

THE EFFECTIVENESS OF SAS AND IFRS BASED FINANCIAL REPORTS: EVIDENCE FROM THE HEALTHCARE SECTOR

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ABSTRACT

Since the adoption of IFRS the world over, many studies have been conducted by researchers on the effectiveness of IFRS compared to local GAAPs. This study adds to the existing literature by investigating the effectiveness of SAS and IFRS based financial reports. The study specifically reviews the financial performance of Health care firms in Nigeria under SAS and IFRS. Financial performance is proxied by return on equity (ROE) as dependant variable while long term solvency ratio represented by debt to equity ratio (DER) and debt to asset ratio (DAR) and investment ratio represented by earnings per share (EPS) and dividend per share (DPS) were used as independent variables with sales as control variable. Data was sourced from the financial statements of the health care firms covering period of 14 years (2005-2018) divided into 7 years each of SAS and IFRS regimes. Result show that SAS was better and more effective in the area of investment ratio compared to IFRS. However, for the long-term solvency, it was mixed result with debt to asset ratio (DAR) better under SAS but debt to equity ratio (DER) more effective under IFRS. Results of SAS and IFRS models were subjected to Akaike's information criteria and Bayesian information criteria test of comparability which indicate that model SAS was better when compared with IFRS regime. Therefore, based on the findings, the study concluded that the introduction of IFRS has not significantly impacted on the financial performance of firms under health care sector in Nigeria.

Key words: IFRS, Financial Performance, Local GAAP, SAS

1. INTRODUCTION

Financial statements are prepared to communicate to users the economic activities of an organization within a given period in order to evaluate their performance. The quality of financial reports in terms of information delivery helps to assist in the evaluation and predicting the future performance and investment decisions (Donwa,

Mgbame, & Idemudia, 2015). This gave rise to regulation and standardization of accounting information.

Financial reports and accounting information are therefore, regulated by countries and professional bodies to provide a framework of consistency and reporting practice. This framework of regulations is used in the measurement of assets and liabilities, recognition and measurement of revenues and expenses and disclosure of relevant information provided in the financial statements (Adejola, 2011). Prior to IFRS adoption in 2012, the companies and allied matters act (CAMA, 1990), spelt out the contents and formats of financial statement disclosure in Nigeria. The transition and harmonization of our accounting standards with International Financial reporting standards (IFRS) was fundamentally to align our local standards with standards of other countries world over. A standardized set of financials is expected to benchmark company performance against their peers which will allow global investors to compare firms globally (IASB, 2010). The result will be more direct foreign investments and increased investors' confidence in the quality of our financial reports. It is also likely to improve financial performance and quality of accounting records; and will further enhance business efficiency, aid resource allocation and performance planning in companies, (Taiwo & Adejare, 2014).

Ratio analysis is used to compare trends and evaluate performance over the years and between firms. Akinleye, (2016) describes it as an index of evaluating the financial performance of a business concern. It expresses mathematical relationship between two figures and can be used to compare results. Hence, Blanchette, Racicot, & Girard, (2011) suggest that financial ratio based on accounting information is widely used to compare results. Financial ratios are also used by investors, brokers and bankers to analyze financial performance, compare results and even take decisions. For these reasons, this study intends to compare the financial performance of health care firms in Nigeria under SAS and IFRS in order to determine the effectiveness of the financial reports through the use of accounting ratios. The study tests the strength of leverage ratio represented by debt to equity ratio (DER) and debt to asset ratio (DAR) and investment ratio represented by earning per share (EPS) and dividend per share (DPS) on the performance of health care firms in Nigeria which is proxy by return on equity (ROE) in order to compare and draw conclusion on which of the two (2) standards is more effective in value addition and improved financial performance.

