

Detecting discretionary accruals in South African firms using deferred tax note

Authors: Paula van de Wouw; Elaine Rabin

University of the Witwatersrand

ABSTRACT

The purpose of this study is to assess whether the deferred tax expense (DTE), in South African listed companies, can be used as a proxy for discretionary accruals as reported by Phillips et al. (2003) and to identify which accruals are associated with earning management (EM) to avoid reporting a loss.

The sample of suspected EM firms was obtained by comparing the empirical earnings distribution to a reference curve determined using Kernel Density Estimation (Lahr, 2014). The accruals analysed were obtained from the deferred tax note disclosure required by International Financial Reporting Standards. Both the accruals and total DTE were tested using logistic regression, for association with EM.

Revenue accruals were found to be associated with EM but the DTE component relating to recognised tax losses was found to be significantly associated with non-EM firms and not with suspected EM firms, as expected. Furthermore, total DTE was, at first, found to be useful at identifying EM. However, when removing the recognised tax loss component from total DTE, the residual DTE was no longer associated with EM.

This finding suggests that the reason for the initial association of the total DTE to EM is because of the inclusion of the recognised tax loss component in DTE and not because of EM. As such, the total DTE cannot be used as a proxy for discretionary accruals in South African companies. Furthermore, the lack of association observed between the recognised tax loss DTE component and the suspected EM1 firms has provided insight into a shortcoming of using earnings distributions to detect EM firms. The location of suspected EM firms comprises loss firms that have managed earnings upwards and legitimate profit-making companies.

1. INTRODUCTION

Can the deferred tax expense be used as a proxy for discretionary accruals in South African listed firms? Which types accruals are being manipulated in South African listed companies with the intent of managing earnings upwards to avoid reporting losses?

Resolving these questions is essential for auditors, investors, lenders and any other stakeholders who require practical methods for detecting companies involved in upward EM. This is particularly so, due to a perceived lack of awareness of the methods used by South African companies to perpetrate EM. Watson and Rossouw (2012) reported that from the period 2002 to 2010, merely 38 South African listed companies were required to restate their financial statements as a result of investigations by the South African GAAP Monitoring Panel¹. This observation could indicate that there are very few companies in South Africa that are being identified as having managed earnings upwards. However, despite this observation, global surveys conducted on economic crime have revealed a perceived increase in financial statement fraud in South African firms (Ernst&Young, 2014) as well as greater instances of financial statement fraud in South African companies compared to companies globally (PricewaterhouseCoopers, 2014).

The purpose of this study is two-fold. Firstly, it is to confirm that DTE can be used as a proxy for discretionary accruals within a South African context and secondly, by using the DTE disclosure note, it is to identify the types of accruals that are being used by South African firms to manipulate earnings upwards.

The sample used in this study was obtained by comparing the empirical earnings distribution of all listed South African firms (1 740 firm year observations covering all South African firms listed on the Johannesburg Securities Exchange (JSE) from 2000 to 2010 with the exception of financial institutions and the mining sector) with a theoretical distribution constructed using a kernel density estimate to locate discontinuities in the earnings distribution (Lahr, 2014). The primary advantage of using earnings distributions to obtain a sample of EM firm years is that it is a relatively simple method of detecting EM especially in light of the fact that databases (of firms that have misstated earnings) are not always available. This methodology is based on transaction cost theory which infers that users rely on simple heuristics to make decisions about a firm. A discontinuity in the distribution of earnings levels (net income after tax) deflated by number of shares in issue at the end of the reporting period was observed at zero. In line with Burgstahler and Dichev (1997) and Lahr (2014) the discontinuity in the distribution at zero was interpreted as evidence of upward earnings

¹ Watson and Rossouw (2012) used the McGregor BFA database to search for all companies that were required to restate their financial statements between the periods 1 September 2002 and 30 September 2010. The sample of 38 companies identified do not include multiple restatements required by the same company within the above-mentioned period,

management to avoid reporting a loss. A sample of 225 control firm years (or EM 0 firm years) and 496 “suspected EM” (or EM1 firm years) was identified in the locations immediately to the left (-0.71 to 0) and right (0 to 0.24) of zero respectively.

In line with research performed by Phillips et al. (2003), this study examined whether DTE can be used as a proxy for discretionary accruals in South African firms by testing whether total DTE was incrementally useful to the Modified Jones discretionary accrual model (MJ model) and found that total DTE was equally as useful as the MJ model at detecting EM. Thereafter, the total DTE was disaggregated into different categories of temporary differences. This was done through the analysis of the detailed deferred tax disclosure presented by firms, as required in terms of International Financial Reporting Standards (IFRS). The majority of temporary differences that give rise to DTE arise because of differences between accounting accruals and current tax. Consequently, as a particular accrual is manipulated to increase earnings, so the deferred tax expense (saving) on such accrual should also increase (decrease).

This study identified six DTE components that arise from accounting accruals, these being capital allowances, employee compensation accruals, expense accruals, fair value adjustments, prepayments and revenue accruals. A seventh DTE component identified did not arise from accounting accruals but rather from the recognition of tax losses. In accordance with IAS 12, tax losses should only be recognised when the company expects to generate future taxable income against which such losses could be set off. This gives entities the discretion of when to recognise tax losses. EM companies could potentially use this discretion to recognise the tax losses as a last attempt of managing earnings upwards.

The seven DTE components identified were tested for association with suspected EM firms using logistic regression. The regressions were performed separately for each individual component (scaled by number of ordinary shares in issue). With the exception of the DTE component arising from the recognition of tax losses, a positive and significant coefficient was expected for all DTE components arising from accruals that are associated with upward EM. In other words this study expected an association between increasing DTE, arising from increased EM accruals, and firms suspected of managing earnings.

The recognition of tax losses is not related to accounting accruals, however the timing of the recognition of tax losses could itself be manipulated to manage earnings upwards (Dhaliwal et al., 2004, Frank and Rego, 2006). In other words, a firm could choose to recognise a tax loss (thereby reduce the deferred tax expense) in order to shift profits upwards. Consequently, if this DTE component is used to manage profits upwards, one would expect to see a negative and significant

coefficient when estimating the logistic regression i.e. one would expect an association between the DTE arising from the recognition of tax losses (i.e. lower DTE) and suspected EM firms.

