# The impact of firm size and industry on capital structure decisions

By

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**Abstract:**

This paper investigates the impact of firm size and industry on the capital structure of listed South African firms. It uses data obtained from firms listed on the Johannesburg Stock Exchange and tests trade-off theory and pecking order theory for firms of various sizes, firms in different industries and also tests for differences between debt maturities. Multiple fixed effect models are used to firstly test for the main factors that impact capital structure and secondly to test which sources of capital are preferred to finance a change in assets.

The analysis shows that firms of different sizes and firms that operate in different industries choose their capital structure in various ways. Larger firms are more highly geared debt more than small firms and smaller firms prefer to use internally generated funds. The two main capital structure theories, trade-off and pecking order, do not explain the difference in behaviour adequately. The paper also finds that similar factors impact both long-term and short-term debt.

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**Keywords:** [capital structure, firm size, industry, fixed effects]

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# 1. Introduction

The capital structure choice of a firm is one of the most important choices it can make, as it materially impacts the value of a firm through tax benefits and its cost of capital. A firm's capital structure choice also impacts the financial risk it faces as firms with lower levels of debt are more likely to be able to weather difficult economic times. This is not only a financial decision, but also a strategic decision that can have an impact on how much control and oversight external investors have over a business. A firm is free to choose its level of debt, but how firms choose their debt and at which level they should set their gearing has not yet been conclusively explained, even though capital structure has been studied for over 50 years.

This paper investigates whether firm size and industry impact the capital structure of listed South African firms. Specifically, it considers if firms follow trade-off or pecking order theory, if the capital structures of firms in separate industries are impacted by different factors and if the size of the firm impacts its capital structure choice. The paper also compares the factors that impact long-term and short-term debt.

Capital structure has been thoroughly researched both locally and internationally. This paper makes a contribution to the field as it considers a larger sample and a different time period when compared to many South African studies. Also, the use of Watson and Wilson's (2002) methodology, that tests how a change in assets is financed, has not been observed in other South African studies. This approach is different as it is a more defined test for pecking order theory, when compared to other methodologies.

The paper begins by explaining the evolution of Modigliani and Miller's (1958) capital structure theory from proposition I, which shows that a firm should be as highly geared as possible to maximise the benefit derived from their tax shield, to later propositions which introduce bankruptcy costs (Modigliani and Miller 1963). They show that these bankruptcy costs exceed the benefits derived from the tax shield at some point, so there is an optimal capital structure range which exists. Modigliani and Miller's theory was extended into trade-off theory over time and over multiple papers. This theory takes other costs into account when a firm's gearing increases. These other costs include the risks of customers and employees leaving due to the firm being too indebted, banks demanding that loans get

repaid if loan covenants are broken and the company being unable to raise future debt for expansion purposes.

The other mainstream theory that this paper considers is pecking order theory. Pecking order theory states that firms prefer to choose their sources of capital in a certain order. They specifically prefer internally generated funds, rather than debt funding and will resort to equity as a last resort. The reason for this specific order is that firms prefer sources of finance with lower levels of information asymmetry. High levels of information asymmetry, as is the case for equity, lead to higher costs and higher levels of investor monitoring and control. The literature review in this paper also briefly explains some less popular capital structure theories like agency, life-cycle, bootstrapping and market timing theory. These are not fully investigated in the quantitative section of the paper, since this is not the focus.

The empirical papers studying capital structure follow two main approaches. They either use regression techniques to investigate which factors impact the level of gearing or they focus on how a firm finances its change in assets. This paper uses both approaches as the first approach is better suited to compare which factors impact debt choices in different industries. The second approach is better at testing which theory fits the data.

Most papers focus on which variables determine capital structure. The main variables that come up repeatedly are the industry in which the firm operates in, the growth of the firm's revenue, the level of tangible assets on the firm's balance sheet, the profitability of the firm, the tax rate the firm faces and the size of the firm's revenue.

Papers which focus on South Africa show that South African firms tend to target lower gearing levels than would be expected from trade-off theory (Correira and Cramer 2008). There are significant differences in the gearing levels of firms in different countries, firms that operate in various industries and firms of different sizes. This paper contributes to this work by focussing on the gearing of firms in various industries and of different sizes. It also investigates the capital structure choice of South African firms after the 2008 recession, evaluates the two main capital structure theories and compares the debt maturity choices.

The financial statement data from firms listed on the Johannesburg Stock Exchange is sourced from McGregor BFA for 2009 – 2013. This is the most commonly used data source

used in South African empirical papers on this topic. A high level data description indicates that firms in different industries have different capital structure levels. Firms in the financial industry are the most geared, so they are excluded when the entire market is considered. A graph showing the average gearing levels of different industries over time shows that firms operating in different industries have reacted differently over time. The data also shows that firms in different industries have vastly different levels of intangible assets.

Based on the empirical papers in the literature review, the problem is analysed by building fixed effects models. These models consider which variables impact the capital structure of firms and how they finance the change in their assets.

Numerous fixed effect models are built as the data sample is split between industries and firm size in order to test if there are differences in coefficients. This method finds that the pecking order theory and trade-off theory do not adequately explain capital structure choice. It also shows variations in the ways that firms in different industries and firms of different sizes choose their capital structure. Smaller firms prefer internally generated funds in comparison to larger firms. The regressions are also split by current and long-term debt maturity to investigate if there are differences in the way firms that operate in different industries choose debt of different maturity as their operational needs and cash requirements vary. The significant variables and the size of the coefficients were relatively consistent between current and long-term debt and were found to be largely consistent with findings from other studies.

The remainder of this paper is organised as follows; in section 2 the literature of capital structure is discussed. This section considers and explains general capital structure theories and outlines the empirical approaches used to test for different determinants of capital structure. It then considers capital structure in the South African context and how, as per the literature, capital structure choices differ in different industries.

Section 3 discusses the research approach used to answer the research question. It starts with a discussion on the merits of quantitative and qualitative methods, then continues by describing the data and quantitative techniques used in this paper.

Presented in section 4 are the results from the completed analysis. Section 5 discusses the results and outlines what conclusions can be reached from the analysis and section 6 outlines limitations of this paper and gives suggestions on how this paper could be improved and where there is scope for future research.

The conclusions are summarised in section 7 and supporting information is shown in sections 8 and 9 in the form of the references and the appendix which contains descriptive statistics about the fixed effects models.

# 2. Literature review

## General theory

### Modigliani and Miller

Most discussions and academic papers on capital structure begin with a discussion around Modigliani and Miller's 1958 paper titled: *'The cost of capital, corporation finance and the theory of investment'*. Modigliani and Miller's Proposition I shows that capital structure is irrelevant to the value of a firm in a world with:

1. No taxes;
2. Equal corporate and private lending costs;
3. No transaction costs;
4. Perfect symmetric information;
5. No bankruptcy costs.

A common way of explaining this concept is to consider two homogenous firms with different capital structures. Firm one is fully financed through equity and firm two has a debt component. An investor should be indifferent between having holdings in either of the firms. If the investor held shares in the levered firm and learnt that firm one was offering better returns, then he would sell all his holdings in firm two and take out debt to buy the same holdings in firm one. The capital structure should be irrelevant to the investor's decision to buy into the firm.

Modigliani and Miller go on to show in a later paper that the arbitrage opportunity that existed in the example above, disappears when taxes are introduced. In a world with taxes, the value of a more levered firm will increase due to the benefit arising from a tax shield (Modigliani & Miller 1963). A firm can benefit by using the tax deductibility of the interest payments. This proposition implies that firms should increase their gearing as much as possible to increase their value.

Now consider a situation where interest rates increase due to increased bankruptcy risk. When a firm becomes more levered, the increasing interest rates, due to increased risk will at some point outweigh the benefit deriving from the tax shield (Modigliani & Miller 1963). This means the value of the firm will begin to decrease again and shows that there is an optimal range of debt where the tax shield benefits and the bankruptcy costs are similar. This implies that an optimal capital structure exists (Modigliani & Miller 1963).

Modigliani and Miller's 1958 paper is profound in that it started a new way of thinking about capital structure. The fact that many of the assumptions in the model are unrealistic is irrelevant. As Merton Miller puts it: *"The minute you start questioning the assumptions underlying the model you leave the world of pure logic behind. You have gone from deduction to induction, from an ideal world to the empirical world were terms like true or false no longer apply"* (Miller 1998). Models following this seminal paper disagree with some of its findings and empirical work show mixed findings. This does not draw from the fact that these models are logically sound.

Research following in Modigliani and Miller's footsteps is not about trying to justify or examine the set of assumptions, rather it is focussed on finding previously unrelaxed assumptions (Frank & Goyal 2005).

