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MAF012 Does the index matter? A comparison of the capital structures of firms listed on the AltX to those listed on the JSE

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ABSTRACT:
The AltX was established to support growth of small and medium enterprises (SMEs) by enabling access to finance. This study investigates whether there is a significant difference between the capital structures of firms listed on the JSE's main board and those listed on the AltX. The factors influencing the differences are explored in detail. Non-financial firms listed on the JSE and AltX respectively between 2011 and 2015 were chosen for the study. A panel data regression model is used and five measures of leverage were tested. The findings indicate that the exchange on which a company is listed is a determinant of its capital structure, with firms listed on the AltX having significantly higher levels of leverage than those listed on the JSE's main board. AltX firms are found to be more reliant on short term financing than JSE firms, making them more susceptible to liquidity risks. In support of the pecking order theory, AltX firms are found to be more likely to draw on their internal funds as a first source of finance, even though they are less likely than JSE firms to have internal funds available. The availability of tangible assets to offer as collateral appears to be a more significant determinant of leverage to AltX firms indicating higher levels of information asymmetry amongst these firms. The study concludes that despite the establishment of the AltX, SMEs still face considerable constraints on their options for finance.

Keywords: Capital structure, AltX, JSE, SME, information asymmetry

INTRODUCTION

Capital structure refers to the combination of debt and equity used to finance a firm. Capital structure theories are often linked to firm value (Modigliani and Miller, 1958, Modigliani and Miller, 1963, Myers and Majluf, 1984, Jensen, 1986, Miller, 1977) making the topic relevant in the context of economic growth. In the developing South African economy, Small and Medium Enterprises (SMEs) are firms which are essential contributors to employment, gross domestic product[77] and provide competition to larger firms (Olawale and Garwe, 2010). The role of finance is a critical element for the development of SMEs as a large portion of the SME sector does not have access to adequate and appropriate forms of credit and equity (Cook and Nixson, 2000). An analysis of the capital structure of Small and Medium Enterprises (SMEs) may provide valuable guidance on how to encourage their growth.

The success of SMEs is one of the main areas of concern of many policy makers as they attempt to accelerate the growth of developing economies (Abor and Quartey, 2010). SMEs are easier to establish than their larger counterparts and are usually more adaptable to changing market conditions. They therefore generate returns more rapidly. These firms are less likely to use advanced technology and are more likely to rely on labour, contributing to the creation of employment in the economy. Moreover, they contribute to a more even distribution of economic activity as they are more likely to succeed in smaller, underserviced urban centres (Abor and Quartey, 2010).

In South Africa research has mainly focused on large listed companies trading on the main board of the Johannesburg Stock Exchange (JSE) (Lemma and Negash, 2011, Letsoenya and Negash, 2013, Correia and Cramer, 2008, Gwatidzo and Ojah, 2009, Gwatidzo et al., 2016, Moyo et al., 2013). A study of the capital structure of smaller firms may therefore be a relevant yet largely unexplored area of research in South Africa. Correia and Cramer (2008) found that large listed companies in South Africa have low levels of debt in relation to what is predicted by trade-off theory. This is despite the country's relatively sophisticated financial markets (de Wet and Gossel, 2016, Gwatidzo and Ojah, 2009). Possible reasons for these low debt levels may relate to high profitability levels in the domestic economy but limited growth prospects for expansion as well as a reluctance or inability to expand into international markets (Correia and Cramer, 2008). These findings strengthen the case for a similar study into SMEs in South Africa.

Despite the crucial role of SMEs in the South African economy, their failure rate is estimated at between 70% and 80% (Cant and Ligthelm, 2002). In a study on South African SMEs, Olawale and Garwe (2010) found that the main inhibitors of growth were capital structure-related as access to finance and insufficient owner's equity contribution were among the top three obstacles cited by respondents. Insufficient access to dynamic capital markets for SMEs in South Africa is one of the main reasons for business discontinuance (Falkena et al., 2007, Abor and Quartey, 2010, SEDA, 2016).

A key objective of the AltX is to be a growth catalyst to South African SMEs by enabling access to finance (JSE, 2013). Stock exchanges play a key role in enabling access to finance. Besides allowing companies to enjoy easy access to capital through equity issues,

[77] Estimations indicate a probable contribution to GDP of more than 50% and a contribution to employment of more than 60% (Falkena et al, 2007, Abor and Quartey, 2010).

they encourage specialisation as well as acquisition and dissemination of information. Furthermore, well developed stock exchanges may mitigate the principal-agent problem through aligning the interests of managers and owners so that managers strive to maximise firm value. Easy access to capital markets improves the allocation of capital which is an important channel of economic growth (Arestis et al., 2001, Yartey and Adjasi, 2007). In an African context, Yartey and Adjasi (2007) cite the development of stock exchanges as central to the domestic financial liberalisation process.

The purpose of this study is to determine whether there is a significant difference between the capital structures of firms listed on the AltX and those listed on the JSE's main board and if there is a difference, what are the factors driving the difference.

LITERATURE REVIEW

Financial theories such as trade off, pecking order, agency, information asymmetries and taxation are equally relevant to the financing behaviour of small and large firms (Ang, 1992). The influential work on capital structure and firm value by Modigliani and Miller (1958) forms the basis of the capital structure theoretical framework. They asserted that capital structure is irrelevant to firm value in a perfect market with no taxes or bankruptcy costs. The underlying premise of the Modigliani and Miller (1958) proposition is that in perfect securities markets, the capital structure decisions by firms belonging to the same risk class do not alter the opportunity set available to investors. Hence any discrepancies in total market values of identical firms in the same risk class arising from differences in financing mix will be removed through arbitrage operations by investors. Once the perfect market assumptions[78] are relaxed, the effect of capital structure on firm value becomes apparent.

