# EVA and Stock Returns: Are They Correlated?

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**Abstract:** *The study sought to examine the relationship between economic value-added (EVA) and stock returns in commercial banks listed at the Johannesburg stock exchange. Furthermore, we also investigated other traditional value measures like Dividend per Share and Return on Equity in-order to identify which metric measures firm value better. The data was analysed with the Ordinary Least Squares (OLS) method. Economic value added was found to have significant influence on the financial performance of banks. This explains why traditional performance measures have driven investors to look for alternatives, such as value based measures in most developed economies. Therefore, EVA can be reliably used to measure corporate value and performance simultaneously. This at least should be a good encouragement for South African banks to adopt Eva so as to keep up with local and international competition for foreign capital (FDIs) in global financial markets. Hence, South African banks should consider supplying EVA data when releasing annual performance figures.*

**Keywords:** *economic value added, traditional metrics, shareholder value, value creation, management tools, commercial banks*

**JEL codes:** *G23, G01, G21*

## Introduction

For a long time, the focus of investors and corporate decision makers has been the creation and subsequent sustenance of Shareholder Value (SHV) within corporations. Since the 1980s, shareholders have exerted tremendous pressure on managers to maximize their wealth. In principle, value generation has been found to be the best avenue of guaranteeing the general prosperity and welfare for the entire corporation (Pettit J, (2014); Starovic et al. (2004); Teker, et al. (2011); Bacidore et al., (1997)). Different performance metrics have been formulated that attempt to tie managerial rewards to their performance. These performance measures include; traditional measures such as Net Income (NI), Earnings per Share (EPS) and Earnings before Interest & Tax (EBIT)); Value based metrics such as Economic Value Added (EVA), Market Value Added (MVA) and Cashflow measures (such as Cashflow from Operations (CFO), Cashflow Return on Investment (CFROI). The rationale of these metrics is to address agency problems. Bacidore (1997) posits that if managers are compensated based on shareholder wealth creation, then their incentives are better aligned to company owners than other types of contracts.

Recent literature (e.g. Nakhaei and Hamid, 2013; Dumitru, & Dumitru, 2012; de Villiers, & Auret, 1998) asserts that shareholder value is maximized through a consistent increase in the share price of an enterprise. Thus, from this perspective managerial performance can be tied and aligned to share price growth. Garvey & Milbourn (2000) suggests that any metric adopted for managerial compensation must be highly correlated with changes in shareholder wealth, bearing in mind the stochastic nature of share price movement. However, citing Gjesdal, (1981), Garvey & Milbourn went on to caution that strong correlation does not imply causation. As such, a strong correlation between stock returns and a performance measure does not necessarily imply value addition. This dichotomy led to the evolution of EVA in 1981 by Joel Stern & Bennet Stewart.

The concept of EVA is based on the firm's economic profit rather than accounting profit. It is widely accepted by the corporate world due to its ability to look at the firm's real profitability (Grant, 2003; Eva Dimensions LLC, 2010; and Dumitru & Dumitru, 2012). Unlike other traditional performance metrics such as EBIT and Net Operating Income (NOI); EVA highlights a firm's residual profitability after incorporating the cost of capital. This makes it the most appropriate measure of corporate achievement as it is well aligned with the firm's goal of shareholder wealth maximization. Furthermore, EVA can be decomposed to a unit level and beyond thus facilitating the evaluation of individual section managerial performance.

Since the financial bubble decimated private and public investments in the securitised markets around 2008, all kinds of companies have publicly proclaimed their commitment to increasing long-term value for their shareholders. Pettit (2014) asserts that managing for value has become the mantra of today's executives. A casual scrutiny of the statements of directors or chief executives in annual financial and non-financial reports confirms the assertion that the aim of publicly listed companies has always been to maximize the value of shareholders' investment. What matters now is whether and how companies are creating value for their owners (Starovic et al., 2004). Value generation is thus, in principle, the best means of securing overall prosperity and welfare for the corporation.

Studies have shown that it is one thing to proselyte about companies being managed for shareholder value but quite another to provide guidance on the best way of attaining this. According to Knight (1998) creating value is not about applying a prescribed set of tools or processes as envisioned by Stern Stewart & Co, but about creating a competitive edge in the marketplace. Strategy lies at the heart of enterprise success and "Managing for value begins with strategy and ends with financial results" (Knight, 1998). Thus Pettit (2014) notes that most companies have excellent financial performances, yet their activities don't generate value but drive perpetual, permanent loss in value.

