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# THE IMPACT OF THE DEFERRED TAX ADJUSTMENT ON THE ECONOMIC VALUE ADDED (EVA) MEASURE

## Abstract

Economic Value Added (EVA) is a value-based accounting measure used by companies to measure the amount of value created for shareholders. EVA requires the conversion of accounting values to economic values. This conversion process is known as the EVA adjustment. If accounting values are not converted to economic values, the value of the EVA can be distorted. Previous studies have shown that companies are experiencing difficulties in implementing EVA adjustments. To reduce these difficulties, companies have decided to limit their EVA adjustments to ten or even fewer. The research problem is that if the appropriate adjustments are not made, an inaccurate EVA measure will be calculated.

The aim of the research is to measure whether deferred taxes impact EVA. The study is conducted within a quantitative research paradigm. Secondary data analysis was carried out on JSE-listed food producers over a seven-year period, from 2004 to 2010. The unadjusted EVA was compared to the adjusted EVA measure to determine the before and after effects of deferred taxes on EVA. The findings of the study revealed that deferred taxes either understated or overstated the value of the EVA during the period 2004–2010. In addition, the results from the regression analysis revealed an overall significance for all deferred tax predictors. The results from the study showed that deferred tax had a significant impact on the value of EVA. Therefore, the study recommends that companies implement the deferred tax adjustment on EVA.

## Keywords

economic value added, unadjusted EVA, deferred tax  
adjustment, adjusted EVA, shareholder value

**JEL Classification** M41, G0, G30

## INTRODUCTION

During recent years, there has been an increasing emphasis on the concept of value creation. Many corporations around the world are focusing on making decisions that create value for the company and for the shareholder. Shareholders are considered as one of the most important stakeholders in a company, as the investment in shares is a primary source of capital.

It is, therefore, essential for managers to act in the best interests of shareholders by making decisions that will benefit the shareholder, and, hence, create shareholder value (Collier, 2012). Consequently, the primary goal of management is to increase shareholder wealth by aligning the interests of management with that of shareholders (Lovata & Costigan, 2002). Sharma and Kumar (2010) also agree that companies are focusing more on maximizing shareholder value.

In order to maximize shareholder value, a tool is required to measure shareholder value. Many companies are using *EVA* as a tool to measure shareholder value. The *EVA* measure is the registered trademark of a New York-based consulting company, Stern Stewart and

Company. During the late 1980s, Bennett Stewart and Joel Stern pioneered the *EVA* measure as one of the value-based accounting measures (Stewart, 1991).

*EVA* is a tool used to measure the amount of value the company has created and, consequently, measures the amount of value created for shareholders. The *EVA* measure indicates if the company has created value or destroyed value (Latha, 2009). Ray (2001) points out that *EVA* has been used increasingly and successfully in the corporate world by corporate giants such as Coca-Cola, AT&T, Briggs Stratton, DuPont, Eli Lilly and Quaker Oats. Stern Stewart and company created the following *EVA* formula:

$$EVA = NOPAT - (TCE \times WACC\%), EVA = NOPAT - COC .$$

The above formula can be reduced by multiplying *TCE* by *WACC%* to yield *COC*, where *NOPAT* – Net operating profit after taxes; *TCE* – Total capital employed; *WACC%* – Weighted average cost of capital percentage; *COC* – Cost of capital.

With reference to the *EVA* formula, *NOPAT* represents the profits generated by the company from using invested capital (*TCE*). *TCE* represents the amount of capital invested in the company, which constitutes shareholder capital and borrowed capital. The *COC* represents the cost of using the capital (*TCE*) invested in the company. The aim is for companies to generate a return (*NOPAT*) that would exceed the cost of using capital (*COC*). A positive *EVA* ( $NOPAT > COC$ ) indicates value creation, whilst a negative *EVA* ( $NOPAT < COC$ ) represents value destruction (Young, 1997).

The computation of the *EVA* measure requires the extraction of accounting information from company annual financial statements (AFS). AFS are prepared according to accounting standards and, therefore, reflect accounting values. Burksaitiene (2009) makes an important point by stating that accounting values are distorted due to the application of Generally Accepted Accounting Practices (GAAP).

Furthermore, accounting values need to be adjusted to reflect an economic value for the purposes of calculating *EVA*. For example, the ‘profit for the period’, as reflected on the statement of comprehensive income, and ‘capital’, as reflected on the statement of financial position, are accounting values. These accounting values need to be converted to economic values. The ‘profit for the period’ is converted to an economic value called net operating profit after taxes (*NOPAT*). Likewise, ‘capital’ is converted to an economic value called total capital employed (*TCE*). The conversion of accounting values to economic values is referred to as an adjustment (Burksaitiene, 2009).

Converting accounting values to economic values is important for the purposes of calculating *EVA*. Economic values must be reflected in the *EVA* measure, hence, the term ‘Economic Value Added’. According to Stewart (1991), *EVA* must also be adjusted for other accounting transactions that take place during the year. The accounting transactions include research and development, operating leases, depreciation and deferred taxes. The *EVA* must be adjusted for accounting transactions, because these transactions are accounting values that affect the values of *NOPAT* and *TCE*. The *NOPAT* and *TCE* are components of *EVA*. Therefore, adjustments to *NOPAT* and *TCE* are synonymous to adjusting the *EVA* measure.

However, Sharma and Kumar (2010) believe that companies are experiencing difficulties in understanding and implementing adjustments. In addition, Young (1997) states that companies have decided to keep their adjustments to ten or fewer in order to prevent the *EVA* system from becoming complicated. Furthermore, Young (1997) indicates that some companies prefer not to make any adjustments so that the system is easier to administer and comprehend. The research problem is that the accuracy of the *EVA* measure is affected for companies that are not prepared to implement the appropriate accounting adjustments. This paper seeks to make a contribution towards improving the accuracy of the *EVA* measure. This will be achieved by investigating the impact of the deferred tax adjustment on the *EVA* measure.

## 1. CONCEPTUAL FRAMEWORK

According to Stewart (2013), there are several accounting adjustments that can be made to *EVA*. Accounting adjustments constitute the removal of accounting transactions. There are many types of accounting transactions, namely, operating lease transaction, research and development (R&D) transaction and the deferred tax transaction. These accounting transactions are removed because of their distorting impact on *EVA*. For example, the operating lease transaction distorts *EVA*. To remove the distortion, an operating lease adjustment is made to *EVA*. The operating lease adjustment is one type of an accounting adjustment. In the context of this study, the deferred tax transaction distorts *EVA*. To remove the distorting impact of deferred taxes on *EVA*, a deferred tax adjustment is implemented for *EVA*. The deferred tax adjustment is another example of an accounting adjustment.