In the analysis of the DTE components, positive and significant coefficients were observed for DTE arising from revenue related accruals and DTE arising from the recognition of tax losses. The association of revenue related accruals to upward EM was validated by a supplementary logistic regression that controlled for growth in companies. This result was as expected as the use of revenue accruals in earnings manipulation has been extensively documented by prior researchers (Dechow et al., 2011, Beneish, 1999, Phillips et al., 2004). The coefficient observed on the DTE component arising from the recognition of tax losses was unexpected and revealed an association between the recognition of tax losses and non-EM firms. Non-EM firms (i.e. the control firms located to the left of zero in the earnings distribution) are also loss-making firms. As such, the DTE component arising from the recognition of tax losses was found to be significantly associated with such loss-making firms and not with suspected EM firms as expected.

The above results prompted the question as to whether the DTE would remain equally useful to abnormal accruals if the DTE component arising from the recognition of tax losses were removed from total DTE. In other words, is total DTE a measure to detect EM firms, or is its positive association to EM firms primarily a consequence of the DTE component arising from the recognition of tax losses?

A second logistic regression to test the usefulness of the residual DTE (total DTE less the recognised tax loss component) to the MJ model was performed. It was expected that the residual DTE remain useful at detecting EM. The resulting coefficient in this instance was however positive but insignificant. This indicates that total DTE is not associated with EM to avoid a loss and cannot be used as a proxy for discretionary accruals for South African companies. One reason for the initially observed association between total DTE and suspected EM firms was due to the inclusion of a significant recognised tax loss component. An alternative, but not mutually exclusive, reason for this result is the manner in which the EM sample of firms was identified in this study. This finding has provided insight into a shortcoming of using earnings distribution curves to detect EM firms. More specifically, it has exposed the fact that the firms located in the EM band are not all loss firms that have managed earnings upwards to avoid reporting a loss but rather a mix of such loss firms and legitimate profit-making firms. The legitimate profit firms in the EM band could potentially distort the results by changing the analysis between non-EM and EM firms into a comparison of distinctive differences between profit and loss firms. Logically, one would expect loss firms (non-EM firms) to incur and recognise more tax losses than profit firms. This shortcoming of earnings

distribution methodologies has not previously been discussed in earnings management literature. Whilst earnings distributions are valuable for identifying the location of suspected EM firms (Donelson et al., (2013), future researchers should be cognisant of this limitation and “drill-down” into the suspected EM firms to identify which of these firms are indeed true upward EM firms.

The remainder of the paper is organised as follows. Section 2 reviews previous research on this topic. Section 3 describes the approach for obtaining a sample and research design. Section 4 presents the analysis of the findings and section 5 concludes.

2. PREVIOUS LITERATURE

Accrual-based EM is often used by management to “obscure” true economic performance or “smooth” away volatility in financial statements. As the accrual basis of accounting is an underlying assumption in the preparation of financial statements (as per the conceptual framework for financial reporting issued by the International Accounting Standards Board), not all accruals are illegitimate. However, measurement and recognition principles in the accounting standards are sometimes subjective, encouraging discretion and judgement on the part of the preparers of financial statements. Consequently, these standards may offer management the means to modify the true earnings of a firm through the use of discretionary accruals (Healy, 1985). Discretionary accruals are those accruals that arise from the manipulation of earnings. As discretionary accruals cannot be directly observed and its direct measurement is impossible, researchers have proposed several models to estimate discretionary accruals.

Healy (1985) and DeAngelo (1986) proposed looking at total accruals as broad estimators of discretionary accruals. Jones (1991) and Dechow et al. (1995) attempted to split total accruals into two elements, *viz.* discretionary and non-discretionary accruals. Dechow et al. (1995) enhanced Jones’ (1991) model by developing the MJ model which has been prominently used as a reference model for discretionary accruals in literature (Bayley and Taylor, 2007).

As the various abnormal accrual models estimate discretionary accruals with error and lack power to detect earnings management of plausible magnitudes (Dechow et al., 1995, Guay et al., 1996, Young, 1999, Bayley and Taylor, 2007), Phillips et al. (2003) proposed that the DTE be used as a proxy for discretionary accruals. The principle advantage of using DTE as opposed to discretionary accrual models is that DTE is an observed figure as opposed to a calculated one. Theoretically, it should therefore be subject to less measurement error.

The use of DTE as a proxy for discretionary accruals is based on the premise that managers prefer to overstate earnings without having a consequential effect on taxable income (Ettredge et al., 2008, Badertscher et al., 2006, Phillips et al., 2003). The difference between the accounting earnings figure and taxable income (representing the “book-tax difference” or “temporary difference” as described in terms of IAS 12: *Income taxes*) should therefore contain many, if not most of the tax consequences of the discretionary accruals. Book-tax differences have been extensively shown to be indicators of earnings management (Mills and Newberry, 2001, McAnally et al., 2008). As DTE is the deferred tax effect on such book-tax differences, it is likely also to include the deferred tax effect of discretionary accruals.

Using the earnings distribution methodology of Burgstahler and Dichev (1997) to obtain a sample of suspected EM firms, Phillips et al. (2003) found that DTE was incrementally useful at detecting such EM firms beyond several abnormal accrual measures; forward-looking Jones model as described by Dechow and Dichev (2002), MJ model as described by Dechow et al. (1995) and total accruals. Rabin and Negash (2012) however, found that for South African companies listed on the Johannesburg Stock exchange, the discretionary accruals calculated using the MJ model were incrementally useful beyond DTE at detecting earnings management to avoid an earnings decline and to avoid a loss.

The usefulness of DTE in detecting aggressive EM was confirmed by Ettredge et al. (2008) who reported an association between DTE and earnings overstatement fraud in a sample of fraudulent companies with positive pre-tax income. Furthermore, Ettredge et al. (2008) observed higher DTE for fraud firms in the year prior to the fraud onset, which they interpreted as being indicative of earnings management behaviour preceding fraud.

A limitation of using DTE as an indicator of EM, as shown in the research of Phillips et al. (2003) and Ettredge et al. (2008) arises from the assumption that managers avoid the cost of paying tax when manipulating earnings. Although DTE is likely to represent the tax effect of a substantial portion of the discretionary accruals, some researchers have found that management may actually be willing to pay tax in order to conceal the manipulation of earnings (Badertscher et al., 2006, Erickson et al., 2004). In such cases, the use of DTE as a surrogate for discretionary accruals would be incomplete.

