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2017

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Sebastian, Avani (2017) Does the index matter? A comparison of the capital structures of firms listed on the AltX to those listed on the JSE, University of the Witwatersrand, Johannesburg, <https://hdl.handle.net/10539/24385>

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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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in partial fulfilment of the requirements for the degree of

Master of Commerce

University of the Witwatersrand

Abstract

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 also 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 was used and five measures of leverage were tested. The findings indicate that the exchange on which a firm is listed has an impact on its capital structure, with firms listed on the AltX having significantly higher levels of leverage than those listed on the JSE's main board. 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 generally less profitable than JSE firms and have less internal funds available. Moreover, AltX firms are found to be more reliant on more accessible short term financing than JSE firms, making them more susceptible to liquidity risks. This higher risk is congruent with the finding that the availability of tangible assets to offer as collateral appears to be a more significant determinant of leverage for AltX firms. The AltX was established to support growth of small and medium enterprises (SMEs) by enabling access to finance. Thus despite the establishment of the AltX, SMEs still face considerable constraints to accessing capital.

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

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Chapter 1: Introduction

1.1. Context and contribution of the study

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, Miller, 1977, Myers and Majluf, 1984, Jensen, 1986) 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 and provide competition to larger firms (Olawale and Garwe, 2010). Estimations indicate a probable contribution to GDP of more than 50% and a contribution to employment of more than 60% in South Africa (Falkena et al, 2007, Abor and Quartey, 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 (Falkena et al., 2007). 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).

Governments provide incentives to these firms as they are seen as making a significant contribution to the alleviation of poverty in the economies in which they operate (Cook and

Nixson, 2000). In South Africa, R3.9 billion was allocated to supporting the growth of SMEs in 2017 (Gordhan, 2017). Furthermore, South African SMEs have the potential to be an engine for black economic empowerment (Falkena et al., 2007).

In South Africa capital structure research has mainly focused on large listed companies trading on the main board of the Johannesburg Stock Exchange (JSE) (Correia and Cramer, 2008, Gwatidzo and Ojah, 2009, Lemma and Negash, 2011, Letsoenya and Negash, 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. The trade-off theory 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 (Kraus and Litzenberger, 1973). The low debt level in South African companies is despite the country's relatively sophisticated financial markets (Gwatidzo and Ojah, 2009, de Wet and Gossel, 2016). 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.

1.2. Statement of the problem

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, they encourage specialisation as well as acquisition and dissemination of information. Furthermore, well developed stock exchanges may mitigate the principal-agent problem by 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.

1.3. Research question

The research questions addressed by this study are as follows:

Is there a significant difference between the capital structures of firms listed on the AltX and those listed on the JSE's main board and if so, what are the factors driving the difference?

1.4. Assumptions, limitations and delimitations

This study considers only firms that are listed on the JSE and AltX. The findings may therefore not be credibly generalised to all firms in South Africa. Measurement proxies have been used for the estimation of explanatory variables as outlined in Section 3.2 of this study. The findings and interpretations thereof may vary if alternative approximations are used.

This study uses book values of leverage rather than market values. Bowman (1980) found that accounting measures of debt were not significantly different from their market values. Titman and Wessels (1988) conclude that an accounting measure may be a very good surrogate for market value of debt. It is therefore unlikely that the results of this study will be substantially different if market values had been used.

1.5. Definitions

Term	**Meaning**
AltX	The JSE's alternate board for SMEs was established in 2003. It provides a platform for SMEs to make their shares available for trading on a regulated market (JSE, 2013). The listing requirements of the AltX are more flexible than those of the JSE's main board (Van Heerden, 2015).
Leverage	The use of debt in the capital structure of a firm (Correia, 2015).
Information asymmetry	Refers to the case where firms have more information about their financial prospects than external parties. This asymmetry in information creates difficulty when firms try to raise funds (Damodaran, 2010).
Small and Medium Enterprise (SMEs)	According to the National Small Business Amendment Act (2003) an enterprise is defined as small if it has a maximum turnover of R13m and medium if its turnover does not exceed R64m, depending on the industry.
Term structure of debt	Refers to the duration before the principal amount of debt becomes payable.

Chapter 2: Background

2.1. Literature review

Financial theories such as those in Modigliani and Miller (1958), trade off, pecking order, agency, and information asymmetries 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[1] 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

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

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.

The rest of this chapter explains the theoretical and empirical reasons for including the chosen variables (leverage, listing, size, tax, asset structure and profitability) in the study by presenting findings from other empirical works of research. It explains various features of SME capital structure in relation to the capital structure theoretical framework. The results of prior empirical analysis appear to have yielded evidence of both positive and negative relationships between the chosen explanatory variables, control variables and leverage. This study will present perspectives from prior studies where differing findings were reached.

2.1.1. Leverage

In this study, leverage is used as the dependent variable to provide an indication of capital structure. Capital structure theories have different implications depending on how leverage is defined (Lemma and Negash, 2011, Harris and Raviv, 1991, Rajan and Zingales, 1995). Results from previous studies suggest that the debt duration varies as firm size changes. Therefore, separate measures are required for short term, long term and total debt respectively. Short term debt is measured using Current liabilities while long term debt is measured using Non-current liabilities. Total liabilities are used as the measurement proxy for total debt.

Consistent with Rajan and Zingales (1995), “net assets” used in the first measure of leverage is calculated as the total assets less “trade and other payables”. Therefore, an increase in the amount of trade payables will result in a reduction in this measure of leverage. This is useful in analysis as the level of accounts payable may be influenced by

industry considerations, this measure of leverage isolates these effects (Rajan and Zingales, 1995).

2.1.2. 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. Gwatidzo and Ojah (2009) suggest that enhancing institutional infrastructures would enhance capital structure decisions of firms in Africa. 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. These requirements are set out in Appendix 1. 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.

2.1.3. Term structure of debt

Prior literature indicates that the term structure of debt seems to vary between larger and smaller firms: smaller firms tend to rely more on short term financing. The apparent difficulty experienced by small firms in raising long term debt may be predicated on theories of information asymmetry (Titman and Wessels, 1988). 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).

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 because 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. 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.

2.1.4. Taxes

In the presence of corporate taxes, the capital structure irrelevance theory of 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. 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. Moyo et al. (2013) posit that profitable firms face increased tax payable, and they reduce this through the use of debt interest tax shields.

It is therefore uncertain whether tax rates will be positively or negatively correlated with leverage.

2.1.5. Size

The existence of bankruptcy costs associated with debt lead to the trade-off theory 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 (see 2.1.4 above) 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).

Prior literature links the cost of financial distress to the size of the firm. Prasad et al. (2001) takes size as a proxy for the inverse likelihood of default. In their study of JSE-listed firms, Holman et al. (2011) noted that firm size is related to the probability of default. It follows then that the larger the firm, the lower the probability of default. 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.

2.1.6. Asset structure

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. 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.

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).

2.1.7. 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 debt and, as a last resort, the issue of new equity. Firms therefore prefer internal sources of funding before exhausting their debt capacity. A possible explanation put forward is 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 (Rajan and Zingales, 1995, Booth et al., 2001, Bevan and Danbolt, 2002, Lemma and Negash, 2011). 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 financing 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 (Booth et al.,

2001, Prasad et al., 2001). These findings are supported by some studies on South African firms (Gwatidzo and Ojah, 2009, Lemma and Negash, 2011). In contrast, Moyo et al. (2013) found that a significant positive relationship between leverage and profitability of firms in the manufacturing, mining and retail industries.

Chapter 3: 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 and if so, what are the factors driving the difference. This study follows a quantitative method of research. The intention of quantitative research is to establish, confirm, or validate relationships (Leedy and Ormrod, 2012).

3.1. Sample and data

The sample for the study is based on panel data of the five year period from 2011 to 2015. It 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. This creates an unbalanced panel but in doing so, survivorship bias is eliminated (Brown et al., 1992). This was the same approach followed in prior studies (Rajan and Zingales, 1995, Bevan and Danbolt, 2004) where data was gathered from databases, which included companies that had delisted from their respective local market index.