The implementation of an accounting adjustment for *EVA* will require adjusting the components of *EVA*, namely, *NOPAT* and *TCE*. To elaborate, the implementation of accounting adjustments for *EVA* entails the removal of accounting transactions from *NOPAT* and *TCE*. The accounting transactions are removed from the unadjusted *NOPAT*, to arrive at the adjusted *NOPAT*. Similarly, the accounting transactions are removed from the unadjusted *TCE* to arrive at the adjusted *TCE*. The implementation of accounting adjustments ensures that accurate values for *NOPAT* and *TCE* (adjusted *NOPAT* and adjusted *TCE*) are produced. Consequently, an accurate *EVA* value (adjusted *EVA*) is produced (Larrabee & Voss, 2012).

## 2. LITERATURE REVIEW

### 2.1. The unadjusted NOPAT and the adjusted NOPAT

The following studies analyzed the overall impact of accounting transactions on *NOPAT*.

Studies by Nichols, Gray, and Street (2005), Bhattacharya, Black, Christensen and Larson (2003), Black and Christensen (2009), Aubert, (2009) and Eames and Sepe (2005) investigated the impact of accounting adjustments on *NOPAT*. These studies

examined the before and after effects of accounting transactions on *NOPAT*. The accounting transactions included amortization, restructuring charges, R&D, impairment losses, merger and acquisitions, gains and losses on asset dispositions and stock-based compensation costs. The findings by Nichols et al. (2005), Bhattacharya et al. (2003), Black and Christensen (2009), Aubert (2009) and Eames and Sepe (2005) yielded similar results. The findings revealed that accounting transactions distorted *NOPAT*. The implementation of accounting adjustments showed a lower unadjusted *NOPAT* and a higher adjusted *NOPAT*. These studies concluded that accounting transactions understated *NOPAT*. In contrast, the study by Marques (2010) provided a mixed set of results. The empirical results revealed an understated *NOPAT* for 52% of companies and an overstated *NOPAT* for 48% of companies.

### 2.2. The unadjusted TCE and the adjusted TCE

The following studies examined the impact of individual accounting adjustments on *TCE*.

Studies by Damodaran (2009) and Bryan, Lilien, and Martin (2010) examined the impact of the operating lease transaction on *TCE*. These studies yielded similar results, as the unadjusted *TCE* was lower than the adjusted *TCE*. The findings revealed that the operating lease transaction understated *TCE*.

A study by Callimaci and Landry (2004) and Cazavan-Jeny and Jeanjean (2006) examined the impact of the R&D transaction on *TCE*. Callimaci and Landry (2004) found that the R&D transaction understated *TCE*, as the unadjusted *TCE* was lower than the adjusted *TCE*. In contrast, the empirical findings by Cazavan-Jeny and Jeanjean (2006) found that the R&D transaction understated and overstated *TCE* during the sample period.

Another study by Damodaran (2007) provided a comprehensive set of results, as the study individually examined the impact of four different types of accounting transactions on *TCE*. The results of the study showed that the depreciation transaction understated *TCE*, the R&D transaction understated and overstated *TCE*, the operating lease transaction understated *TCE* and the goodwill transaction understated *TCE*.

Previous empirical evidence shows that accounting transactions (such as operating leases, depreciation, merger costs) distort the value of *NOPAT* and *TCE*. The above studies show that the implementation of accounting adjustments removes the distorting effect of accounting transactions and, in turn, will produce accurate values for *NOPAT* and *TCE*.

### 2.3. The unadjusted *NOPAT*, adjusted *NOPAT* and deferred tax expenses

Noor, Mastuki, and Aziz (2007) and Herbohn, Tutticci, and Khor (2010) explain that there has been an increasing trend amongst companies in using deferred tax expenses to manage *NOPAT*. The empirical findings from the above studies showed that a decrease in deferred tax expenses resulted in a higher unadjusted *NOPAT* and a lower adjusted *NOPAT*. These studies concluded that a decrease in the provision for deferred tax expenses resulted in an overstated *NOPAT*.

In addition, the following studies investigated whether deferred taxes were useful in detecting the management of *NOPAT*. Phillips, Pincus and Rego (2002) and Chang, Herbohn, and Tutticci (2009) suggest that an increase in deferred tax expenses resulted in a lower unadjusted *NOPAT* and a higher adjusted *NOPAT*. The above studies concluded that an increase in the provision for deferred tax expenses resulted in an understated *NOPAT*.

### 2.4. The unadjusted *TCE*, adjusted *TCE* and deferred tax assets/liabilities

Previous studies by Gee and Mano (2006) and Gallermore (2012) investigated the relationship between deferred tax assets and *TCE* in the banking sector. The above studies showed that banks were using deferred tax assets to maintain an adequate level of *TCE*. Gee and Mano (2006) and Gallermore (2012) yielded similar empirical results as both studies found that deferred tax assets resulted in a higher unadjusted *TCE* and a lower adjusted *TCE*. This finding revealed that deferred tax assets overstated *TCE*. Furthermore, Gee and Mano (2006) and Gallermore (2012) suggest that the reporting

of a deferred tax liability would result in a lower unadjusted *TCE* and a higher adjusted *TCE*. These studies suggest that the deferred tax liabilities would understate *TCE*.

The above studies provided evidence that deferred tax expenses distorted *NOPAT* and that deferred tax assets/liabilities distorted *TCE*.

### 2.5. Empirical evidence on accounting adjustments and *EVA*

Previous studies provided empirical evidence on the components of *EVA* (*NOPAT* and *TCE*) and on the different types of accounting adjustments (the deferred tax adjustment being one of the accounting adjustments). However, very few studies have been conducted on *EVA* and accounting adjustments (Latha, 2009). A database search showed that there was only one study that examined the role of adjustments on *EVA*. A study by Anderson, Bey, and Weaver (2005) investigated the impact of accounting adjustments on the *EVA* measure. The study was found to be the most relevant piece of literature in relation to this research study.