Donwa, Mgbame, & Idemudia, (2015) in a comparative study of Nigeria Oil & Gas used financial ratio computed under Nigerian GAAP and compare it with those computed under IFRS for two years 2010 and 2011. He adopted two-test significance

and compared liquidity, leverage and profitability ratios. Abdul-Baki, Uthman, & Sanni, (2014) adopted short term solvency, long term solvency, profitability and investment ratios to compare oil & gas companies using Nigerian GAAP and IFRS. The study compared mean, maximum, minimum and standard deviation of the ratios. Mann-whitney U test was used to test each category of the ratios prepared under GAAP and IFRS. Jinadu, Oluwafemi, Soyinka, & Akanfe, (2017) also tests for means and standard deviation of profitability, liquidity and gearing ratios. The study used descriptive analysis and Pearson correlation analysis in comparing ratios under Nigerian GAAP and IFRS. These comparative studies were conducted on oil & gas sector, banking sector and some selected companies in Nigeria, however, this paper intends to focus on Health care sector.

Earlier studies detailed above used t-test, to test for comparability of mean, median, standard deviation and variances unlike this study where ratios computed under SAS and IFRS were regressed first then subjected to the akaike test of comparability to identify the model with the best result. Another gap identified in the previous studies is in the period covered which were limited to one, two or three years each for pre/post IFRS, but this study adopted seven-year period each for SAS/IFRS and introduced DPS in addition to EPS as a component of investment ratio.

Empirical studies on comparative analysis of IFRS adoption has continued to show mixed results in different countries including Nigeria, (Zakari, 2017). This may not be unconnected with the fact that accounting standards of a country is influenced by factors that include environmental and institutional factors, governmental and political factors, legal, economic and financial factors among others as well as cultural and social factors, (Masud B. , 2015). These are issues likely to affect IFRS implementation that will require further studies and analysis.

The objective of the study is therefore to determine if SAS is more effective in financial performance compared with IFRS and whether SAS provide investors with better information on earnings and long-term solvency for investment and financing decisions for the health care sector in Nigeria.

2. LITERATURE REVIEW

The essence of the convergence between IFRS and SAS is to strengthen our financial reporting system and make it more competitive for investment decisions. The comparison of SAS and IFRS and the identification of differences between the two regimes is therefore an important issue for users of financial statements, (Yahaya,

Fagbemi, & Oyeniyi, 2015). Users of financial reports are diverse depending on the area of interest.

2.1 Ratio Analysis

Ratio analysis is a quantitative method that is used to assess and evaluate an entity. It is a conventional way of looking into the company's liquidity position, operational efficiency and profitability by comparing information contained in firm's financial statements. Ogiedu, Erhagbe, & Ibadin, (2009) defined ratio as the quantitative factor which expresses the relationship between two or more values. Ratio analysis can be used to establish a trend for a firms' result over a spread of financial reporting period. It is also an accepted practice to use accounting ratios in comparability analysis. Hence (Blanchette, Racicot, & Girard, 2011) opined that financial ratio based on accounting information is widely used in practice to compare results. Financial ratios are used by all stakeholders including Investors, and financial analysts to analyze the financial condition and performance of a company. This paper aligned with (Ogiedu, Erhagbe, & Ibadin, 2009) in terms of definition and uses of ratio analysis.

2.2 Review of empirical Studies and hypotheses development

Various studies were conducted in Nigeria and other countries on comparability analysis between IFRS and local GAAPS using different variables but producing mixed results. Some of these studies that relates to the variables used are:

2.3 SAS/IFRS and Financial performance ratio analysis

Lantto & Sahlstrom, (2009) studied the impact of IFRS adoption on key financial ratios of Finnish listed firms, the result shows that the adoption of IFRS changes the magnitude of the key accounting ratios of Finnish companies. Profitability ratios increase by 9-19% and the price-to-earning (PE) ratios decrease by 11%, gearing ratios increase by 2.9% while equity ratios decrease by 0.2%. Based on this study, Punda, (2011) examined the effects of IFRS adoption on key financial ratios of UK listed firms, non-parametric Wilcoxon Signed-Rank Test was used to test the statistical significance of the differences between the UK-GAAP based ratios and IFRS ratios. He found significant change in three (3) key indicators of operating profit margin (OPM), return of equity (ROE) and return on invested capital (ROIC) but recorded a marginal significant change on current ratio (CR) and price to earnings ratio (P/E) post IFRS adoption. The outcome indicated that financial performance of firms in Finland and UK have witnessed improvement as a result of IFRS adoption

These studies were conducted in Europe and given different economic environment and a longer period the result may be different.