### Trade-off theory

Trade-off theory is an extension of the Modigliani and Miller theorem (Frank & Goyal 2005). It states that firms will choose their capital structure based on the benefits and costs of debt (Lemmon & Zender 2008). Some of these costs have been mentioned above, but trade-off theory includes the direct costs mentioned under Modigliani and Miller and it includes other indirect costs.

Trade-off theory also takes indirect costs of bankruptcy into account from different stakeholders' viewpoints. For example, if a company is highly indebted then the customers may leave, as the company becomes less able to fulfil its warranty obligations. Employees may become demotivated or eager to leave if the perceived risks of the firm becomes too high. Banks may demand that loans get repaid if loan covenants are broken or the company may struggle to raise financing for future projects (Frank & Goyal 2005).

The idea underlying trade-off theory is that the cost of debt is low at low levels of gearing. As the company takes on more debt, the associated direct and indirect costs of the debt increases. This results in there being an optimal range of debt, like in Modigliani and Miller's (1963) theory.

Trade-off theory implies that safer firms will be more highly levered than riskier firms. Firms with low bankruptcy costs will find their optimal capital structure at a higher debt-equity ratio (D/E ratio) than riskier firms (Shyam-Sunder & Myers 1999).

Firms with high levels of collateral tend to benefit by having access to lower debt costs, so according to trade-off theory firms with high levels of tangible capital will have more debt (Frank & Goyal 2009). It is interesting to note that this also implies that more unique firms will be less levered. If a firm owns machines and expertise that are not easily transferable in the case of a bankruptcy, then these will have to be sold at a discount, increasing bankruptcy costs (Titman & Wessels 1988).

Firms with high levels of intangible assets are less likely to take on debt as the intangible assets cannot support the debt. The value of intangible assets is impacted by those who own and manage them. This means it is not always appropriate to be financed through debt. Intangible assets are more likely to be financed through equity and therefore a negative relationship between debt and intangible assets could theoretically be expected (Lim, Marcias & Moeller 2014).

In their quantitative study, Lim *et al.* (2014) found that a positive relationship exists between intangible assets and leverage. Intangible assets that generate cash may be collaterised, however intangible assets are funded by half the debt levels of a tangible asset of equal value.

There has also been an investigation into dynamic trade-off theory. These models try and take expectations and adjustment costs into account (Frank & Goyal 2005). These models suggest that even small transaction costs can lead to delays in rebalancing and wide variations in the debt ratio. In the United Kingdom, it has been found that firms adjust relatively quickly to their target capital structure (Ozkan 2001).

### Pecking order theory

The main alternative theory to Modigliani and Miller's theory (and other expansions) is pecking order theory. This theory states that firms will acquire financing from their safest sources first (Myers 1984) and in a specific order of preference. Companies would prefer financing from internal sources like cash reserves and retained profits first. Firms may then adapt their dividend policy to increase the amount of cash available to finance assets. This is of course only possible if the dividend policy is flexible. Once internal sources have been exhausted a firm will use debt to finance assets. Then the firm will issue convertible debt and preference shares. Firms issue equity as a last resort.

Assuming that a company's management wants to maximise current shareholder value, they will not want to take on new investors (i.e. issue new equity), as this could dilute the holdings of current shareholders. Management will prefer to use internally generated funds and they will then issue debt. They will only issue equity as a last resort, if they have a bearish outlook. If the company's management has a more pessimistic view, then they will be more likely to issue equity, since it will benefit shareholders that hold equity before more is issued (Watson & Wilson 2002).

Firms prefer internal financing over external financing due to information costs and adverse selection issues (Frank & Goyal 2003). Information costs arise due to information asymmetries between management and outsiders. Information asymmetries raise the cost of external financing over the cost of internal funds (Dhawan 1997).

Once it is clear that external funds are needed, managers begin with debt financing due to its lower information costs. Asymmetric information may lead to higher lending costs from financiers who do not have as clear an insight into the company as its management. These increased rates can cause an adverse selection problem for the financiers, as only less desirable firms find these interest rates acceptable.

Managers will prefer sources of capital where they do not have to issue information and that will subject them to investor monitoring or control (Shyam-Sunder & Myers 1999). This theory also predicts that the debt with shorter maturities will be issued first as they have lower information costs (Frank & Goyal 2003). Equity has the highest information cost, so is always chosen last. Outside investors will always demand the highest return from equity.

Equity is generally one of the most expensive methods to raise new capital for an established business. Firms will only raise equity capital once their debt capacity has been reached. This is the point where raising more debt is no longer feasible (Frank & Goyal 2005). Firms with overpriced equity are most likely to want to issue debt, causing another adverse selection problem for the issuers of the debt (Frank & Goyal 2005). The main difference between pecking order theory and trade-off theory is that pecking order theory implies that there is no target capital structure, however it does agree with other financial theories.

Exceptions to pecking order theory have been found in different countries, for example Chen (2004) found that Chinese firms tend to follow a 'new pecking order theory' where the firms prefer equity over debt. The underlying assumptions of pecking order theory do not seem to hold in China. Debt is restricted and overseen by the state and equity financing is regarded as less binding (Chen 2004). This implies that different countries with different preferences could determine their capital structure in different ways.

Pecking order theory is persuasive, but like Modigliani and Miller's theory it does not pass all empirical tests. Shyam-Sunder and Myers (1999) find that pecking order theory has much more explanatory power than trade-off theory, but they do admit that it does not show the full picture. Their model is disputed by Frank and Goyal (2003) due to a small sample size. Shyam-Sunder and Myers (1999) also find that small high growth firms do not follow pecking order theory.

### Alternate theories

Less mainstream theories can also be found. Agency theory, which is normally included in trade off theory, states that high growth firms will experience higher agency costs and have a tendency to invest sub-optimally in order to extract wealth from shareholders (Johnsen &

McMahon 2005). This would mean that high growth firms would be less likely to take on more debt.

Signalling theories largely agree with pecking order theory. The issuing of debt would imply that equity is overpriced (Chen 2004). It also implies that profitable firms with low investment opportunities will decrease their debt ratios and firms who are growing faster will use debt to finance investment opportunities as their retained profits cannot keep up (Shyam-Sunder & Myers 1999).

Life-cycle theory states that differences exist between growth and non-growth industries and between traditional and non-traditional industries. Each of these industries are in different life cycles and as a result choose their financing differently (Johnsen & McMahon 2005).

Alternate resource and bootstrapping theories state that firms with high levels of fixed assets are less likely to make use of bootstrapping (short-term financing). Capital intensive industries will have easier access to long-term financing, which will reduce the need for short-term finance (Johnsen & McMahon 2005).

Market timing theory has regained popularity in the last few years (Frank & Goyal 2009). It states that managers will source capital from the market that appears the most favourable. It does however ignore most factors that are used in traditional corporate structure models, and suggests that market conditions play a large role (Frank & Goyal 2009).

# Empirical studies

## Testing capital structure theories

According to trade-off theory one would expect the firm to follow a target capital ratio. This means that the best predictor of current debt is last period's debt (Watson & Wilson 2002):

$$\left(\frac{Debt}{Total\ Assets}\right)_t = \propto + \beta \left(\frac{Debt}{Total\ Assets}\right)_{t-1} \quad (1)$$

In a perfect capital structure targeting world, one would expect $\propto = 0$ and $\beta = 1$. Estimating the individual costs associated with trade-off theory have proven to be much more difficult to measure and quantify (Watson & Wilson 2002).

In Watson and Wilson's (2002) paper they investigate trade-off theory by considering the change in a firm's holding of major asset classes. This method allows them to understand how a change in assets is financed. They then decompose any changes in these holdings into expected and unexpected changes (Watson & Wilson 2002).

To investigate pecking order theory they consider the firm's growth rate and the relevant changes in their holding of different asset classes. To do this they consider the standard accounting identity:

$$Total\ assets\ (TA_t) = Equity\ (E_t) + \ Debt\ (D_t) \qquad (2)$$

They then manipulate this to show firm (*i*)'s growth in assets with equity broken down into new equity issued (*NE*) and retained profits (*P-Div*):

$$\frac{TA_{it}-TA_{it-1}}{TA_{it-1}} = \propto_i + \frac{\beta_1(P_{it}-Div_{it})}{TA_{it-1}} + \ \beta_2(NE_{it}/TA_{it-1}) + \frac{\beta_3(D_{it}-D_{it-1})}{TA_{it-1}} \qquad (3)$$

If $\beta_1 = \beta_2 = \beta_3$ then trade-off theory holds, because the D/E ratio will have remained constant. If $\beta_1 > \beta_3 > \beta_2$ then pecking order holds, because retained earnings are preferred to debt and debt is preferred to issuing new equity (Watson & Wilson 2002). They take this further by considering short-term debt and long-term debt separately. Short-term debt has fewer informational requirements and is therefore preferred to long-term debt.