The study conducted by Anderson et al. (2005) investigated the impact of five types of accounting adjustments on *EVA*. The five accounting adjustments included the R&D adjustment, operating lease adjustment, advertising adjustment, last-in-first-out (LIFO) adjustment and the bad debts adjustment. The study compared the unadjusted *EVA* (value of the *EVA* before accounting adjustments) to the adjusted *EVA* (value of the *EVA* after accounting adjustments). The results of the study showed that R&D and LIFO were the two out of the five adjustments that accounted for a major change in the value of the *EVA*. Furthermore, the regression statistics revealed a lack of statistical significance in relation to the accounting adjustments and *EVA*.

The reason for the lack of statistical significance was due to the selection of the number and type of adjustments. The number and types of adjustments resulted in a lack of commonality. The lack of commonality resulted in the lack of com-

parability. As a result, the overall results could not determine a material effect of accounting adjustments on *EVA* (Anderson et al., 2005).

In order to prevent the difficulties experienced by Anderson et al., the researcher has chosen only one adjustment. Deferred tax has been chosen, as it is an adjustment that occurs every year for each company and is also a common adjustment between companies. This is evident as a review of the sample companies' AFS showed that each company recognized deferred tax. The deferred tax values were reflected on each company's statement of comprehensive income and on the statement of financial position. In addition, deferred taxes were reflected on each company's AFS for each year starting from 2004 to 2010 (sample period). As a result, the deferred tax adjustment facilitates comparability during each sample year for a single company and between each company.

According to Latha (2009), there is much room for studies to be conducted on the importance and significance of accounting adjustments on *EVA* within a different sector and under different GAAP settings. To the best of the researcher's knowledge, no research has been done on the impact of deferred tax adjustments on *EVA* within a South African context. As a result, this paper investigates the impact of the deferred tax adjustment on *EVA* for the Johannesburg Stock Exchange (JSE)-listed food producers.

### 3. RESEARCH METHODOLOGY

The research methodology encompasses the research design used for this study, which is followed by a discussion of the target population, sampling method, data collection, data analysis and formulation of the hypotheses. The section ends with a brief discussion on how validity was achieved.

#### 3.1. Research design

##### 3.1.1. Quantitative research study

A close examination into sample companies unadjusted *EVA* and adjusted *EVA* values was required, to solve the research problem. This study calculated the unadjusted *EVA* and adjusted *EVA* val-

ues from company's annual financial statements (AFS). This showed that the entire data collection and data analysis constitute numerical data, and is therefore a quantitative research study.

##### 3.1.2. Time horizon

This study calculated and analyzed independent variables (deferred tax expenses & deferred tax assets/deferred tax liabilities) and dependent variables (unadjusted *EVA* and adjusted *EVA*) for each year, over a seven-year period starting from 2004 to 2010. For this reason, this study is longitudinal in nature.

##### 3.1.3. Type of investigation

The primary aim of this research was to determine if the deferred tax adjustment causes a major change in the *EVA* measure. A causal study was selected to establish any causal relationships between variables. In other words, the causal study was undertaken to determine if variable X causes variable Y. Hence, the statistical analysis produced correlational statistics to measure the impact of the independent variable on the dependent variable.

##### 3.1.4. Research strategy

An experimental design was chosen to study causal links between variables and to furthermore examine whether a change in one independent variable produces a change in the dependent variable. The experimental design focused on the pre-measurement and post-measurement of the dependent variable. In particular, the pre-measurement of the dependent variable constituted the *EVA* measure without the deferred tax adjustment, whereas the post-measurement of the dependent variable constituted the *EVA* measure with the implementation of the deferred tax adjustment. To elaborate, the experimental design had a control variable and an experimental variable. The control variable (unadjusted *EVA*) was the *EVA* without deferred tax adjustment, which is the dependent variable without any intervention. The experimental variable (adjusted *EVA*) was the *EVA* measure with the implementation of the deferred tax adjustment, which is the dependent variable with planned intervention.

### 3.2. Target population

Drury (2011) states that listed companies who trade shares on the stock market are more likely to adopt *EVA*. Therefore, the target population constituted 50 industrial sectors from the JSE.

### 3.3. Sampling method

This study used a purposive sampling method. The aim of this sampling method was to choose an industrial sector from the JSE that adopted *EVA*. A study by Alzawahreh and Khasawneh (2011) presented an empirical finding which showed that companies in the food producer sector used a defender strategy. Furthermore, Lovata and Costigan (2002) stated that companies, which used a defender strategy, adopted *EVA*. For this reason, the food producers sector was selected for the purposes of this study.

The sample population for this study constituted a total of 14 JSE-listed companies from the food producers sector. However, due to missing information on the McGregors BFA database, the final sample constituted 9 JSE-listed food producing companies.

### 3.4. Data collection

The sample companies AFS together with supporting financial information was downloaded from the McGregor's BFA database. Three types of data sets were downloaded from McGregors BFA database include the statement of comprehensive income, the statement of financial position and the weighted average cost of capital (WACC) calculations. In addition, the last data set included taxation rates that was obtained from the South African Revenue Services (SARS) website. The four data sets constituted the secondary data for this study. The company AFS, WACC calculations and taxation rates are viewed as secondary data, as it was prepared by a third party.

### 3.5. Data analysis

The author used the abovementioned data sets to conduct the data analysis. The data analysis for this study was done on an excel spreadsheet and is referred to as the '*EVA* and deferred tax analysis'. The *EVA* and deferred tax analysis constitute cal-

culations of the unadjusted *EVA*, the deferred tax adjustment and the adjusted *EVA*.

The statement of comprehensive income was used to calculate the unadjusted *NOPAT*, and was used to locate values of deferred tax expenses to calculate the adjusted *NOPAT*. To note, the taxation rates was taken into account in the *NOPAT* calculations. The statement of financial position was used to calculate the unadjusted *TCE*, and was used to locate the values of the deferred tax liabilities to calculate the adjusted *TCE*.

The following formulae, as specified by Bennett Stewart and Joel Stern, were used for the *EVA* and deferred tax analysis:

#### **Deferred tax adjustment as specified by Stern Stewart:**

- Increases in deferred tax expenses – add back to the unadjusted *NOPAT*
- Decreases in deferred tax expenses – subtract from the unadjusted *NOPAT*
- Deferred tax liability – add back to the unadjusted *TCE*
- Deferred tax asset – subtract from the unadjusted *TCE*

#### **EVA formulae as specified by Stern Stewart:**

- Unadjusted *EVA* = Unadjusted *NOPAT* – (Unadjusted *TCE* × *WACC*%)
- Adjusted *EVA* = Adjusted *NOPAT* – (Adjusted *TCE* × *WACC*%)

With reference to the above formulae, the unadjusted *EVA* represents *EVA* without the implementation of the deferred tax adjustment, this means that the values of deferred tax are included in the unadjusted *EVA*.