Firms were selected from the JSE and AltX if they had financial data available for any period/s in 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 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

Following precedent (Lemma and Negash, 2011, Chipeta et al., 2012, Chipeta et al., 2013, Letsoenya and Negash, 2013), 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). Further detail on all the AltX firms used in the study is contained in Appendix 2. All data was managed using Microsoft Excel 2010 and statistical analysis was done in the software package, R (Croissant and Millo, 2008).

3.2. Data analysis

The panel data available for this study lends itself to panel data regression analysis (Baltagi, 2008). For the analysis, the fixed effects model and the random effects model were estimated. The choice between the models depends on the assumptions made about the error term. The random effects model assumes that the individual specific error component (or the individual heterogeneity) is random while the fixed effects model ignores the unit

specific residual (Gwatidzo and Ojah, 2009). In order to assess the suitability of each of the models, the Hausman test was conducted. The results of this test are detailed in section 4.2.

As indicated in Section 2.1.1, leverage is the dependent variable in this study. The linear regression models in this study were run separately using each of the five measures of leverage (Lev_1 to Lev_5) as detailed in Table 2 in this section.

Results from previous studies suggest that the debt duration varies as firm size changes. Therefore, separate measures are used for short term, long term and total debt respectively. Short term debt is measured using Current liabilities in Lev_4 (Current liabilities/ Total assets) while long term debt is measured using Non-current liabilities in Lev_5 (Non-current liabilities/ Total liabilities). Total liabilities are used as the measurement proxy for total debt in Lev_1 (Total liabilities/ Net assets), Lev_2 (Total liabilities/ Total assets) and Lev_3 (Total liabilities/ Equity).

Equation 1:

$$LEVERAGE(k)_{it} = \alpha + \beta1*(\ln(SIZE))_{it} + \beta2*(CD_TAX)_{it} + \beta3*(ASSETSTRUCT)_{it} + \beta4*(PROFIT)_{it} + \beta5*(CD_Listing)_{it} + \varepsilon_{it}$$

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. This equation is 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)
- ε_{it} is the normal error term.

- 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, holding all other major know determinants of capital structure constant. 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 determine the differences in factors affecting capital structure of AltX and JSE listed firms. Therefore, the regression analysis will be performed with AltX firms only and then with JSE firms only.

$$LEVERAGE(k)_{it} = \alpha + \beta1*(\ln(SIZE))_{it} + \beta2*(TAX)_{it} + \beta3*(ASSETSTRUCT)_{it} + \beta4*(PROFIT)_{it} + \varepsilon_{it}$$

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/Capital, Current liabilities/Total Assets, Non-Current liabilities/ Total Liabilities) with k = 1, 2, 3, 4 and 5. This equation is run ten times – once for each measure of leverage for JSE firms and once for each measure of leverage for AltX firms.

- ε_{it} is the normal error term.
- 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 (CD_TAX)	Tax paid (per the cash flow statement) / Profit before interest and tax	Lemma and Negash (2011)
Asset structure (ASSETSTRUCT)	Tangible / 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)

This study did not control for the state of the economy. During the period under analysis, there were no significant changes in gross domestic product quarter on quarter (Statistics SA, 2017) and no significant monetary policy changes.

This study analyses the effect of taxes on leverage, as explained in section 2.1.3. 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**	**Ratio of tax paid to profit before interest and taxes**	**Coded variable**
Positive	Positive	Greater than 14%	High
Positive	Positive	Lower than 14%	Low
Negative (receiving a refund)	Positive	n/a	Low[2]
Positive	Negative (loss)	n/a	Low[3]
Negative (receiving a refund)	Negative (loss)	n/a	Low

[2] These firms are not in a tax paying position and therefore unlikely to want to take on debt for its tax shield.

[3] Graham (1998) found that firms that were in distress were unlikely to enjoy the benefits of interest deductions.

3.3. 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).

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; 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 the tests are detailed in Section 4.2. Where the assumptions were not met, appropriate statistical techniques were employed to ensure that results were reliable.

Chapter 4: Results

4.1. 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 process detailed in section 4.2 of this study. Table 4 presents the descriptive statistics for the dependent variables. As with prior research, it provides evidence that the levels of leverage vary widely depending on how leverage is measured (Harris and Raviv, 1991, Rajan and Zingales, 1995, Bevan and Danbolt, 2002, Gwatidzo and Ojah, 2009, Lemma and Negash, 2011). This is apparent for both indices under analysis. Overall, companies on the AltX have higher levels of total 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.

Furthermore, the composition of leverage for JSE and AltX firms is rather different, also suggesting problems with access to capital for AltX firms. JSE firms make greater use of long term debt with a higher level of non-current liabilities to total liabilities than AltX firms. Long term debt may be more difficult to access but provides relatively less liquidity risk than short term debt for the firm. It appears that firms on the AltX have lower levels of non-current liabilities than firms on the JSE. AltX firms seem to use current liabilities as a major source of financing. They have a significantly higher current liabilities to total assets ratio. This is consistent with prior findings that firms prefer short term debt, possibly as it is easier to access (Gwatidzo and Ojah, 2009).

The standard deviations for all measures of leverage are higher for AltX firms, indicating more variations in the capital structures of these firms than JSE firms.

Table 4: 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 (Size, Profitability, asset structure, tax and listing) are provided in Table 5. Coded variables were used for the measurement of the Tax (CD_Tax), and Index listing (CD_Listing). Results from these coded variables may not be interpreted in the same way as the non-coded variables.

Table 5: Descriptive Statistics of the Independent Variables in Equation 2

Model 2: Independent Variables	Mean		Std. dev		JSE		AltX	
	JSE	AltX	JSE	AltX	Max	Min	Max	Min
LNSize	15.236	12.135	2.063	1.449	21.598	1.609	16.349	6.428
Profit	0.070	-0.108	0.369	0.662	0.693	-9.923	0.443	-7.806
AssetStruct	0.887	0.803	0.143	0.258	1.000	0.053	1.000	0.008
CD_Tax	0.364	-0.453	0.932	0.891	1.000	-1.000	1.000	-1.000
CD_Listing	n/a	n/a	n/a	n/a	1.000	1.000	-1.000	-1.000

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.

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.

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 on average, companies on the AltX are loss-making. Their average profitability is also less than firms on the JSE's main board.The greater standard deviation, recorded for AltX-listed companies, provides further evidence of the diverse range of firms on the index. The negative mean recorded for the coded tax variable indicates that most AltX firms are in low or non-tax paying positions. This is consistent with the low profitability of these firms.

4.2. Regression results

In order to test whether the assumptions of a linear regression model, outlined in Section 3.3, were met, several diagnostic tests were performed. 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). These plots are produced in Appendix 3 for each measure of leverage. Following close examination of the plots, outliers were identified for each of the five different measures of leverage. These were removed from the analysis.

Appendix 4 shows the observations which were removed for each respective measure of leverage.

For the panel data analysis in this study, the fixed effects model and the random effects model were estimated. The choice between the models depends on the assumptions made about the error term. The random effects model assumes that the individual specific error component (or the individual heterogeneity) is random while the fixed effects model ignores the unit specific residual (Gwatidzo and Ojah, 2009). 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 Hausman test may be used to detect autocorrelation (Gujarati, 2009). Autocorrelation is defined as correlation between members of series of observations ordered in time or space. Under this test, the null hypothesis is that there is no autocorrelation (Gujarati, 2009). 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 of the Hausman test, the random effects model was used. The results of this test, presented in Appendix 5, indicated that the fixed effects model was preferred in some instances while the random effects model was preferred in others. Each time a model was run, the results for both the fixed effects and random effects were recorded and are presented in Appendix 6. The results presented in this section are the results of the model that was chosen based on the Hausman test.