Earnings management which also affects taxable income has been referred to as conforming EM (Badertscher et al., 2006). Conforming EM is likely to be more prevalent in “loss-making companies” that manage earnings upwards in order to avoid reporting losses. Because such firms potentially also have tax losses which they can use to set off against any discretionary profits, they

have the ability to manipulate accounting earnings without any consequent effect on tax or deferred tax (Ettredge et al., 2008).

In short, deferred tax might not reveal the full extent of discretionary accruals (this would reduce the power of deferred tax to identify EM firms – type II error). An additional limitation of using DTE as a proxy for discretionary accruals is that not all accruals for which deferred tax is provided are discretionary (this would increase type I error of misspecification).

Analysis of DTE components

Principally, the DTE represents the movement (or part of the movement) between the opening and closing deferred tax balances. As IAS 12: *Income taxes* para 81g (i) requires companies to disclose the deferred tax asset or liability by nature of temporary difference, it is “theoretically” also possible to determine which of the accruals are potentially discretionary.

Phillips et al. (2004) increased the depth of their analysis of DTE by identifying the underlying accruals on which deferred tax is based² and testing these for association with EM. More specifically, Phillips et al. (2004) investigated which of the accruals are used to manage earnings upwards in order to avoid an earnings decline. They found that “revenue and expense accruals and reserves” could be used to detect EM to avoid a decrease in earnings. Furthermore, they observed that “other valuation accruals” were associated with EM to avoid an earnings decline when using a sample of firms with negative deferred tax liability changes.

Although most temporary differences would be affected by the level of discretionary accruals, there is a second type of temporary difference that is not driven by accounting accruals, but by the recognition of tax losses. Whilst upward EM, through discretionary accruals, would most often result in a consequential increase in DTE, it would be interesting to investigate whether companies would choose the discretion allowed to them for the recognition of tax losses, as a last attempt to manage earnings upwards by decreasing the level of DTE being recognised. The only way in which this could be done would be to manipulate the timing and/or the level of recognition of tax losses

² Phillips et al., (2004) used the footnote disclosures of deferred tax required in terms of the Statement of financial Accounting Standards No. 109 to decompose the total change in a firm’s net deferred tax liability into components relating to: (1) revenue and expense accruals and reserves, (2) compensation, (3) depreciation of tangible assets,(4) other asset valuation accruals (e.g., expenses related to intangible assets, inventory, and leases), (5) miscellaneous items, (6) tax carry-forwards, (7) unrealized gains and losses from securities, and (8) the deferred tax asset valuation allowance account. Thereafter they examined whether each of the DTL components were useful to detect EM to avoid an earnings decline. They used a simultaneous “3SLS” system of equations in their methodology.

thereby reporting deferred tax assets relating to such losses, when in fact the deferred tax asset is not recoverable. Phillips et al. (2004) reported that the “deferred tax valuation allowance account” (VAA) was associated with EM to avoid an earnings decline when using a sample of firms with positive deferred tax liability changes. This indicates that managers could use the discretion allowed in recognising the tax expense (in particular, through the VAA) as a mechanism to manipulate earnings. Cook et al. (2008) confirmed that the tax expense represents an opportunity for firms to manage earnings. Dhaliwal et al. (2004) observed that managers decrease their annual estimated tax rate from the third quarter to the fourth quarter to avoid missing the consensus forecast. In other words, firms decrease their tax expense as a last attempt to manage earnings, where other non-tax sources of EM are insufficient.

This research investigates whether the total DTE can be used as a proxy for discretionary accruals for South African listed companies. Thereafter it investigates which accruals (DTE components identified through the DTE note) are used to manage earnings upwards by testing the association of such accruals with a sample of EM firms. As part of this process, this study also investigates whether the DTE component arising from recognised tax losses is used to manage earnings upwards.

3. RESEARCH DESIGN

Hypothesis development

The research questions firstly seek to establish the usefulness of the total DTE to the MJ discretionary accrual measure at detecting EM and thereafter to identify the accounts (or discretionary accruals) that are being used by management to manipulate earnings upwards in an attempt to avoid reporting a loss.

Unlike prior research that estimates discretionary accruals solely through the use of abnormal accrual models (Dechow et al., 1995, Jones, 1991) this study identifies potential earnings management activity by analysing the components of the deferred tax note which contains information about the types of accruals recognised by a firm.

Incremental usefulness of total DTE to abnormal accrual measure

Phillips et al. (2003) found that DTE was incrementally useful beyond abnormal accrual methods at detecting EM to avoid a loss. Rabin and Negash (2012) also tested the incremental usefulness of DTE to several discretionary accrual measures for a sample of South African firms. They

however found that the abnormal accrual measures were incrementally useful to DTE at detecting EM to avoid a loss.

To place this study in the context of prior research, the following hypothesis was tested:

H1: The total deferred tax expense is incrementally useful to discretionary accruals, computed using the Modified Jones model, in detecting upward earnings management to avoid reporting a loss.

Accruals identified through the deferred tax note

In terms of IAS 12: *Income taxes*, the objective of providing for deferred tax is to account for the “future tax consequences of the future recovery (settlement) of the carrying amount of assets (liabilities) that are recognised in an entity’s statement of financial position”. Consequently, if the carrying amount of an asset or liability is altered due to earnings management, this should have an effect on the future tax consequences (deferred tax) of the asset/liability.

In this research the DTE was disaggregated into seven broad categories of temporary differences (accruals) to which the following hypothesis pertains.

H2: Each separately identified component of the deferred tax expense (as observed through the changes in each type of temporary difference of the net deferred tax liability (asset)), including capital allowances, employee compensation, expense accruals, fair value adjustments, prepayments, revenue accruals and recognised tax losses is, in its own right, significantly associated with suspected upward EM to avoid reporting a loss.

Sample

Detection of suspected EM firms through earnings distribution

Suspected EM firms were identified through the comparison of an empirical distribution of net income after tax scaled by number of ordinary shares in issue (at year end) and a reference distribution constructed using KDE from the empirical distribution as proposed by Lahr (2014). All firms listed³ on the Johannesburg Securities Exchange (JSE) for the years 2000-2010, with the exception regulated industries, such as financial institutions (“financials”) and the mining sector (“basic materials”), were included in the earnings distribution. These industries were excluded

³ Firms that delisted during the period 2000 to 2010 were not included in the sample.

because they are either highly regulated or have very specialised reporting requirements in terms of IFRS which reduces their comparability across sectors.) The number of firm year observations totalled 1 740 and number of individual companies totalled 212 (refer to table 1).

