Determinants of RoE of S&P BSE Sensex Companies : A Panel Data Analysis

** M. Sriram*

Abstract

The present study analyzed the determinants of RoE (return on equity) for a sample of 22 companies drawn from S&P BSE Sensex in India for a period of 6 years. The study found that on an average, companies gave a RoE of 19.7% and RoA (return on assets) of 16.4% to the shareholders and investors in total during the period of study. The average equity multiplier (EM) was 1.434 which shows that companies had used significant amount of debt to finance the purchase of assets. The study demonstrated that a fixed effect panel data analysis is much better than the pooled OLS regression results to explain variation in RoE. RoE is not only influenced significantly by RoA, but also by company specific characteristics which the conventional model fails to capture. Hausman test was run to decide on whether a fixed effect model or random effect model will be suited for the analysis. Wald χ^2 test suggested that a panel data model is a better explanatory model than pooled OLS model. The study also provides directions for future research.

Keywords : **RoE, RoA, EM, Pooled OLS regression, panel data, fixed effects, random effects**

JEL Classification : G0, G1,G3

Paper Submission Date : July 24, 2018 ; Paper sent back for Revision : August 16, 2018 ; Paper Acceptance Date : August 22, 2018

The analysis of a company's performance is vital to the stakeholders as their decision to invest their funds into a company's assets depends on the performance (Penman, 2007). A company's financial performance is assessed by its stakeholders using different methods. One of the methods used by the investing fraternity/practicing managers is ratio analysis - a simple tool which analyzes the relationship between any two variables drawn from the financial statements of a company. Different ratios are used for different purposes and the type of ratio to be analyzed and interpreted depends upon the category the stakeholder belongs to. One of the ratios widely used by the shareholders of a company to measure the returns earned by them is return on equity (RoE). Assessing a company based on the performance of shareholders' equity reflects RoE (Fabozzi & Peterson, 2003). What determines RoE is a subject for research among academicians and researchers, and lot of studies have gone into to analyze the factors influencing RoE.

One of the most widely used models to estimate RoE is the Du Pont analysis. According to the Du Pont analysis, RoE is a function of RoA (return on assets) and leverage (the proxy variable being equity multiplier) (Narayanaswamy, 2017). In financial research, a series of data sets are chosen for analysis and categorized as either time series, cross sectional, or panel data. A time - series data observes a variable/variables over a period. In cross - sectional data, different variables (company/country) are surveyed at a given point of time. Usually, in a time series study, RoE is regressed with RoA and EM, and the results are analyzed and interpreted. The limitation of the model is that it fails to capture the company/time specific characteristics as there is a common intercept for

**Assistant Professor - Finance,* SDM Institute for Management Development, Mysuru - 570 011, Karnataka.
E-mail : msriram@sdmimd.ac.in

all the companies under study. Also, in practice, RoE may vary across companies in a given period based on a definite set of specifications. Additionally, RoE may also vary across time periods for the same company based upon the economic context in which the company operates (Jaba, Robu, & Balan, 2017). The occurrence of such differences between companies requires the use of panel data analysis. A panel data, which is a time - series cross-sectional data, considers different variables (company/country) and is surveyed over time. In a typical panel data, there are many cross-sectional units and a few time periods and the reverse of it also holds good. The panel data analysis takes into account heterogeneity across individual cross - sectional units and includes unobserved effects as explanatory variables. The exclusion of such effects could cause omitted variable bias. First, application of panel data analysis was found in longitudinal studies of sociological problems (Jaba et al., 2017). Gradually, interest for studying events at the macroeconomic level heightened due to easy availability of data (Gujarati, 2004). At a micro level, the focus of researchers was on behaviour of companies, labour force, and consumers.

The objective of the present study is to investigate the factors determining RoE using the pooled OLS regression and panel data regression and infer results in terms of which model is better suited to explain variation in RoE of companies selected for the analysis.