In Nigeria, Abdul-Baki, Uthman, & Sanni, (2014) examined the impact of IFRS adoption on oil and gas entities and findings concluded that IFRS do not depict a higher performance than the ratios under the Nigerian GAAP. However, the study was restricted to OANDO Nig. Plc and for one year each pre and post IFRS. Yahaya, Fagbemi, & Oyeniya, (2015) also conducted study on the effect of IFRS standards on financial statements of Nigerian Banks and found that the means and median of the ratios under the two financial statements were not statistically different. The study was also limited to two years 2011 for NGAAP and 2012 for IFRS and was focused on the banking sector. Akinleye (2016) conducted study on the effect of International Financial Reporting Standards (IFRS) adoption on the Performance of Money Deposit Banks in Nigeria, he used 6 years (pre/post) periods and adopted ROE and ROA as proxies of performance while liquidity, current and investment ratios as independent variables. Findings revealed that financial ratio such as liquidity ratio, current ratio and investment ratio exert significant influence on bank's performance post IFRS period. Jinadu, Oluwafemi, Soyinka, & Akanfe, (2017) examined the effect of IFRS on financial statements by comparability analysis of 20 listed firms in Nigeria and found that IFRS has statistical significance between the considered variables. The study also was also limited to 2 years, 2011 for SAS and 2012 for IFRS periods. Based on this submission, the study hypothesizes that:

Ho1: Financial performance of firms from Healthcare sector using IFRS result is not significantly better than result from SAS financials.

2.4 SAS/IFRS and Investment ratios

Armstrong, Barth, Jagolinzer, & Riedi, (2010) compared pre IFRS adoption data with post-IFRS adoption data on Earnings Per Share, Price Earnings Ratio and Dividend Yield and found that investors reaction to adopting firms was generally positive. Yeboah & Tackas, (2018) investigated the effect of IFRS adoption on corporate performance: Evidence of South Africa based on 49 listed manufacturing and mining firms in South Africa from 2001 to 2014 and the result revealed that IFRS had negative significant impact on ROA and ROE but positive effect on earnings per share (EPS). Ibanichuka & Asukwo, (2018) examined the effect of IFRS adoption on the financial performance of Petroleum marketing Entities in Nigeria using a sample size of 10 listed petroleum marketing companies as at 21/12/2015 using ANOVA and

simple t test. The result indicated that pre-IFRS and post-IFRS have significant impact on Earnings per share of the petroleum marketing firms.

Amaefule, Onyekpere, & Kalu, (2018) investigated IFRS and Manufacturing Firms Financial Performance in Nigeria. Earnings per share (EPS) and ROA were used as dependent variable while pre IFRS and post IFRS were the independent variables. It was found that IFRS adoption exerts insignificant negative effect in the firms EPS but on the other hand, exerting significant negative effect on the firms ROA. In view of the mixed outcome, this study hypothesizes that:

Ho2: Investment ratios of firms under Healthcare sector computed from IFRS financials is not better than SAS financials.

2.5 SAS/IFRS and Long-term solvency ratios

Studies reviewed also indicated mixed results on ratios indicating long term solvency.

Lantto & Sahlstrom (2009) conducted study on the impact of IFRS adoption on key financial ratios of Finnish listed firms. Ratios were calculated from sampled of 91 firms on the Helsinki Stock Exchange and the result showed that the adoption of IFRS changes the magnitude of the key accounting ratios of Finnish companies. Profitability and gearing ratios increased significantly but the price-to- earning (PE) and equity ratios decrease significantly.

Zakari, (2017) investigated the impact of IFRS adoption of Financial Reporting in Nigeria Oil & Gas sector; whether the adoption leads to significant improvement in term of value addition and quality. He adopted ROE for shareholders, PAT/Sales for profitability as dependent variables with current ratio and Debt to Equity ratio to test for short- and long-term liquidity. The study found no significant financial reporting difference in terms of these ratios.