The earnings figure chosen as the numerator for the underlying empirical distribution was “net income after tax” (NIAT) as it includes tax consequences that could potentially also be manipulated (Dhaliwal et al., 2004, Cook et al., 2008, Ettredge et al., 2008). As the “recognised tax losses” were one of the DTE components analysed in this research, it was essential to test earnings after tax.

In response to the concerns of Durtschi and Easton (2005) and others (Degeorge et al., 1999, Dechow et al., 2003) who suggested that if a deflator is different between a profit and loss firm, the deflator itself will affect the underlying earnings distribution, particularly at zero, this study chose to scale NIAT by the number of ordinary shares in issue at year end for the earnings distribution, as an unbiased scaler.⁴

The reference distribution was developed using an Epanechnikov KDE of the empirical cumulative distribution function (ECDF), as proposed by Lahr (2014) (refer to Figure 1).

[Insert Figure 1]

A statistically significant discontinuity, from which the sample of firm years used in this study was extracted, was observed in the three bandwidths to the left of zero and one bandwidth to the right of zero. The three intervals immediately to the left of zero (ranging from -0.71 to 0) revealed the actual number of observations (225 observations) as being significantly less than the expected number of observations (476 expected observations). The interval immediately to the right of zero (0 to 0.24) revealed actual number of observations (496 observations) as being significantly more than the expected number of observations (248 expected observations). This discontinuity in the curve around zero can be interpreted as evidence of earnings management to avoid a loss (Degeorge et al., 1999, Lahr, 2014, Rabin and Negash, 2012, Donelson et al., 2013, Burgstahler and Dichev, 1997).

⁴ A comparison between the means and the medians of two potential deflators *viz.* total assets and number of ordinary shares outstanding was made across profit and loss companies. The comparison indicates that the means and medians of the number of ordinary shares in issue are not significantly different across profit and loss companies whereas those relating to total assets are. These results have not been tabled.

The companies located within the three intervals to the left of zero (-0.71 to 0) are referred to as non-EM / EM0 firm years and represent the “control group of no earnings management” used in this study. The interval immediately to the right of zero (0 to 0.24) is the location of suspected EM firm years (EM1 firm years) tested in this study.

Data collection

Financial statements for all firm years identified within the EM0 and EM1 locations were obtained from INET BFA database. The information required for testing was manually obtained from the deferred tax note in the financial statement of each firm year identified in the sample. The deferred tax note is a summary of the deferred tax asset or liability recognised for each type of temporary difference (component) at year end (IAS 12 para 81g. (i)).

The data collected off the deferred tax note was analysed, aggregated and classified to a particular category (component/variable) of accruals being tested. For comparability purposes, the categories analysed were broadly based on the categories identified by Phillips et al. (2004).

This research identified the components of the DTE as the movement between the closing balance and the opening balance of the deferred tax asset/liability per type of temporary difference. Movements in deferred tax balances recognised through “other comprehensive income” or equity, or relating to mergers, acquisitions or divestitures could, however, create “noise” when attempting to identify the deferred tax movement that was recognised through profit or loss. Consequently, firm years, in which there were significant unknown and irreconcilable differences between the sum of the deferred tax component movements and the total DTE were excluded from the analysis of DTE components altogether (238 firm year exclusions –refer to table 1).

[Insert Table 1]

A limitation in the categorisation of deferred tax components relates to the manner in which each individual company classifies the types of temporary differences. As there is no specific guidance in IAS 12: *Income taxes* as to which “type” of temporary differences must be disclosed, classification of temporary differences is foremost at the discretion of the preparer.

Notwithstanding the difficulties mentioned above in identifying the DTE components, seven categories of components were identified. These represent the majority of temporary differences classified in firms, as follows:

1. Capital Allowances (includes depreciation, amortisation and impairments of property, plant and equipment and intangible assets)
2. Employee Compensation (including share based payments, leave pay provisions and post-retirement benefits)
3. Expense Accruals (includes provisions)
4. Fair value adjustments (in particular of financial instruments and investment property)
5. Prepayments (prepaid expenses)
6. Revenue accruals (revenue accruals and reserves, including allowance for credit losses and deferred revenue)
7. Recognised tax losses

Research instrument

Descriptive tests

All independent variables were winsorised at 1% and 99% to limit the undue effects of outlier observations. The means and medians of each independent variable scaled by number of ordinary shares in issue were compared across EM1 and EM0 firm years to establish whether they were significantly different. The means of the independent variables of the EM1 group and of the EM0 group were compared using a general linear model. The general linear model was chosen to facilitate the clustering of the information by firm. The medians of the independent variables of the EM1 group and of the EM0 group were compared using a clustered form of the Wilcoxon rank sum test.

Empirical tests

- Incremental usefulness of DTE to abnormal accrual measure

The incremental usefulness of the total DTE to discretionary accruals (as calculated through the MJ model) in detecting EM to avoid a loss was assessed using logistic regression (refer to equation 1 below).

Each independent variable, with the exception of discretionary accruals, was scaled by number of ordinary shares in issue at the end of the reporting period. The MJ discretionary accruals were calculated in accordance with the model proposed by Dechow et al. (1995) and were consequently scaled by total assets at the beginning of the period.