Several capital structure theories have since provided insights into the factors affecting firms' financing decisions. The trade-off theory (Kraus and Litzenberger, 1973) views the firm as having an optimal capital structure which involves the trade-off between the benefits of debt and its costs to arrive at a value-maximising capital structure. The free cash flow theory from Jensen (1986) suggests that the use of debt imposes discipline on management to invest in positive net present value projects only. Pecking order theory suggests that firms go through a specific hierarchy of financing options with the intention of exhausting internal sources of funding before raising capital from external sources (Myers and Majluf, 1984). Inherent in the pecking order theory is the assumption of information asymmetries between the firm's managers and its providers of capital. The theory recognises the existence of transaction costs which compel firms to follow a pecking order. Research on firms listed on the JSE has indicated support for the pecking order theory (Gwatidzo and Ojah, 2009, Lemma and Negash, 2011, Ramjee and Gwatidzo, 2012). Correia and Cramer (2008) found that while a relatively large proportion of main board listed firms use a strict debt equity ratio, these ratios were lower than what is predicted by trade off theory.

[78] All information is available to all participants in the market and there are no taxes or transaction costs (Correia, 2015)

The AltX

A possible solution to the apparent lack of access to finance that SMEs face is the establishment of an exchange exclusively for these firms. The AltX was established to provide SMEs with access to long term equity finance which was previously reserved for firms listed on the main board (JSE, 2013). The listing requirements of the AltX are therefore not as onerous as those for the JSE. Van Heerden (2015) suggests that the AltX has been successful in its goal of offering an opportunity for SMEs to raise capital and be a springboard to the main board of the JSE. This conclusion is largely predicated on the findings that the JSE experienced more de-listings than the AltX and the latter experienced more listings than de-listings for the period under analysis.

Research on AltX equivalents in various countries highlights the challenges faced in promoting growth of SMEs. London's privately regulated Alternative Investment Market (AIM) has been effective in providing finance to small, high-growth companies (Mendoza, 2008) although these firms still experience a high failure rate and are unlikely to move to larger exchanges (Gerakos et al., 2013). In 2005, 40 companies moved directly from the London Stock Exchange to the AIM while only 2 companies moved from AIM to the main board.

From an emerging market perspective, the Over the Counter Exchange of India (OTCEI) failed in its objective to provide access to finance to SMEs in India (Banerjee, 2006). Among the reasons for the OTCEI's failure according to Banerjee (2006) were onerous listing requirements and high levels of information asymmetry. The findings of the Commission of Enquiry on Small Firms, as cited by Holmes and Kent (1991) indicated that small firms suffered from a "finance gap" – the result of limited access to capital markets. Smaller firms therefore had to resort to more expensive financing which hindered their development.

The establishment of the AltX may have alleviated some of these pressures for SMEs in South Africa by allowing access to the same capital markets as firms listed on the main board. In order to determine whether AltX companies have the same level of access to capital markets as firms listed on the main board, this study tests whether there is a significant difference in the capital structure of firms on the AltX and JSE. Thereafter, further analysis has been done to determine the extent to which each of the factors identified influence the capital structure of companies on the JSE and the AltX respectively.

The rest of this section presents a discussion of the attributes that various theories of capital structure suggest may affect the firm's debt-equity decision. It explains the theoretical and empirical reasons for including the chosen explanatory variables in the study. The results of empirical analysis appear to have yielded evidence of both positive and negative relationships between the chosen explanatory and control variables and the extent of leverage. This study will present perspectives from prior studies where differing findings were reached.

Term structure of debt

Prior literature indicates that the term structure of debt seems to vary between larger and smaller firms. The results of the analysis presented by Bevan and Danbolt (2002) differed significantly depending on whether short or long term debt was used as a measure of leverage. The study showed size to be significantly negatively correlated with short term

debt. Similarly, Holmes and Kent (1991) found that smaller firms hold significantly more short term debt than their larger counterparts. The distinction between short and long term debt may therefore be particularly important for SMEs. In the context of a developing economy, small firms in India were found to rely on more short term debt, possibly as a result of high transaction costs (Bhaduri, 2002) or the fact that short term debt is unlikely to require collateral (Gwatidzo and Ojah, 2009). Research on African firms provides evidence that where these firms need debt to finance their production activities, they choose mostly short-term debt (Gwatidzo and Ojah, 2009).

Titman and Wessels (1988) found short term debt ratios to be negatively correlated to firm size – a possible result of relatively high transaction costs of long term debt for small firms. They posit that small firms pay more than large firms to issue long term debt and therefore prefer to borrow short term because of the lower fixed costs associated with this type of debt. This apparent difficulty experienced by small firms in raising long term debt may be predicated on theories of information asymmetry.

Asymmetric information between owners and outsider capital suppliers could cause a large gap in the cost of funds perceived by the owners and by suppliers of capital. As the providers of short term capital interact with the firm more frequently, they may have a more intimate knowledge of the firm than the providers of long term debt (Ang, 1992, Damodaran, 2010). If debt is required, SMEs will choose short term debt as it is unlikely to have covenants which impose limitations on managers' control – evidence of the pecking order theory. This study therefore tests whether firm size is correlated to debt term.

Taxes

In the presence of corporate taxes, capital structure irrelevance theory from Modigliani and Miller (1958) no longer holds and taxes do affect financing decisions. Interest, which is the cost of debt, is deductible for tax purposes in South Africa (Correia, 2015). It is therefore viewed as a tax shield as firms pay lower taxes. By virtue of the tax deductibility of interest, debt is viewed as a cheaper form of capital which increases the value of the firm. Unlike interest payments, the payment of dividends to equity holders is not tax deductible. Graham (2000) makes reference to the unsolved "riddle" of why many firms appear conservative in their use of debt despite the sizable benefit available from the tax deductibility of interest. According to Lee and Barker (1977), the optimal leverage is at the point where the present value of the tax shield is equal to the present value of the cost of financial distress. Negash (2001) found that while the potential tax benefit from leverage should theoretically be larger in firms, they are not taking full advantage of the potential tax benefit. This may be because other non-debt tax shields reduced the attractiveness of the interest deductions.