Heteroscedasticity may be detected using the Breusch-Pagan[4] test (Gujarati, 2009). For this study, the Breusch-Pagan test was conducted on both equations 1 and 2. The results are presented in Appendix 5. Where heteroscedasticity was detected, a robust covariance matrix was used to account for it (Croissant and Millo, 2008). The construction of the test

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

statistics using a robust covariance matrix allows more accurate inferences as the matrix allows for heteroscedasticity (Den Haan and Levin, 1997, Croissant and Millo, 2008).

According to Gujerati (2009), we do not test for multicollinearity but rather measure its degree in a particular sample. Furthermore, there is no single measure of multicollinearity. This study therefore presents the results of several indicators of multicollinearity. 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 is 0.48 suggesting minimal correlation between explanatory variables.

Table 6: Covariance matrix

	LNSize	*CD_Tax*	*AssetStruct*	*Profit*	*CD_Listing*
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

Source: Author's computations

In the context of several explanatory variables, reliance on simple pairwise correlations as indicators of multicollinearity can be misleading (Gujerati, 2009).Therefore, the Pearson Correlation coefficient and the variance inflation factor (VIF) were generated. If there is no collinearity, the VIF will be 1 (Gujerati, 2009). These indicators of multicollinearity are presented below and provide further evidence that no significant correlation existed between explanatory variables. All Pearson Correlation Coefficients were less than 0.7 (or more than -0.7) and all VIFs were less than 10 (Pallant, 2013, Gujerati, 2009).

Table 7: Pearson Correlations

Pearson Correlation	Size	CD_Tax	AssetStruct	Profit
Size	1.000	0.002	0.074	0.214
CD_Tax	0.002	1.000	-0.032	0.050
AssetStruct	0.074	-0.032	1.000	-0.035
Profit	0.214	0.050	-0.035	1.000

Source: Author's computations

Table 8: Variance Inflation Factors (VIFs)

	Collinearity Statistics	
	Tolerance	VIF
Size	0.948	1.055
CD_Tax	0.997	1.003
AssetStruct	0.991	1.009
Profit	0.949	1.053

The results from the regression equations are presented and discussed overleaf.

Table 8: 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	0.0268	0.0253	-6.0339	0.1441	-0.0613
	(0.1609)	(0.0864)	(2.2284)	(0.0721)	(0.1027)
LNSize	0.0326	0.0269	0.5382	0.0122	0.0356
	(0.0098)***	(0.0073)***	(0.2107)**	(0.0030)***	(0.0050)***
CD_Tax	0.0353	-0.0157	0.0367	-0.0041	0.0027
	(0.0181)^	(0.0079)*	(0.1775)	(0.0057)	(0.0075)
AssetStruct	0.3826	0.1128	1.0191	0.1471	0.2511
	(0.1259)	(0.0755)	(1.5712)	(0.0432)***	(0.060)***
Profit	-0.4540	-0.1001	0.7971	-0.1183	0.0291
	(0.0770)	(0.1288)	(1.035)	(0.0349)***	0.0324
CD_Listing	-0.1220	-0.0479	-1.0121	-0.1872	0.1337
	(0.0409)**	(0.0187)*	(0.5207)^	(0.0745)*	(0.0973)
Probability (F-stat)	0.0000	0.0000	0.0000	0.0000	0.0000
R Squared	0.0869	0.088	0.035	0.063	0.0831

*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%.*

4.2.1. 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 section 4.1 of this study. Index listing is found to be significant at the 1% level when measuring leverage as total liabilities scaled by net assets. It is significant at the 5% level when measuring leverage as total liabilities scaled by total assets and current liabilities scaled by total asset Considering the coding of the index variable[5], the negative coefficient indicates that companies on the AltX on average have higher levels of leverage than those listed on the JSE's main board, when controlling for other possible influences on capital structure.

[5] As explained in section 3.2 of this study, "CD_Listing" is a coded variable indicating either listing on the JSE (1) or the AltX (-1).

The higher levels of leverage for AltX firms may be as a result of them not enjoying the same access to capital as those listed on the JSE. According to Olawale and Garwe (2010) one of the main obstacles inhibiting SME growth is poor credit rating. These poor credit ratings may be as a result of lower profitability and the accumulation of too much debt (especially current liabilities). This would substantiate the findings of higher levels of leverage as well as a negative mean profitability detected in AltX firms in Section 4.1 of this study.

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 in raising both equity and debt finance (Moyo et al., 2013).

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). This lack of access to relatively less risky forms of finance may result in an increased cost of capital as a result of financial distress, compounding the difficulties that AltX firms face in accessing long term capital.

Having established that there is a difference in capital structure between the JSE and AltX listed firms, Sections 4.2.2 to 4.2.6 of this study aim to analyse the difference in more detail. To this end, results from equation 2 are presented and discussed.

Table 9: 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	0.0644	-0.0403	-5.7860	0.0328	0.1324
	(0.1458)	(0.0685)	(1.5378)	(0.0534)	(0.0865)
LNSize	0.0268	0.0319	0.4425	0.0124	0.0245
	(0.0078)***	(0.0070)***	(0.0821)***	(0.0029)***	(0.0061)***
CD_Tax	-0.0252	-0.0238	-0.0250	-0.0002	-0.0137
	(0.0137)^	(0.0082)**	(1.332)	(0.0055)	(0.0110)
AssetStruct	0.2820	0.0506	0.8740	0.1104	0.1810
	(0.111)*	(0.0778)	(1.0180)	(0.0448)*	(0.1091)^
Profit	-0.2400	-0.0438	0.5693	-0.1913	0.0893
	(0.0606)***	(0.1225)	(0.5826)	(0.0383)***	(0.0776)
Probability (F-stat)	0.0000	0.0000	0.0000	0.0000	0.0000
R Squared	0.0472	0.1113	0.0455	0.0752	0.0613

*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 10: 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	-0.0975	-0.1062	1.6612	-0.2649	0.8166
	(0.5607)	(0.2055)	(3.1501)	(0.2639)	(0.1852)
LNSize	0.0212	0.0320	-0.0860	0.0259	-0.0219
	(0.0522)	(0.0190)^	(0.2900)	(0.0246)	(0.0164)
CD_Tax	-0.0075	-0.0117	-0.0557	-0.0094	-0.0201
	(0.0522)	(0.0191)	(0.4462)	(0.0180)	(0.0166)
AssetStruct	0.8050	0.3096	0.2582	0.3912	-0.3492
	(0.3366)*	(0.1216)*	(1.8386)	(0.1497)*	(0.0993)***
Profit	-1.1925	-0.3531	0.7560	-0.0211	-0.1489
	(0.2365)***	(0.0755)***	(1.8357)	(0.0709)	(0.0660)*
Probability (F-stat)	0.0000	0.0000	0.9844	0.0075	0.0000
R Squared	0.2579	0.3351	0.0026	0.1221	0.2238

*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%.*

4.2.2. 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 at the 0.1% level for all measures of leverage for JSE listed firms. This means that the greater the size[6] the greater the leverage on average for JSE listed firms. Notably, size is shown to be significant for AltX listed firms only for one measure of leverage at the 10% significance level. 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 in Section 4.1.

4.2.3. Taxation

Taxation[7] 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. As outlined in Section 2.1.3, 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.

4.2.4 Asset Structure

[6] Measured as a natural logarithm of turnover as detailed in Section 3.2 of this study
[7] Coded as -1 for low and 1 for high as detailed in Section 3.2 of this study

For firms across both bourses, asset structure is found to be significant for three out of the five measures of leverage. The positive coefficients show 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.

4.2.5. 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. Section 4.1 showed a negative mean profitability for AltX firms, suggesting that, on average, these firms are not profitable. If AltX firms are likely to draw on their profits[8] as their

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

first source of finance and 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).