It can be difficult to differentiate between pecking order and trade-off theory at high debt levels, since under pecking order theory firms are more likely to issue equity and under trade-off theory they may be adjusting to their capital structure target (Shyam-Sunder & Myers 1999).

Watson and Wilson (2002) find that pecking order theory tends to hold amongst small and medium size enterprises (SMEs) and that there is a preference for specific debt types as well. Alternatively, the pecking order theory can be viewed as follows:

$$\Delta D_{it} = a + \ \beta_{PO} DEF_{it} \qquad (4)$$

Where $\Delta D_{it}$ is long-term debt issued and $DEF_{it}$ is the funds flow deficit (Shyam-Sunder & Myers 1999). The funds flow deficit can be defined as:

$$DEF_t = DIV_t + \ X_t + \ \Delta W_t + R_t - C_t \qquad (5)$$

Where $DIV_t$ are dividends, $X_t$ are capital expenditures, $\Delta W_t$ is the change in working capital, $R_t$ is the current portion of long-term debt due in the coming year and $C_t$ is operational profits (Shyam-Sunder & Myers 1999). Under pecking order theory one would expect $\beta_{PO} = 1$ and $a = 0$ when $DEF_{it} < 0$.

These are not accounting identities, because they exclude equity. It is not a problem if $DEF_{it} > 0$. Excess funds can be redistributed back to shareholders in the form of a dividend and outstanding debt can be paid off. In theory, it could get to a point where the firm is a net lender (Shyam-Sunder & Myers 1999). These models tend to exclude equity, since they are regarded as a capital source of last resort. The equation may not hold at extreme ends of the debt-equity ratio, but it should be reasonable at moderate gearing levels (Shyam-Sunder & Myers 1999).

Shyam-Sunders & Myers (1999) also consider splitting out the funds flow deficit into an expected and unexpected portion:

$$DEF_t = E_{t-1}[DEF_t] + Z_t \quad (6)$$

where $E_{t-1}[DEF_t]$ is the expected funds flow deficit expected at time *t-1*. $Z_t$ represents the unexpected portion of the funds flow deficit. They argue that the unexpected portion of the funds flow deficit might be a good indicator of debt changes, if it is difficult for the firm to change its equity position quickly. Their analysis shows that firms tend to fund expected shortfalls through debt and could use unexpected gains to reduce their planned increase in debt.

To test their model they create two sets of data generated from hypothetical firms using a Monte Carlo simulation. One of these sets describes debt issuance as per trade-off theory, the other describes debt issuance as per pecking order theory. The logic is that if the pecking order model has statistical significance in the trade-off theory dataset, then the model should be rejected (and vice versa). It is found that the pecking order theory is rejected correctly in all cases, whereas the trade-off model is likely to be accepted even when the hypothetical dataset is following pecking order theory rules (Shyam-Sunder & Myers 1999). Their view is that the data may be serially correlated and dividends are sticky making it appear that the firm is following a trade-off theory approach. This could mean that

some past work presenting trade-off theory as fitting the data may have been showing spurious and sticky relationships.

## Main determinants of capital structure

Frank and Goyal (2009) conducted research on the main predictors of capital structure. They started with a large number of factors that could indicate the different theories and used more than 50 years of data on American firms to reduce this list to show the main variables that determine capital structure.

The main determinants according to them are industry, growth, tangibility, profitability, firm size, inflation and dividends. Frank and Goyal (2009) found that firms operating in an industry with high leverage will also tend to be highly leveraged. High growth firms and firms that are more profitable tend to be less levered, as they have more retained income to finance assets. They measured growth using a market-to-book ratio. Firms who have lower levels of intangible assets tend to be more highly levered. Companies take on higher levels of debt in economic states of high inflation as the debt becomes cheaper in real terms. Higher inflation levels erode the real value of the debt making debt financing cheaper.

Firms that pay dividends are less levered than firms that do not pay debt. The impact of dividends is not explained properly in their paper, as admitted by them, but they do find it to be statistically significant (Frank & Goyal 2009). They further suggest that more investigation is needed in this area, as the current theory is ambiguous on this point (Frank & Goyal 2009). Ozkan (2011) also finds no empirical relationship between firm size and the amount of debt a company takes on.

## Inter-industry capital structure differences

Industry differences in capital structure choices should be observable based on the mainstream theories outlined above. Differences in the collateral they hold or the resale value of their assets can impact their capital structure. Inter-industry differences could reflect managers using the industry average as a benchmark, alternatively it could mean that the industry reflects a set of correlated but omitted variables such as asset types, business risk, technology or regulation (Frank & Goyal 2009).

Studies in Australia have found inter-industry differences to be significant and that these differences are more significant among short-term debt than among long-term debt (Johnsen & McMahon 2005). This study also suggest that firms try to match their assets structure to their liabilities, causing the difference in debt maturity choices between industries (Johnsen & McMahon 2005).

Johnsen and McMahon (2005) find that the firm's industry does impact how much short-term and long-term debt it takes on. The impact on the short-term debt decision was particularly pronounced in the construction, wholesale and trade industries. The impact on the long-term debt decision was strongest in the manufacturing, retail trade, transportation and storage industries.

### African and South African studies

As this paper considers South African firms it is necessary to consider what has happened in South Africa and the rest of the African continent. Correira and Cramer (2008) conducted a survey of 28 South African firms focussing on their capital budgeting, cost of capital and corporate structure policies. They published the following graphs in their paper:

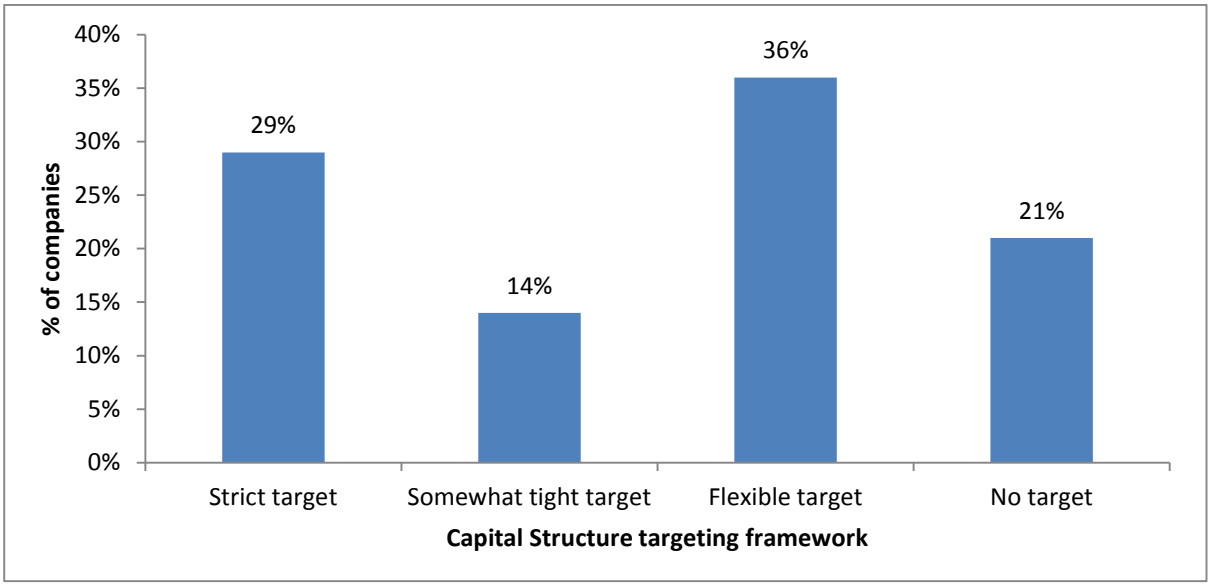


Figure 1: Do firms follow a target capital structure?