There are varied findings on the effect of tax on leverage in South African firms. Moyo et al. (2013) found that profitable firms face increased tax payable, and they reduce this through the use of debt interest tax shields. The analysis performed by Negash (2002) yielded a negative association between tax rate variables and the extent of leverage while that of Gwatidzo and Ojah (2009) found that the tax variable was insignificant. It is therefore uncertain whether tax rates will be positively or negatively correlated with leverage. This study will test whether firms that pay high taxes in relation to their income are more likely to use debt as a tax shield.

Costs of financial distress

The existence of bankruptcy costs associated with debt leads to the theory of trade-off between tax and bankruptcy costs (Modigliani and Miller, 1963, Kraus and Litzenberger, 1973). There are benefits and costs associated with debt. The benefits stem from the interest being tax deductible while higher debt levels increase the probability of bankruptcy and financial distress. This is why, in reality, there is a moderate, cautious approach to borrowing as opposed to a capital structure comprised entirely of debt (Gwatidzo and Ojah, 2009). The firm is therefore seen as balancing the tax advantages of debt financing with the implicit and explicit costs of financial distress to arrive at an optimal capital structure which maximises the value of the firm. This theory is particularly relevant for SMEs as they have a greater chance of landing in financial distress than their larger counterparts (Ang, 1992, Bhaduri, 2002).

The economies of scale related to bankruptcy costs are highlighted in a study on developing economies by Prasad et al. (2001). In the study, larger firms are shown to face lower unit costs of bankruptcy than do smaller firms. Similarly, the findings in Ang et al. (1982) suggest that bankruptcy costs constitute a larger proportion of a firm's value as its size decreases. Research on banks' lending practices indicate that smaller firms attract higher costs of capital (Pettit and Singer, 1985, Graham, 2000). Vassalou and Xing (2004) found default risk to be "intimately" related to size. After classifying firms by their default risk, they noted that within the high-default risk category, small firms have much higher default risk than big firms and default risk always increases as size decreases.

Under the assumption that liquidation is costly, smaller firms should be more averse to debt. Rajan and Zingales (1995) postulate that larger firms tend to be more diversified and fail less often. Similarly, Prasad et al. (2001) suggest that higher leverage in firms which manufacture products across a number of industries are diversified and less prone to collapse. In a study which included South African firms, Gwatidzo and Ojah (2009) found that the relationship between size and leverage was positive and significant. Moyo et al. (2013) found a significant negative correlation between financial distress and the firms' leverage in the manufacturing, mining and retail industries in South Africa.

Profitability

According to the Pecking Order Theory (Myers and Majluf, 1984) firms prefer internal to external sources of financing. The theory suggests that firms go through a specific hierarchy of financing options when it comes to raising capital – their first choice is retained earnings, second from debt and, as a last resort, from the issue of new equity. Firms therefore prefer internal sources of funding before exhausting their debt capacity. A possible explanation could be that firms draw on internal sources of finance that will not dilute their control; either as a result of restrictive debt covenants or new shareholders. Therefore firms with high levels of cash resources will forgo additional debt. Accordingly, Myers and Majluf (1984) predict a negative relationship between profitability and debt as highly profitable companies will tend to finance investment with internal funds rather than debt.

Several studies agree that leverage decreases with profitability (Bevan and Danbolt, 2002, Booth et al., 2001, Lemma and Negash, 2011, Rajan and Zingales, 1995). Furthermore, the negative influence of profitability on leverage became stronger as firm size increases (Rajan and Zingales, 1995). Holmes and Kent (1991) suggest that small firms have a preference for

those finance options which minimise intrusion into their businesses. Titman and Wessels (1988) assert that the past profitability of the firm and hence its retained earnings, should be an important determinant of its capital structure. Studies on developing economies show that the more profitable the firm, the lower the debt ratio (Prasad et al., 2001, Booth et al., 2001). These findings are supported by studies on South African firms (Lemma and Negash, 2011, Gwatidzo and Ojah, 2009). This study therefore tests whether firm profitability is correlated to leverage.

Asset tangibility

Theories on information asymmetry suggest that firms may prefer to raise secured debt (Myers and Majluf, 1984). There may be costs associated with obtaining debt as a result of asymmetric information between the firms' managers and the providers of debt. Akerlof (1970) explains that the availability of credible information is critical to the functioning of vital markets in an economy. Firms which cannot credibly signal their quality to providers of finance can incur an increased premium as a result of lack of information. The practice of offering property with known values as collateral may reduce these costs. Therefore firms with assets that can be used as collateral may take advantage of their increased opportunities to access debt. Gwatidzo and Ojah (2009) note that the prevalence of information asymmetry is high in the African environment.

From the perspective of the providers of debt finance, Long and Malitz (1985) found that lenders are likely to prefer tangible assets with an active second hand market as collateral as they will be easier to liquidate. Bevan and Danbolt (2002) found that leverage is significantly positively correlated with tangibility. Research on South African firms has shown that firms with tangible assets find it easier to access debt finance (Gwatidzo and Ojah, 2009, Lemma and Negash, 2011). In contrast, Moyo et al. (2013) find asset tangibility to be negatively related to leverage when considering South African firms in the manufacturing, mining and retail industries only.

This study therefore tests whether firm leverage is positively related to asset tangibility.

RESEARCH METHODOLOGY

The purpose of this study is to test whether there is a significant difference in the capital structures of firms listed on the AltX to those listed on the JSEs main board. A regression model detailed in the Data Analysis section is used to achieve this purpose. If a significant difference is found, further analysis will be performed to determine the factors which drive this difference.