Chapter 5: 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 the major factors that have previous been found to influence capital structure, a dissimilarity between AltX and JSE firms' capital structures does exist. Although AltX firms on average have more total debt, this debt is more likely to be current liabilities. This suggests 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, AltX firms on average, although not profitable, prefer to use internal sources of finance rather than debt. When these firms do require finance, they appear to resort to short term debt, resulting in greater liquidity risk[9]. This makes them more susceptible to financial distress, increasing their cost of capital making it yet more difficult to access much needed long term finance.

The findings in this study may form a good basis for 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.

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

This study's findings that taxation is not a significant factor in determining capital structure highlights that this is an area for further research. Consistent with other studies, there seems to be a contradiction between the theoretical framework and the empirical results. Alternative measures of taxation may shed further light on this finding.

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. These country-specific factors may include bankruptcy laws, monetary policy and competition in the financial sector.

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Appendix 1: Listing requirements of the AltX and JSE

Listing Requirement	JSE main board	AltX
Share Capital	R25 million	R2 million
Profit History	3 Years	None
Pre-Tax Profit	R8 million	N/A
Number of Shareholders	300	100
Publication in the Press	Compulsory	Voluntary
Annual Listing Fee	0.04% of the average market capitalisation	R22,000

Source: JSE (2013)

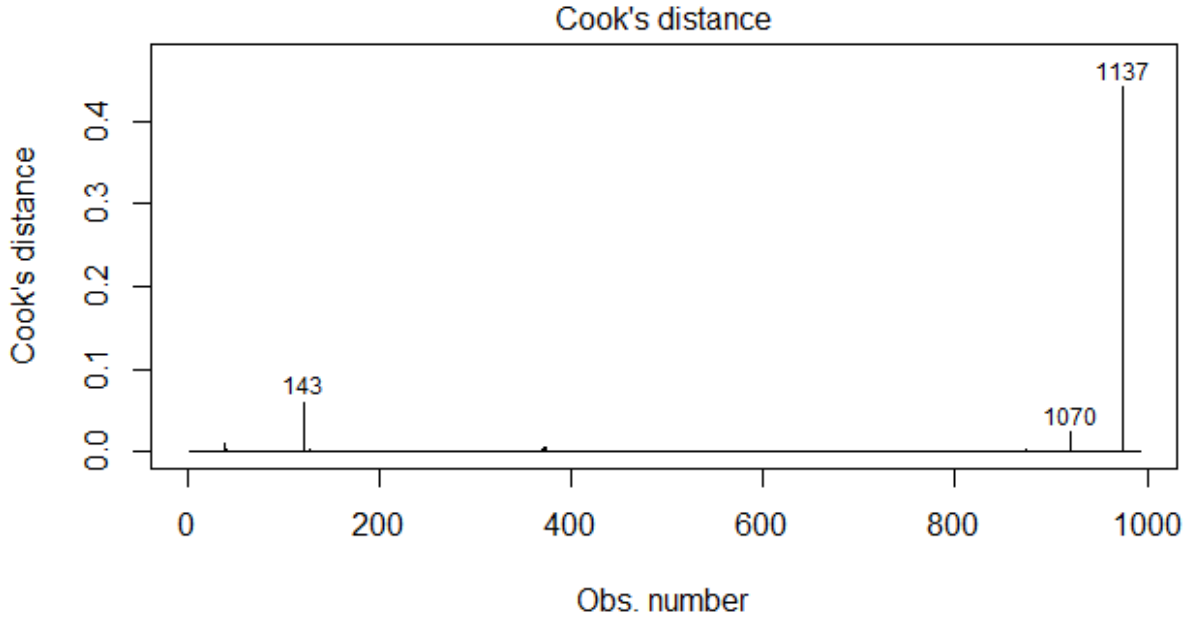
Appendix 2: Summary report: Data available on the INET database

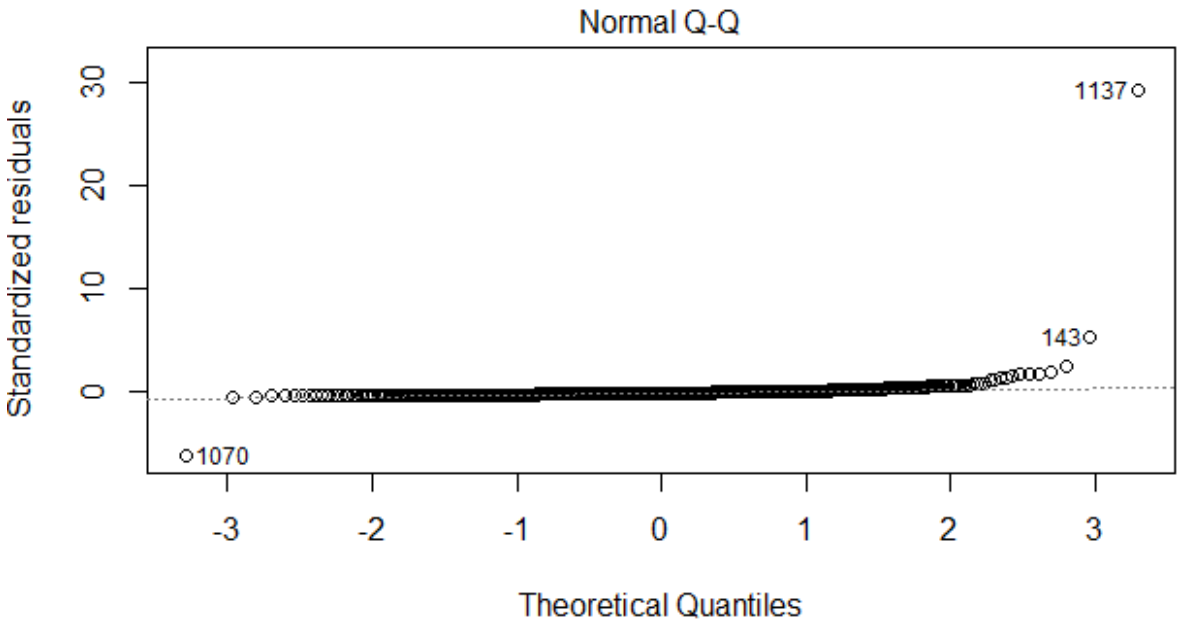
January 2017

Company Name	Financial Data Available				
	2011	2012	2013	2014	2015
Accentuate Ltd (ACE)	✔	✔	✔	✔	✔
Advanced Health Ltd (AVL)				✔	✔
AH-Vest (AHL)	✔	✔	✔	✔	✔
Alaris Holdings Ltd (ALH)	✔	✔	✔	✔	✔
Ansys Ltd (ANS)	✔	✔	✔	✔	✔
Beige Holdings Ltd (BEG)	✔	✔	✔	✔	✔
BSI Steel Ltd (BSS)	✔	✔	✔	✔	✔
Buffalo Coal Corporation (BUC)		✔	✔	✔	✔
Central Rand Gold Ltd (CRD)	✔	✔	✔	✔	✔
Chrometco Ltd (CMO)	✔	✔	✔	✔	✔
CSG Holdigs Ltd (CSG)	✔	✔	✔	✔	✔
Gooderson Leisure Corporation Ltd (GDN)	✔	✔	✔	✔	✔
Imbalie Beauty Ltd (ILE)	✔	✔	✔	✔	✔
ISA Holdings Ltd (ISA)				✔	✔
Jubilee Platinum Plc (JBL)	✔	✔	✔	✔	✔
Kibo Mining Plc (KBO)					✔
Mine Restoration Investments Ltd (MRI)			✔	✔	✔
Nutritional Holdings Ltd (NUT)	✔	✔	✔	✔	✔
Oasis Crescent Ltd (OAS)				✔	✔
PSV Holdings Ltd (PSV)	✔	✔	✔	✔	✔
Rare Holdings Ltd (RAR)	✔	✔	✔	✔	✔
Silverbridge Holdings Ltd (SVB)				✔	✔
Telemasters Holdings Ltd (TLM)	✔	✔	✔	✔	✔
WG Wearne Ltd (WEA)	✔	✔	✔	✔	✔
Workforce Holdings Ltd (WKF)	✔	✔	✔	✔	✔
Chemical Specialities Ltd (CSP)	✔	✔	✔	✔	
Alert Steel Holdings Ltd (AET)	✔	✔	✔		
Brikor Ltd (BIK)	✔	✔			
Total Client Services (TCS)	✔	✔	✔		
Giyani Gold Corporation (GIY)			✔	✔	✔
Zaptronix Ltd (ZPT)	✔				
IPSA Group Ltd (IPS)	✔	✔	✔	✔	✔
William Tell Holdings Ltd (WTL)	✔				
Erbacon Investment Holdings Ltd (ERB)	✔	✔	✔		
Africa Cellular Towers Ltd (ATR)	✔				
BioScience Brands Ltd (BIO)	✔	✔			
Muvoni Tech Group Ltd (MTG)	✔	✔			
B & W Instrumental and Electrical Ltd (BWI)	✔	✔	✔		
RGT Smart High Performance Decision Support (RGT)	✔	✔			
Insimbi Refractory and Alloy Supplies (ISB)	✔	✔	✔	✔	✔
Oline Holindings Ltd (OLI)	✔				
SA French Ltd (SFH)	✔	✔			
African Brick Center Ltd (ABK)	✔				
Hardware Warehouse Ltd (HWW)	✔	✔			
Racec Group Ltd (RAC)	✔	✔			