The above formulae were used to remove the deferred taxes from *EVA*. This required removing the components of deferred taxes (deferred tax expenses and deferred tax liabilities) from the components of *EVA* (*NOPAT* and *TCE*). To elaborate, the deferred tax expenses were removed from the unadjusted *NOPAT* to arrive at the adjusted *NOPAT*. In addition, the deferred tax liabilities were removed from the unadjusted *TCE* to arrive at the adjusted *TCE*.

The implementation of the deferred tax adjustment results in the removal of deferred taxes from the unadjusted *EVA* to arrive to the adjusted *EVA*. The adjusted *EVA* represents a more accurate *EVA*, as the distorting impact of deferred taxes are removed. The *EVA* and deferred tax analysis was computed for all nine food producers (see to Appendix I for the *EVA* and deferred tax analysis of a sample company).

The *EVA* and deferred tax analysis served as an input to compute descriptive statistics and inferential statistics. These statistics are interpreted to either accept/reject the hypothesis and, hence, answer the research problem.

### 3.6. Research hypotheses

The study formulated the following research hypotheses:

- the null hypothesis for this study was:

\*H0 = The deferred tax adjustment has no significant impact on the *EVA* measure;

- the alternate hypothesis for this study was:

\*H1 = The deferred tax adjustment has a significant impact on the *EVA* measure.

The hypotheses were developed to examine if there is a relationship between the independent variable (deferred tax) and the dependent variable (*EVA*). Consequently, a regression analysis was se-

lected for this study. In addition, the regression analysis provided an indicator of the statistical significance of relationships. The statistical significance output from the regression analysis was used to determine the rejection/acceptance of the alternate hypothesis.

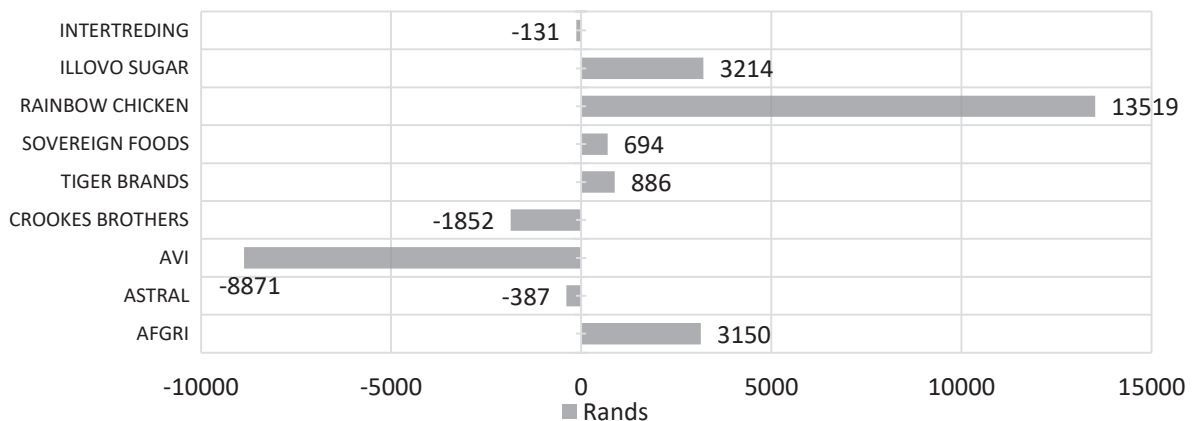
### 3.7. Validity

This study was conducted under laboratory experimental conditions. This means that all nuisance variables had been controlled (Zikmund, Babin, Carr, & Griffin, 2013). The nuisance variables included all other accounting adjustments and non-accounting adjustments. The unadjusted *EVA* and adjusted *EVA* models measured what they intended to measure, as all other variables that would otherwise affect *EVA* were controlled. The use of the *EVA* formulae ensured construct validity. In addition, the data on the spreadsheet (*EVA* and deferred tax analysis) were verified on several occasions with the data downloaded from the McGregors database to ensure face validity.

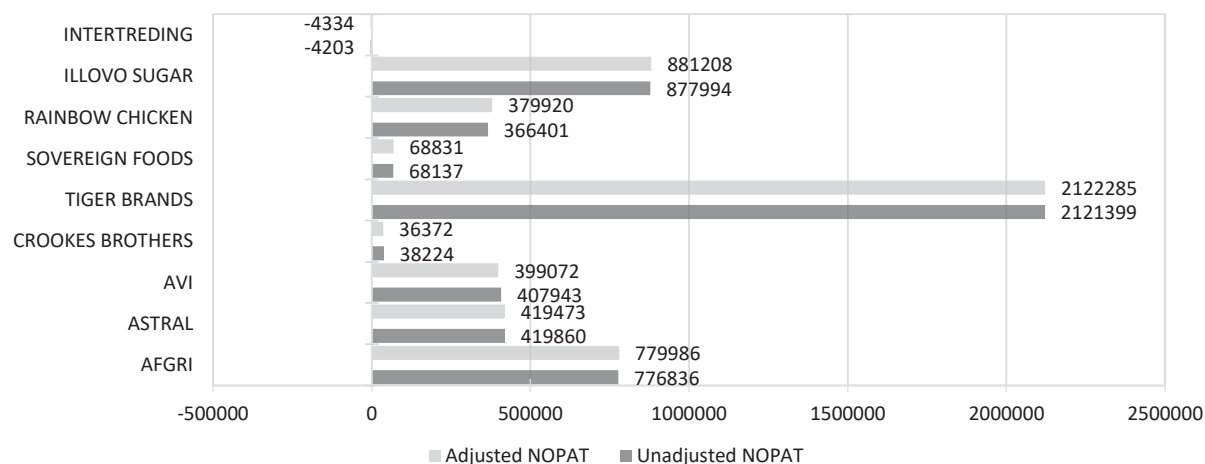
## 4. EMPIRICAL RESULTS

### 4.1. Descriptive statistics

Figure 1 shows the mean value of deferred tax expenses for each company over the sample period (2004–2010). An increase in deferred tax expenses is depicted by a horizontal bar to the right, indicating that the company owes taxes to the receiver of



**Figure 1.** Increases and decreases in deferred tax expenses (Rand values in 000's)



**Figure 2.** The unadjusted NOPAT and the adjusted NOPAT (Rand values in 000's)

revenue. The decrease in deferred tax expenses is depicted by the horizontal bar to the left, indicating that the company is due for a tax refund from the receiver of revenue. Figure 1 shows that five companies experienced an increase in deferred tax expenses, whilst the other four companies experienced a decrease in deferred tax expenses.

