18	143
DE I(1)	ADF - Fisher Chi-square	96.1269	0.0000	18	143
	PP - Fisher Chi-square	109.889	0.0000	18	144
	Levin, Lin & Chu t*	-7.08905	0.0000	17	131
	Im, Pesaran and Shin W-stat	-2.47423	0.0067	17	131
AGE I(1)	ADF - Fisher Chi-square	63.2583	0.0017	17	131
	PP - Fisher Chi-square	79.9570	0.0000	17	136
LNLIQ I(1)	Levin, Lin & Chu t*	-13.7166	0.0000	18	125
	Im, Pesaran and Shin W-stat	-4.53613	0.0000	18	125

	ADF - Fisher Chi-square	85.1100	0.0000	18	125
	PP - Fisher Chi-square	100.725	0.0000	18	143
LTA I(1)	Levin, Lin & Chu t*	-39.3819	0.0000	18	140
	Im, Pesaran and Shin W-stat	-9.29525	0.0000	18	140
	ADF - Fisher Chi-square	98.1111	0.0000	18	140
	PP - Fisher Chi-square	111.623	0.0000	18	144

The study analyses the impact of financial risk on profitability in the services sectors. This study uses return on assets and returns on equity as the dependent variables, whereas debt to equity ratio, time interest earned, age, liquidity, and total assets have been used as explanatory variables. Normally, sequential modified LR test statistics, Final prediction error, Akaike information criterion, Schwarz information criterion, and Hannan-Quinn information criterion are used for order selection. The results of lag order selection have been presented in table 14. Based on the Schwarz information criterion and Hannan-Quinn information criterion lag length 1 has been used for empirical analysis.

Table 14

Lag Order Selection

Services Sector ROA Model						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1894.037	NA	831.1361	26.58793	26.73297	26.64687
1	-1117.952	1465.335	0.031892	16.41891	17.57919*	16.89039*
2	-1058.459	106.5063*	0.027666*	16.27215*	18.44766	17.15617
Services Sector ROE Model						
0	-2054.259	NA	7813.860	28.82879	28.97383	28.88773
1	-1315.167	1395.488	0.503003	19.17716	20.33744*	19.64864*
2	-1252.832	111.5930*	0.419345*	18.99066*	21.16617	19.87468

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

In panel data analysis Hausman test can help you to choose between a fixed effects model or a random effects model. The null hypothesis is that the preferred model is random effects; The alternate hypothesis is that the model is fixed effects. The results of the Hausman test have been presented in Table 15. The estimated results of the Hausman test reveal that fixed effect analysis is more appropriate for the services sector for ROA and ROE models.

Table 15

Random Effects - Hausman Test

Sample for Services Sector			
Test cross-section random effects for Services Sector ROA			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross section random	24.916881	5	0.0001
Test cross-section random effects for Services Sector ROE			
Test summary	Chi-Sq statistic	Chi-Sq D.F	Prob
Cross section random	27.669058	5	0.0000

The estimated fixed effect outcomes of the services sector have been given in table 16. This study has used ROA and ROE for measuring the profitability of the services sector. The results show that time interest earned has a positive and significant impact on profitability when we measure profitability with the help of ROA. But time interest earned has a negative and insignificant impact on profitability when we measure profitability with the help of ROE. The results reveal that to raise profitability (ROA), the manufacturing sector should raise the level of time interest earned. Our findings in the services sectors are consistent with the findings of our manufacturing sector.

The estimated results show that the debt to equity ratio has a negative and significant impact on profitability in the services sector, with both measures ROA and ROE. The results explain that a 1 percent rise in debt to equity ratio

reduces the profitability of the services sector by -0.017968 percent and -0.153910 percent (ROA and ROE respectively). Our findings of services sectors are opposite to the findings of the manufacturing sector over the selected period.

The estimated outcomes show that age has a negative and insignificant impact on profitability (ROA) in the services sector. These findings are consistent with Yazdanfar (2013), Salman and Yazdanfar (2012), Mehari and Aemiro (2013), Malik (2011). But age has a positive and significant impact on profitability (ROE) in the case of the services sector. These findings are consistent with Vijayakumar (2011), and Mansoori and Muhammad (2012).