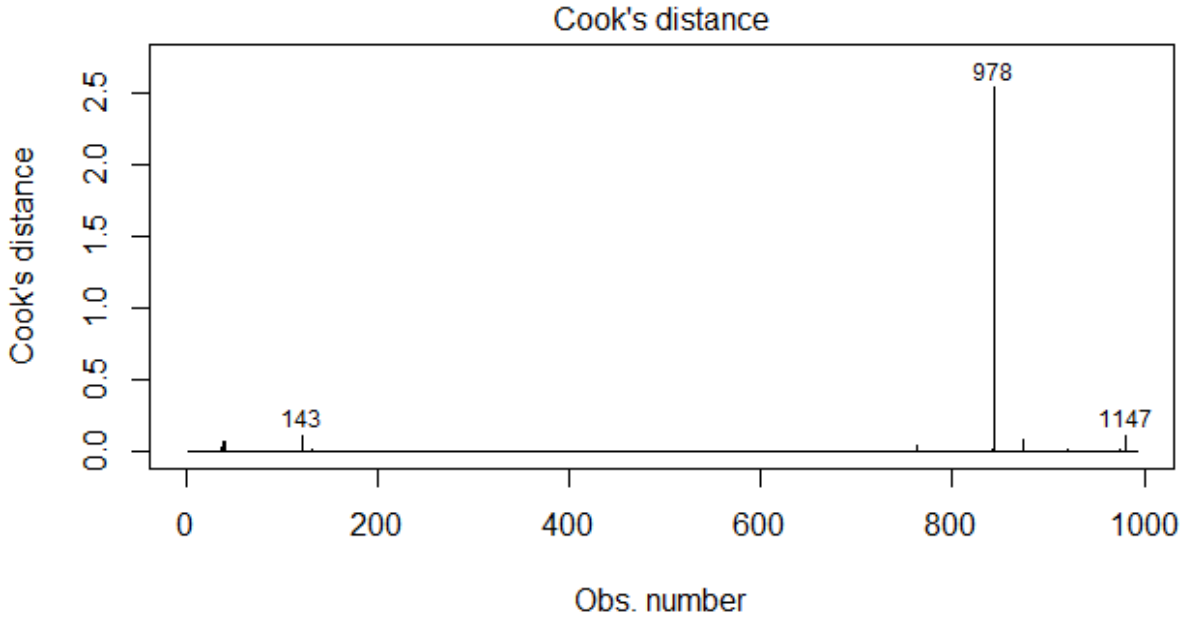
Appendix 3: Cooks Distance and Normal Q-Q Plots for each measure of leverage

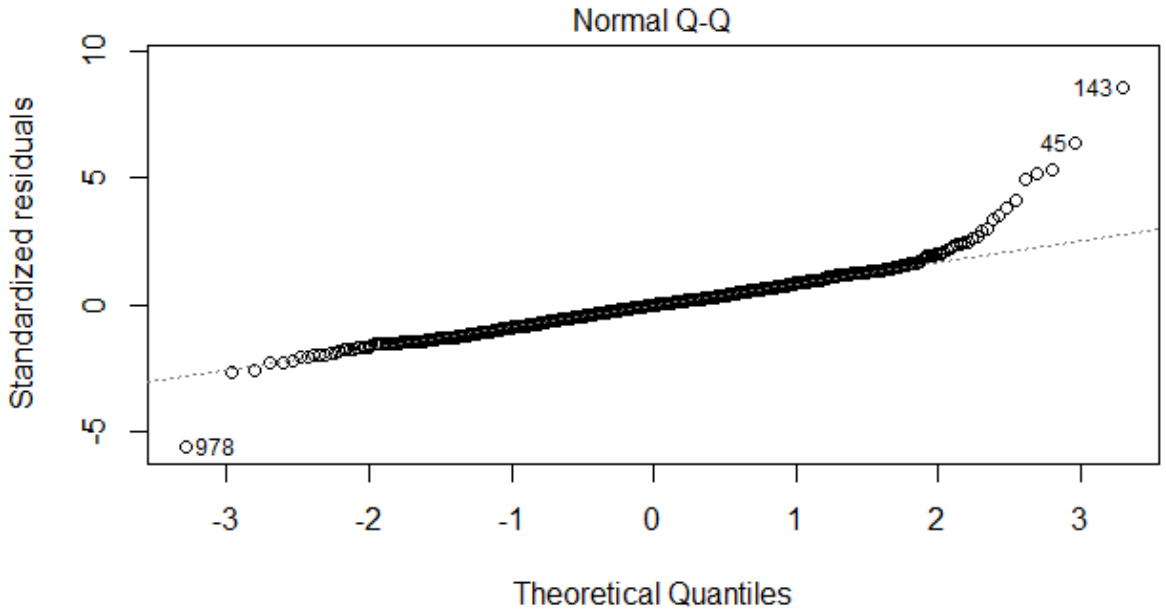
Total Liabilities/Net Assets (Lev_1)