EQUATION 1: $\text{Logit}(p) = \beta_0 + \beta_1 \text{DTE}_{it} + \beta_2 \text{CFO}_{it} + \beta_3 \text{DAMJ}_{it} + \beta_4 \text{industry} + \mu_{it}$

Where:

logit (p)	is the odds ratio; i.e. $\text{logit}(p) = p / (1-p)$
P	is the probability of $\text{EM}_{it}=1$ given an independent variable (IV) i.e. $p = P(\text{EM}_{it}=1 \mid \text{IV})$
$\text{EM}_{it} = 1$	Where firm i has been identified as an EM firm year using KDE distribution. $\text{EM}_{it}=0$ has been chosen as the reference and the equation is modelling EM1 firm years.
DTE_t	this represents the total deferred tax expense
CFO_{it}	this represents firm i's total cash flow from operations.
DAMJ_{it}	Discretionary accruals computed using the MJ model (Dechow et al., 1995) as total accruals ($Tacc$) less non-discretionary accruals. Non-discretionary accruals are estimated as $Tacc_{it} = \alpha + \beta_1 (\Delta REV_{it} - \Delta REC_{it}) + \beta_2 PPE_{it} + \xi_{it}$ where ΔREV_{it} is change in firm i's sales from period t-1 to t; ΔREC_{it} is changes in firm i's receivables from year t-1 to t, PPE_{it} is gross property, plant and equipment for firm i in period t. All variables are scaled by lagged total assets.
Industry	this categorical variable controls for the industry for a particular observation. The industries controlled for are: Consumer Goods; Consumer Services; Health Care; Industrials; Oil & Gas; Technology; Telecommunications and Utilities

- *Association of DTE variables with EM*

The association of each DTE component with EM to avoid reporting a loss was tested using a logistic regression as depicted by equation 2 below. Following the work of Phillips et al. (2003), the regressions are estimated using the level of cash flow from operations (CFO) as a control variable for performance. More specifically, CFO controls for the fact that high performance companies should theoretically also have higher levels of cash flows. Furthermore, companies with high levels of cash flows should have a reduced incentive to manage earnings and *vice versa* (Lee et al., 1999).

Phillips et al. (2004) estimated a system of equations using a full information method (i.e. 3SLS) to identify the components of DTE that were useful in detecting EM to avoid an earnings decline. Their methodology could not be used in this study because of the constraints of sample size, arising from the fact that companies do not necessarily disclose every type of DTE component identified.

Consequently, each component identified was tested for association with EM individually and not through a multilinear function, as follows:

EQUATION 2: $\text{Logit}(p) = \beta_0 + \beta_1 \text{DTE component}_{it} + \beta_2 \text{CFO}_{it} + \beta_3 \text{industry} + \mu_{it}$

Where: all variables are as described for equation 1 with the exception of the DTE component which refers to one of the seven individual explanatory variables (DTE components) that are being tested for association with EM, as follows: capital allowances, employee compensation, expense accruals, fair value adjustments, prepayments, revenue accruals and recognised tax losses. Each independent variable was scaled by number of ordinary shares in issue at the end of the reporting period.

4. FINDINGS AND DISCUSSION

Phillips et al. (2003) proposed that DTE be used as a proxy for discretionary accruals based on the finding that DTE was incrementally *useful* to various discretionary accrual measures at detecting EM to avoid a loss. In this study, however, the first hypothesis has been rejected as total DTE is not incrementally useful, but rather equally as useful as the MJ abnormal accruals at detecting EM to avoid a loss. Both independent variables have positive and significant coefficients in the estimation of the logistic regression ($p < 0.0001$ per table 4).

Accordingly, the descriptive statistics reveal that the total DTE is significantly lower in EMO firms than in EM1 firms (from tables 2 and 3: means of -0.015:0 for EMO:EM1 with $p < 0.0001$ and medians with $p < 0.0001$).

Association of DTE components with EM

Descriptive statistics of the DTE components as well as clustered mean and median tests are presented in tables 2 and 3. The results of the logistic regressions performed on the DTE components are presented in table 5.

The only two DTE components identified as having significant and positive coefficients in the logistic regressions performed relate to “revenue accruals” and “recognised tax losses”.

Revenue accruals

An increase in revenue accruals due to upward EM would lead to an increase in the DTE. Although the means and medians of the DTE component relating to revenue accruals are not significantly different between EM0 and EM1 firm years (table 3), it is interesting to note that in the means, medians, 25th and 75th percentile of the observations (per table 2), the magnitude of this DTE component in the EM0 companies is lower (or the same) as this component in the EM1 firms. In other words, EM1 companies have a higher DTE relating to revenue accruals than EM0 companies. This is confirmed by the results of the logistic regression where the coefficient for this variable is positive and significant ($\beta=53.19$ and $p= 0.006$ per table 5). This outcome suggests that as this DTE component increase, so the likelihood of the firm being an EM1 firm also increases.

This finding concurs with prior research where revenue and sales accruals were found to be linked to EM (Dechow et al., 2011, Nelson et al., 2002, Beneish, 1999, Phillips et al., 2004).

Phillips et al. (2003) suggested that the comparison of high growth companies to companies with lower growth rates could distort the significance of the results when comparing EM0 and EM1. In other words, an increase in DTE could be merely a consequence of year-on-year growth in a company's assets and not the result of EM. In response to this, the association of the revenue-related accrual to EM was re-tested using logistic regression in the presence of a control variable for growth. The regression was performed using one of two growth variables; average growth in revenue or average growth in total assets⁵. The introduction of the additional variables however has not altered the direction or significance of the coefficient.

Recognised tax Losses

The descriptive statistics reveal that both the means and the medians of the DTE relating to recognised tax losses are significantly larger (and not smaller, as expected) in EM1 firms than in EM0 firms (means of -0.029:-0.004 for EM0:EM1 firm years with $p =0.0013$ and medians of -0.007:0 for EM0:EM1 firm years with $p=0.0004$). Further, the results of the logistic regression (table 5) indicate that the coefficient is positive and significant ($\beta=23.19$ and $p<0.0001$). This suggests that as DTE

⁵ The control variables were averaged over a prior period of two years.

Average growth in revenue = $\frac{((\text{turnover}_t - \text{turnover}_{t-1}) / \text{turnover}_{t-1}) + ((\text{turnover}_{t-1} - \text{turnover}_{t-2}) / \text{turnover}_{t-2})}{2}$

Average growth in total assets = $\frac{((\text{total assets}_t - \text{total assets}_{t-1}) / \text{total assets}_{t-1}) + ((\text{total assets}_{t-1} - \text{total assets}_{t-2}) / \text{total assets}_{t-2})}{2}$

increases (i.e. an increase in a tax expense or a reduction in tax gains), so the likelihood of the firm falling into the EM1 bandwidth also increases.

Firms suspected of upward EM (i.e. loss firms in the suspected EM band) that use the discretion available to them, through the premature recognition of tax losses should reflect a decrease, not an increase in DTE compared to non-EM firms. The results are therefore not indicative of earnings management.