Figure 2 shows the unadjusted *NOPAT* (before the deferred tax adjustment) and the adjusted *NOPAT* (after the deferred tax adjustment) for all nine sample companies. The implementation of the deferred tax adjustment to *NOPAT* entails the removal of deferred tax expenses from the unadjusted *NOPAT* to arrive at the adjusted *NOPAT*.

Therefore, the findings from Figure 1 and Figure 2 are interpreted together. For example, Afgri Limited reported an increase in deferred taxes (taxes owing) of R3 150 000. Also, Afgri Limited had a unadjusted *NOPAT* (with deferred taxes) of R776 836 000. When deferred tax expenses are removed, the adjusted *NOPAT* is R779 986 000. The increase in deferred tax expenses (taxes owing) resulted in the unadjusted *NOPAT* being lower than the adjusted *NOPAT*. To elaborate, an increase in deferred tax expenses understated the value of the *NOPAT*. The *NOPAT* value was understated for five food producers.

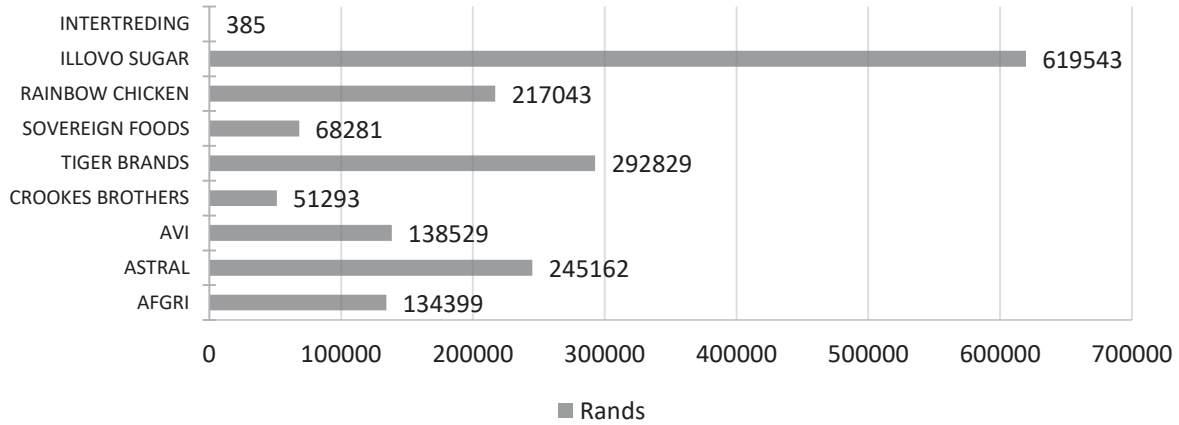
The findings for the current study is compared with the literature findings from previous studies. Phillips, Pincus, and Rego (2002) examined

the usefulness of deferred tax expenses in detecting the management of *NOPAT*. The results of the study suggested that an increase in deferred tax expenses resulted in an understated *NOPAT* value. The previous literature findings concur with the current empirical findings.

In contrast, Figure 1 and Figure 2 also illustrate how a decrease in deferred tax expenses (tax refund) affects *NOPAT*. AVI Limited reported a decrease in deferred tax expenses of R8 871 000. AVI Limited had a unadjusted *NOPAT* of R407 943 000. When deferred tax expenses are removed, the value of the adjusted *NOPAT* is R399 072 000. A comparison of the unadjusted and adjusted *NOPAT* shows that the unadjusted *NOPAT* is higher than the adjusted *NOPAT*. This implies that a decrease in deferred tax expense overstated the value of *NOPAT*. The *NOPAT* value was overstated for four food producers.

The current empirical findings can be compared with the literature findings. The study by Noor et al. (2005) investigated the reason for the widening gap between the unadjusted *NOPAT* and the adjusted *NOPAT*. The study showed that the widening gap was due to the management of *NOPAT* through the use of deferred tax expenses. Furthermore, the previous literature findings revealed that a decrease in deferred tax expenses resulted in an overstated *NOPAT* value. Therefore, the literature findings by Noor et al. are in agreement with the current empirical findings.





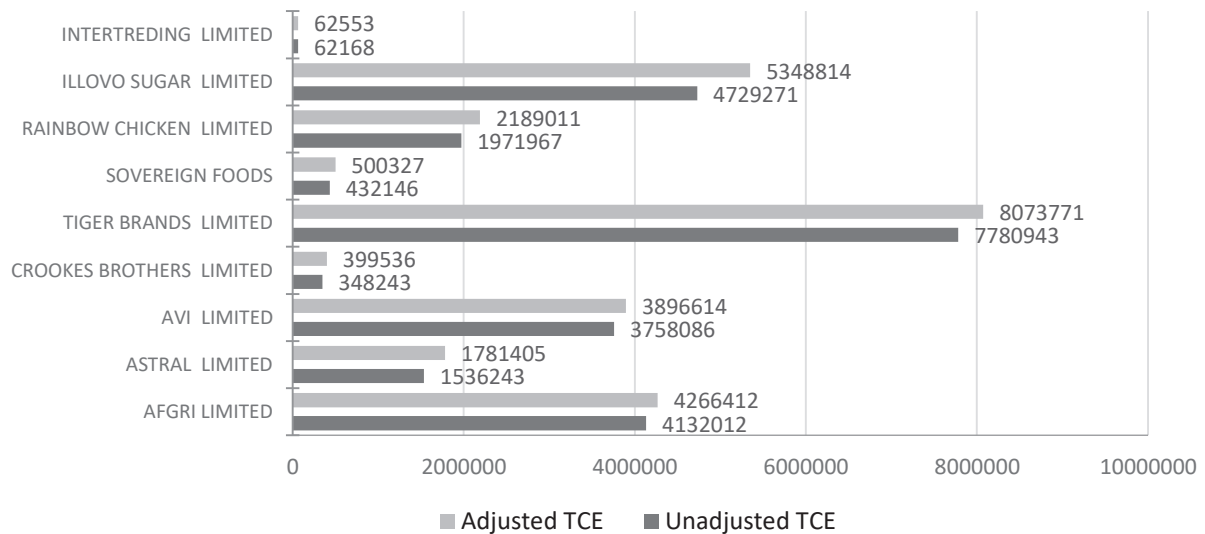
**Figure 3.** Deferred tax liabilities (Rand values in 000’s)

Figure 3 shows the mean value of deferred tax liabilities for each of the nine companies in the food producer sector. With reference to Figure 3, all nine companies in the food producer sector reported deferred tax liabilities. To add, each company reported a deferred tax liability for each of the seven years starting from the period 2004–2010. No deferred tax assets were reported during the sample period.