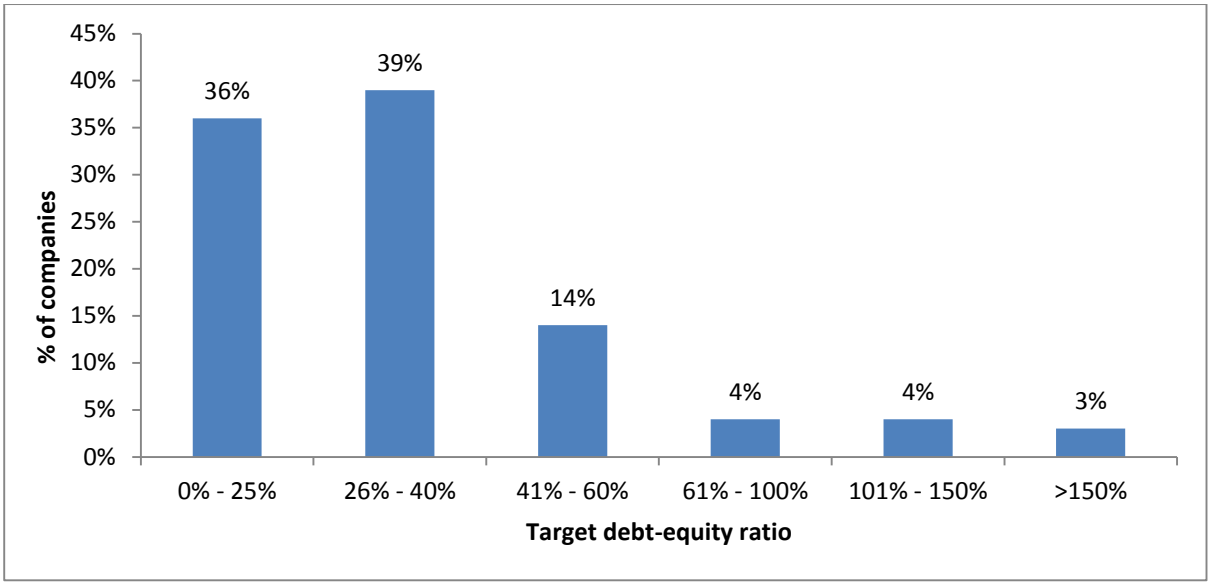


Figure 2: Target debt-equity ratio of South African firms

If the results from this small sample can be generalised, then it looks as if South African firms tend to target a low debt-equity ratio. Correira and Cramer (2008) state that this target appears to be too low from what would be predicted from trade-off theory. They argue that this may be due to local firms facing limited growth potential, an unwillingness to expand to international markets and historically high real interest rates. They argue that the fact that private equity firms use such high levels of gearing for financing the purchase of companies implies that these firms are utilising too little debt (Correia & Cramer 2008).

Naidu (1986) found that there is no significant difference in capital structures across industries in South Africa, but there were significant differences of firms in different industries in Australia. The same paper also found that Australia and South Africa follow distinctly different capital structure strategies when choosing long-term debt, but not when choosing short-term debt (Naidu 1986).

Theories that use agency cost and information asymmetries to explain capital structure, like pecking order, are more likely to fit empirical data in an African context (Gwatidzo & Ojah 2009). The thinking is that these costs are more material in less developed markets with lower levels of legal protection.

Gwatidzo and Ojah (2009) use a different approach for their model than presented above. They use a regression to determine the firm's leverage by using the tangible asset ratio, tax rate, firm profitability, firm size and firm age as the independent variables.

For South Africa, they find that profitability is negatively related to debt. Presumably this is due to the firms having more retained income to finance their assets. Larger firms are more likely to take on more debt. Firms with lower tangibility ratios use more debt, but they found that the tax rate is not significant. They also found that more mature firms take on less short-term debt, but they do take on more long-term debt.

The negative relationship with profitability supports pecking order theory. Firms with high levels of internal funds will not take on as much debt. Larger firms being more levered also supports pecking order theory. Larger firms have larger profiles, which reduces the information asymmetries. This means larger firms are more likely to take on more debt. The negative relationship between tangibility and debt highlights that firms with more collateral will be able to access debt at cheaper rates. They use firm age as a proxy for reputation. An older firm has a reputation which may reduce information costs, increasing the level of long-term debt they can take on.

The paper also finds that South African firms tend to have higher debt levels than firms in Kenya and Nigeria, which may be due to the South African financial market being more developed (Gwatidzo & Ojah 2009).

Erasmus (2009) considers the impact of the economic environment on the capital structure of Johannesburg Stock Exchange (JSE) listed companies between 1989 and 2008. He analyses the data using multiple regressions to understand the relationship between these economic factors and the capital structure. He considers firm specific factors and economic factors that could impact the capital structure. These are:

**Table 1:**
Summary of variables considered in the Erasmus study

| Erasmus (2009) | |
|---|---|
| Firm specific factors | Economic factors |
| *Maturity of debt* | *Inflation* |
| *Asset tangibility* | *Economic growth* |
| *Profitability* | *Exchange rate* |
| *Operating risk* | *Corporate tax rate* |
| *Firm size* | *Foreign direct investment* |
| *Growth* | |
| *Asset maturity* | |

The firm specific choice of variables largely agrees with the significant variables found by Frank and Goyal (2009). He sourced the firm specific data from the McGregor BFA database and the economic variables from the South African Reserve Bank. It was found that economic factors were not correlated strongly to capital structure (Erasmus 2009). This largely supports the capital structure theories outlined above. The paper also supports Correira and Cramer (2008) in that South African firms take on conservative levels of debt. Additionally, they found that firm size and the market-to-book ratio (a measure of growth) is statistically significant across the full sample, though the direction of the relationship disagrees with the study performed by Gwatidzo and Ojah (2009).

Ramjee and Gwatidzo (2012) try to expand on previous research done by Ozkan (2001) and look at the dynamic adjustment of firms to their capital structure. They use a sample of JSE listed firms for the years 1998 - 2008 using the McGregor BFA database. They exclude financial and utility firms, due to the fact that they are highly regulated. They conclude that a target debt-equity ratio exists in South Africa and that the target would be reached within 1.2 years if the firm is deviating from the target. It is interesting to note that they find that firms follow both the pecking order and trade-off theories. They target a certain gearing level, though firms also prefer internal financing.

Industries from different countries can show similar capital structures. De Wet (2006) compares the average long-term debt ratios of firms from South Africa (SA) and the United States of America (USA).

**Table 2:**
Long-term debt to capital (book value)

De Wet (2006)

| Sector | U.S. | SA |
|---|---|---|
| *Technology* | 19% | 20% |
| *Energy* | 30% | 31% |
| *Healthcare* | 32% | 33% |
| *Transportation* | 40% | 45% |
| *Basic Materials* | 46% | 48% |
| *Capital Goods* | 46% | 56% |
| *Conglomerates* | 54% | 32% |
| *Services* | 63% | 35% |

Negash (2002) considers firms between 1991 and 1998 and performs a regression analysis using marginal tax rates, effective tax rates, leverage, interest paid, operational cash flow, asset tangibility, depreciation, price to book ratio and turnover.

Effective tax rates are calculated as per the tax paid and reported in the cash flow statement over profit before taxes. The marginal tax rate was calculated as the incremental tax paid from the cash flow statement to the incremental income from the income statement. Tax rates and cash flow were found to be the most significant indicators of leverage (Negash 2002).

De Vries and Erasmus (2010) did a regression analysis on SA firms and found that lagged debt-equity and revenue is positively correlated to leverage. Return on assets and the ratio of fixed assets to total assets have negative correlations. Mans and Erasmus (2011) show that the impact of economic variables may have a delayed impact on leverage. The correlation between some of the variables change over time indicating that firms may follow different theories under different situations. This may explain some of the conflicting nature of studies in the area.

Moyo (2013) considers capital structure of JSE listed manufacturing, retail and mining firms. He tests for pecking-order and dynamic and static trade-off theory using multiple regression techniques. He finds that asset tangibility, firm profitability, non-debt tax shields, financial

distress, liquidity, price earnings, share price and retention rate were negatively correlated with leverage and dividend paid, capital expenditure, firm growth rate, profitability, cash flow from operations and economic value added were positively correlated to leverage. This is arguably the most comparable paper to this study as it considers the capital structure of JSE listed firms over a similar timeframe.

## The way forward

Based on the literature discussed, it is clear that firm size impacts capital structure and that South African firms have at times shown to follow different capital structure strategies to international firms. However, not a lot of work has been done to compare the capital structure choice decisions of small firms to large firms, especially in the South African context. Additionally, in South Africa little work has been done looking at inter-industry differences in capital structure choices. The studies above do not consider whether firms of different sizes and if firms in various industries choose their capital structure differently, many do not consider South African firms after the 2008 recession and many do not consider the difference in debt maturity choices.