Review of Literature

Porter (2005) in his study identified that investment returns were highly correlated with the industry portfolio returns. The author found that the portion of investment returns orthogonal to equity returns were positively associated with changes in profitability. Negative association was also witnessed between lagged investment returns and equity. Leisz and Maranville (2008) in their study described that a simple calculation is required for the Du Pont model of profitability analysis. According to them, these calculations can lead to understanding the financial performance, and managers of firms, irrespective of size, can take precise actions that will lead to higher profitability and returns. The authors were of the view that the components of ROE also allow even small business managers to take prudent financial decisions which will, in turn, provide a positive impact on the return to firms' owners. Circiumaru, Siminică, and Marcu (2010) studied a select sample of Roman companies to see whether the return on sales (ROS), the asset turnover, and the financial leverage had joint impact upon return on equity (ROE) using regression analysis. It was found that ROS did not impact RoE, though both the variables were correlated. Kim and Kim (2010) found that there was a significant short-term relationship between equity returns and equity fund flows. They employed dividend yield effect and also found that a significant relationship existed among the three variables. The authors used Granger causality test to analyze the results. Khare and Rizvi (2011) analyzed the important variables that impacted the debt equity ratio of BSE-100 companies and also examined the applicability of pecking order theories for the companies. The study found that profit margins and ratio of total depreciation to total assets were the most significant factors which determined capital structure decision of companies. The pecking order theory was found to be applicable to the companies.

Kabajeh, Al Nu'aimat, and Dahmash (2012) examined a small sample of companies across 5 years and concluded that a positive relationship existed between the ROA, ROE, ROI, and share prices. Nunes, Viveiros, and Serrasqueiro (2012) in their study on SMEs found that age was an important factor affecting profitability. In addition to age, they also identified size, liquidity, and long-term debt as other factors positively affecting profitability. Petcharabul and Romprasert (2014) analyzed technology stocks listed on the Thailand Stock Exchange by considering variables such as current ratio, debt - to - equity ratio, inventory turnover, return on equity, and price - earnings ratios. The results indicated that only ROE and PE were related to stock returns. The study employed OLS regression analysis. In their study, Kabajeh et al. (2012) were of the view that ROA, ROE, and ROI were positively associated with share prices. The authors tried to identify the effect of RoA, RoE, and RoI individually on share prices and concluded that only RoA and RoI had a positive relationship with share prices.

Mohapatra, Acharya, and Mahapatra (2013) analyzed the literature on determinants of share prices in India. They found that analyzing the share price behaviour was a complicated issue, and according to them, the markets were found to be with imperfections because of which identifying factors determining share prices were a difficult proposition. Jaba et al. (2017) analyzed the financial performance of companies listed in the Bucharest Stock Exchange using panel data analysis. The authors provided a theoretical background and applied fixed as well as random effect models to explain variation in RoE. Jahan (2012) studied the determinants of banks' profitability in Bangladesh. The study was conducted on a select set of commercial banks. The study found that profitability of the banks were determined by operational efficiency, asset size, and the association was found to be statistically significant.

Santhosh Kumar and Bindu (2018) studied the determinants of capital structure of passenger car companies and found that none of the factors, that is, profitability, tangibility, and size of the firm had an effect on the capital structure decision. The *F* - statistics confirmed the model with the above variables to have more predictive power and explained more than the 'intercept only' model.

Data and Methodology

(1) About S&P BSE Sensex and Sample Selection : S&P BSE SENSEX was initially compiled in 1986, and the index was calculated on a 'market capitalization-weighted' methodology of 30 component stocks representing large, well - established, and financially sound companies across key sectors. From September 2003, the index is calculated on 'free float market capitalization methodology.' Free float market capitalization methodology is a widely followed index construction across major global indices. A sample of 22 companies were selected for the study. There were eight banking and housing finance companies that were not considered for the analysis. This is because banking companies have different reporting requirements and assessment parameters. The name of the companies considered for the study are mentioned in the Appendix.

(2) Data and Period of the Study : The data were sourced from www.capitaline.com . It is a digital corporate database of more than 35000 listed and unlisted Indian companies. The database had all the necessary financial details required for the present study. The study is based on secondary data and the period of study is between 2013-2018, that is, 6 years.

(3) Model Specification : The following is the OLS regression model in the context of panel data. The model is called pooled regression model :

$$Y_{RoEit} = \alpha_1 + \beta_1 X_{RoAit} + \beta_2 X_{EMit} + \varepsilon_{it} \qquad \text{----------(1)}$$

where, *i* stands for *i*th cross-sectional unit or observation(in this case, a company) ; *t* for the *t* th time period; and ε_{it} is the common error term.