The estimated results show that liquidity has a positive and significant impact on profitability (ROA and ROE) in the services sector. Results show that a 1 percent rise in liquidity raises the profitability of the manufacturing sector by 0.027706 percent and 0.092917 percent, ROA and ROE respectively. These findings are consistent with Goddard et al., (2004), Aborode and Idekwulim (2006), and Angahar and Agbo (2008). Our findings in the services sectors are consistent with the findings of our manufacturing sector.

The estimated results show that total assets have a negative and insignificant impact on profitability (ROA and ROE) in the services sector. These findings are consistent with Niresh and Thirunavukkarasu (2014). This is assumed that some firms may not consider their assets too much important in the process of profitability. These findings of the services sector are consistent with the findings of the manufacturing sector when profitability has been measured with the help of ROA.

Table 16

Services Sector

Dependent Variable: Return on Assets					Dependent variable: Return on Equity				
Fixed Effect Standardized Coefficients					Fixed Effect Standardized Coefficients				
Variables	Coefficient	Std. Er	t-Stat	Prob.	Variables	Coefficient	Std. Er	t-Stat	Prob.
TIE	5.50E-05	1.88E-05	2.922083	0.0040	TIE	-1.74E-05	7.87E-05	-0.22098	0.8254
DE	-0.017968	0.008460	-2.12387	0.0077	DE	-0.153910	0.035352	-4.35369	0.0000
AGE	-0.002440	0.003369	-0.72430	0.4700	AGE	0.027436	0.014078	1.948894	0.0531
LNLIQ	0.027706	0.012571	2.203961	0.0110	LNLIQ	0.092917	0.052531	1.673185	0.0358
LTA	-0.010925	0.018423	-0.59300	0.5540	LTA	-0.062967	0.076989	-0.81786	0.4147
C	0.373002	0.380438	0.980455	0.3284	C	0.749567	1.589805	0.471484	0.6380

7. CONCLUSIONS

Based on estimated results and discussion, this study can be concluded with major findings. The results of descriptive statistics explain that selected variables have reasonable and correct intertemporal properties to applying the random effect model or fixed effect model. The results of the correlation matrix explain that most of the variables have a significant correlation with the profitability of both sectors, whereas correlation among explanatory variables does not show any sign of multicollinearity. The outcomes of PP - Fisher Chi-square (PP-FC), ADF - Fisher Chi-square (ADF-FC), Im, Pesaran and Shin W-stat (IP&S), and Levin, Lin & Chu t*(LLC) unit root tests show that all variables of the model are stationary with mixed order of integration. This is the best situation to apply the fixed effect model or random effect model. The results of the Hausman test show that the random effect model is suitable for the manufacturing sector model, and the fixed effect model is more appropriate for the services sector model. The results show that time interest earned has a positive and significant impact on the profitability of the manufacturing sector and services when profitability has been measured with the help of ROA. But time interest earned has an insignificant impact on the profitability of the manufacturing sector and services when profitability has been measured with ROE. The results show debt to the equity ratio has a positive and significant impact on the profitability (ROA and ROE) of the manufacturing sector. But the debt to equity ratio has a negative and significant impact on the profitability (ROA and ROE) of the services sector. The outcomes show that age has an insignificant impact on the profitability (ROA and ROE) of the manufacturing sector. The results show that age has an insignificant impact on the profitability of the services sector when profitability has been measured with ROA, but age has a positive and significant impact on the profitability of the services sector when profitability has been measured with the help of ROE. The results explain that liquidity has a positive and significant impact on profitability (ROA and ROE) of the manufacturing sector and services sector. The results show that total asset has an insignificant impact on the profitability of the manufacturing sector when profitability has been measured with the help of ROA. But total assets have a positive and significant impact on the profitability of the manufacturing sector when profitability has been measured with the help of ROE. Total assets have an insignificant impact on the profitability (ROA and ROE) of the services sector. In short, it is concluded that time interest earned, debt to equity ratio, liquidity, and total assets are contributing to deciding the level of profitability of the manufacturing sector.

Whereas time interest earned, debt to equity ratio, liquidity, and age are contributing to deciding the level of profitability of the services sector.

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