Looking at these studies, the comparison is limited in the number of years most of which are one or two years for pre and post IFRS and the conclusion was also mixed. Therefore, the extension in the number of years as reflected in this study will give a better result.

It is based on these arguments that this study hypothesizes that:

Ho2: Long term solvency ratios of firms under Healthcare sector computed from IFRS financials is not better than SAS financials.

2.6 Theoretical framework

This study is anchored on stewardship theory which situates that the long-term interest of the organization and the shareholders should be placed above the interest of individuals (Cardwell & Karri, 2005). It is anchored on the fact that managers are stewards who are motivated to act at all times in the best interest of the organization. They always take the best decision with the strong believe that their prosperity is hinged on the success of their organization. This theory therefore perceives a strong relationship between managers and the success of an organization hence, (Davies, Schoorman, & Donaldson, 1997) believed that in stewardship theory, managers placed emphasis on the organization by aligning their interest with the goals and aspirations of their organization. Therefore, as stewards' managers are expected to place emphasis on achievements and robust result in terms of financial performance of their organization since their reward and progress depends on the success of the organization.

3. METHODOLOGY

The study is quantitative and descriptive which allows for systematic collection, presentation and analysis of data covering two periods of seven (7) years each. The first seven years between 2005 – 2011 cover the period of SAS regime while the second part of another seven years 2012 – 2018 cover the adopted IFRS period which became effective from 2012 financial year. IFRS 1 specifies that an entity's first financial statements in IFRS should include at least one year of comparative information, this rule therefore allows for the comparison of accounting figures in IFRS and SAS.

The population of the study comprised of the eight (8) listed firms in the health care sector. A sample of six (6) companies was selected based on the availability of financial reports of the companies that have fully complied with provision of IFRS in 2012. The sample companies are: Glaxo Smithkline Nigeria Plc, May & Baker Plc, Morison Industries Plc, Pharma Deko Plc, Neimeth Phamaeetical Plc and Fidson Healthcare Plc.

The study utilizes secondary data which was sourced from the audited financial statements of the affected companies directly from their websites. The financial ratios were manually calculated from financial statements prepared under the SAS and compared with those calculated under the IFRS to compare the two performance models, ROE proxied the dependent variable while long term solvency (represented by DAR and DER and investment ratios proxy by EPS & DPS) were adopted as the

independent variables. Sales variable was also introduced as a control variable in view of its significance in financial performance measurement. Empirical analysis was performed using multiple regression with the aid of Stata as the statistical tool of data analysis. This was followed by akaike test to compare and ascertain which of the two models is most effective in financial performance.

3.1 Model Specification and Variables Measurements

Model specification for this study is as stated below.

$$roe_{it} = \beta_0 + \beta_1 dar_{it} + \beta_2 der_{it} + \beta_3 eps_{it} + \beta_4 dps_{it} + \beta_5 size_{it} + \mu \dots \dots \dots \text{SAS}$$

$$roe_{2it} = \beta_0 + \beta_1 dar_{2it} + \beta_2 der_{2it} + \beta_3 eps_{2it} + \beta_4 dps_{2it} + \beta_5 size_{2it} + \mu \dots \dots \dots \text{IFRS}$$

The selected variables and their measurements are as follows:

Variable SAS/IFRS	Type of Variable	Definition	Measurement	Source
ROE/ROE2	Dependent	Return on Equity	<u>Net Profit after Tax</u> Equity	(Zakari, 2017)
DAR/DAR2	Independent	Debt to Asset Ratio	<u>Total Liabilities</u> Total Assets	(Zakari, 2017)
DER/DER2	Independent	Debt to Equity Ratio	<u>Total Liabilities</u> <u>Equity</u>	(Akinleye, 2016)
EPS/EPS2	Independent	Earnings per Share	<u>Net Profit after Tax</u> Outstanding shares	(Punda, 2011)
DPS/DPS2	Independent	Dividend per Share	<u>NPAT – Preference Div.</u> No. of Ordinary Shares	(Masud B. , 2015)
SIZE/SIZE2	Control	Firm Size	Log of Total Assets	(Adejola, 2011)