Description of dependent and independent variables of the model are as follows :

Dependent Variable	Explanation
RoE	**Return on Equity =** Profit after tax/shareholders funds for company *i* at time *t*.
Independent Variables	
RoA	**Return on Assets =** Profit after tax/total assets for company *i* at time *t*.
EM	**Equity Multiplier =** Total assets/Equity for company *i* at time *t*. This is a proxy variable to measure the amount of debt used to purchase assets of a company.

The problem with model (1) is that it ignores company specific dimensions, that is, factors which are specific to each cross sectional unit but remains unchanged over time. The OLS results obtained in model (1) may not be fully reliable and the following model is employed to overcome the limitations of model (1) :

$$Y_{RoEit} = \alpha_{1i} + \beta_1 X_{RoAit} + \beta_2 X_{EMit} + \varepsilon_{it} \quad \text{----------(2)}$$

α_{1i} is specific to each individual cross - sectional unit *i* and is an unknown parameter to be estimated in this study. Model (2) is known as fixed effect model (one way fixed effect model) since only one individual effect is taken to study.

To allow company specific effect in model (2), the dummy variable technique is employed and the model (2) is rewritten as follows :

$$Y_{it} = \alpha_1 + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \ldots + \alpha_n D_{ni} + \beta_1 X_{RoAit} + \beta_2 X_{EMit} + \varepsilon_{it} \quad \text{----------(3)}$$

where,
D_{2i} = 1 if observation belongs to cross-sectional unit 2, zero otherwise.
D_{3i} = 1 if the observation belongs to cross-sectional unit 3, zero otherwise.
D_{ni} = 1 if the observation belongs to *n*th cross-sectional unit, zero otherwise.

If we have *n* cross-sectional units/groups, we use *n*-1 dummies to avoid falling into the dummy - variable trap (i.e. situation of perfect collinearity). Hence, there is no dummy for first cross - sectional unit, which means α_1 represents intercept for first (or omitted *i* in terms of assigning dummies) cross - sectional unit. Other 's represent differential intercept coefficients indicating how much intercepts of dummy variable assigned *i*'s differ from intercept of *i* which is not assigned a dummy. In short, cross-sectional unit which is not assigned a dummy becomes comparison cross - sectional unit.

A random effect model assumes that the unobserved effect is not correlated with one or more of the explanatory variables unlike the fixed effect model. The following is the one way random effect model :

$$Y_{it} = \alpha_1 + \beta_1 X_{RoAit} + \beta_2 X_{EMit} + w_{it} \quad \text{----------(4)}$$

where, $w_{it} = \varepsilon_i + u_{it}$. The composite error term w_{it} consists of two components, ε_i, which is the cross - section or individual - specific error component, and u_{it}, which is the combined time series and cross - section error component. ε_i is assumed independent of u_{it}.

To check as to which model is better suited (fixed/random), Hausman specification test is used to decide on the suitability of the model. The Hausman specification test is conducted in order to compare the two categories of specifications. A fixed effect model assumes differences in intercepts across groups or time periods ; whereas, a random effect model explores differences in error variances. The Hausman specification test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model (Hausman, 1978).

If correlated (H0 is rejected), a random effect model produces biased estimators, violating one of the Gauss - Markov assumptions; so a fixed effect model is preferred (Srinivasan, 2012). The Wald test is used to determine whether a panel data OLS model (i.e, all the coefficients of the dummy variables $\neq 0$) is better than the OLS regression model. The analysis was carried out using the E Views 7 software.

Data Analysis and Interpretation

The Table 1 provides the descriptive statistics of the variables considered for the study. The average RoE of the companies is 19.7%, and the average RoA is 16.4%. The Table 1 shows that the average RoE is higher than the average RoA, implying that the companies earned more per unit of the underlying currency to the shareholders than the other stakeholders. One possible reason for a higher RoE than RoA is the use of debt financing. When the RoA is more than the interest rate of debt, the shareholders usually benefit (Narayanaswamy, 2017). With lower equity base, returns tend to magnify over a period of time. The average EM is 1.434, which is more than 1. EM with more than 1 indicates the use of more debt in the capital structure of the companies selected for the study. A higher debt is used in purchasing assets of the companies.