Despite the usefulness of EVA in explaining stock returns identified by (Abdoli et al., 2012; Grant, 2003; Stern, 1991 & 1994) anecdotal evidence to date presents mixed results on the correlation between EVA and stock returns both in the financial and nonfinancial sectors. More so researchers such as (Magwegwe, 2003; Worthington & West, 2001) have looked at the superiority of value added metrics such as EVA and

MVA over traditional based measures with mixed results. The above debate shows that the issue of the correlation between EVA and stock returns and which performance measure is highly correlated with shareholder wealth creation cannot be settled satisfactorily without further research. This paper seeks to make contributions to this debate by analysing the relationship between EVA and banks' share price returns in emerging markets with a focus on South Africa.

# 1 Literature Review

Empirical evidence is quite limited in the financial sector in comparison to other sectors; therefore we draw much of our anecdotal literature on non-financial studies.

Findings in a research by Munteanu and Brezeanu (2012) suggest that EVA results are higher than RI results but the rank correlation is higher when the value of NOPAT is positive. ROE and ROA were found to show the best correlation with EVA for the period 2006-2010. However, the researchers caution that banks are highly leveraged institutions, where of higher financial leverage tends to propel ROE up while masking the deterioration of the capital base and other off-balance sheet commitments.

In India, Sharma and Kumar (2012) sought to establish if EVA can be utilized as a dominant performance measurement tool while investing in Indian markets vis-a-vie its competitors like EPS, ROE, ROA, NOPAT and RI. In the research, panel data regression was used to test the hypotheses and efficacy of the various performance measures. Results show a positive relationship between EVA and MVA and that EPS and RI surpassed EVA in explaining market value addition. Their recommendation to the Indian investor fraternity was to be extra prudent and most importantly, EVA should be deployed together with the traditional measures when exploring investment strategies.

From the studies by Stewart & Co, Wallace (1996), and many others, it can be accepted that EVA is not just a performance measure. It is an integrated performance measurement, and reward system. Dumitru & Dumitru (2012) reinforce this position by hinting that Eva has been proven excellent performance measure to motivate management and employees in any company due to its highest correlation with MVA.

Fiordelisi and Molyneux (2010) set out to investigate the value creation process in 12 EU-15 area countries for the period 1998 -2005. The study used EVA as a proxy of bank performance and postulated that shareholder value creation is linearly connected to numerous bank specific, industry specific and macroeconomic factors. Results revealed that SHV has a positive relationship to cost efficiency changes and economic returns were related to revenue efficiency variability.

Dumitru & Dumitru (2009) examined a possible association between EVA, EPS, OCF and DPS with MVA. MVA is actually calculated as the present value of future EVAs. Their findings revealed that there was a stronger relationship between MVA and OCF. EVA showed weaker correlations with MVA, DPS or EPS.

More studies on EVA and banks were conducted by Bhattacharyya and Phani (2004), who endeavoured to explain the concept, in the context of Indian banks and Teker et al. (2011) who derived EVA for eleven listed banks in Turkey. The research

reinvigorates the computational challenges faced by researchers in the calculation of EVA when it comes to the banking sector. According to the research, EVA can involve sentimental subjectivity which tends to curtail its information value. Even so, their findings begrudgingly support the adoption of EVA as a corporate mind-set if productivity and SHV creation are to be enhanced. Researches in South Africa portrayed a concoction of results. Magwegwe (2003) in a *"Study into economic value added (EVA) as an indicator of share price in the South African context"* discovered that there is no statistically significant correlation between EVA intrinsic share values and the share price as quoted on the JSE in both the same and lagged periods. Hence they could not conclude that EVA is a reliable indicator of share price.

De Villiers and Auret (1998) when comparing the explanatory power of EPS and EVA in the share prices found that EPS had more power than EVA.

The influence of EVA as a robust management tool was also tested by Wallace (1996). He studied the effects of adopting management bonus plans based on residual income measures. His study sample consisted of forty firms that adopted some residual income measure, mainly EVA, as bonus base. The sample was compared to an identical sample consisting of companies where the bonus was tied to accounting based measures. Wallace tested the management actions of the sample groups with various methods and his findings corroborated Stern Stewart's advocacy that providing incentives for managers and other workers makes them to act more like owners. It thus dulls the inherent conflict between managers, shareholders and other stakeholders. Significant increases were noted in residual income (EVA) for the firms that adopted residual income based compensation relative to the control group. The firms that adopted residual income based compensation outclassed the market over the twenty-four month period by over 4 %-points in snowballing terms.

A number of detailed influential studies show that traditional earnings based performance measures are dominant in the firm's performance measurement. Biddle et al. (1997) argue that earnings dominate EVA in explaining stock returns in the relative information content test. Not only do earnings outperform EVA, but conventional accounting profit rates such as ROA, ROE and EPS are also a better measure of firm performance than EVA.