A characteristic of non-EM firms is that they are all loss-making firms as they are found in the intervals to the left of zero. The suspected EM band, to the right of zero is comprised of loss firms that have manipulated earnings upwards as well as legitimate profit-making firms. These results could therefore be mimicking a distinctive financial characteristic of loss vs profit firms *viz.* that loss firms, by nature, generate (and recognise) more tax losses than profit firms. The significant and positive coefficient on the logistic regression suggests that as the DTE component increases (i.e. as the recognition of tax losses decreases), so the firm is more likely to be a ***profit-making firm***.

This finding has provided new insight into a shortcoming of using earnings distributions to identify EM firms. The location of suspected EM1 firms, immediately to the right of zero, is also home to a large component of legitimate profit firms. The noise observed within the suspected EM sample could therefore affect the results of any analysis of EM1 firms. Although the use of distribution curves promises to be a simple and valuable tool (Donelson et al., 2013) for detecting EM firms, additional research is required to unravel and separate the EM1 firms (loss making firms that manipulated earnings) from the legitimate profit firms within the EM1 interval.

Consequent to this outcome, supplementary tests were performed to examine whether the DTE component relating to recognised tax losses affected the usefulness of total DTE to detect EM.

[insert Table 2]

[insert Table 3]

[insert Table 4]

[insert Table 5]

Supplementary tests

In order to test whether the DTE remains useful in detecting EM after deducting deferred tax relating to recognised tax losses, the following logistic regression was estimated:

$$\text{EQUATION 3: } \text{Logit}(p) = \beta_0 + \beta_1 \text{ResDTE}_{it} + \beta_2 \text{CFO}_{it} + \beta_3 \text{DAMJ}_{it} + \beta_4 \text{industry} + \mu_{it}$$

Where: all variables are the same as those described for equation 2, with the exception of ResDTE. ResDTE is the “residual DTE” after deducting the deferred tax on recognised tax losses from the total DTE, scaled by number of shares in issue at the end of the reporting period.

The primary results in this study suggest that the DTE component relating to recognised tax losses is not associated with EM but is instead a distinctive characteristic of loss vs profit firms. Loss firms have lower DTE because of the recognition of tax losses when compared to profit-making firms. Consequent to this finding, the question was raised as to whether the deferred tax arising on the recognised tax loss component could affect the apparent association of the total DTE with EM to avoid a loss.

When removing the recognised tax loss component from total DTE, the means and the medians of the residual DTE are no longer significantly different between EM0 and EM1 firm years ($p=0.92$ for means and $p=0.67$ for medians per tables 2 and 3). In addition, when performing the logistic regression per equation 3, the estimated coefficient on the abnormal accruals remains positive and highly significant, but the coefficient on the residual DTE is positive and **insignificant** ($\beta=0.968$; $p=0.822$ per table 4) indicating that the residual DTE is not useful at detecting EM to avoid a loss.

The primary results in this study indicate that total DTE and the MJ discretionary accrual measure are equally useful at detecting EM to avoid a loss in South African companies ($p<0.0001$ for discretionary accruals and $p<0.0001$ for total DTE per table 4). The findings in the supplementary tests however, show that the principle reason for the primary results is due to the distinctive financial characteristic of recognised tax losses in loss vs profit companies, and not because of EM. Consequently this research provides evidence that DTE, as a whole, is not useful at detecting EM to avoid a loss and therefore cannot be used as a proxy for discretionary accruals in South African firms.

5. CONCLUSION

The purpose of this study was firstly to establish whether the total DTE could be used as a surrogate for discretionary accruals in the South African context. Secondly, this study identified the types of accruals used by South African listed companies to manage earnings upwards to avoid reporting a loss.

On initial examination, this research found that the total DTE was equally useful to the MJ discretionary accrual measure at detecting EM to avoid a loss, initially showing that DTE could be used as a proxy for discretionary accruals in the South African environment.

Thereafter, in the analysis of the DTE components, the DTE variable relating to recognised tax losses is not associated with EM, but is instead significantly greater in EMO firms (i.e. causing a significant decrease in the DTE in these companies) than in EM1 firms. This finding would be anticipated if comparing loss firms to profit firms as the recognition of tax losses would be expected to be distinctly greater in loss firms than profit firms. Consequent to this finding, the study finds that after deducting this DTE component from the total DTE, the residual DTE (total DTE less recognised tax losses) is not useful, in the presence of the MJ discretionary accrual measure, at detecting EM to avoid a loss.

This result makes two contributions to accrual-based EM research. Firstly, it shows that total DTE cannot be used as a surrogate for EM in South African listed companies. This is based on the fact that it is the underlying DTE component relating to recognised tax losses that is driving the apparent “usefulness” of total DTE to detect EM to avoid a loss. Secondly, it unveils a shortcoming of using empirical distributions for the identification of EM firms in that the EM1 interval identified as being the location of suspected EM firms (loss firms that managed earnings upwards) is also the location of other legitimate profit-making firms. If not controlled for, the distinctive financial characteristics of these profit-making firms compared to the loss firms (non-EM firms) could obstruct attempts to identify financial characteristics of EMO vs suspected EM firms.

An interesting avenue for future research would be to consider the effect of the recognised tax loss component of DTE on the usefulness of DTE to detect EM in international financial markets. Furthermore, it would be interesting and very useful, for future researchers to develop a means of specifically identifying the “true” EM firms (loss making firms that have managed earnings upwards to avoid the loss) located within the EM1 interval of an empirical distribution. If this problem were resolved, then empirical distributions would become very valuable in the identification of EM firms, particularly in emerging markets where other sources of EM information (e.g. databases of restated company earnings) are limited.

Further examination of the DTE components revealed that revenue-related accruals are associated with EM to avoid a loss in line with the outcome of prior research.

This analysis should provide analysts, auditors, investors, and other financial statement users with better insight into the usefulness of the deferred tax note for detecting areas of earnings management and with a better understanding of the accounts that are being used by South African listed companies to manage earnings upwards to avoid reporting losses.