Table 1. Descriptives

Particulars	RoE	RoA	EM
Mean	0.197	0.164	1.434
Median	0.161	0.118	1.228
S.D	0.223	0.179	0.574
No. of Obs	131	131	131

Table 2. Pooled OLS Regression Results

Variable	Coefficient	Std. Error	*t* - Statistic	Prob.
C	-0.103112	0.011624	-8.870339	0.0000
ROA	1.287976	0.020903	61.61649	0.0000
EM	0.061875	0.006516	9.495730	0.0000
R-squared	0.969096	Mean dependent var	0.197026	
Adjusted *R*-squared	0.968613	*S.D.* dependent var	0.223215	
S.E. of regression	0.039545	Akaike info criterion	-3.600098	
Sum squared resid	0.200172	Schwarz criterion	-3.534254	
Log likelihood	238.8064	Hannan-Quinn criter.	-3.573343	
F-statistic	2006.945	Durbin-Watson stat	0.791296	
Prob (*F*-statistic)	0.000000			

Table 3. Hausman Test Results

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. *d.f.*	Prob.
Cross-section random	54.146554	2	0.0000

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var (Diff.)	Prob.
ROA	1.591059	1.446934	0.000547	0.0000
EM	0.003211	0.053832	0.000207	0.0004

Table 4. Parameter Estimates for the Fixed Effect Model

Wald χ^2 **280.754 (*p* < 0.01)**

ROE= *C*(1) + *C*(2)*ROA + *C*(3)*EM + *C*(4)**D*2 + *C*(5)**D*3 + *C*(6)**D*4 + *C*(7)**D*5 + *C*(8)
D*6 + *C*(9)D*7 + *C*(10)**D*8 + *C*(11)**D*9 + *C*(12)**D*10 + C(13)**D*11 + *C*(14)
D*12+ *C*(15)D*13 + *C*(16)**D*14 + *C*(17)* *D*15 + *C*(18)**D*16 + *C*(19)**D*17 + *C*(20)**D*18 + *C*(21)* *D*19 + *C*(22)
D*20 + *C*(23)* *D*21 + *C*(24)D*22

	Coefficient	**Std. Error**	***t* - Statistic**	**Prob.**
C(1)	0.043923	0.039186	1.120867	0.2649
C(2)	1.591059	0.036171	43.98682	0.0000*
C(3)	0.003211	0.017698	0.181453	0.8564
C(4)	-0.190607	0.022154	-8.603767	0.0000*
C(5)	-0.198932	0.022555	-8.819879	0.0000*
C(6)	-0.064113	0.017493	-3.664986	0.0004*
C(7)	-0.053901	0.020520	-2.626746	0.0099*
C(8)	-0.082868	0.019319	-4.289484	0.0000*
C(9)	-0.237496	0.023028	-10.31355	0.0000*
C(10)	-0.270757	0.028513	-9.495933	0.0000*
C(11)	-0.184596	0.022885	-8.066231	0.0000*
C(12)	-0.187517	0.022298	-8.409580	0.0000*
C(13)	-0.079537	0.018896	-4.209283	0.0001*
C(14)	-0.097202	0.019612	-4.956216	0.0000*
C(15)	-0.127694	0.021816	-5.853141	0.0000*
C(16)	-0.028295	0.012216	-2.316291	0.0224**
C(17)	-0.079228	0.019451	-4.073257	0.0001*
C(18)	0.023616	0.027515	0.858299	0.3926
C(19)	-0.060004	0.016988	-3.532118	0.0006*
C(20)	-0.053583	0.019461	-2.753422	0.0069*
C(21)	-0.074298	0.013033	-5.700749	0.0000*
C(22)	-0.049305	0.014687	-3.356959	0.0011*
C(23)	-0.252997	0.023444	-10.79173	0.0000*
C(24)	-0.123533	0.020378	-6.062055	0.0000*
R-squared	0.993017	Mean dependent var	0.197026	
Adjusted *R*-squared	0.991515	S.D. dependent var	0.223215	
S.E. of regression	0.020561	Akaike info criterion	-4.766830	
Sum squared resid	0.045233	Schwarz criterion	-4.240076	
Log likelihood	336.2273	Hannan-Quinn criter.	-4.552786	
F- statistic	661.5238	Durbin-Watson stat	1.439745	
Prob (*F*-statistic)	0.000000			

Note : *significant @ 1%,** significant @5%.