This study is based on panel data of the five year period from 2011 to 2015 and follows a quantitative method of research. The intention of quantitative research is to establish, confirm, or validate relationships (Leedy and Ormrod, 2012). The sample for this study comprises all companies that were listed on the AltX and the JSE at any point during the period under analysis. Therefore, firms which may have subsequently delisted from either exchange are included in the analysis. In doing so, survivorship bias is eliminated. This was the same approach followed by Rajan and Zingales (1995) as data was gathered from databases which included companies that had delisted from their respective local market index.

Following precedent (Chipeta et al., 2012, Chipeta et al., 2013, Letsoenya and Negash, 2013, Lemma and Negash, 2011), firms within the financial services sector have been excluded from the analysis because their borrowing capacity and capital adequacy requirements are subject to separate regulation. This regulation therefore impacts their capital structure.

The data for this study was drawn from INET BFA database (formerly known as the McGregor BFA database). The data was managed using Microsoft Excel 2010 and statistical analysis was done in the software package, R.

Data Analysis

Firms were selected from the JSE and AltX if they had financial data available for any period/s under the five years under analysis. Thereafter, all companies in the financial services sector were excluded from the analysis as these firms are subject to special regulations that may influence their capital structure. Before any statistical analysis, 234 firms were identified of which 189 were listed on the JSE and 45 were on the AltX.

Table 1: Distribution of sampled firms by sector classification (JSE and AltX listed firms)

Sector	Number of firms		Percentage	
	JSE	AltX	JSE	AltX
Basic Materials	47	8	24.87	17.78
Consumer goods	17	4	8.99	8.89
Consumer services	39	3	20.63	6.67
Healthcare	6	2	3.17	4.44
Industrials	63	18	33.33	40.00
Oil and Gas	3	0	1.59	0
Utilities	0	1	0.00	2.22
Technology	9	8	4.76	17.78
Telecommunications	5	1	2.65	2.22
TOTAL	**189**	**45**	**100.00**	**100.00**

Source: INET database and author's computations

The following are the models that have been used in the study.

Equation 1:

$$LEVERAGE(k)_{it} = \alpha + \beta_1*(\ln(SIZE))_{it} + \beta_2*(CD\_TAX)_{it} + \beta_3*(ASSETSTRUCT)_{it} + \beta_4*(PROFIT)_{it} + \beta_5*(CD\_Listing)_{it} + \beta_6*(\text{Sector dummy variables9})_{it} + \varepsilon_{it}$$

where:

- i denotes the cross-sections and t denotes the time period with i = 1...234 and t = 1...5. The yearly observations are from 2011 to 2015.
- LEVERAGE (k) represents different leverage measures (Total Liabilities/Net Assets, Total Liabilities/Total Assets, Total Liabilities/Capital, Current liabilities/Total Assets, Non-Current liabilities/Total Liabilities) with k = 1, 2, 3, 4 and 5. The model was run five times (once for each measure of leverage).
- CD_Listing is a coded variable indicating whether the firm is listed on the AltX (-1) or the JSE (1).
- εit is the normal error term.
- Sector dummy variables range from 1 to 9 representing the industry classification.
- α is the constant

The first equation will test whether there is a significant difference in the capital structure of AltX listed firms and JSE listed firms. It aims to isolate the effect that the index has on the capital structure of a firm. Therefore, the following are the control variables:

- Size (SIZE)
- Taxes (CD_TAX)
- Asset Structure (ASSETSTRUCT)
- Profitability (PROFIT)

Equation 2:

The second equation will test whether the factors affecting capital structure differ between AltX and JSE listed firms. Therefore, the regression analysis will be performed with AltX firms only and then with JSE firms only.

$$LEVERAGE(k)_{it} = \alpha + \beta_1*(\ln(SIZE))_{it} + \beta_2*(CD\_TAX)_{it} + \beta_3*(ASSETSTRUCT)_{it} + \beta_4*(PROFIT)_{it} + \beta_5*(Sector\ dummy\ variables9)_{it} + \varepsilon_{it}$$

where:

- i denotes the cross-sections and t denotes the time period with i = 1...189 for the JSE's main board, I =1…45 for the AltX and t = 1...5. The yearly observations are from 2011 to 2015.
- LEVERAGE (k) represents different leverage measures (Total Liabilities/Net Assets, Total Liabilities/Total Assets, Total Liabilities/Equity, Current liabilities/Total Assets, Non-Current liabilities/Total Liabilities) with k = 1, 2, 3, 4 and 5.
- εit is the normal error term.
- Sector dummy variables range from 1 to 9 representing the industry classification.
- α is the constant

Table 2 presents a summary of the measurement proxies used for the independent or control variables in this study.

Table 2: Measurement of Variables

Variable	Measurement	Precedent
Leverage	Total Liabilities/Net Assets (Lev_1), Total Liabilities/Total Assets (Lev_2), Total Liabilities/Equity (Lev_3), Current liabilities/Total Assets (Lev_4), Non-Current liabilities/Total Liabilities (Lev_5)	Letsoenya and Negash (2013), Rajan and Zingales (1995), Lemma and Negash (2011)
Size (SIZE)	Natural logarithm of total turnover	Rajan and Zingales (1995), Bevan and Danbolt (2002),Titman and Wessels (1988) Lemma and Negash (2011)
Tax (TAX)	Tax paid (per the cash flow statement) / Profit before interest and tax	Lemma and Negash (2011)
Asset structure (ASSETSTRUCT)	Tangible assets / total assets (where tangible plus intangible assets equal total assets)	Sogorb-Mira (2005), Bevan and Danbolt (2002), Lemma and Negash (2011)
Profitability (PROFIT)	Earnings before interest and taxes / Total assets	Sogorb-Mira (2005), Bevan and Danbolt (2002), Lemma and Negash (2011)

Capital structure theories have different implications depending on how leverage is defined (Lemma and Negash, 2011, Rajan and Zingales, 1995, Harris and Raviv, 1991). In this study, leverage is measured using the four variables employed by Lemma and Negash (2011). The linear regression models in this study were run using each of these four measures of leverage. An additional variable of current liabilities over total assets will be used to test whether debt duration is positively correlated to firm size.