Figure 4 shows the unadjusted *TCE* (before the deferred tax adjustment) and the adjusted *TCE* (after the deferred tax adjustment) for all nine sample companies. To elaborate, the implementation of the deferred tax adjustment to *TCE* entails the removal of deferred tax liabilities from the unadjusted *TCE* to arrive at the adjusted *TCE*.

The empirical findings for Figure 3 and Figure 4 are interpreted together, because the value of the deferred tax liability impacts the value of *TCE*. For example, Afgri Limited reported an unadjusted *TCE* of R4 132 012 000. The removal of deferred tax liabilities resulted in an adjusted *TCE* of R4 266 412 000. A comparison of the unadjusted *TCE* with the adjusted *TCE* showed that unadjusted *TCE* is lower than the adjusted *TCE*. This result confirms that the value of the deferred tax liability understated *TCE*. The *TCE* value was understated for all nine food producers.

A study by Gee and Mano (2006) showed that managers were using deferred tax assets to manage the value of *TCE*. The results from the study indicated that companies were recognising deferred tax assets to produce an overstated *TCE*. The previous



**Figure 4.** The unadjusted TCE and the adjusted TCE (Rand values in 000’s)

study also mentioned that if companies reported a deferred tax liability, an understated *TCE* would be produced. Therefore, the previous literature findings agree with the current empirical findings.

To conclude, the descriptive statistics analysed the relationships between deferred taxes and *EVA*. This was done by examining the relationships between the components of *EVA* (*NOPAT* and *TCE*) with the components of deferred tax (deferred tax expense and deferred tax liability). These descriptive results showed that deferred tax expenses distort *NOPAT* and that deferred tax liabilities distort *TCE*. Hence, descriptive findings revealed that deferred taxes distort *EVA*.

#### 4.2. Inferential statistics

The inferential results constitute regression statistics, the ANOVA test for overall significance and the coefficient test for individual significance for both the unadjusted *EVA* and adjusted *EVA*.

**Table 1.** Multiple regression model of the unadjusted *EVA*

Model summary				
Model	R	R square	Adjusted R square	Std. error of the estimate
1	1.000 <sup>a</sup>	1.000	1.000	0.385

Note: a. Predictors: (constant), unadjusted cost of capital, unadjusted *NOPAT*, unadjusted *TCE*.

With reference to Table 1, the unadjusted *EVA* regression model yielded a perfect positive correlation of +1. This implies that the independent variables accurately predict the value of the (unadjusted *EVA*) dependent variable.

With reference to Table 2, the ANOVA (f-tests) evaluated the overall significance of the independent variables on the dependent variable. The findings revealed that all independent variables, (unadjusted *NOPAT*, unadjusted *TCE* and the unadjusted cost of capital) had an overall significance (p-value < 0.05) in predicting the value of the unadjusted *EVA*.

Table 3 shows the coefficient test for individual significance. The results revealed that the unadjusted *NOPAT* and the unadjusted cost of capital were the most significant variables in predicting the value of the unadjusted *EVA*. However, the unadjusted *TCE* lacked statistical significance (p-value > 0.05) in predicting the value of the unadjusted *EVA*. The reason for the lack of significance on the unadjusted *TCE* variable is inherent in the formulae used to calculate the value of *EVA*. The *TCE* forms an important component in the *EVA* formula. However, the *TCE* cannot determine the value of the *EVA* in isolation. The lack of completeness in this component led to the lack of significance as the multiplication of *TCE* by the WACC% makes the component of *EVA* complete and meaningful. In addition, the following unadjusted *EVA*

**Table 2.** ANOVA test for overall significance

ANOVA <sup>a</sup>						
Model	Sum of squares	df	Mean square	F	Sig.	
1 Regression	12772919748781.700	3	4257639916260.560	28757108110560.200	0.000 <sup>b</sup>	
Residual	8.735	59	0.148			
Total	12772919748790.400	62				

Notes: a. Dependent variable: unadjusted *EVA* (method 1). b. Predictors: (constant), unadjusted cost of capital, unadjusted *NOPAT*, unadjusted *TCE*.

**Table 3.** Coefficient test for individual significance

Coefficients <sup>a</sup>						
Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	
	B	Std. Error	Beta			
1 (Constant)	-0.084	0.071		-1.179	0.243	
Unadjusted <i>NOPAT</i>	1.000	0.000	1.557	7927466.069	0.000	
Unadjusted <i>TCE</i>	5.160E-08	0.000	0.000	0.608	0.545	
Unadjusted Cost of capital	-1.000	0.000	-0.782	1509010.857	0.000	

Note: a. Dependent variable: unadjusted *EVA* (method 1).

**Table 4.** Multiple regression model of the adjusted EVA

Model summary				
Model	R	R square	Adjusted R square	Std. Error of the estimate
1	1.000 <sup>a</sup>	1.000	1.000	0.382

Note: a. Predictors: (constant), adjusted cost of capital, deferred tax expenses impacting NOPAT, Deferred tax liabilities impacting TCE, unadjusted NOPAT, adjusted TCE.

**Table 5.** ANOVA test for overall significance

ANOVA <sup>a</sup>						
Model		Sum of squares	f	Mean square	F	Sig.
1	Regression	12578959126479.700	5	2515791825295.940	17278537831752.700	0.000 <sup>b</sup>
	Residual	8.300	57	0.146		
	Total	12578959126488.000	62			

Notes: a. Dependent variable: adjusted EVA (method 1). b. Predictors: (constant), adjusted cost of capital, deferred tax expenses impacting NOPAT, deferred tax liabilities impacting TCE, unadjusted NOPAT, adjusted TCE.

regression equation for Food producers was formulated from Table 3.