Note : ***C* (1) is the coefficient of Adani Ports Ltd. Coefficients *C*(4) to *C*(24) are coefficients of companies in the order shown in Appendix.

The Table 2 shows the results of the pooled OLS regression model. The dependent variable is RoE, and the independent variables are RoA and EM. The results indicate that 96.9% (*R*-squared) variation in the dependent variable is jointly explained by RoA and EM, respectively. The coefficients of RoA ($p < 0.01$) and EM ($p < 0.01$) are statistically significant. An increase in 100% RoA increases RoE by 128%. Similarly, an increase in the financial leverage improves the RoE for the companies. The *F* - statistics ($p < 0.01$) shows that the model is significant in all aspects.

The Table 3 shows the results of the Hausman test. This test is applied to compare fixed and random effects of the panel data model and based upon the results, decide on a suitable model to complete the analysis. The chi - sq. value of 54.146 is statistically significant at the 1% level, and hence, the null hypothesis that the individual effects are uncorrelated with other regressors is rejected. Therefore, the fixed effect model is the preferred model to conduct the analysis for the study.

The Table 4 shows the parameter estimates of all the companies selected for the study. It can be seen from the Table that there are significant differences in the level of RoE between the company *C*(1) [Reference] and other companies barring *C*(18). The variation in the RoE of different companies is statistically significant at the 1% and 5% levels, respectively. These companies have lower RoE than the value estimated for company *C*(1) with estimated values of cross differences. The Table 4 also shows that RoA alone has a significant influence on RoE : an increase in 100% of RoA increases RoE by 159%, and an increase in the level of financial leverage has no significant impact on RoE. The results of Wald χ^2 statistics also indicate that the panel data analysis is a better model to explain the variation in RoE than pooled OLS regression estimates as the coefficients of the parameters are not equal to zero.

Discussion and Conclusion

The study concludes that on an average, the companies have given a RoE of 19.7% and RoA of 16.4%, respectively during the period of study. All the companies have significantly used debt in the capital structure as the EM value is more than 1 (1.434). The study derives that RoE is determined by RoA and EM. The findings are based on the pooled OLS regression model. Based on the Hausman test, a one-way fixed effect panel OLS was run and the analysis identified company-specific characteristics in addition to RoA determining RoE of companies. The results also show that there is a significant difference in the RoE estimated for different companies. The pooled OLS model does not capture this result as it takes a common intercept for RoE determination. The significant difference in RoE of companies may be due to factors such as geographical location, managerial style, financial leverage, historical factors, etc. These variables are better captured and represented by the fixed effect panel data regression. The findings of the present study are similar to the findings of Jaba et al. (2017). The Wald χ^2 statistics also reveals that a one-way fixed effect panel data model is a better explanatory model when compared to the pooled OLS results. The results of the present study will be of immense help to the investing fraternity and practicing managers in making investment decisions. This will assist in greater appreciation of the fact that certain unique features discussed above of the companies may have an influence on the determinants of RoE in addition to other variables.

Research Implications

Determinants of RoE is one of the important aspects for promoters as well as the shareholders of companies. RoE is a tool which measures the performance of shareholders' funds in the business. Hence, what influences RoE is a matter of interest to the stakeholders. The study based on panel data analysis has reiterated that investors and

practicing managers should look into firm specific characteristics when analyzing determinants of RoE. A look into these factors will provide valuable insights in decision making.

Limitations of the Study and Scope for Further Research

The study is restricted to 22 companies from a total of 30 companies which comprise the BSE Sensex. Banking companies were excluded from the study. The period of the study is limited to 6 years for the present research. The findings of the study cannot be generalized and are specific to the selected companies.

The study offers few directions for future research :

(i) The present study has not factored the time effect to analyze the determinants of RoE. Hence, future studies can include the time effect along with firm specific effects in the panel data analysis.

(ii) A large sample size and inclusion of more number of years will throw more light on the impact of fixed/ random effects of the variables on RoE. The findings will add credence to the existing literature.