This study analyses the effect of taxes on leverage. The ratio of tax paid (per the cash flow statement) to the profit before interest and tax was used to determine whether the firm was paying taxes at high rates relative to its income. Upon analysis, it was found that where the tax paid was negative (implying that the firm received a refund from SARS) and the profit before interest and taxes was negative (implying that the firm made a loss) a misleading positive ratio resulted. It was therefore deemed more suitable to use a coded variable in the models indicating either a relatively high tax rate (coded as “High”) or a relatively low tax rate (coded as “Low”). The variable in the regression equations, CD_Tax was assigned the value of -1 for Low and +1 for High tax rates as defined. Further information on how the coding was carried out is contained in the table below.

Table 3: Coding of tax variable

Tax paid (where a positive value means tax paid)	Profit before interest and taxes	Tax paid to profit before interest and taxes (ratio)	Coded variable
Positive	Positive	Greater than 14%	High
Positive	Positive	Lower than 14%	Low
Negative (refund)	Positive	n/a	Low[79]
Positive	Negative (loss)	n/a	Low[80]
Negative (refund)	Negative (loss)	n/a	Low

Validity and reliability

This study used panel data over a five year period. Panel data has distinct advantages over cross section data. Panel data are better able to identify and measure effects that are not apparent in pure cross sections or pure time series data. They give more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency (Baltagi, 2008). Furthermore, panel data is superior to aggregate time series data as the underlying dynamics of the data are not obscured by aggregation bias (Bond, 2002).

In order to enhance the reliability of this study, the author consulted a statistician who guided the process of statistical analysis and validated the results.

The study follows precedent by using a 5 year period. Sogorb-Mira (2005) and Lemma and Negash (2011) also used a five year period as it reduced the measurement error arising from random year-to-year fluctuations in variables. Additionally, there have been no significant monetary policy changes during the time period that will be covered. This improves the validity of the study.

The classic linear regression model is based on certain assumptions. The model residuals should be normally distributed; there should be homoscedasticity[81]; there should be no autocorrelation between the disturbances and the explanatory variables should not be correlated (Gujarati, 2009). Several model diagnostic tests were run to test whether these assumptions were met. The results of these tests are contained in the Results section of this study.

[79] These firms are not in a tax paying position and therefore unlikely to want to take on debt for its tax shield.
[80] Graham (1998) found that firms that were in distress were unlikely to enjoy the benefits of interest deductions.
[81] There should be equal (homo) spread (variance). The opposite of homoscedasticity is heteroscedasticity.

RESULTS

Diagnostic Tests

The classic linear regression model is based on certain assumptions. Several diagnostic procedures were used to test whether these assumptions were met.

One of the ways in which the assumption of normality is checked is to inspect a normal probability plot (Pallant, 2013). For this study, a normal probability plot (labelled Normal Q-Q Plot) was generated in R for each measure of leverage. These plots showed that the residuals approximated a normal distribution. In order to detect outliers, Cook's distances may be generated (Pallant, 2013). Outliers are observations which have unusually high or low values making them stand out from the other observations (Hair et al., 2010). Following close examination of the plots, outliers were identified for each of the five different measures of leverage. These were removed from the analysis.

Autocorrelation is defined as correlation between members of series of observations ordered in time or space. The Hausman test may be used to detect autocorrelation (Gujarati, 2009). Under this test, the null hypothesis is that there is no autocorrelation. The test was applied to the panel data models in this study. Where a statistically significant value was obtained, the null hypothesis was rejected indicating that autocorrelation was present. In these instances, the fixed effects model was used for statistical inference. Where we failed to reject the null hypothesis, the random effects model was used. Heteroscedasticity may be detected using the Breusch-Pagan[82] test (Gujarati, 2009). Where heteroscedasticity was detected, robust covariance matrix estimation was used. Robust estimators of the covariance matrix allow for heteroscedasticity (Croissant and Millo, 2008).

In order to test whether there was correlation between the explanatory variables, a covariance matrix was generated. It showed no evidence of correlation between explanatory variables as all correlations were below the acceptable threshold of 0.7 (Pallant, 2013). The largest correlation coefficient was 0.48 suggesting minimal correlation between explanatory variables.

Table 4: Covariance matrix

	LNSize	*CD_Tax*	*AssetStruct*	*Profit*	*CD_Listing*	*CD_Sector*
LNSize	1					
CD_Tax	0.3085	1				
AssetStruct	0.2198	0.0442	1			
Profit	0.2137	0.2626	-0.0033	1		
CD_Listing	0.4772	0.3085	0.1861	0.1402	1	
CD_Sector	-0.111	0.1695	-0.0518	0.1205	-0.1522	1

Source: Author's computations

Descriptive Statistics

In analysing the results of this study, reference is first made to the descriptive statistics of the variables. Descriptive statistics were calculated after removing the outliers identified in the

[82] Derived by Breusch and Pagan, this test checks whether there is unequal variance in the error terms (Gujarati, 2009)

process detailed in the results section of this study. Table 4 presents the descriptive statistics for the dependent variables. These statistics provide the initial evidence that the levels of leverage vary widely depending on how leverage is measured (Lemma and Negash, 2011, Gwatidzo and Ojah, 2009, Rajan and Zingales, 1995, Harris and Raviv, 1991, Bevan and Danbolt, 2002). This is apparent for both indices under analysis. Overall, companies on the AltX have higher levels of leverage than those on the main board. This may indicate either that the AltX may not be providing the same level of access to equity finance as the JSE or that equity investors prefer shares listed on the main board.