It seems reasonable that small firms and firms in different industries will show different behaviours when choosing their capital structure. So the main research question in this dissertation will be:

*Does firm size and industry impact the leverage of listed South African firms?*

The next section justifies why this paper uses a quantitative approach. To investigate this question using a quantitative approach, this paper will break the problem down into four hypotheses. The analysis will focus on whether pecking order theory or trade-off theory are followed, if different behaviours in different industries are observed and if different behaviours by firms of different sizes are observed. The justification on why this paper will use a quantitative approach is considered in the next section. The multiple hypothesis are:

1. $H_0$*:* Trade-off theory explains the capital structure choice of firms in all industries.
2. $H_0$*:* Pecking order theory explains the capital structure choice of firms in all industries.

3. $H_0$: The capital structure of firms in different industries is determined by the same factors.
4. $H_0$: The size of the firm impacts its capital structure decision.

# 3. Research approach

## Quantitative approach versus qualitative approach

In this section, an overview of the benefits and drawbacks will be provided in using quantitative and qualitative research methods. A proposal of possible methodologies to investigate the research question and the null hypotheses will follow.

The difference between qualitative and quantitative research is described by two underlying research philosophies:

1. Functionalism;
2. Interpretavism.

These two philosophies are separated by their objectives. Functionalism seeks to create reproducible results, which is then used for theory testing and refinement. This philosophy would normally use quantitative methods. The purpose of interpretavism is usually to show the experience of the researcher. The underlying principle is that it is possible to have multiple truths (Shah & Corley 2006), which implies that results are not repeatable. Interpretavism tends to use qualitative methods.

Betiner, Robinson and McGoun (1994) introduce five major types of qualitative research methods that are appropriate for finance. These methods include grounded field theory, ethnographic analysis, historical techniques, case study research and action research.

Grounded field theory is a method used to formulate theories. Extensive interviews and discussions are held with the relevant stakeholders. Trends are discovered as the base for new theories to be formulated on. These theories can then be tested using either quantitative or qualitative methods (Betiner, *et al.* 1994).

This contrasts to quantitative methods which would use mathematical and statistical methodologies to arrive at a theory (Betiner *et al.* 1994). The grounded field method is not

appropriate in the context of this paper, as this paper would like to investigate which existing theories South African firms follow. This paper is not attempting to develop new theories on capital financing decisions. Also, it is outside of the scope and resources of this paper to interview high level financial executives across numerous industries and firm sizes.

Ethnographic analyses the study of cultural impacts. These methodologies do not overlap much with the research question of this paper. Qualitative methods would consider historical data to answer a research question. Historical methods can either be quantitative, qualitative or both. Qualitative methods would include looking at the historical context of the problem to attempt to explain the problem differently or explain the findings. Quantitative methods would consider historical data to answer a research question.

Case study methodologies focus on one or a small sample of examples (Betiner *et al*. 1994). This methodology can help people understand theory and the shortcomings of theory by using specific examples.

Using case studies is different to quantitative capital markets structure research, because it cannot be generalised or used in statistical testing. This is the most appealing qualitative method for this paper. In fact, the paper by De Wet (2006) follows a case study approach. He considers three firms and investigates their capital structure decision by building models to test if they have an optimal capital structure and if they are meeting this target.

Action research methodologies would be used if a researcher has the resources and permission to spend time at a firm to follow exactly how the decisions are made. This is not in the scope of this paper.

Quantitative methods have become popular partly because financial research wants to emulate the success of natural science research and so it has adopted its methods (Betiner *et al. 1994)*. Qualitative methods however are often better suited to studying processes (Sale & Brazil 2002) and would be better suited to understanding why and how choices are made. Both quantitative and qualitative research methodologies have their place, so the type of methodology used must be determined by the research question. The functionalist approach serves to test theories, which is the purpose of this paper, so a quantitative approach will be taken.

However, the conflicting nature of the papers in this area suggest that there may not be one theory of capital structure. If this is the case then it may also be interesting to understand how individual firms reach their capital structure decisions. It would be interesting to interview some firms individually and try to understand how they choose their capital structure. This can be investigated using a qualitative method in future studies.

Most research in finance has been focussed on quantitative techniques. In fact, most prominent theories are based and tested using quantitative methods. Betiner *et al* (1994) argue that it has become so fashionable to use quantitative methods that researchers are disadvantaged or even embarrassed at times to use qualitative methods. Editors of financial journals are more likely to prefer quantitative methodologies, which puts qualitative financial researchers at a professional disadvantage.

## Data source

McGregor BFA describe themselves in their marketing material as the pre-eminent provider of stock market, fundamental research and news to the South African financial sector at large. All South African studies read for this paper have used the McGregor BFA database, which is why the same will be used in this paper.

## Data description

Financial statement data was collected from the McGregor BFA database for all firms from the JSE for the last five years. Firms were excluded if they were not present for all of 2009 – 2013.

Firms were allocated to one of the following JSE industries: basic, consumer goods, financials, general, information technology, resources and services. Firms in the basic industry mainly include building companies and industrial firms. Consumer goods mainly includes retail firms. Financial firms include banks, real estate companies and insurance firms. Firms in the general industry include logistics firms and transportation firms. Information technology includes technology oriented firms and telecommunication firms. The resource industry includes mining firms. The services industry includes media and hospitality firms.

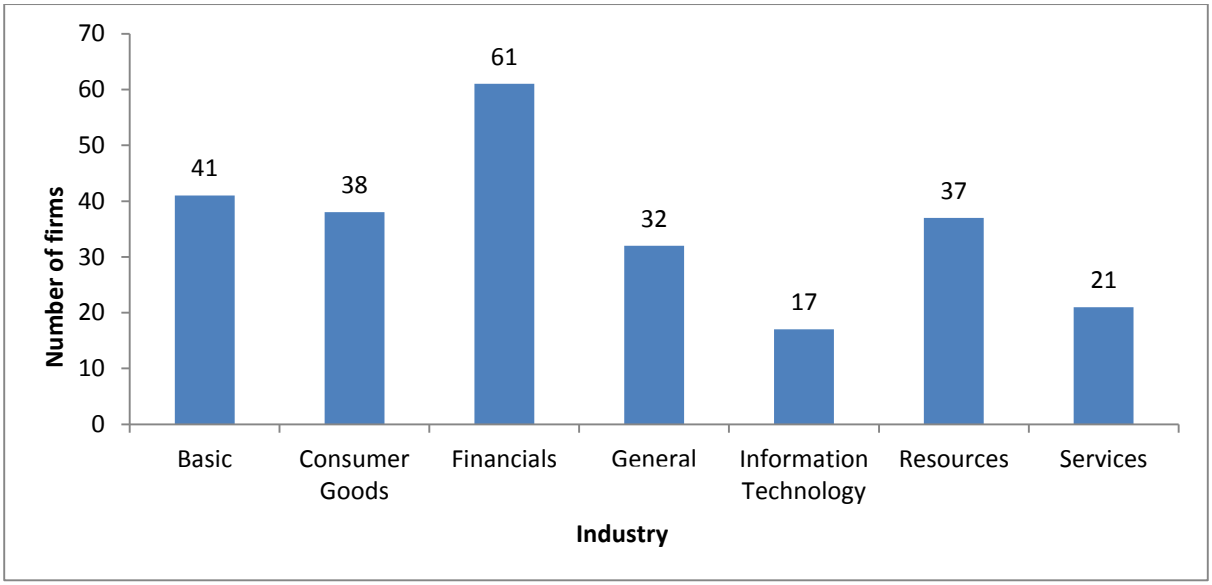


*Figure 3: Distribution of firms by industry*

There are 247 different firms split across the seven industries. The graph above illustrates that each industry is well represented. The financial industry has the most firms in the sample followed by basic industry and resources. Information technology firms are the least common in the sample.