Studies in the financial sector were earnestly pursued by Uyemura et al. (1996) using a sample of 100 largest US banks for the ten-year period from 1986 till 1995 to compute MVA and to test the correlation with EVA, EPS, ROE and ROA. The results of their regression analysis evidently show that EVA with a 40% margin is the measure that correlates the best by far with shareholder wealth creation in the banking sector.

Dodd and Chen (1996) studied the association of EVA, RI, EPS, ROE and ROA with stock returns respectively using a sample of 566 United States companies over the period 1983–1992. They concluded that unadjusted accounting measures have greater association with stock returns than EVA.

However in an earlier study by You Lee (1995) to determine whether EVA should be used as opposed to traditional accounting measures in measuring corporate performance leant that EVA was a marginally better performance measure than ROE

and ROA. Very limited attention was paid into the information content of these metrics from a South African perspective.

From the previously mentioned work, empirical research on the claim that EVA is superior to traditional accounting performance measures in association with stock returns is still contentious both in the banking and non-banking terrain.

# 2 Methodology

## 2.1 Model Specification

This research is a post-event correlation study which has the primary objective of establishing whether or not EVA can depict stock prices behavior better than the favorite traditional measures of performance. Following the suggestions put forward by the theoretical and empirical review in the preceding sections, the OLS estimator was adopted for inference. The general model indicates that EVA has a linear relationship to Market returns (MR), Dividend per Share (DPS), Return on Equity (ROE) and Headline Earnings per Share (HEPS). The model therefore has EVA as dependent variable; while MR, DPS, ROE and HEPS were the predictor or independent variables.

We follow the generalized linear regression in Nakhaei & Hamid (2013):

$$EVA_t = \beta_0 + \beta_1 MR_t + \beta_2 ROE_t + \beta_3 DPS_t + \beta_4 EPS_t + \mu \tag{1}$$

Where:

$EVA_t$ is economic value added at time t,
$MR_t$ is Market return at time t,
$ROE_t$ is return on equity at time t,
$DPS_t$ is dividend per share at time t,
$EPS_t$ is Earnings per share at time t,
$\beta0$ is the constant (intercept),
$\beta1$, $\beta2$, $\beta3$ and $\beta4$ are coefficients of explanatory variables,
$\mu$ is the stochastic variable or error term.

**Research Hypothesis**

***H₁***: There is no correlation between EVA and stock returns.

***H₂***: Banks with positive EVA are associated with raising share prices.

***H₃***: The information content of EVA is equal to the information content of EPS and DPS in explaining abnormal stock returns.

## 2.2 Data and Variables

### 2.2.1 Data

This study used balance sheet variables obtained from seven South African commercial banks for the period 2000 to 2013. The sampled banks are: Absa, Capitec, First National Bank, Standard Bank, Ned bank, Finbond Bank and Rand

Bank. These banks were chosen on the basis of data availability. Data for this study was obtained from BFA McGregor database, a database that hosts data for South African companies. In order to fulfill the research objectives, financial performance metrics for the period under study were gathered, collated and synthesized using E-VIEWS 7 statistical package. The leading two variables in the inquiry are EVA and Market Stock return, nonetheless, the study also integrates ROE, DPS, ROE and HEPS.

## 2.2.2 Dependent Variable: Economic Value Added (EVA)

EVA is an internal measure of performance which measures the surplus value created by a firm in its existing environment. Whilst there are at least four approaches to determine EVA, this study adopted the following number cruncher to calculate EVA with some adjustments tailored to align the traditional formula to the banking environment, Munteanu & Brezeanu (2012). In order to compute a relatively accurate EVA, our study adopted the adjustments proposed by Munteanu & Brezeanu (2012).

**Table 1** Accounting Adjustments Made to Align Book Values with Economic Values

| $NOPAT_t$ | |
| --- | --- |
| **Loan loss provisions** | + Value of charge –offs from t |
| **Deferred tax balances** | +/- Δ deferred tax liabilities/Assets x( t/t-1) |
| **R&D expenses and training costs** | **+** R&D, training expenses at t |
| **Non-recurring events** | Case by case decision |
| **Security accounting** | **+/-** amortization of gain/losses over the remaining lives |
| **INVESTED CAPITAL** | |
| **Loan loss provisions** | **+** value of loan loss reserve x( t-1) |
| **Deferred tax balances** | +/- deferred tax liabilities/Assets x (t-1) |
| **R&D expenses and training costs** | **+** capitalized R&D, training costs over 5 yrs period less amortization of R&D, training costs for t yrs. |
| **Non-recurring events** | Case by case decision |

**Source:** Authors' work

$$EVA = (r - c^*) \,.\, Invested\ Capital \qquad (2)$$

Where:

   $r$ is the rate of return, calculated as r = ROC = NOPAT/Invested capital,
   $c^*$ is the weighted average cost of capital (WACC).