(iii) The inclusion of firm specific variables and factors such as efficiency of assets and net margin will add more prominence to panel data studies in the future.

References

Circiumaru, D., Siminică, M., & Marcu, N. (2010). A study on the return on equity for the Romanian industrial companies. *Annals of University of Craiova – Economic Sciences Series, 2* (38), 94 - 103.

Fabozzi, F., & Peterson, P. (2003). *Financial management and analysis* (2nd ed.). New Jersey : John Wiley & Sons.

Gujarati, D. (2004). *Basic econometrics* (4th ed.). New York : McGraw - Hill.

Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica, 46* (6), 1251-1271.

Jaba, E., Robu, I.B., & Balan, C. B. (2017). Panel data analysis applied in financial performance assessment. *Romanian Statistical Review, 2,* 3 - 20.

Jahan, N. (2012). Determinants of bank's profitability: Evidence from Bangladesh. *Indian Journal of Finance, 6* (2), 32 - 38.

Kabajeh, M.A.M., Al Nu'aimat, S.M.A., & Dahmash, F.N. (2012). The relationship between the ROA, ROE and ROI ratios with Jordanian insurance public companies market share prices. *International Journal of Humanities and Social Science, 2* (11), 115 - 120.

Khare, S., & Rizvi, S. (2011). Factors affecting the capital structure of BSE-100 Indian firms: A panel data analysis. *Indian Journal of Finance, 5* (6), 20-25.

Kim, S., & Kim, Y. (2010). Nonlinear dynamic relations between equity return and equity fund flow: Korean market empirical evidence. *Asia - Pacific Journal of Financial Studies, 39* (2), 139 -170. DOI: 10.1111/j.2041-6156.2010.00007.x

Leisz, T. J., & Maranville, S. J. (2008). Ratio analysis featuring the DuPont method: An overlooked topic in the finance module of small business management and entrepreneurship courses. *Small Business Institute Journal, 1* (1), 17 - 34.

Mohapatra, A., Acharya, P., & Mahapatra, R. (2013). Determinants of share price behaviour : A detailed review of empirical studies. *Indian Journal of Finance, 7* (11), 38 - 50.

Narayanswamy, R. (2017). *Financial accounting - A business perspective* (6th ed.). New Delhi : PHI.

Nunes, P.M., Viveiros, A., & Serrasqueiro, Z. (2012). Are the determinants of young SME profitability different ? Empirical evidence using dynamic estimators. *Journal of Business Economics and Management, 13* (3), 443 - 470. DOI: 10.3846/16111699.2011.620148

Penman, S.H. (2007). *Financial statement analysis and security valuation* (3rd ed). New Delhi : McGraw Hill.

Petcharabul, P., & Romprasert, S. (2014). Technology industry on financial ratios and stock returns. *Journal of Business and Economics, 5* (5), 739 - 746.

Porter, R.B. (2005). Connecting optimal capital investment and equity returns. *Financial Management, 34* (2), 63 - 98. DOI: 10.1111/j.1755-053X.2005.tb00100.x

Santhosh Kumar, S., & Bindu, C. (2018). Determinants of capital structure : An exclusive study of passenger car companies in India. *Indian Journal of Finance, 12* (5), 43 - 53. doi:10.17010/ijf/2018/v12i5/123695

Srinivasan, P. (2012). Determinants of equity share prices in India - A panel data approach. *The Romanian Economic Journal, XV* (46), 206 - 228.

Appendix

S.No	Company
1	Adani Ports
2	Asian Paints
3	Bajaj Auto
4	Bharti Airtel
5	Coal India
6	Dr. Reddy's Labs
7	Hero Motocorp
8	Hindustan Unilever
9	Infosys
10	ITC
11	Larsen & Toubro
12	M & M
13	Maruti Suzuki
14	NTPC
15	O N G C
16	Power Grid Corpn
17	Reliance Inds.
18	Sun Pharma.Inds.
19	Tata Motors
20	Tata Steel
21	TCS
22	Wipro

About the Author

M. Sriram is an MBA (Finance), FCMA (Fellow Member of The Institute of Cost Accountants of India), Ph.D., and has 18 years of postgraduate teaching experience in management. He has authored more than 20 papers that have been published in peer reviewed and indexed journals, including ABDC and Scopus.