4. RESULTS AND DISCUSSION

Table 1:
Descriptive Statistics under SAS & IFRS

Variable	Mean	S/D	Min	Max	Obs
ROE	9.97	13.53	-9.96	40.2	42
ROE2	6.95	16.79	-29.01	78.51	
DAR	0.51	0.17	0.21	0.95	42
DAR2	0.50	0.15	0.21	0.93	
DER	2.42	4.69	0.27	26.04	42
DER2	1.22	0,60	0.27	2.94	
EPS	0.28	3.42	-14.66	7.60	42
EPS2	0.34	3.92	-12.30	7.45	
DPS	0.31	0.47	-0.01	2.27	42
DPS2	0.16	0.30	0.01	1.30	
SIZE	6.42	0.50	5.29	7.24	42
SIZE2	6.67	0.60	5.61	5.61	

Source: descriptive statistics result using STATA 14

Table 1 above is the summary of descriptive statistics of the variables under SAS and IFRS. The mean of the dependent variable roe (9.97) was higher under SAS when compared with the mean of IFRS (6.95). On the average therefore, the return of equity holders was higher under SAS as compared to IFRS. This was supported by the means and SD of DAR, DER and DPS of SAS which were all higher compared to IFRS.

Table 2 Correlation Matrix of the Dependent and Independent variables under SAS

	ROE	DAR	DER	EPS	DPS	SIZE	vif	Tolerance
ROE	1.0000							
DAR	-0.0170	1.0000					2.72	0.367
DER	-0.3623	0.7134	1.0000				2.52	0.397
EPS	0.6459	-0.1697	-0.3320	1.0000			1.38	0.725
DPS	0.7921	0.0768	-0.1967	0.4357	1.0000		1.35	0.741
SIZE	0.5506	0.0882	-0.2267	0.2213	0.2796	1.0000	1.25	0.798

Source: Correlation Matrix table under SAS regime using Stata

Table 3
Correlation Matrix of the Dependent and Independent variables under IFRS

	ROE2	DAR2	DER2	EPS2	DPS2	SIZE	Vif	Tolerance
ROE2	1.0000							
DAR2	0.1807	1					3.57	0.280
DER2	0.1902	0.8342	1				3.40	0.294
EPS2	0.4412	-0.0883	-0.1124	1			1.79	0.558
DPS2	0.2761	-0.0401	-0.1399	0.1525	1		1.71	0.584
SIZE	0.2837	0.0326	0.0406	0.3086	0.6040	1	1.13	0.884

Source: Correlation Matrix table under IFRS regime using Stata

Table 2 and 3 presents the correlation matrix between roe (return on equity) and the variables measuring the long-term solvency (DAR and DER) and investment ratios of (EPS and DPS). A strong relationship exists between roe, eps and DPS at 64% and 79% respectively under SAS regime. This is an indication that performance (roe) of the health care firms is strongly influenced by earnings per share (EPS) and dividend per share (DPS) under SAS. A strong association also exists between roe and control variable (SIZE) which suggests that firms’ performance under SAS regime is propelled by the size of the firms. However, the relationship between dependent and independent variable in IFRS model is mostly low except for eps2 which is moderate at 44%.

4.1 Empirical Results & Discussion

Table 4
Summary of Regression Result

Variable	SAS			IFRS			
	Coeff.	t-stat	p-value	Variable	Coeff.	t-stat	p-value
DAR	4.601	0.55	0.587	dar2	-0.750	-0.03	0.979
DER	-0.363	-1.15	0.258	der2	8.042	1.10	0.277
EPS	1.232	4.02	0.000	eps2	1.915	3.05	0.004
DPS	15.689	6.95	0.000	dps2	15.780	1.56	0.127
SIZE	7.929	3.96	0.000	size2	-1.558	-0.30	0.764
R2		0.8399			0.3139		
Adjusted R2		0.8177			0.2186		
F Statistics		37.77			3.29		
F Sig		0.000			0.0150		