Where:

| WACC | Weighted Average Cost of Capital | Cost of equity × [E/(D + E)] + after-tax cost of debt × [D/(D + E)] |
|------|------|------|
| ROC | Return on Capital | EBIT (1 – t)/(BV of debt + BV of equity – Cash) |

**Source:** Munteanu & Brezeanu (2012)

### 2.2.3 Independent Variables

### Return on Equity (ROE)

ROE is known by various names like ROIC, RONA, ROTCE or ROI. Chandra Shil (2009) admits that among all traditional metrics ROE is the most common and relatively a good performance measure. Stockholders invest to get a return on their risked money and this ratio informs how well they are doing in accounting sense (Brigham & Ehrhardt, 2005).

$$ROE = \frac{NP}{TE} \qquad (3)$$

Where:

$NP$ is net profit or income,
$TE$ is total equity.

Researchers who have focused their attention on the applicability of EVA in the banking field suggest a ruffle of further adjustments in addition to those proposed by Stern Stewart & co in the simple form of EVA computation. Munteanu and Brezeanu (2012) point out that in the case of banking institutions there is a fundamental difference between shareholder equity in its common sense and risk weighted capital as applied in the banking set-up. Risk capital is related to the bank's risk profile and is a function of the structure of the bank's asset portfolio. Basel II stipulates this capital to be at least 8% of equity capital. This study uses the Tier 1 ratio to calculate the value of the risk-weighted asset.

### Dividend per Share (DPS)

This measures the return attributable to ordinary shareholders. A company in the growth phase may choose to retain all profits earned in-order to finance growth. But a payment of dividends is important in-order to keep shareholders happy plus retain their faith and trust in the company.

$$DPS = \frac{TotalDividends(interim + final declare\ )}{Number of issued ordinary shares} \qquad (4)$$

### Market Returns (MR)

Stern (1991) categorically asserts that "EVA is the only measure that ties directly to intrinsic market value". He also maintains that "Corporate managers should accept that stock prices represent intrinsic value..." (1991:53). EVA is by implication a superior indicator of share price because not only does it tie directly to intrinsic market value, it has been shown that stock prices represent intrinsic value. Market

share prices are gathered from the individual bank's financial statements as determined by the JSE for comparison with the intrinsic share value as measures by EVA. No mention in related literature has been directly linked to the efficiency of the market in so far as it influences stock price behaviour. The assumption inherent in this study is that the JSE operates at the strong form and EVA intrinsic values naturally inherit the same pattern.

### Headline Earnings per Share (HEPS)

Headline Earnings per Share measures returns on shareholders' funds after accounting for dilutions.  It is computed as net Earnings After Taxes/no. of ordinary shares issued. It is a very popular traditional measure of company performance which shows profit trends.

### Error Term

The purpose of this term is, inter alia, to cater for all qualitative and omitted variables.

## 2.3 Estimation Procedure

### Correlation Assessment: H1

In order to quantify and test our $H_1$, the Ordinary Least Square (OLS) was employed to estimate the specified model equation. Econometric software, E-views was used to facilitate the estimation process. An examination of the Pearson's Correlation Coefficient ($R$) between EVA and stock returns will be performed. We reject the null hypothesis if ($R$) is positive.

### Positive (High) EVA versus Raising Share Prices Assessment: H2

An application of the F test relative to the Granger Causality framework, which adheres to the F-distribution, was adopted in order to test our $H_2$. If the calculated F exceeds the critical F value at the 5% level of significance the possibility of any association between the dependent and independent variables is diminished and the Null hypothesis will be refuted.

### Information Content Assessment: H3

In order to accept or refute the assertion that the information content of EVA is equal to the information content of EPS and DPS, ROE in explaining abnormal stock returns (SP)- $H_3$ , the study utilises the relative information content test. The test enables us to identify which performance measures better explain shareholder returns by comparing the information content of EVA, DPS, ROE, and EPS, respectively, relative to Stock returns. The method used in the relative information content test is to compare the R² value from each regression result. The researchers shall be able to determine which performance measure has the greatest explanatory power from four pairwise comparisons in the relative information content test. We reject the null hypothesis if the adjusted ($R^2$) is not the same for the regressors.