Unadjusted EVA = -0.084 + unadjusted NOPAT + unadjusted cost of capital.

With reference to the coefficient test for individual significance, the current empirical findings are compared to previous literature findings. Previous empirical evidence by Lynn, Seethamraju, and Seetharaman (2008) showed that the unadjusted NOPAT was statistically significant. The comparison of empirical findings showed that the current empirical findings are in agreement with previous literature findings.

With reference to Table 4, the adjusted EVA regression model yielded a perfect positive correlation

value of +1. This implies that the independent variables predict 100% of the dependent variable (adjusted EVA).

With reference to Table 5, the ANOVA (f-test) showed that all independent variables had an overall significance on the dependent variable. The findings revealed that all five independent variables had an overall significance (p-value < 0.05) on the value of the adjusted EVA.

Table 6 shows the coefficient test for individual significance. The results showed that the unadjusted NOPAT, the deferred taxes that impact NOPAT and the adjusted cost of capital variables significantly impacted (p-value < 0.05) the value of the adjusted EVA. However, the deferred taxes that impacted TCE and the unadjusted TCE were

**Table 6.** Coefficient test for individual significance

Coefficients <sup>a</sup>						
Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.127	0.075		-1.698	0.095
	Unadjusted NOPAT	1.000	0.000	1.569	7986474.723	0.000
	Deferred tax expenses impacting NOPAT	1.000	0.000	0.078	716624.832	0.000
	Deferred tax liabilities impacting TCE	-2.384E-08	0.000	0.000	-0.076	0.940
	Unadjusted TCE	4.410E-08	0.000	0.000	0.519	0.606
	Adjusted Cost of capital	-1.000	0.000	-0.819	1573007.896	0.000

Note: a. Dependent variable: adjusted EVA (method 1).

not individually significant ( $p$ -value  $> 0.05$ ) in predicting the value of the dependent variable. In addition, the following adjusted *EVA* regression equation for food producers was extracted from Table 6.

Adjusted *EVA* =  $-0.127 + \text{unadjusted NOPAT} +$   
 $+ \text{deferred tax expenses impacting NOPAT} +$   
 $+ \text{adjusted cost of capital.}$

With reference to Table 6, the current empirical findings are compared to previous literature findings. A previous study by Noor et al. (2007) found deferred taxes that impacted *NOPAT* was statistically significant. The empirical results from the current study are in agreement with the previous literature findings.

In addition, Gallemore (2012) found deferred taxes that impacted *TCE* were statistically significant. The finding by Gallemore contrasts with the current empirical findings, because the study by Gallemore reported a deferred tax asset, whilst the current study reported deferred tax liabilities.

The above comparison shows a variation of empirical results for individual significance of independent variables. The current study shows five independent variables, of which three are statistically significant, whilst the remaining two independent variables are not statistically significant. Although there is a lack of statistical significance amongst some of the independent variables, the study shows a high overall statistical significance for the

majority of the independent variables. The variation of empirical findings is also due to the nature of the previous studies that only evaluate specific components of *EVA*, whereas the current study investigated the entire *EVA* model. To summarize, the current empirical findings are in partial agreement with the previous literature findings.

## 5. LIMITATIONS

The multiple regression models were specifically designed for companies in the food producers sector. Therefore, the results for the current study are specific to companies in the food producers sector. The impact of the deferred tax adjustment could vary amongst other industrial sectors. Consequently, the results of the study can only be generalized for the companies in the food producers sector.

## 6. SUGGESTIONS FOR FUTURE RESEARCH

Sharma and Kumar (2010) state that companies are experiencing difficulties in implementing *EVA* adjustments. The current research study assists in bridging the knowledge gap by investigating the impact of deferred taxes on *EVA*. However, more research should be done on other types of *EVA* adjustments. Also, future research should focus on external factors that could impact the accuracy of *EVA*.

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## CONCLUSION AND RECOMMENDATIONS

The aim of this study was to determine the impact of the deferred tax adjustment on *EVA* for JSE-listed food producers in South Africa. The descriptive statistics provided two main empirical findings. The first empirical finding that an increase in deferred tax expenses understated *NOPAT*, whilst a decrease in deferred tax expenses overstated *NOPAT*. The second empirical finding revealed that deferred tax liabilities understated *TCE*.

In addition, the regression statistics revealed an overall statistical significance for all deferred tax predictors in relation to *EVA*. The regression results led to the rejection of the null hypothesis. This research study, therefore, proved the stated hypothesis, that deferred tax has a significant impact on *EVA*. As a result, the current study concluded that deferred taxes significantly impacted *EVA*.

The above findings show that deferred taxes distort the value of *EVA*. Furthermore, the regression statistics show that deferred taxes significantly impact *EVA*. The implementation of the deferred tax adjust-

ment will remove the distorting effects of deferred taxes on *EVA*. A further motivation for the implementation of the deferred tax adjustment relates to the aspect of cash flows. The *EVA* measure represents actual cash flows, whilst deferred taxes do not represent actual cash flows, thus providing another reason for the implementation of the deferred tax adjustment (removal of deferred taxes from *EVA*).

The deferred tax adjustment will improve the accuracy of *EVA*. An accurate *EVA* measure will benefit managers and shareholders, who use *EVA* for decision-making purposes. Shareholders will benefit, as they will know with a reasonable degree of accuracy, the amount of wealth the company has created for their investment in shares. In addition, managers that use the *EVA* measure will be able to make better and well-informed decisions, which, in turn, impact shareholder wealth. Therefore, the study recommends that companies implement the deferred tax adjustment.

To date, there is no empirical evidence measuring the impact of deferred taxes on *EVA*. This study is the first to provide empirical evidence on the impact of deferred taxes on *EVA*, which is reflected in the descriptive and inferential statistics of this study. Consequently, this study has established the behavioral pattern of deferred taxes on *EVA*, this behavioral pattern will not change as the deferred tax variable and the *EVA* variable was calculated using *EVA* formulae (formulae were developed by the pioneers of *EVA*, Bennett Stewart and Joel Stern). Therefore, the research results from this study remains relevant regardless of the timing concerning the data collection and data analysis.