REFERENCES

- BADERTSCHER, B., PHILLIPS, J. D., PINCUS, M. & REGO, S. O. 2006. Tax implications of earnings management activities: Evidence from restatements. *Available at SSRN 888564*.
- BAYLEY, L. & TAYLOR, S. 2007. Identifying earnings overstatements. A practical test. *Available at SSRN 995957*.
- BENEISH, M. D. 1999. The Detection of Earnings Manipulation. *Financial Analysts Journal*, 55, 24-36.
- BURGSTHALER, D. & DICHEV, I. 1997. Earnings Management to Avoid Earnings Decreases and Losses. *Journal of Accounting and Economics*, 24, 99-126.
- COOK, K. A., HUSTON, G. R. & OMER, T. C. 2008. Earnings Management through Effective Tax Rates: The Effects of Tax-Planning Investment and the Sarbanes-Oxley Act of 2002. *Contemporary Accounting Research*, 25, 447-471.
- DEANGELO, L. E. 1986. Accounting numbers as market valuation substitutes: a study of management buyouts of public stockholders. *The Accounting Review*, LXI, 400-420.
- DECHOW, P. M. & DICHEV, I. D. 2002. The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors. *The Accounting Review*, 77, 35-59.
- DECHOW, P. M., GE, W., LARSON, C. R. & SLOAN, R. 2011. Predicting material accounting misstatements. *Contemporary Accounting Research*, 28, 17-82.
- DECHOW, P. M., RICHARDSON, S. A. & TUNA, I. 2003. Why are Earnings Kinky? An Examination of the Earnings Management Explanation. *Review of Accounting Studies* 8 355-384.
- DECHOW, P. M., SLOAN, R. G. & SWEENEY, A. P. 1995. Detecting Earnings Management. *The Accounting Review*, 70, 193-225.
- DEGEORGE, F., PATEL, J. & ZECKHAUSER, R. 1999. Earnings management to exceed thresholds. *The Journal of Business* 72, 1-33.
- DHALIWAL, D. S., GLEASON, C. A. & MILLS, L. F. 2004. Last-Chance Earnings Management: Using the Tax Expense to Meet Analysts' Forecasts. *Contemporary Accounting Research*, 21, 431-459.
- DONELSON, D. C., MCINNIS, J. M. & MERGENTHALER, R. D. 2013. Discontinuities and Earnings Management: Evidence from Restatements Related to Securities Litigation. *Contemporary Accounting Research*, 30, 242-268.
- DURTSCHI, C. & EASTON, P. 2005. Earnings Management? The Shapes of Frequency Distributions of Earnings Metrics Are Not Evidence Ipso Facto. *Journal of Accounting Research* 43, 557-592.
- ERICKSON, M., HANLON, M. & MAYDEW, E. L. 2004. How Much Will Firms Pay for Earnings That Do Not Exist? Evidence of Taxes Paid on Allegedly Fraudulent Earnings. *The Accounting Review*, 79, 387-408.
- ERNST&YOUNG. 2014. *13th Global Fraud Survey* [Online]. Available: [http://www.ey.com/Publication/vwLUAssets/EY-13th-Global-Fraud-Survey/\\$FILE/EY-13th-Global-Fraud-Survey.pdf](http://www.ey.com/Publication/vwLUAssets/EY-13th-Global-Fraud-Survey/$FILE/EY-13th-Global-Fraud-Survey.pdf) [Accessed 30 October 2015].

- ETTREDGE, M. L., SUN, L., LEE, P. & ANANDARAJAN, A. A. 2008. Is Earnings Fraud Associated with High Deferred Tax and/or Book Minus Tax Levels? *AUDITING: A Journal of Practice & Theory*, 27, 1-33.
- FRANK, M. M. & REGO, S. O. 2006. Do managers use the valuation allowance account to manage earnings around certain earnings targets? *Journal of the American Taxation Association*, 28, 43-65.
- GUAY, W. R., KOTHARI, S. P. & WATTS, R. L. 1996. A market-based evaluation of discretionary accruals models. *Journal of Accounting Research* 34, 83-105.
- HEALY, P. M. 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting and Economics*, 7, 85-107.
- JONES, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29, 193-228.
- LAHR, H. 2014. An improved test for earnings management using kernel density estimation. *European Accounting Review* 23, 559-591.
- LEE, T. A., INGRAM, R. W. & HOWARD, T. P. 1999. The Difference between Earnings and Operating Cash Flow as an Indicator of Financial Reporting Fraud. *Contemporary Accounting Research*, 16, 749-786.
- MCANALLY, M. L., SRIVASTAVA, A. & WEAVER, C. D. 2008. Executive stock options, missed earnings targets, and earnings management. *The Accounting Review*, 83, 185-216.
- MILLS, L. & NEWBERRY, K. 2001. The influence of tax and non-tax costs on book-tax reporting differences: Public and private firms. *The Journal of the American Tax Association*, 23, 1-19.
- NELSON, M. W., ELLIOTT, J. A. & TARPLEY, R. L. 2002. Evidence from Auditors about Managers' and Auditors' Earnings Management Decisions. *The Accounting Review*, 77, 175-202.
- PHILLIPS, J., PINCUS, M. & REGO, S. O. 2003. Earnings management: new evidence based on deferred tax expense. *The Accounting Review*, 78, 491-521.
- PHILLIPS, J., PINCUS, M., REGO, S. O. & WAN, H. 2004. Decomposing changes in deferred tax assets and liabilities to isolate earnings management activities. *The Journal of the American Tax Association* 5-1, 43-66.
- PRICEWATERHOUSECOOPERS. 2014. *Global Economic Crime Survey 2014* [Online]. Available: <http://www.pwc.com/gx/en/services/advisory/consulting/forensics/economic-crime-survey.html> [Accessed 30 October 2015].
- RABIN, E. & NEGASH, M. 2012. Detecting Earnings Management Using kernel Density Estimation: Evidence from the Johannesburg Securities Exchange. . *American Accounting Association, Annual Meeting - August 4-8, 2012*. Washington
- WATSON, S. & ROSSOUW, J. 2012. JSE efficiency and share price reaction to forced financial statement restatements. *Journal of Economic and Financial Sciences*, 5, 417-436.
- YOUNG, S. 1999. Systematic measurement error in estimation of discretionary accruals: An evaluation of alternative modelling procedures. *Journal of Business Finance and Accounting* 26, 833-862.