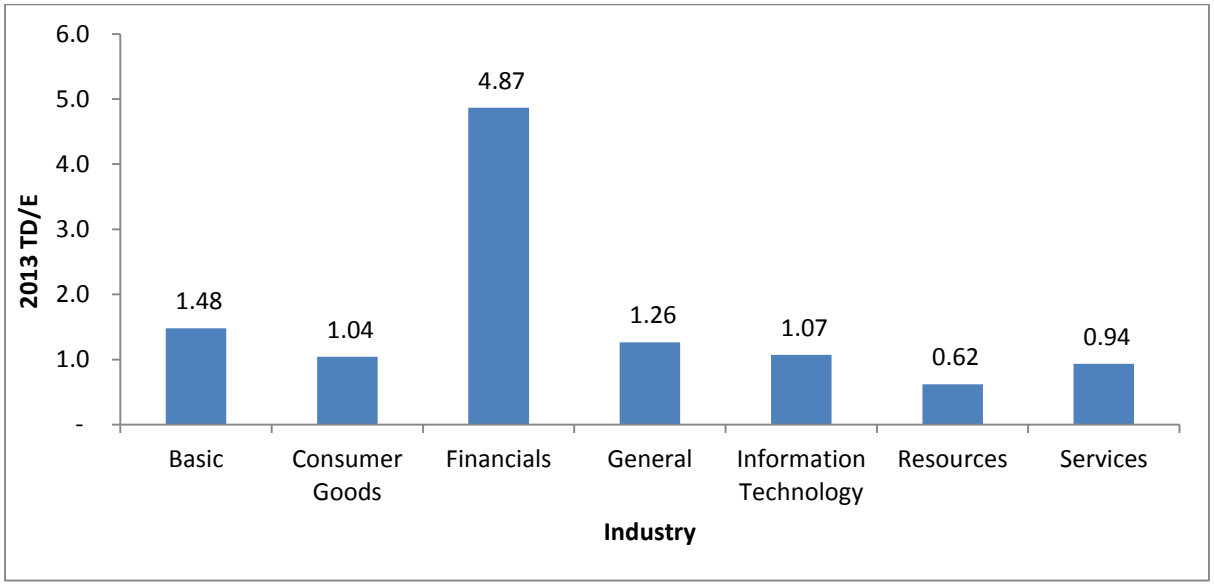


*Figure 4: TD/E of firms by industry (2013)*

Firms in the financial industry are by far the most geared, followed by the basic industry and general industry. Based on the fact that firms in the financial sector seem to follow a different debt structure, the fact that real estate companies are included and that other studies recommend that it is removed from the sample (Ramjee & Gwatidzo 2012), this study will do the same. Firms in the financial industry will be excluded from the regression

analysis when looking at the JSE in its entirety. Excluding financial firms leaves us with a sample of 186 firms. Financial firms will be considered separately to other industries.

As mentioned above, turnover is used as a measure of firm size. Firms were ranked by their turnover and split into equally sized deciles to give an indication of the distribution of large and small firms in the data.

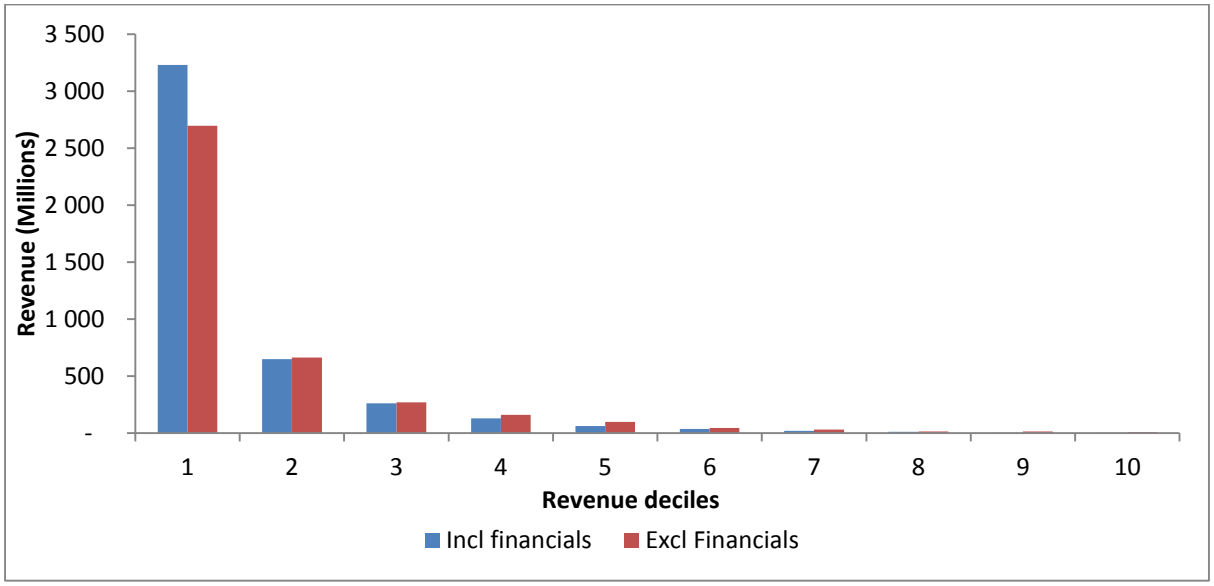


*Figure 5: Distribution of turnover by firm-size*

The largest firms are allocated to decile 1 and the smallest firms are allocated to decile 10. 88% of revenue is generated by the top 20 firms on the JSE, this drops to 84% if firms in the financial industry are excluded. A bias of large firms on a stock exchange can be expected, since they would be more likely to be able to go through the listing process. The graph below considers the gearing of firms by decile.

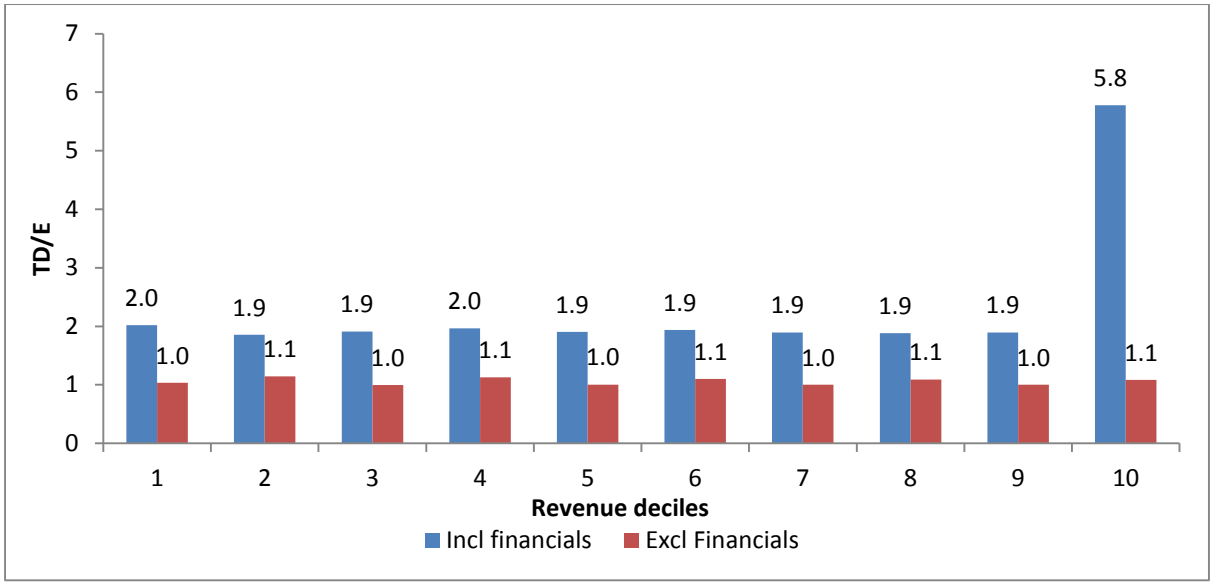


*Figure 6: TD/E by firm-size*

No distinct trends or differences in leverage can be identified on face value when comparing large and small firms if financial firms are excluded. Financial firms are over-represented in quintile 10. A quick t-test however revealed that it cannot be concluded that the mean TD/E ratio of the top 2 deciles is equal to deciles 3 - 10. This does indicate that large and small firms do follow different capital structure strategies. Larger firms tend to be more leveraged than smaller firms. This is only an initial high level check as this relationship will be more fully investigated later in the paper.