Levels of leverage are higher for JSE firms when we consider the ratio of non-current liabilities to total liabilities. It appears that firms on the AltX have lower levels of non-current liabilities than firms on the JSE. Further support for this finding is provided by the ratio of current liabilities to total assets which is higher for firms on the AltX. This may provide evidence that firms on the AltX are using relatively more current liabilities for financing.

Table 5: Descriptive Statistics of the Dependent Variable

Dependent Variable	Mean		Std. dev	
	JSE	AltX	JSE	AltX
Total Liabilities/ Net Assets	0.683	0.735	0.515	0.747
Total Liabilities/ Total Assets	0.458	0.497	0.191	0.294
Total Liabilities/ Total Equity	1.036	0.815	2.343	4.030
Current Liabilities/ Total Assets	0.297	0.354	0.176	0.232
Non-current Liabilities/ Total Liabilities	0.351	0.267	0.247	0.256

Source: Author's computations

Descriptive statistics of the independent variables are provided in Table 5. Coded variables were used for the measurement of the Tax (CD_Tax), Index listing (CD_Listing), and Sector (CD_Sector). Any inferences drawn from the descriptive statistics for these coded variables would therefore have been meaningless.

Table 6: Descriptive Statistics of the Independent Variables in Equation 2

Equation 2: Independent Variables	Mean		Std. dev		Max	Min	Max	Min
	JSE	AltX	JSE	AltX	JSE	JSE	AltX	AltX
Size (LNSize)	15.236	12.135	2.063	1.449	21.598	1.609	16.349	6.428
Profitability (Profit)	0.070	-0.108	0.369	0.662	0.693	-9.92	0.443	-7.80
Asset Structure (AssetStruct)	0.887	0.803	0.143	0.258	1.000	0.053	1.000	0.008

Source: Author's computations

As anticipated, the average size of companies listed on the main board of the JSE is larger than companies listed on the AltX. This is supported by maximum values on each index with the JSE's main board having the larger maximum size. Notably, the smallest firm listed on the JSE's main board is smaller than the smallest firm listed on the AltX. We may infer that it is possible that certain companies are listed on the AltX despite possibly qualifying for listing on the JSE's main board. A higher standard deviation for the JSE's main board provides evidence of a more diverse range of companies than those listed on the AltX.

Regarding profitability (measured by the ratio of earnings before interest and tax to total assets), the average profitability of companies listed on the AltX is negative indicating that most companies on the AltX are loss-making and considerably less profitable than companies on the JSE's main board. The greater standard deviation recorded for AltX-listed companies provides further evidence of the diversity range of companies on the index.

When considering asset structure (measured by the ratio of tangible assets to total assets), the descriptive statistics show similarity between the indices under analysis. Both indices appear to be dominated by firms which have predominantly high levels of tangible assets. However, the minimum values for each index may indicate that more AltX listed firms have lower levels of tangible assets compared to firms listed on the JSE's main board.

Regression results

For the panel data analysis in this study, the fixed effects model and the random effects model were estimated. In order to assess the suitability of each of the models, the Hausman test was conducted for each measure of leverage for equation 1 and equation 2 respectively. The choice between the random and fixed effects models depends on the assumptions made about the error term. The random effects model assumes that the individual specific error component or individual heterogeneity is random whereas the fixed effects model ignores the unit specific residual (Gwatidzo and Ojah, 2009). The Hausman test indicated that the fixed effects model was preferred in some instances while the random effects model was preferred in others. Similarly, the Breusch-Pagan test was conducted on both equations 1 and 2. Where this test detected heteroscedasticity, a robust covariance matrix was used to account for it (Croissant and Millo, 2008). The results from the regression equations are presented and discussed below.

Table 7: Regression Results: Equation 1

Leverage	Total Liabilities/ Net Assets	Total Liabilities/ Total Assets	Total Debt/ Total Equity	Current Liabilities/ Total Assets	Non-current Liabilities/ Total debt
Intercept	-0.6681	0.3193	-2.3415	0.3088	-0.0615
	(0.6086)	(0.1244)	(3.4828)	(0.1489)	(0.1490)
LNSize	0.0620	0.0258	0.5900	0.0116	0.0356
	(0.0354)^	(0.0072)***	(0.2099)**	(0.0029)***	(0.0096)***
CD_Tax	0.0186	-0.0142	0.0386	-0.0051	0.0028
	(0.0811)	(0.0079)^	(0.1775)	(0.0055)	(0.0101)
AssetStruct	0.7243	0.1079	1.2181	0.1391	0.2512
	(0.4554)	(0.0734)	(1.5957)	(0.0429)**	(0.1095)*
Profit	-0.1821	-0.0993	0.8045	-0.0717	0.0292
	(0.3586)	(0.1289)	(1.0406)	(0.0235)**	(0.0926)
CD_Sector	0.0096	-0.0451	-0.5908	-0.0267	0.0000
	(0.0305)	(0.0212)*	(0.6227)	(0.0117)*	(0.0279)
CD_Listing	-0.1915	-0.1576	-2.5055	-0.2492	0.1338
	(0.1137)^	(0.0546)**	(1.6951)	(0.0791)**	(0.0723)^
Probability (F-stat)	0.2005	0.0000	0.0000	0.0000	0.0000

*Notes: Robust standard error values are given in parentheses. ^Indicates significance at 10%; *indicates significance at 5%; **indicates significance at 1%; and ***indicates significance at 0.1%.*

4.3.1. Listing

The results show that even when controlling for the other possible determinants of capital structure, firms listed on the AltX have higher levels of debt than firms listed on the JSE's main board. This substantiates the findings in the Descriptive Statistics section of this study. Index listing is found to be significant at the 1% level when measuring leverage as either total liabilities scaled by total assets or current liabilities scaled by total assets. Considering the coding of the index variable[83], the negative coefficient indicates that companies on the AltX have higher levels of leverage than those listed on the JSE's main board when controlling for other possible influences on capital structure. The higher levels of leverage for AltX firms may be as a result of them not enjoying access to the same capital markets as those listed on the JSE. According to Olawale and Garwe (2010) one of the main obstacles inhibiting SME growth is poor credit rating. The poor credit ratings may be as a result of accumulating debt balances as a result of an impaired ability to repay debts in AltX companies. This would substantiate the findings of higher levels of leverage as well as a negative mean profitability detected in AltX firms.