## 2.4 Tests

**Stationarity Test**

A simple test for stationarity is provided by the Phillips-Perron test. By definition, a series is stationary if it has a constant mean and a constant finite variance. On the contrary, a non-stationary series contains a clear time trend and has a variance that is not constant over time. If a series is non-stationary, it will display a high degree of persistence, that is, shocks do not die out. Time series data suffers from the problem of non-stationarity which leads to spurious regressions. If two variables are trending over time, a regression of one on the other could have a high $R^2$ even if the two are totally unrelated. If the variables in a regression model are not stationary, then it can be proved that the standard assumption for asymptotic analysis will not be valid. In other words, the usual t-ratios will not follow a t-distribution, so we cannot validly undertake hypothesis tests about the regression parameters. The Phillips-Perron test was used to test for stationarity since it is effective on small samples and also adjust for seasonal variations.

**Auto-correlation**

Auto-correlation refers to the relationship among observations drawn from the same series. Whenever there is correlation in the error terms, all inference that is estimating hypothesis testing and forecasting must take into account the effects of auto-correlation for the conclusion to be valid. When performing regression one underlying assumption is that the error terms are independent. If the data set has significant autocorrelation then this assumption will be violated. The Durbin - Watson test was used to detect the presence of autocorrelation in the residuals from a regression analysis. It provided a test for first order auto-correlation. Using the Durbin-Watson test, we were able to decide if autocorrelation correction was needed. The closer a value is to 2, the more the evidence is in favour of no auto-correlation.

**Heteroscedasticity Test**

The assumption of homoscedasticity is central in using the OLS as a robust estimation model. Heteroscedasticity is present when the size of the error term differs across values of the repressor. Homoscedasticity describes a situation where the 'noise' in the error term between the repressor and the regressant are even through the variables. Random disturbances should be limited as much as possible if the model should be effective. The Breusch-Pagan-Godfrey test was used to test for heteroscedasticity.

## 3 Results and Discussion

### 3.1 Unit Root Test

Stationarity tests are recommended whenever a research involves the use of time-series data in-order to eliminate spurious or unauthentic regression results. In this research study, the Phillips-Perron (PP) test was applied for unit root tests and the results are outlined below. The PP test, unlike the Augmented Dickey- Fuller test, computes the root test after adjusting endpoints.

The Unit Root tests showed that variables were stationary except for HEPS which is near stationary. Variables were stationary at level-1 order of integration. For a variable to be stationary, the PP - statistic should be greater than the critical values given at various levels, ignoring the sign. The variables in the study are stationary since the PP unit root test are larger than the critical levels at 1%, 5% and 10% level of significance. Therefore the null hypothesis of a root test is rejected since all variables have no unit roots.

**Table 2** Unit Root Test Results

| Variable | PP-statistic | Critical value | Level of significance | Order of integration | Decision |
|---|---|---|---|---|---|
| EVA | -4.087 | -2.776<br>-1.969<br>-1.629 | 0.01<br>0.05<br>0.10 | Level | Stationary |
| DPS | -5.576 | -2.776<br>-1.969<br>-1.629 | 0.01<br>0.05<br>0.10 | Level | Stationary |
| MR | -5.856 | -2.799<br>-1.969<br>-1.631 | 0.01<br>0.05<br>0.10 | Level | Stationary |
| ROE | -4.579 | -2.776<br>-1.969<br>-1.629 | 0.01<br>0.05<br>0.10 | Level | Stationary |
| HEPS | -1.965 | -2.776<br>-1.969<br>-1.629 | 0.01<br>0.05<br>0.10 | Level | Stationary |

**Source:** EVIEWS Output

## 3.2 Heteroscedasticity Test

**Table 3** White Heteroscedasticity Test

| F- Statistic | 0.900537 | Probability | 0.567352 |
|---|---|---|---|
| Obs*R-squared | 8.184035 | Probability | 0.415703 |

**Source:** EVIEWS Output

A p-value of 56.7% is determined, hence the null hypothesis if heteroskedasticity is refuted. The residuals are homoscedasticitic, which makes the model reasonably sound.