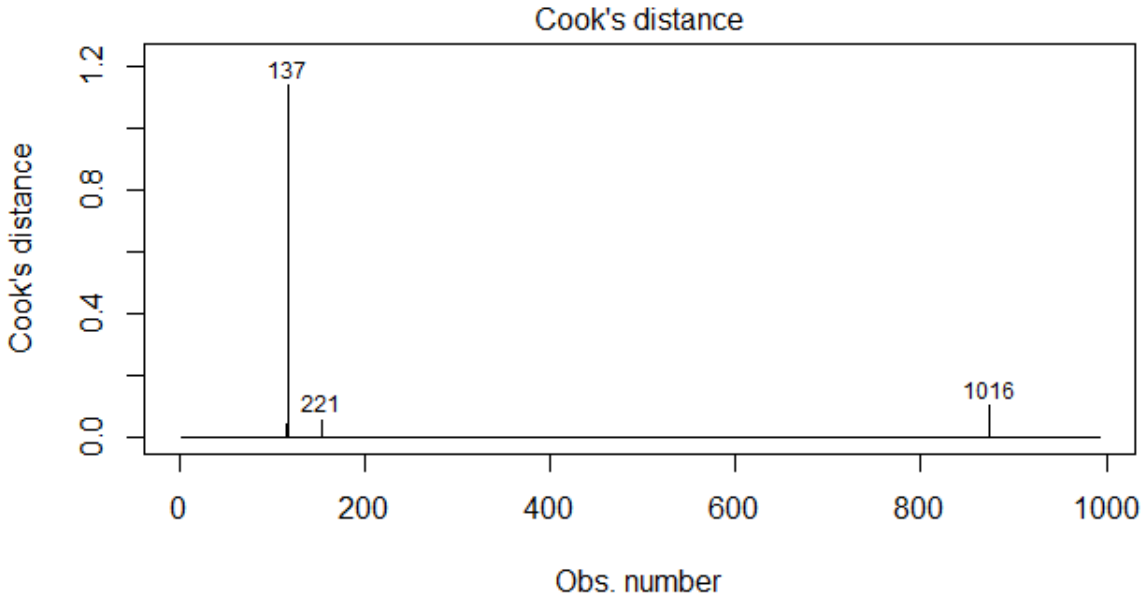


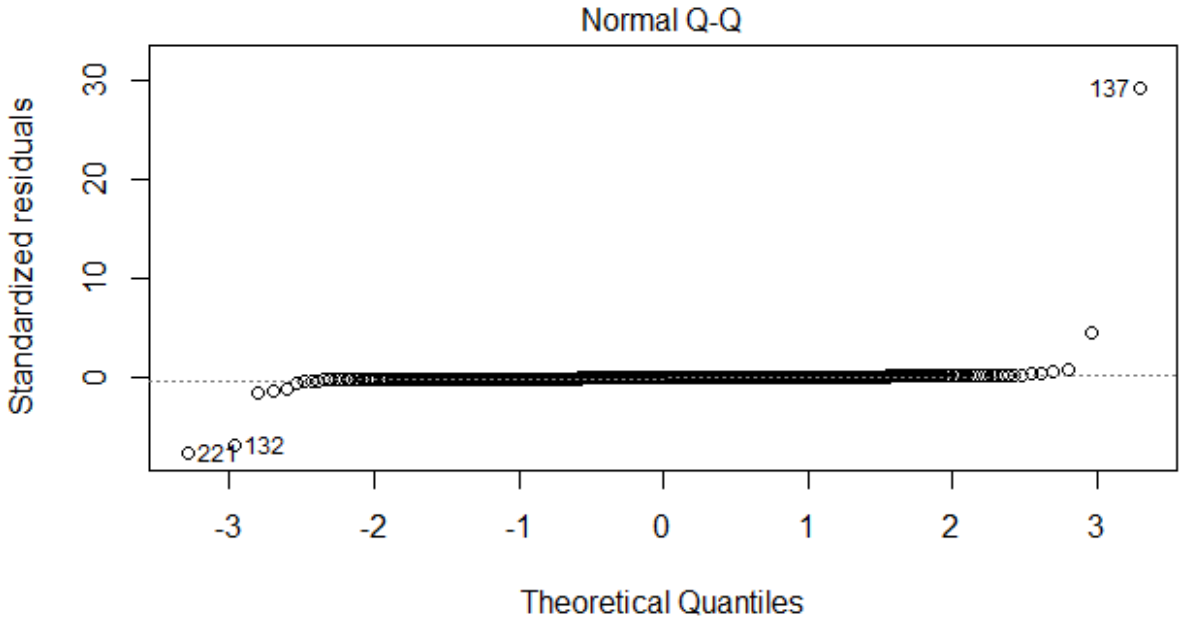
Total Liabilities/Total Assets (Lev_2)



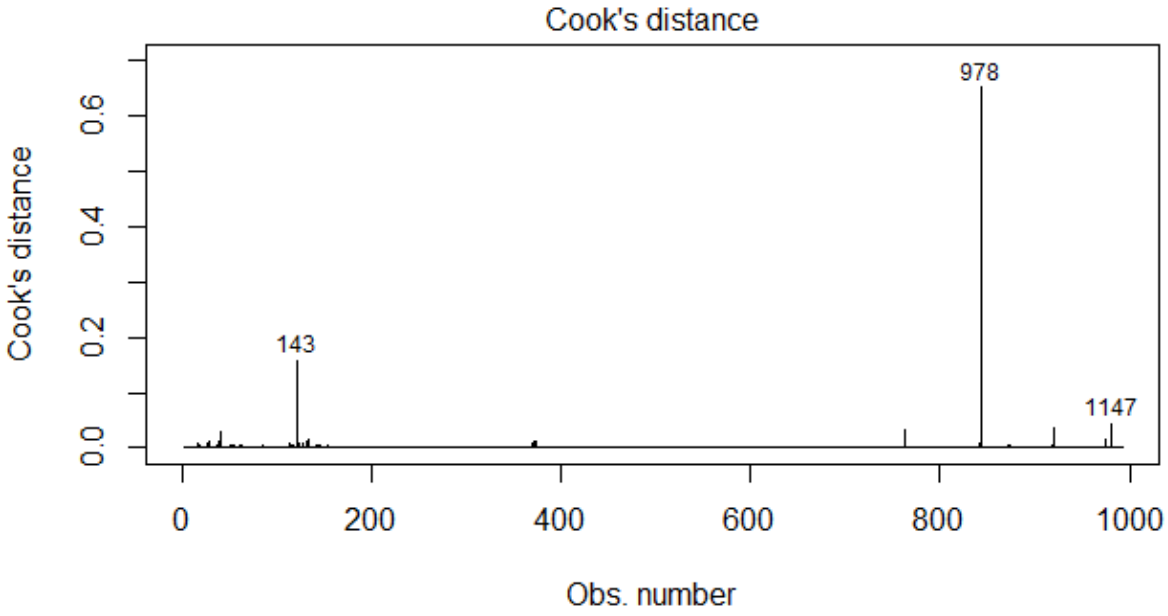


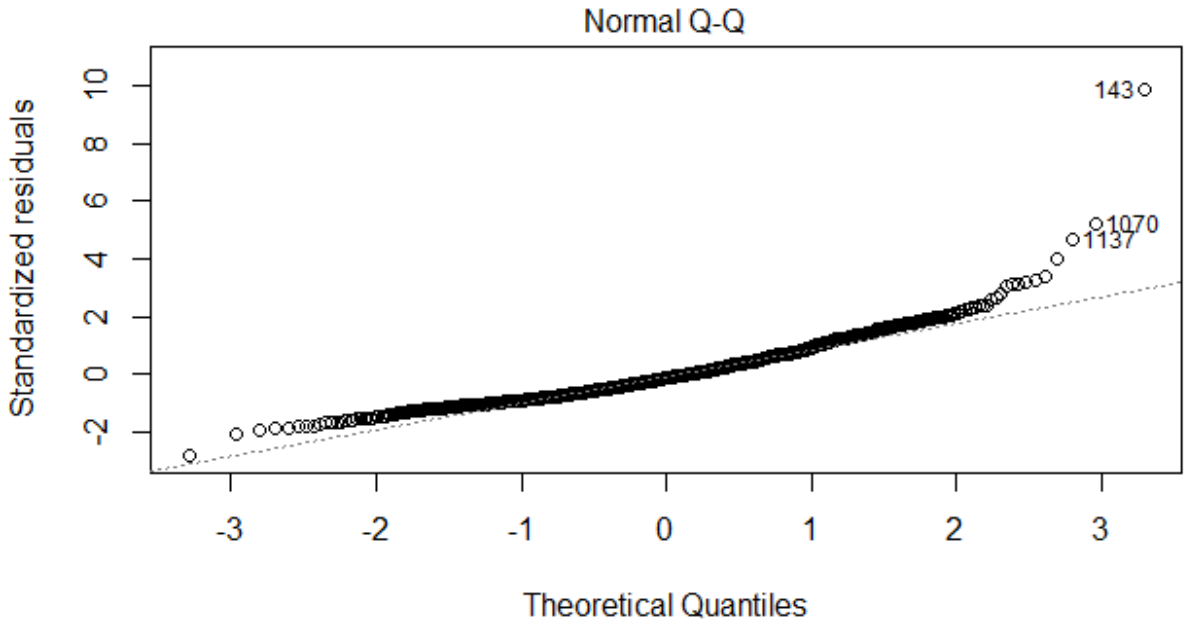
Total Liabilities/Capital (Lev_3)