Firms with higher leverage ratios are more likely to default on their debt (Correia, 2015). If these findings do indeed point to most AltX firms being in financial distress, they may have to rely more on equity financing so as to reduce the agency costs of debt. However, financially distressed firms may incur high costs of equity. This situation will result in firms facing considerable difficulty is raising both equity and debt finance (Moyo et al., 2013).

Considering theories of information asymmetry, Bhaduri (2002) postulates that high transaction costs as a result of asymmetric information may explain lower levels of leverage

[83] "CD_Listing" is a coded variable indicating either listing on the JSE (1) or the AltX (-1).

in SME's. This suggestion appears to stand in contrast with the results obtained in this study. Olawale and Garwe (2010) explain that in order to access external finance, it is necessary for firms to reduce information asymmetry. Considering that the AltX listing requirements do not provide exception from the main board's requirement to produce and publish financial statements (Van Heerden, 2015), the results of this study may indicate that AltX listed firms have in fact been successful in reducing information asymmetry by publishing financial statements. If we ignore the possibility of financial distress, the findings in this study appear to indicate that AltX firms may have better access to debt as a result of reduced transaction costs attributed to information asymmetry.

The significant result obtained when measuring leverage with reference to current liabilities may indicate that firms listed on the AltX are more likely than firms listed on the JSE to use more short term debt as a financing option. This finding is consistent with prior literature which found that smaller firms rely more on short-term debt (Titman and Wessels, 1988, Bevan and Danbolt, 2002, Bhaduri, 2002, Gwatidzo and Ojah, 2009) and validates the postulation by Cook and Nixson (2000) that SMEs do not have access to *appropriate* forms of credit (emphasis added).

Having established that there is a difference in capital structure between the JSE and AltX indices, the rest of this section aims to analyse the difference in more detail. To this end, results from equation 2 are presented and discussed.

Table 8: Regression Results: Equation 2 – JSE Listed Firms

Leverage	**Total Liabilities/ Net Assets**	**Total Liabilities/ Total Assets**	**Total Debt/ Total Equity**	**Current Liabilities/ Total Assets**	**Non-current Liabilities/ Total debt**
Intercept	-0.2125	0.1399	-4.8073	-0.1127	0.1256
	(0.1589)	(0.3265)	(3.3520)	(0.0528)*	(0.1842)
LNSize	0.0270	0.0304	0.4464	0.0127	0.0246
	(0.0077)***	(0.0070)***	(0.0830)***	(0.0025)***	(0.0061)***
CD_Tax	-0.0282	-0.0232	-0.0265	0.0041	-0.0137
	(0.1370)*	(0.0083)**	(0.1334)	(0.0053)	(0.0110)
AssetStruct	0.3248	0.0516	0.0733	0.1145	0.1808
	(0.1106)**	(0.0782)	(1.0197)	(0.0397)**	(0.1089)^
Profit	-0.2555	-0.0461	0.5770	-0.2006	0.0893
	(0.0604)***	(0.1239)	(0.5835)	(0.0362)***	(0.0780)
CD_Sector	0.0569	0.0902	-0.2416	0.0326	0.0017
	(0.0138)***	(0.0485)^	(0.7352)	(0.00415)***	(0.0502)
Probability (F-stat)	0.0000	0.0000	0.0000	0.0000	0.0000

*Notes: Robust standard error values are given in parentheses. ^Indicates significance at 10%; *indicates significance at 5%; **indicates significance at 1%; and ***indicates significance at 0.1%.*

Table 9: Regression Results: Equation 2 – AltX Listed Firms

Leverage	Total Liabilities/ Net Assets	Total Liabilities/ Total Assets	Total Debt/ Total Equity	Current Liabilities/ Total Assets	Non-current Liabilities/ Total debt
Intercept	0.3061	0.1138	-0.1653	-0.0185	0.9881
	(0.6004)	(0.2190)	(3.2952)	(0.2953)	(0.1779)
LNSize	-0.0018	0.0209	0.0310	0.0187	0.0327
	(0.0534)	(0.0192)	(0.2949)	(0.02470)	(0.0156)*
CD_Tax	0.0031	-0.0066	-0.1458	-0.0042	-0.0088
	(0.0595)	(0.0189)	(0.4466)	(0.0181)	(0.0159)
AssetStruct	0.9840	0.3824	-0.8828	0.3794	-0.1125
	(0.3485)**	(0.1225)**	(1.9583)	(0.1484)*	(0.1065)
Profit	-1.1842	-0.3521	0.6575	-0.0251	-0.1252
	(0.2348)***	(0.0743)***	(1.8245)	(0.0702)	(0.0627)*
CD_Sector	-0.0522	-0.0278	0.2590	-0.0293	-0.0449
	(0.0291)^	(0.0108)*	(0.1595)	(0.01636)^	(0.0099)*
Probability (F-stat)	0.0000	0.0000	0.0100	0.0044	0.0000

*Notes: Robust standard error values are given in parentheses. ^Indicates significance at 10%; *indicates significance at 5%; **indicates significance at 1%; and ***indicates significance at 0.1%.*

Size

Consistent with prior literature, in JSE listed firms, size is found to be a significant and positive determinant of leverage (Rajan and Zingales, 1995, Booth et al., 2001, Chipeta et al., 2012, Gwatidzo et al., 2016) irrespective of how leverage is measured. Size was found to be significant for is significant at the 0.1% level for all measures of leverage for JSE listed firms. This result is interpreted to mean that the greater the size[84] the greater the leverage for JSE listed firms. Notably, size is shown to be significant for AltX listed firms only for one measure of leverage. It appears that size has a greater significance for a firm listed on the JSE. This may be due to external providers of finance viewing all AltX listed firms as "small"; a view that may be supported by the lower standard deviation of the size variable for AltX firms compared to JSE firms.