Table 3:
Small versus large firm TD/E t-test

| | Deciles 1-2 | Deciles 3-10 |
|---|---|---|
| *Mean* | 1.55 | 0.98 |
| *Variance* | 1.07 | 1.68 |
| *Observations* | 33 | 153 |
| *Hypothesized Mean Difference* | 0 | |
| *t Stat* | 2.37 | |
| *P(T<=t) one-tail* | 0.01 | |
| *t Critical one-tail* | 1.65 | |
| *P(T<=t) two-tail* | 0.02 | |
| *t Critical two-tail* | 1.97 | |

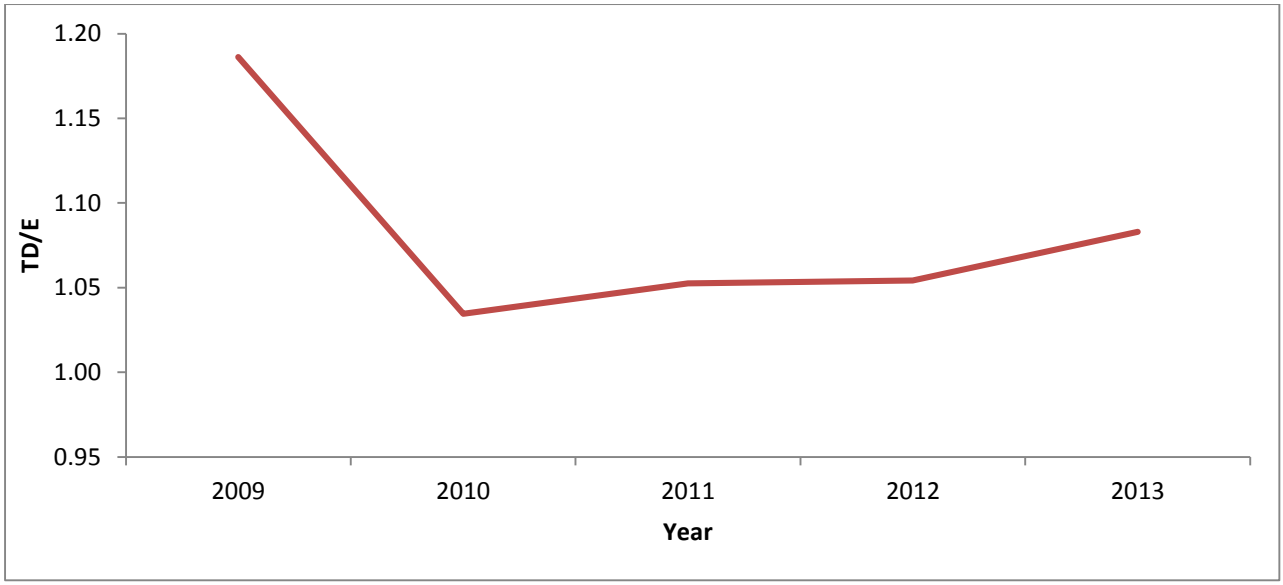


*Figure 7: TD/E ratio over time (excl Finance)*

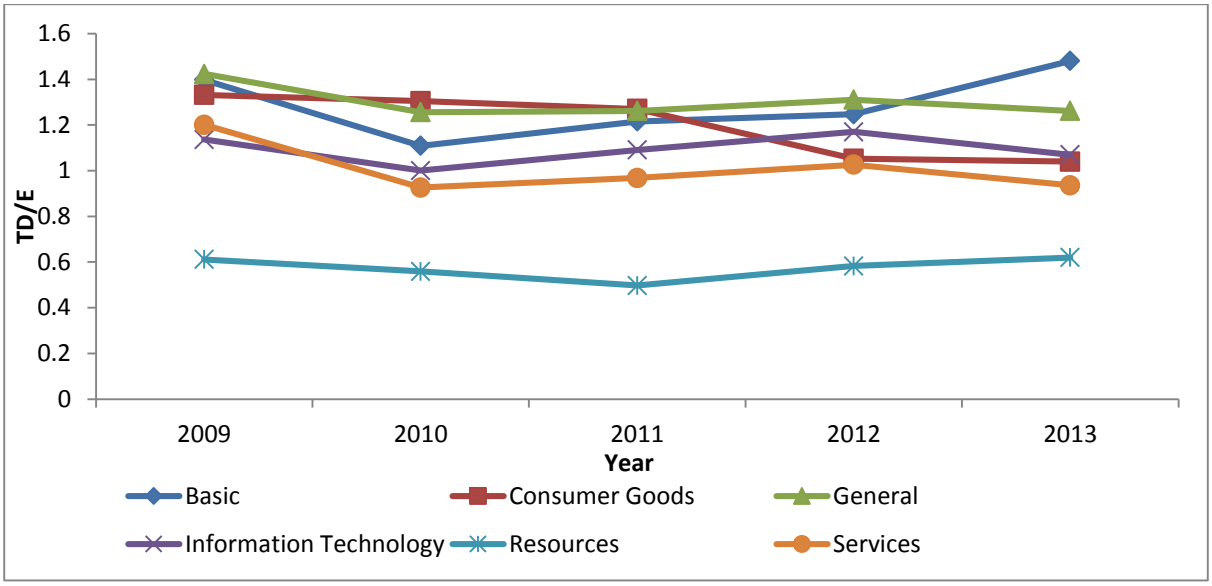


*Figure 8: TD/E by industry (excl Finance)*

Leverage dropped significantly from 2009 to 2010 and has been recovering slowly. Services and consumer goods dropped the most over this period. The basic industry and resources increased over the same period. It is already noticeable how the trends of leverage of these difference industries move differently over time. If similar macro-economic variables were at play then the lines should be parallel or move similarly. It does appear that firms do set their debt differently and that different factors are at play from these descriptive statistics.

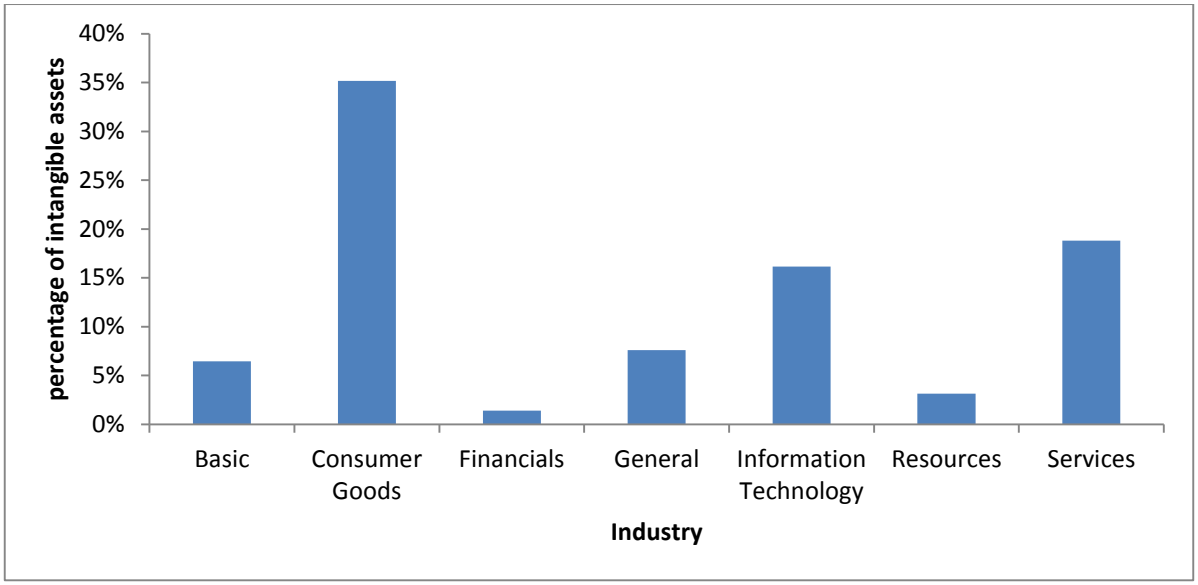


*Figure 9: Percentage intangible assets by industry*

Consumer goods, general and the service industry have the highest percentage of intangible assets. Intangible assets include patents, goodwill and brands amongst other items.

## Method

Quantitative research methods often use different regression analysis techniques to test the different capital structure theories. These methods allow objective measurements for which theories the firms generally follow. Based on the methodologies seen locally and internationally, this paper will follow a fixed effect multiple regression analysis approach for the quantitative portion of this research.

$$\frac{Debt_{It}}{Equity_{it}} = \beta_1\left(\frac{EBIT_{it}}{Turnover_{it}}\right) + \beta_2(Eff.\ Tax\ Rate_{it}) + \beta_3\left(\frac{Intangible\ Assets_{it}}{Total\ Assets_{it}}\right) + \beta_4(Turnover_{it}) + \beta_5(Growth\ in\ Turnover_{it}) + \beta_6(c_{it}) + u_{it} \quad (7)$$

For the purposes of this study the paper will consider the following variables:

**Dependant variables:**

1. Total debt-equity ratio (TD/E)
2. Long-term debt-equity ratio (LTD/E)
3. Short-term debt-equity ratio (STD/E)

Total debt-equity ratio is measured by the firm's book value of debt over the market value of equity. It measures the total amount of debt the firm has taken on. The long-term debt-

equity ratio measures the firm's book value of debt that is due in more than one year's time over equity. The short-term debt-equity ratio is the firm's book value of debt that is due in less than one year's time over the market value of equity. The long-term and short-term debt equity ratios are included, so that the difference in debt maturity choices can be observed across different industries and for firms of different sizes.

**Independent variables:**

The independent variables considered in this paper are based on Frank and Goyal's (2009) study as this paper was focussed on finding variables that would impact capital structure. This paper will only focus on firm specific variables. Economic variables are not considered as these were found to be insignificant in Erasmus' (2009) paper and also did not feature in Frank and Goyal's (2009) paper.