Source: Result of output from STATA 14

4.2 Performance of firms under SAS & IFRS Models

Table 4 is the regression result on performance of health care firms in Nigeria under SAS and IFRS regimes. Adjusted R² which indicates the explanatory power of the regression model is higher under SAS with 83% as compared with the model under IFRS which shows 31%. This result concludes that financial performance of health care sector firms was better and more effective under SAS when compared with IFRS. The outcome was in line with (Zakari, 2017) and (Yeboah & Tackas, 2018) but contrary to (Lantto & Sahlstrom, 2009), (Punda, 2011) and (Tanko, 2012). This also confirms hypothesis 1 that financial performance of firms from Healthcare sector using IFRS result is not significantly better than result from SAS financials. We therefore accept the null hypothesis 1.

The investment ratios of EPS and DPS under SAS have coefficient values of 1.232 and 15.689 with t values of 4.02 and 6.95 all significant at 1%. This implies that for any increase in the ratio of EPS and DPS by 1 unit, return on equity of the health care firms will increase by N1.23 and N15.68 respectively. On the other hand, eps under IFRS model gave a coefficient value of 1.915 with t value of 3.05 but significant at 5% whereas the DPS has a coefficient value of 15.780 and t value of 1.56 but not significant. This outcome is in line with the findings of (Abdul-Baki, Uthman, & Sanni, 2014); (Amaefule, Onyekpere, & Kalu, 2018) and (Yeboah & Tackas, 2018) but contrary to the findings of (Tanko, 2012). It also confirms hypothesis 2 that investment ratios of firms under Healthcare sector computed from IFRS financials is not better than SAS financials and therefore we accept the null hypothesis 2.

The long-term solvency ratios under both SAS and IFRS were not significant even though the coefficient value of 4.601 for DAR (SAS) was better compared to -0.750 for IFRS. On the contrary, the coefficient of 8.042 for DER under IFRS was higher than -0.363 for SAS. This indicates that neither the SAS nor the IFRS has depicted a better performance in term of long-term solvency ratios as the outcome was same in term of significance and mixed in the area of coefficient values. This is in line with the findings of (Donwa, Mgbame, & Idemudia, 2015) but contrary to the outcome of (Blanchette, Racicot, & Girard, 2011); (Abdul-Baki, Uthman, & Sanni, 2014) and (Zakari, 2017). This position contradicts hypothesis 3 which says that long term solvency ratios of firms under Healthcare sector computed from IFRS financials is not better than SAS financials, therefore we reject the null hypothesis and accept the alternate.

Table 5
Comparability Test:
Akaike’s Information Criteria & Bayesian Information Criteria

<u>SAS</u>		<u>IFRS</u>	
<u>variable</u>	<u>coefficient</u>	<u>Variable</u>	<u>Coefficient</u>
DAR	4.601	dar2	-0.750
DER	-0.363	der2	8.042
EPS	1.232	eps2	1.915
DPS	15.689	dps2	15.780
SIZE	7.929	size2	-1.558
AIC	272.045		351.305
BIC	282.471		361.731

Source: Result of output from STATA

Table 5 is the result of Comparability Test using Akaike’s information criteria (AIC) and Bayesian information criteria (BIC).

AIC and BIC are two popular measures for comparing maximum likelihood models. Given two models results fit on the same data, the model with the smaller value of information criterion is considered to be better, (Akaike, 1974), (Schwarz, 1978), (Sakamoto, Ishigoro, & Kitagawa, 1986) and (Raftery, 1995). Regression results of the two models was therefore subjected to comparability test using this measure and the outcome indicates that model SAS has AIC of 272.045 and BIC of 282.471 while model IFRS has AIC of 351.305 and BIC of 361.731. Accordingly, the result with the smaller value of the information criterion is the better in comparability. Based on this information, model SAS has the least AIC and BIC values than model IFRS which implies that SAS was more effective in term of financial performance of firms in the health care sector when compared with IFRS.

5. CONCLUSION AND RECOMMENDATION

In this study, three null hypotheses on investment, long term solvency and financial performance were tested. The data analyzed was sourced from the financial statements of the health care firms in Nigeria. The data covered period of 14 years (2005-2018) divided into 7 years each under SAS and IFRS regimes.