Table 1: Reconciliation of population size to sample size used (in number of firm years and number of firms)

	Firm years	Firms
Population (2000 to 2010)	1 740	212
Less winsorised 1 & 99 percentile outliers in distribution	-42	-1
Population used in earnings distribution	1 698	211
Exclusions ¹	-977	-64
Firm years identified as EM1 or EM0	721	147
	721	
EM1 firm years	496	136 ³
EM0 firm years	225	94 ³
Exclusions ²	-238	
Total	483	
EM1 firm years	348	117 ⁴
EM0 firm years	135	76 ⁴

¹ Firms falling within a location on the empirical distribution that is not significantly different to the theoretical distribution as per Lahr (2011) methodology.

² Firms excluded due to insufficient disclosure available per the deferred tax note to collect deferred tax component data.

^{3&4} The sum of the EM1 firms and the EM0 firms exceed the total number of firms in the sample. The reason for this is that certain firms have both EM1 and EM0 firm years.

Table 2: Descriptive statistics for deferred tax expense (DTE) variables and total DTE (scaled by number of ordinary shares in issue at year end)

Variable	EM	N ¹	Mean	Std Dev	Min	Max	Median	25th Pctl	75th Pctl	z(skew)	z(kurt)
Deferred tax expense components											
Capital Allowances	0	114	0.01	0.059	-0.095	0.33	0	-0.003	0.01	13.67	30.73
Capital Allowances	1	278	0.008	0.035	-0.095	0.33	0.001	-0.001	0.009	40.54	176.61
Compensation	0	22	-0.001	0.007	-0.02	0.01	0	-0.001	0	-2.43	2.55
Compensation	1	88	-0.002	0.006	-0.024	0	-0.001	-0.002	0	-10.9	14.19
Expense Accruals	0	90	-0.006	0.028	-0.11	0.05	0	-0.003	0.001	-8.89	12.76
Expense Accruals	1	202	-0.002	0.01	-0.045	0.04	-0.001	-0.003	0.001	0.79	18.1
Fair value adjustments	0	21	0.004	0.026	-0.042	0.11	0	-0.001	0.002	5.96	13.45
Fair value adjustments	1	42	-0.004	0.014	-0.084	0.01	0	-0.003	0	-12.94	36.05
Prepayments	0	52	0	0.002	-0.006	0.01	0	-0.001	0.001	-0.62	1.79

Prepayments	1	123	0	0.005	-0.02	0.02	0	0	0.001	-2.75	16.79
Revenue accruals	0	51	-0.005	0.018	-0.075	0.02	0	-0.004	0.001	-8.47	13.36
Revenue accruals	1	122	0	0.009	-0.042	0.03	0	-0.002	0.001	-1.16	18.48
Recognised tax loss	0	115	-0.029	0.07	-0.367	0.1	-0.007	-0.03	0.001	-11.95	21.22
Recognised tax loss	1	251	-0.004	0.044	-0.367	0.1	0	-0.01	0.006	-29.92	120.19
Total and Residual DTE											
Total DTE	0	225	-0.015	0.04	-0.164	0.08	0	-0.016	0	-12.68	16.37
Total DTE	1	496	0	0.027	-0.164	0.08	0	-0.005	0.006	-15.55	56.8
Residual DTE	0	115	0.003	0.064	-0.218	0.2	0	-0.006	0.01	0.19	11.63
Residual DTE ²	1	251	0.002	0.032	-0.218	0.2	0	-0.006	0.007	3.38	62.96

¹ N represents the number of firm year observations

² The residual DTE refers to the total DTE excluding the DTE component relating to recognised tax losses.

Table 3: Results of null hypothesis of no significant difference between means and medians of deferred tax expense (DTE) variables and Total/Residual DTE (scaled by number of ordinary shares in issue at year end) in EM1 firms vs EM0 firms

Variable	p-value for H0: no significant difference between means	p-value for H0: no significant difference between medians
Deferred tax expense components		
Capital Allowances	0.66	0.094
Compensation	0.38	0.097
Expense Accruals	0.13	0.52
Fair value adjustments	0.2	0.3
Prepayments	0.48	0.46
Revenue accruals	0.091	0.45
Recognised tax loss	0.0013	0.0004
Total and Residual DTE		
Total DTE	<0.0001	<0.0001
Residual DTE ¹	0.92	0.67

Significant differences at the 5% level are shaded in grey.

¹ The residual DTE refers to the total DTE excluding the DTE component relating to recognised tax losses.

Table 4: Outcome on logistic regression performed on total and residual DTE (scaled by number of ordinary shares at year end) comparing EM1 to EM0 firm years and using Modified Jones abnormal accruals as an additional variable.

	N ¹	Coefficient (β)	Std error	Wald Chi-Square	Pr > Chi-Square	Odds Ratio	95% confidence interval for odds ratio		Coefficient (β) Abnormal Accruals	P
Total DTE	618	18.385	3.9117	22.0903	<.0001	>999.99	>999.99	>999.99	8.0959	-
Residual DTE ²	319	0.968	4.307	0.051	0.822	2.632	<0.001	>999.99	7.222	-

Significant differences at the 5% level are shaded in grey

¹ N represents the number of firm year observations

² The residual DTE refers to the total DTE excluding the DTE component relating to recognised tax losses.

Table 5: Outcome on logistic regressions performed on deferred tax variables (scaled by number of ordinary shares in issue at year end) comparing EM1 to EM0 firm years

Variable	N ¹	Expected Coefficient ²	Actual Coefficient (β)	Standard Error	Wald Chi-Square	Pr > Chi-Square
Capital Allowances	390	Positive	-1.5521	3.6331	0.1825	0.6692
Compensation	101	Positive	22.4579	42.528	0.2789	0.5974
Expense Accruals	290	Positive	10.563	6.7783	2.4285	0.1191
Fair value adjustments	53	Positive	-179.6	69.1582	6.7462	0.0094
Prepayments	169	Positive	23.8885	37.6928	0.4017	0.5263
Revenue accruals	165	Positive	53.1938	19.2198	7.6599	0.0056
Recognised tax loss	358	Negative	23.1923	5.7523	16.2555	<0.0001
Total DTE	717	Positive	14.6794	3.5086	17.5047	<0.0001

Significant differences at the 5% level are shaded in grey

¹ N represents the number of firm year observations

² Expected coefficient in the presence of upward EM to avoid a loss

Figure 1: Diagrammatic representation of distribution curves used to identify the location of suspected EM firms