## 3.3 Correlation Analysis

The results of the multiple regression tests are depicted by the correlation matrix table below:

**Table 4** Correlation Matrix

|  | EVA | DPS | ROE | MR | HEPS |
|---|---|---|---|---|---|
| **EVA** | 1 | 0.07539610 | -0.2354392 | 0.4927151 | -0.6743138 |
| **DPS** | 0.0753961 | 1 | 0.5458663 | 0.0550824 | -0.3369070 |
| **ROE** | -0.2354392 | 0.5458663 | 1 | 0.0993917 | 0.4062015 |
| **MR** | 0.4927151 | 0.0550824 | 0.0993917 | 1 | -0.2023189 |
| **HEPS** | -0.6743138 | -0.3369070 | 0.4062015 | -0.2023189 | 1 |

**Source:** EVIEWS Output

The correlation matrixes presented in Table 4 indicate a strong positive relationship between EVA and MR (Market Return) and HEPS (Headline Earnings per Share). There is some weak positive relationship though between EVA and ROE (Return on Equity) contrary to Munteanu, A.; Brezeanu, P. (2012*)* and DPS (Dividend per Share), an observation substantiated by De Wet (2005). Stock Returns has a very weak correlation with DPS, ROE and HEPS. These varying relational results somehow confirm the numerator-denominator influences involved when deriving these financial metrics with subsequent reconsolidation of off balance sheet items and changes in bank leverage.

Furthermore, Wegner (2007:418) warns that a correlation does not imply a cause and effect relationship. The scholar asserts that a high/low correlation does not necessarily imply that the variables are unrelated or related. A non-linear relationship which is not measured by Pearson's index may actually exist. As a result some researchers have chosen to use the Spearman's rank correlation or Kendall's Tau rank correlation index which are nonparametric and distribution free (Munteanu and Brezeanu, 2013). With the correlation results on hand, we reject the null hypothesis (*H₁*) since (R) is positive and conclude that there is some correlation between Eva and stock returns.

## 3.4 Regression Analysis

Table 5 displays the regression analysis output where EVA is the dependant variable with multiple regressors. The results reveal some favourable inclination of the independent variables in explaining the behaviour of EVA with market return having some greater influence. The $R^2$ is 64 percent which is above the 60 percent threshold for a good model prediction. The regressors can account only for 64% of EVA while 36% is attributed to the noise term. The F statistic with p-value of 0.026 is within the significance benchmark of 0.05. This means the regressors jointly can influence the independent variable in one way or the other.

**Table 5** Regression Analysis Output

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|:---:|:---:|:---:|:---:|:---:|
| DPS | -0.009896 | 0.008446 | -1.171749 | 0.2685 |
| ROE | 0.08298 | 0.097156 | 0.854086 | 0.413 |
| MR | 6.542546 | 4.427446 | 1.477724 | 0.1703 |
| HEPS | -0.171233 | 0.064609 | -2.6503 | 0.0243 |
| C | 5.584432 | 6.952023 | 0.803282 | 0.4405 |
| R-squared | 0.637833 | Mean dependent var | | 8.860667 |
| Adjusted R-squared | 0.492967 | S.D. dependent var | | 3.946631 |
| S.E. of regression | 2.810248 | Akaike info criterion | | 5.165624 |
| Sum squared resid | 78.97496 | Schwarz criterion | | 5.401641 |
| Log likelihood | -33.74218 | F-statistic | | 4.402899 |
| Durbin-Watson stat | 1.713414 | Prob(F-statistic) | | 0.026102 |

**Source:** EVIEWS Output

**Estimated Regression Model:**

Data manipulation from the table above yields the following model:

$$EVA = 5.5584 + 6.5425MR + 0.0830ROE - 0.0099DPS - 0.1712HEPS + \mu \quad (5)$$

## 3.5 Performance of EVA vs. the other Metrics

One of the objectives of the study inquiry was to test whether high EVA leads to high performance when compared with the traditional valuation metrics. An application of the F test relative to the Granger Causality framework, suggests that if the calculated F exceeds the critical F value at the 5% level of significance the possibility of any association between the dependent and independent variables is diminished. The test results are presented in table 6 below:

**Table 6** F-Test: Two-way ANOVA

| | EVA | MR | DPS | ROE | HEPS |
|:---|:---:|:---:|:---:|:---:|:---:|
| Mean | 8.86174731 | 95.6897 | 307.173 | 97.988 | 12.71333 |
| Variance | 15.5792903 | 1588.86 | 26370 | 220.5936 | 407.8992 |
| Observations | 15 | 15 | 15 | 15 | 15 |
| Df | 14 | 14 | 14 | 14 | 14 |
| F | | 453.0629 | 0.000591 | 0.07062439 | 0.03819397 |
| P(F<=f) one-tail | | 4.26E-16 | 0 | 6.5345E-06 | 1.2864E-07 |
| F Critical one-tail | | 2.483726 | 0.402621 | 0.40262094 | 0.40262094 |

**Source:** EVIEWS Output

An application of the F test shows some relationship between EVA and the traditional metrics except for Market return. Table 6 above shows that calculated F does not exceed the critical F value at the 5% level of significance for DPS, ROE and HEPS thus proving a possibility of cause and effect between EVA and its associated variables. Hence the Null hypothesis **(H₂)** is affirmed, except in the case of Share return. It can thus be concluded that when EVA rises or falls, the other metrics are likely to imitate that pattern in the manner shown by the regression model. However, these numbers do not tell use by how much more or less MR, ROE, DPS and HEPS should increase or decrease in the event of changes in EVA.