In addition, the empirical results from this study will serve as historical data to future researchers and practitioners examining deferred taxes and its impact on *EVA*. Lastly, the data analysis that utilized data from 2004 to 2010 produced regression models that will be useful in predicting future trends for *EVA* and deferred tax.

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## APPENDIX

Table A1. EVA and deferred tax analysis (sample company: AFGRI Limited)

AFGRI LIMITED	Year						
	2010	2009	2008	2007	2006	2005	2004
NOPAT	898 220	1 335 368	1 188 561	738 497	572 244	286 499	418 462
Less: cost of capital	824 465	845 467	595 647	201 634	406 891	185 231	279 157
EVA (unadjusted)	73 755	489 902	592 914	536 863	165 353	101 268	139 305
<b>Calculation of NOPAT (unadjusted)</b>							
Profit after tax and interest	272754	413561	356617	342997	202272	182603	272248
Plus: interest and finance charges	488645	720162	644918	306589	286800	79920	112472
Add: tax benefit on interest expense	136 821	201 645	187 026	88 911	83 172	23 976	33 742
NOPAT	898 220	1 335 368	1 188 561	738 497	572 244	286 499	418 462
<b>Calculation of TCE (unadjusted)</b>							
Total assets	9824950	9174033	7119789	3913650	3732439	2832476	3477077
Less: non-interest bearing current liabilities (NIBCL)	1797057	2015127	1680088	1445672	1749539	1032373	1430471
Trade creditors	1475369	1745754	1188458	764816	1004548	597378	795134
Short-term non-interest bearing	321688	269373	491630	680856	744991	434995	635337
TCE (unadjusted)	8027893	7158906	5439701	2467978	1982900	1800103	2046606
<b>Cost of capital calculation</b>							
TCE (unadjusted)	8027893	7158906	5439701	2467978	1982900	1800103	2046606
x Weighted average cost of capital	0.1027	0.1181	0.1095	0.0817	0.2052	0.1029	0.1364
Cost of capital	824 465	845 467	595 647	201 634	406 891	185 231	279 157
<b>Calculation of tax shield on interest expense</b>							
Interest expense	488645	720162	644918	306589	286800	79920	112472
x tax rate	0.28	0.28	0.29	0.29	0.29	0.30	0.30
Tax benefit on interest expense	136 821	201 645	187 026	88 911	83 172	23 976	33 742
<b>Calculation of increase/decrease of deferred tax for the year</b>							
Deferred tax for previous year	5116	1690	23705	-15155	-19039	8212	555
Subtract: deferred tax for the current year	22606	5116	1690	23705	-15155	-19039	8212
Increase/decrease in deferred tax as per Income Statement	-17490	-3426	22015	-38860	-3884	27251	-7657
<b>Calculation of NOPAT (adjusted)</b>							
NOPAT (unadjusted)	898 220	1 335 368	1 188 561	738 497	572 244	286 499	418 462
add or less increase/decrease in deferred tax for the year	17490	3426	22015	38860	3884	27251	7657
NOPAT (adjusted)	915 710	1 338 794	1 166 546	777 357	576 128	259 248	426 119
<b>Calculation of TCE (adjusted)</b>							
TCE (unadjusted)	8027893	7158906	5439701	2467978	1982900	1800103	2046606
Add deferred tax liability and less deferred tax asset (B/S)	173836	200836	192492	178129	99548	40258	55696
TCE (adjusted)	8201729	7359742	5632193	2646107	2082448	1840361	2102302
<b>Calculation of cost of capital for adjusted EVA measure</b>							
TCE (adjusted)	8201729	7359742	5632193	2646107	2082448	1840361	2102302
x Weighted average cost of capital	0.1027	0.1181	0.1095	0.0817	0.2052	0.1029	0.1364
Cost of capital	842 318	869 186	616 725	216 187	427 318	189 373	286 754
<b>Calculation of adjusted EVA measure</b>							
NOPAT (adjusted)	915 710	1 338 794	1 166 546	777 357	576 128	259 248	426 119
Less: cost of capital	842 318	869 186	616 725	216 187	427 318	189 373	286 754
EVA (adjusted)	73 392	469 609	549 821	561 170	148 810	69 875	139 365

**Table A1 (cont.).** EVA and deferred tax analysis (sample company: AFGRI Limited)

AFGRI LIMITED	Year						
	2010	2009	2008	2007	2006	2005	2004
NOPAT (unadjusted)	898 220	1 335 368	1 188 561	738 497	572 244	286 499	418 462
NOPAT (adjusted)	915 710	1 338 794	1 166 546	777 357	576 128	259 248	426 119
Deferred tax expenses impacting NOPAT	17490	3426	22015	38860	3884	27251	7657
Deferred tax liability impacting TCE	173836	200836	192492	178129	99548	40258	55696
TCE (unadjusted)	8027893	7158906	5439701	2467978	1982900	1800103	2046606
TCE capital (adjusted)	8201729	7359742	5632193	2646107	2082448	1840361	2102302
Cost of capital (unadjusted)	824 465	845 467	595 647	201 634	406 891	185 231	279 157
Cost of capital (adjusted)	842 318	869 186	616 725	216 187	427 318	189 373	286 754
EVA (unadjusted) (method 1)	73 755	489 902	592 914	536 863	165 353	101 268	139 305
EVA (adjusted) (method 1)	73 392	469 609	549 821	561 170	148 810	69 875	139 365
EVA (unadjusted) (method 2)	73 755	489 902	592 914	536 863	165 353	101 268	139 305
EVA (adjusted) (method 2)	73 392	469 609	549 821	561 170	148 810	69 875	139 365
Return on capital	0.1119	0.1865	0.2185	0.2992	0.2886	0.1592	0.2045
Minus the cost of capital	0.1027	0.1181	0.1095	0.0817	0.2052	0.1029	0.1364
Return spread	0.0092	0.0684	0.1090	0.2175	0.0834	0.0563	0.0681
Return spread percentage (EVA unadjusted)	0.92	6.84	10.90	21.75	8.34	5.63	6.81
Return on capital	0.1116	0.1819	0.2071	0.2938	0.2767	0.1409	0.2027
Minus the cost of capital	0.1027	0.1181	0.1095	0.0817	0.2052	0.1029	0.1364
Return spread	0.0089	0.0638	0.0976	0.2121	0.0715	0.0380	0.0663
Return spread percentage (EVA adjusted)	0.89	6.38	9.76	21.21	7.15	3.80	6.63