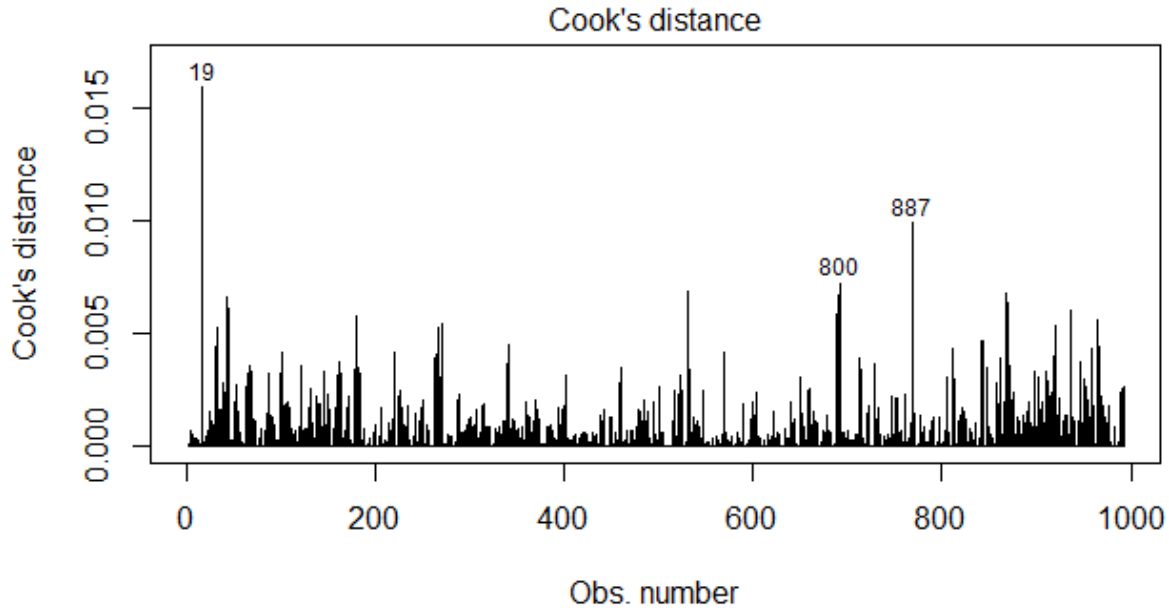


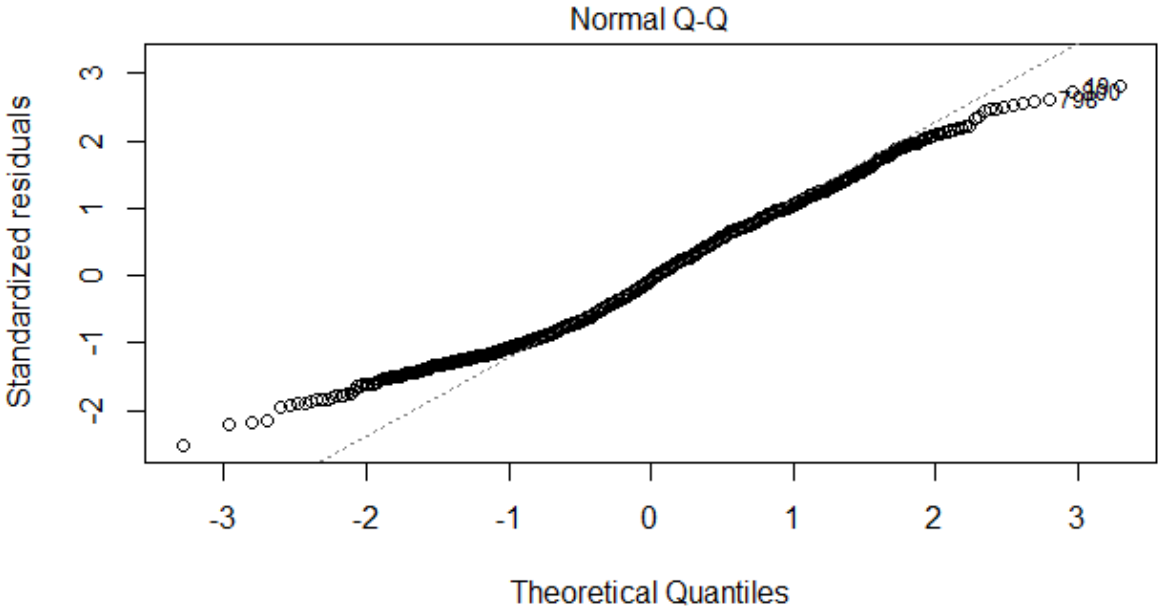
Current liabilities/Total Assets (Lev_4)





Non-Current liabilities/ Total Liabilities (Lev_5)





Appendix 4: Outliers for each measure of leverage

Observation	Lev_1	Lev_2	Lev_3	Lev_4	Lev_5	LNSize	CD_Tax	AssetStruct	Profit	CD_Listing
19	0.85	0.74	2.84	0.13	0.82	11.79	-1.00	0.67	-0.47	-1.00
45	3.36	1.66	-2.51	0.96	0.43	11.54	-1.00	0.86	0.22	-1.00
50	0.18	0.18	0.22	0.01	0.97	6.51	-1.00	0.06	-0.07	-1.00
132	1.69	1.01	-188.08	0.83	0.18	13.63	-1.00	0.98	-0.12	-1.00
137	1.23	1.00	795.35	0.80	0.20	11.81	1.00	0.96	0.09	-1.00
143	11.79	2.28	-1.78	2.24	0.02	10.71	-1.00	0.98	-0.26	-1.00
221	1.77	1.00	-208.78	0.76	0.24	12.72	-1.00	0.99	-0.05	-1.00
798	0.68	0.67	2.07	0.06	0.91	15.70	-1.00	0.99	0.07	1.00
800	0.71	0.70	2.32	0.04	0.94	16.04	-1.00	0.99	0.02	1.00
887	0.30	0.27	0.38	0.07	0.73	10.52	1.00	0.71	0.13	1.00
978	0.40	0.28	0.40	0.28	0.00	13.01	-1.00	1.00	-3.49	1.00
1016	1.51	0.99	126.99	0.34	0.65	6.02	-1.00	0.80	-1.11	1.00
1020	0.22	0.18	0.22	0.18	0.00	10.62	-1.00	0.23	-0.01	1.00
1070	-11.86	1.33	-4.07	1.20	0.09	13.67	-1.00	0.99	-0.42	1.00
1116	0.04	0.04	0.04	0.01	0.81	2.71	-1.00	1.00	-0.04	1.00
1137	59.99	1.49	-3.04	1.09	0.27	16.62	1.00	1.00	0.25	1.00
1147	0.06	0.06	0.06	0.04	0.21	4.96	-1.00	0.57	-1.97	1.00

Source: Author's computations

Appendix 5: Results from Hausman and Breusch-Pagan tests

Hausman Test

Equation 1	Total Liabilities/ Net Assets	Total Liabilities/ Total Assets	Total Debt/ Total Equity	Current Liabilities/ Total Assets	Non-current Liabilities/ Total debt
Hausman Test (p-value)	0.30901	0.004409	0.008523	0.001198	2.23E-10
Model chosen	Random Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
Equation 2 - JSE					
Hausman Test (p-value)	0.1764	0.02598	0.005447	9.17E-05	2.78E-05
Model chosen	Random Effects	Fixed Effects	Fixed Effects	Fixed Effects	Fixed Effects
Equation 2 - AltX					
Hausman Test (p-value)	0.4981	0.0766	0.9162	0.1442	0.493
Model chosen	Random Effects	Random Effects	Random Effects	Fixed Effects	Random Effects