From these results, the suggestion spelt out by objective 2 that high EVA firms result in high corporate performance is thus a partial myth. Stern-Stewart & Co actually posits it that for EVA to have great impact, it ought to be implemented holistically by those firms adopting it as a performance measurement metric. No bank in South Africa has adopted it and therefore it is difficult to confirm these results even though big companies like Sony are telling a bright story.

## 3.6 Information Content Test

According to Biddle, Seow and Siegel's (1995) relative information content test, it is possible to deduce which element is more revealing between the independent variables and dependent variable by comparing their $R^2$ values. Table 7 gives these results for EVA and its associated traditional measurement metrics.

**Table 7** $R^2$ Information Content Test Analysis

|  | EVA | HEPS | MR | ROE | DPS |
|---|---|---|---|---|---|
| R-squared | 0.149142 | 0.164987 | 0.419268 | 0.305093 | 0.484766 |
| Akaike info criterion | 5.677828 | 9.063164 | -0.02787 | 8.169979 | 13.16747 |
| Schwarz criterion | 5.808201 | 9.193537 | 0.102508 | 8.300352 | 13.29785 |
| F-statistic | 0.876418 | 0.987933 | 3.609828 | 2.195206 | 4.70433 |
| Durbin-Watson stat | 1.430974 | 1.241495 | 1.938095 | 2.058769 | 1.472447 |

**Source:** EVIEWS Output

The results reveal that EVA at $R^2$ = 15% has weak information content when compared to the other variables thus disproving **H₃** of the study. DPS and MR have superior information content at 49% and 42% between them. The Akaike information criterion shows a similar pattern of EVA having poor information content even though MR is swapped for HEPS. Overall, the results disprove, Stewart (1991), Wong (1999), and Uyemura et al. (1996) and approve Lehn and Makhija (1997), Kyriazis and Anastassis (2007), Van Wyk R.A (2011) findings on EVA's supremacy in terms of incremental information content.

## 3.7 Model Diagnostic Tests
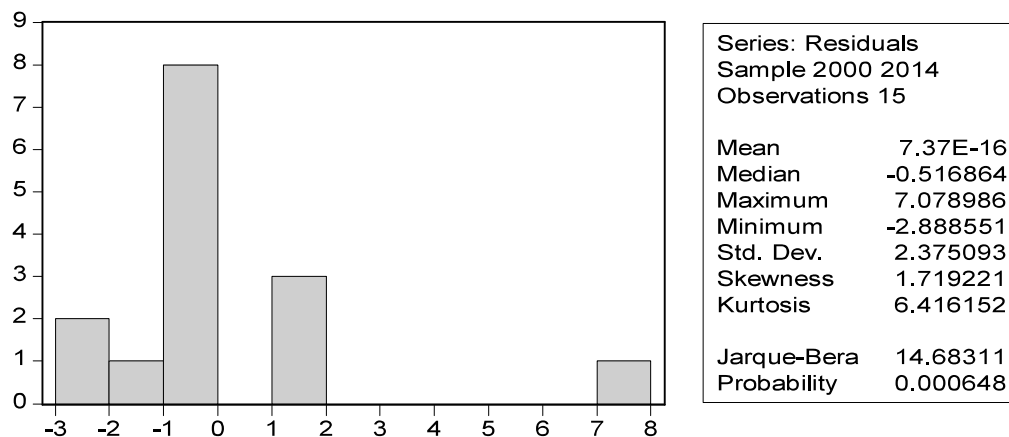
**Serial Correlation Test**

The rule of thumb is that a Durbin-Watson (DW) value close to 2 indicates no serial correlation; a value greater than 2 implies that there is a negative serial correlation and a test value below 2 indicates positive serial correlation. In this case there is no serial correlation since the DW value is 1.7134 as shown in table 8 below.