Results show that SAS financials were better and more effective in the area of investment ratio compared to IFRS figures. This indicates that EPS and DPS have effective and significant influence over ROE under SAS when compared to IFRS.

However, there was mixed outcome in the case of long-term solvency, debt to assets ratio (DAR) was better under SAS but debt to equity ratio (DER) was more effective under IFRS. Consequently, this study could not draw a conclusion in terms of effective performance of the long-term solvency ratio.

When the results of the two (2) models were subjected to Akaike's information criteria and Bayesian information criteria test, model SAS was better compared to IFRS model which indicated that the performance of health care firms was not better under IFRS and this implied that adoption of IFRS by health care firms in Nigeria has not significantly impacted on their financial performance.

This study is however limited to the health sector, the selected variables used and time period highlighted in the study. A different result using regression could still emerge using other variables, a longer period and different sector. It could also be different in other developing nations. It is therefore recommended that future research should focus on other financial and non-financial variables, for longer periods and different sectors of the economy.

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Appendix (1) – Regression Results

. regress roe2 dar2 der2 eps2 dps2 size2

Source	SS	df	MS	Number of obs =	42
Model	3627.59132	5	725.518263	F(5, 36) =	3.29
Residual	7930.63581	36	220.295439	Prob > F =	0.0150
Total	11558.2271	41	281.907979	R-squared =	0.3139
				Adj R-squared =	0.2186
				Root MSE =	14.842

roe2	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
dar2	-.7500543	27.6672	-0.03	0.979	-56.86173 55.36162
der2	8.04163	7.283187	1.10	0.277	-6.729359 22.81262
eps2	1.915527	.6290122	3.05	0.004	.6398315 3.191223
dps2	15.77995	10.10956	1.56	0.127	-4.723182 36.28309
size2	-1.558387	5.144161	-0.30	0.764	-11.99123 8.874455
_cons	4.702698	34.16184	0.14	0.891	-64.58073 73.98613

. regress roe dar der eps dps size

Source	SS	df	MS	Number of obs =	42
Model	6303.1094	5	1260.62188	F(5, 36) =	37.77
Residual	1201.5295	36	33.3758194	Prob > F =	0.0000
Total	7504.6389	41	183.039973	R-squared =	0.8399
				Adj R-squared =	0.8177
				Root MSE =	5.7772

roe	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
dar	4.601842	8.385189	0.55	0.587	-12.40411 21.60779
der	-.3638878	.3168695	-1.15	0.258	-1.006529 .2787533
eps	1.23208	.3066385	4.02	0.000	.6101884 1.853972
dps	15.68938	2.255978	6.95	0.000	11.11404 20.26471
size	7.929394	2.001442	3.96	0.000	3.870281 11.98851
_cons	-47.54172	12.19333	-3.90	0.000	-72.27094 -22.8125

Appendix (2) Akaike Information criterion (aic) and Bayesian Information criterion (bic) results.

```
. estat ic
```

Akaike's information criterion and Bayesian information criterion

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	42	-168.4932	-130.0227	6	272.0454	282.4715

Note: N=Obs used in calculating BIC; see [\[R\] BIC note](#)

```
. estimates table, stats(aic bic) star(.05 .01 .001) style(online)
```

Variable	active
dar	4.601842
der	-.36388781
eps	1.2320801***
dps	15.689379***
size	7.9293945***
_cons	-47.541719***
aic	272.04544
bic	282.47146

legend: * p<.05; ** p<.01; *** p<.001

```
. estat ic
```

Akaike's information criterion and Bayesian information criterion

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	42	-177.5626	-169.6526	6	351.3052	361.7312

Note: N=Obs used in calculating BIC; see [\[R\] BIC note](#)

```
. estimates table, stats(aic bic) star(.05 .01 .001) style(online)
```

Variable	active
dar2	-.75005433
der2	8.0416296
eps2	1.9155272**
dps2	15.779953
size2	-1.5583874
_cons	4.7026985
aic	351.30523
bic	361.73125

legend: * p<.05; ** p<.01; *** p<.001