Taxation

Taxation[85] was found to be a significant determinant of capital structure for JSE listed firms for two of the five measures of leverage. For AltX listed firms, taxation was not found to be a significant determinant. This is consistent with the findings of Gwatidzo and Ojah (2009) where the tax variable was insignificant for South African firms. The predominantly negative coefficients for the various measures of leverage across both indices indicate that firms with higher taxation have lower levels of leverage. These negative coefficients may suggest that firms on both the JSE and the AltX are either not taking advantage of the tax benefits of debt or, consistent with Negash (2001), they are making use of non-debt tax shields. DeAngelo

[84] Measured as a natural logarithm of turnover

[85] Coded as -1 for low and 1 for high

and Masulis (1980) suggest that firms can also benefit from non-debt tax shields and that these credits can be substitutes for tax shield provided by debt.

As outlined the findings on the relationship between debt and taxes are varied. The finding in this study are largely consistent with those of Negash (2002) where a negative association between leverage and the tax variable was discovered.

Asset Structure

For firms across both bourses, asset structure is found to be positive and significant for three out of the five measures of leverage. The positive coefficient shows that the higher the tangible assets relative to total asset base, the higher the leverage. This may suggest that firms use their asset bases as collateral for debt, thereby reducing transaction costs associated with information asymmetry. Overall, the quantum of the coefficients for asset structure is much larger for AltX firms. This indicates that having tangible assets is more important for AltX firms as they have a greater need than JSE firms to provide collateral to providers of debt possibly as a result of increased information asymmetry.

Profitability

Consistent with prior literature (Lemma and Negash, 2011, Gwatidzo and Ojah, 2009), profitability is found to be a significant determinant of capital structure for JSE listed firms. Assuming profitability proxies for availability of internal resources, the predominantly negative coefficients suggest that the higher the profitability of the firm, the lower the leverage, supporting theories on pecking order. JSE listed firms appear to be using internal resources for financing, if these are available.

Interestingly, profitability is also found to be a significant determinant of capital structure in AltX firms. In fact, it is the only measure that was found to be significant at the 0.1% level for two measures of leverage for the AltX. It appears to have the strongest explanatory power of the variation in leverage of AltX listed firms. The negative coefficients provide strong support for AltX firms following the pecking order, possibly due to high transaction costs associated with debt or the inability to access it.

Although profitably is significant for both indices, the finding is of particular relevance to AltX firms. The descriptive statistics contained in this study showed a negative mean profitability for AltX firms, suggesting that the majority are not profitable. If AltX firms are likely to draw on their profits[86] as a first source of finance, if profits are unavailable, this may pose a severe constraint to their growth and survival. These inferences validate findings from prior research into South African SMEs in which difficulty in obtaining finance is regarded as a serious problem facing small businesses (Olawale and Garwe, 2010, Cant and Ligthelm, 2002).

Sector

Firm sector is found to be significant for both JSE and AltX firms. Firms appear to be adjusting their capital structure to their industry's benchmark. Lemma and Negash (2011) found leverage to be function of the average median leverage in a given industry. Firms in a

[86] Profitability is assumed to be a reasonable proxy for the availability of internal resources

given industry face a common set of forces which influence their financing decisions in a specific way.

CONCLUSION AND RECOMMENDATION FOR FUTURE RESEARCH

The first objective of this study was to investigate whether a difference in capital structure exists between firms listed on the JSE's main board and those listed on the AltX. The results indicate that, after controlling for other factors that may influence capital structure, a dissimilarity between AltX and JSE firms' capital structures does exist. This may suggest that the AltX may be only partially addressing the challenges that SMEs face when attempting to access finance.

The study then attempted to explain the variations in capital structure in more detail. Largely consistent with prior work, the study found support for the pecking order theory in both JSE and AltX listed firms. Notably, most AltX firms, although not profitable, prefer to exhaust internal sources of finance before using debt. Higher levels of debt in AltX firms may be indicative of financial distress and greater probability of default. Furthermore, AltX firms may experience greater liquidity risk[87] as they appear to rely more on current liabilities than their counterparts on the JSE.

The findings in this study may inform further research into SMEs – both listed and unlisted. In order to further assess the effectiveness of the AltX in providing access to finance to SMEs, a comparison of listed to unlisted SMEs is required. Although financial data on unlisted SMEs may not be readily available, qualitative research methods may be used to complement empirical research. While the findings in this study are a result of a carefully constructed analytical process, the inferences based on the findings are based on the author's interpretations as well as prior literature. Further, valuable insights are possible from conducting interviews with SME owners and managers.

This study's findings on taxation indicate the need for inclusion of non-debt tax shields as a measure of the effect of taxation on capital structure. Another future research direction is to expand the scope of the study to other developing economies with the objective of including country-specific factors which may influence capital structure decisions. This may be particularly useful when assessing the impact of the tax variable as country-specific legislation will, to a large extent, be controlled for by differing tax regimes.

[87] Current liabilities may be used to finance non-current assets, resulting in a timing mismatch between cash inflows and outflows.

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