Breusch-Pagan Test

Equation 1	Total Liabilities/ Net Assets	Total Liabilities/ Total Assets	Total Debt/ Total Equity	Current Liabilities/ Total Assets	Non-current Liabilities/ Total debt
Breusch-Pagan Test (p-value)	0.7123[a]	2.2E-16[b]	0.01493[b]	7.322E-11[b]	1.74E-09[b]
Equation 2 - JSE					
Breusch-Pagan Test (p-value)	0.000030[b]	2.2E-16[b]	0.07979[b]	0.0000015[b]	1.657E-09[b]
Equation 2 - AltX					
Breusch-Pagan Test (p-value)	0.0009916[b]	0.006969[b]	0.2653[a]	0.007692[b]	0.007952[b]

[a] No heteroscedasticity was detected

[b] A robust covariance was used to account for heteroscedasticity

Source: Author's computations

Appendix 6: Random effects and fixed effects results

Equation 1 Results (Random and Fixed Effects)

Leverage	Total Liabilities/ Net Assets		Total Liabilities/ Total Assets		Total Debt/ Total Equity		Current Liabilities/ Total Assets		Non-current Liabilities/ Total debt	
	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed
Intercept	0.0268	0.4138	0.0075	0.0253	-1.0526	-6.0339	0.0659	0.1441	0.1113	-0.0613
	(0.1609)	(0.2645)	(0.0556)	(0.0864)	(0.8220)	(2.2284)	(0.0466)	(0.0721)	(0.0673)^	(0.1027)
LNSize	0.0326	0.0128	0.0296	0.0269	0.1734	0.5382	0.0127	0.0122	0.0267	0.0356
	(0.0098)***	(0.0129)	(0.0033)***	(0.0073)***	(0.0513)***	(0.2107)**	(0.0027)***	(0.0030)***	(0.0040)***	(0.0050)***
CD_Tax	0.0353	-0.0482	-0.0156	-0.0157	0.0670	0.0367	0.0020	-0.0041	-0.0107	0.0027
	(0.0181)^	(0.0195)*	(0.0060)**	(0.0079)*	(0.1101)	(0.1775)	(0.0055)	(0.0057)	(0.0072)	(0.0075)
AssetStruct	0.3826	0.3503	0.1206	0.1128	0.4597	1.0191	0.1365	0.1471	-1.9270	0.2511
	(0.1259)	(0.1561)*	(0.04315)**	(0.0755)	(0.6559)	(1.5712)	(0.0375)***	(0.0432)***	(0.052)***	(0.060)***
Profit	-0.4540	-0.4595	-0.1265	-0.1001	0.4838	0.7971	-0.1276	-0.1183	0.0011	0.0291
	(0.0770)	(0.0836)***	(0.0258)***	(0.1288)	(0.4833)	(1.035)	(0.033)***	(0.0349)***	(0.0308)	0.0324
CD_Listing	-0.1220	-0.2158	-0.0812	-0.0479	-0.1878	-1.0121	-0.0706	-0.1872	0.0173	0.1337
	(0.0409)**	(0.2506)	(0.0149)***	(0.0187)*	(0.1688)	(0.5207)^	(0.01355)***	(0.0745)*	(0.0184)	(0.0973)
Probability (F-stat)	0.0000	0.0000	0.0000	0.0000	0.0068	0.0000	0.0000	0.0000	0.0000	0.0000
R Squared	0.0869	0.06299	0.16342	0.088	0.0161	0.035	0.10166	0.063	0.0715	0.0831

Equation 2 Results – JSE (Random and Fixed Effects)

Leverage	Total Liabilities/ Net Assets		Total Liabilities/ Total Assets		Total Debt/ Total Equity		Current Liabilities/ Total Assets		Non-current Liabilities/ Total debt	
	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed
Intercept	0.0644	0.1814	-0.0336	-0.0403	-1.4530	-5.7860	0.0517	0.0328	0.0912	0.1324
	(0.1458)	(0.1593)	(0.0584)	(0.0685)	(0.7893)^	(1.5378)	(0.0499)	(0.0534)	(0.0759)	(0.0865)
LNSize	0.0268	0.0191	0.0317	0.0319	0.1798	0.4425	0.0125	0.0124	0.0248	0.0245
	(0.0078)***	(0.0088)*	(0.0031***	(0.0070)***	(0.0420)***	(0.0821)***	(0.0026)***	(0.0029)***	(0.0040)***	(0.0061)***
CD_Tax	-0.0252	-0.0291	-0.0204	-0.0238	0.0791	-0.0250	0.0055	-0.0002	-0.0251	-0.0137
	(0.0137)^	(0.0142)*	(0.0058)***	(0.0082)**	(0.100)	(1.332)	(0.0054)	(0.0055)	(0.0077)**	(0.0110)
AssetStruct	0.2820	0.2898	0.0375	0.0506	-0.3190	0.8740	0.0839	0.1104	-0.1237	0.1810
	(0.111)*	(0.1206)*	(0.0455)	(0.0778)	(0.6296)	(1.0180)	(0.0407)*	(0.0448)*	(0.0585)*	(0.1091)^
Profit	-0.2400	-0.2434	-0.0600	-0.0438	0.2501	0.5693	-0.1814	-0.1913	0.0612	0.0893
	(0.0606)***	(0.0626)***	(0.0257)*	(0.1225)	(0.4598)	(0.5826)	(0.03698)***	(0.0383)***	(0.0333)^	(0.0776)
Probability (F-stat)	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
R Squared	0.0472	0.0469	0.0630	0.1113	0.0264	0.0455	0.1017	0.0752	0.0752	0.0613

Equation 2 Results – AltX (Random and Fixed Effects)

Leverage	Total Liabilities/ Net Assets		Total Liabilities/ Total Assets		Total Debt/ Total Equity		Current Liabilities/ Total Assets		Non-current Liabilities/ Total debt	
	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random	Fixed
Intercept	-0.0975	-0.1960	-0.1062	-0.1667	1.6612	0.9143	-0.1372	-0.2649	0.8166	1.0415
	(0.5607)	(0.9606)	(0.2055)	(0.2929)	(3.1501)	(4.9850)	(0.1710)	(0.2639)	(0.1852)	(0.2295)
LNSize	0.0212	0.0197	0.0320	0.0368	-0.0860	0.0861	0.0225	0.0259	-0.0219	-0.0369
	(0.0522)	(0.0895)	(0.0190)^	(0.0273)	(0.2900)	(0.4521)	(0.0159)	(0.0246)	(0.0164)	(0.0204)^
CD_Tax	-0.0075	0.0204	-0.0117	-0.0022	-0.0557	-0.1190	-0.0141	-0.0094	-0.0201	-0.0151
	(0.0522)	(0.0655)	(0.0191)	(0.0199)	(0.4462)	(0.5686)	(0.0170)	(0.0180)	(0.0166)	(0.0180)
AssetStruct	0.8050	0.9254	0.3096	0.2902	0.2582	-1.4198	0.3114	0.3912	-0.3492	-0.4100
	(0.3366)*	(0.5451)^	(0.1216)*	(0.1662)^	(1.8386)	(2.9731)	(0.1020)**	(0.1497)*	(0.0993)***	(0.1236)**
Profit	-1.1925	-1.0220	-0.3531	-0.2953	0.7560	0.7492	-0.0767	-0.0211	-0.1489	-0.1551
	(0.2365)***	(0.2582)***	(0.0755)***	(0.0787)***	(1.8357)	(2.5274)	(0.0671)	(0.0709)	(0.0660)*	(0.0702)*
Probability (F-stat)	0.0000	0.0003	0.0000	0.0000	0.9844	0.9846	0.0000	0.0075	0.0000	0.0000
R Squared	0.2579	0.1792	0.3351	0.2159	0.0026	0.0036	0.2486	0.1221	0.2238	0.2517