**Table 8** Serial Correlation Test

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|---|----------|-------------------|----------------------------|---------------|
| 1 | 0.637833 | 0.637833 | 0.492967 | 2.810248 | 1.71341 |

**Source:** EVIEWS Output

**Figure 1** Normality Test



Series: Residuals
Sample 2000 2014
Observations 15

| | |
|---|---|
| Mean | 7.37E-16 |
| Median | -0.516864 |
| Maximum | 7.078986 |
| Minimum | -2.888551 |
| Std. Dev. | 2.375093 |
| Skewness | 1.719221 |
| Kurtosis | 6.416152 |
| | |
| Jarque-Bera | 14.68311 |
| Probability | 0.000648 |

**Source:** EVIEWS Output

**Table 9** Empirical Distribution for Residuals

| Method | Value | Adj. Value | Probability |
|--------|-------|------------|-------------|
| **Kolmogorov (D+)** | 0.927202 | 3.728638 | 0 |
| **Kolmogorov (D-)** | 0.066667 | 0.268092 | **0.8661** |
| **Kolmogorov (D)** | 0.927202 | 3.728638 | 0 |
| **Kuiper (V)** | 0.993869 | 4.064876 | 0 |
| **Cramer-von Mises (W2)** | 4.053039 | 4.297642 | 0 |
| **Watson (U2)** | 1.243058 | 1.3028 | 0 |
| **Anderson-Darling (A2)** | 252.0136 | 252.0136 | 0 |

**Source:** EVIEWS Output

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Normality tests were conducted using the Jarque-Bera (JB) and Kolmogorov tests. A JB test is a goodness of fit measure of departure from normality based on the sample kurtosis and skew. It determines whether the data have the skew and kurtosis equating to a normal distribution. (Figure 1 and table 9 above). A small p-value leads to a rejection of the null hypothesis of normal distribution. However, research has shown that JB is unreliable with samples below 50 and above 5000 as in this case. Thus using the Kolmogorov test a p-value of 0.866 leads to acceptance of normal distribution of residuals.

## Conclusions and Recommendations

The study partially confirmed some of Stern Stewart & Co.'s assertions with regards to EVA when compared to some traditional performance metrics. Economic value added has been found to have significant influence on the financial performance of banks. This explains why traditional performance measures have driven investors to look for alternatives, such as value based measures in most developed economies. The most debilitating issue about EVA is that available EVA literature seems to be incongruous, making it difficult for company chiefs to make irrefutable decisions. In fact one of the key complications with the EVA literature is that research conducted by players with a business interest in the success of EVA, has flickered glowing results on EVA; yet our findings here refutes some of the claims especially on information content and causality. The calculation of EVA itself is quite cumbersome when compared to traditional performance measures.

 In this regard, it is not clear whether EVA is germane and cost effective in the South African context, more-so the banking industry which is required to disclose most of its performance in line with the South African Reserve bank and the Basel Committee directives. Simply put, the banking industry is a highly regulated sector not easily amenable to some of these modern valuation techniques. Another challenge with EVA in the banking industry relates to consideration of the discounting rates and cost of capital, as these most significantly vary from one bank to the other thus generating some "noise" in the final results. Furthermore, numerous adjustments are required to align the bank financial details so as to make them suitable for the computation of EVA. This may encourage South African banks to continue using their "time tested" and less costly valuation methodologies and techniques.

However, Value based performance metrics have changed the terrain of performance measures in the global economy. South Africa is operating in a globalized financial arena and cannot afford to lag behind international trends of using modern and proven value based performance techniques in the mould of EVA.  Abundant literature on the bennefits and shortfalls of EVA as well as records of companies that have adopted it with traceable success are available. This study has also shown that EVA can be reliably used to measure corporate value and performance simultaneously. This at least should be good encouragement for South African banks to adopt Eva so as to keep up with local and international competition for foreign capital (FDIs) in global financial markets. Hence, South African banks should consider supplying EVA data when releasing annual performance figures.

**Suggestions for Further Studies**

- Stern Stewart & Co avers that EVA is the only performance measure that ties directly to the share price. Whilst this research has affirmed the assertion, previous detailed study in South Africa yielded mixed results in the non-financial sector. For example work by Van Wyk (2001) and Magwegwe (2003) yielded contradictory findings. It would be interesting to test the EVA valuation model by including more traditional metrics highly favoured by banks and verify the adroitness of each measure.

- EVA proponents claim that this performance measure improves the wealth creation ability of a company. Whilst this study also confirmed this, it is not clear whether the implementation of EVA has an impact on the share prices in the South African context of industries which are non-financial in nature. This research is the first of its kind in the banking and finance field of South Africa. Hence, it is necessary to conduct a survey of companies listed on the JSE that have adopted EVA, if any, and compare correlation of the share prices of these companies to those that have not implemented EVA.

- An underlying assumption that was stated and not thoroughly tested in this research was on the relevance and reliability of EVA-implemented strategies in sprucing business performance at all corporate levels. A study investigating the existence and the strength of this relationship in the South African context would be beneficiary and would increase the bastion of corporate finance knowledge.

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