Specifically, the independent variables being considered are:

1. Firm size;
2. Industry;
3. Growth;
4. Tangibility;
5. Profitability;
6. Effective tax rate.

Firm size is measured by the firm's revenue. Growth is measured by the yearly percentage increase of the firm's revenue. Tangibility is measured as the percentage of assets that are tangible, it measures the percentage of a firm's assets that can stand as surety. Profitability is measured as profit before taxes over revenue. The effective tax rate is calculated as tax paid by the firms over profit before taxes.

Additionally, a second regression analysis will be done to test explicitly if the pecking order theory or trade-off theory is followed. This method is noted in the literature review. Watson and Wilson (2002) perform a regression analysis based on the accounting equation. They re-arrange the accounting equation to show how a change of assets is financed. The coefficients indicate if the business preferred a certain financing method (which would

indicate the pecking order theory) or if they have no preference (which would indicate trade-off theory).

$$\frac{TA_{it}-TA_{it-1}}{TA_{it-1}} = \sum \propto_i + \frac{\beta_1(P_{it}-Div_{it})}{TA_{it-1}} + \beta_2(NE_{it}/TA_{it-1}) + \frac{\beta_3(D_{it}-D_{it-1})}{TA_{it-1}} + u_{it} \qquad (8)$$

To do this the following variables are used:

**Dependant variable:**

1. Change in total assets

The change of total assets is measured by the difference in assets from one year to the next over the value of assets in the base year.

**Independent variables:**

1. Retained profits (profit attributable to shareholders less dividends) over total assets
2. Change in equity over total assets excluding retained profits
3. Change in debt over total assets

Retained profits is measured as profits after dividends. Change in equity represents the new equity that is available to fund new assets and change in debt represents the new amount of debt available to fund new assets. This model is also applied to with different turnovers to investigate how firms of different sizes finance a change in their assets.

## Panel data techniques

The same firms are observed over time, which means that the data extracted from McGregor BFA is panel data. Special considerations need to be made to ensure the best linear unbiased estimators are being used. Panel data comes with the additional complication that the error term is more likely to be correlated to the independent variables. In the case of this study firms are being followed over time. These firms have attributes that do not change over time and that are related to the dependant variable which violate assumptions needed for best linear unbiased estimators. There are two general methods on how to adjust for this error: random effect methods and fixed effects methods.

Random effect methods adjust for panel data where random sampling occurs in each period, i.e. the same individuals are not being observed over time. An assumption of this method is that the error term is not related to the dependant variables. Using a random effect model is useful when drawing random samples from a large data set (de Jager 2008). The data in this study does not meet these requirements, since it follows the same firms over time.

This paper will thus use the fixed effects method to adjust for the fixed unobserved firm effects found in the error term. A fixed effect model allows the assumption that firms are homogenous to be relaxed and also adjusts for omitted variable biases (de Jager 2008).

There are two ways to adjust for the omitted variable bias. Firstly, a first difference approach can be taken. This would mean modelling the change in leverage. The fixed unobserved firm effect would be removed when subtracting two periods from each other. Secondly, the dummy variable approach could be used. This would create a dummy variable for each firm isolating out the fixed unobserved firm effect. This has the same impact as using a time demeaned method which would result in movements from the variables mean over time are being modelled.

The decision whether to use first difference methods or the dummy variable approach is dependent on the data. First difference reduces the degrees of freedom, so fixed effects are more efficient. If the error term is serially uncorrelated, then the dummy variable approach can be used, otherwise it is better to use the first difference method to adjust for the serial correlation. Since the fixed effect method essentially models the change from the mean it is difficult to see if the error term is serially correlated.

The way this paper accounts for this is to firstly do a first difference regression. If the error terms are serially correlated, then it can be concluded that no serial correlation existed in the first place and a dummy variable approach should rather be used.

A regression using the first differences of the variables mentioned was run. A unit root test on the residuals revealed that the error term is serially correlated. It was therefore concluded that it would be best to use a dummy variable approach on the sample.

If a fixed effects approach is used, then the sample will need to be clustered by firms, by time or both. Firm specific shocks can cause correlation across time. Market shock variables can cause shocks at one point of time, but across all firms (Thompson 2011). When doing capital structure regressions Thompson (2011) states that it is reasonable to assume that correlation over both time and firms would exist.

The years were also compared using an Anova F-test. From this test it was concluded that each year has a different impact on the residuals in the model. This supports Thompson's (2011) statement, so both firm and time dummies will be used.

# 4. Results

This section considers different fixed effect regressions to understand how firms of different sizes and in different industries choose their capital structure. There are two types of regressions considered and each regression is broken down in different ways. The full regression excludes the finance sector, because as seen in the data description section, it is significantly more highly levered than other industries.

**Regression 1: Total Debt-equity by industry**

$$\frac{Total\ Debt_{it}}{Equity_{it}} = \beta_1\left(\frac{EBIT_{it}}{Turnover_{it}}\right) + \beta_2(Eff.\ Tax\ Rate_{it}) + \beta_3\left(\frac{Intangible\ Assets_{it}}{Total\ Assets_{it}}\right) + \beta_4(Turnover_{it}) + \beta_5(Growth\ in\ Turnover_{it}) + \beta_6(c_{it}) + u_{it} \quad (9)$$

The first panel data fixed effects regression considers TD/E as the dependant variable. The independent variables are outlined and explained in the literature review and methodology sections.

**Table 4:**
**Results of fixed effect panel data regression on TD/E**

Regression 1: TD/E as dependant variable

| Variable | All (excl Finance) | Basic | Consumer Goods | General | IT | Resources | Services | Financials |
|---|---|---|---|---|---|---|---|---|
| *Intercept* | 1.15** (22.31) | 1.83** (7.78) | 1.01** (5.62) | 1.52** (16.63) | 1.02** (3.57) | 0.59** (10.31) | 1.31** (4.92) | 3.24** (7.23) |
| *EBIT/Turnover* | 0.00 (0.34) | -1.00 (-1.90) | -0.85** (-4.69) | -0.44 (-1.26) | -0.57 (-1.56) | 0.00 (0.16) | -1.37* (-2.0) | -0.04 (-0.46) |
| *Eff Tax Rate* | 0.00 (-0.04) | -0.01 (-0.86) | 0.28 (1.63) | -0.06 (-0.68) | 0.38 (1.20) | -0.02 (-0.61) | -0.27 (-1.19) | 0.19 (0.44) |
| *Intangible/ Total Assets* | -0.67* (-2.06) | -6.07** (-3.45) | 0.25 (0.24) | -2.14** (-3.30) | -0.02 (-0.02) | -0.04 (-0.14) | -1.56 (-0.81) | 13.32 (1.86) |
| *Turnover* | 0.00 (0.64) | 0.00 (0.80) | 0.00* (2.03) | 0.00 (-0.25) | 0.00 (0.27) | 0.00 (-0.12) | 0.00 (0.82) | 0.00 (0.15) |
| *Growth in Turnover* | -0.03 (-1.08) | -0.01 (-0.04) | -0.12* (-2.01) | 0.35** (4.69) | -0.51 (-1.19) | 0.00 (0.11) | 0.42* (2.08) | 0.13 (0.32) |
| *N* | 930 | 205 | 190 | 160 | 85 | 185 | 105 | 305 |
| *R-squared* | 83% | 73% | 95% | 93% | 81% | 65% | 63% | 82% |
| *R-squared adjusted* | 79% | 64% | 93% | 90% | 73% | 54% | 49% | 77% |

*The table above represents 5 years of data (2009 – 2013) and consists of 186 firms in the full regression. * indicates significance at the 5% level, ** indicates significance at the 1% level. T-values are shown in the brackets.*

If the full regression (excluding finance) is considered, then the intangible asset ratio is the only statistically significant variable that is observed. It indicates that firms with high levels of intangible assets will take on less debt. If firms in the basic industry are considered then the regression results look similar to that of the overall regression. The main difference is that the coefficients on intangible assets are larger. Firms in the general industry show a negative relationship between intangible/ total assets and TD/E and a positive relationship between revenue growth and TD/E.

A negative relationship between profitability and growth in the consumer goods and services industry is observed. No variables in the IT, resource or finance industry were found to be significant. Regression 1 was replicated looking at both long-term and short-term debt.

**Regression 1: Long-term debt**

$$\frac{Long\ Term\ Debt_{it}}{Equity_{it}} = \beta_1\left(\frac{EBIT_{it}}{Turnover_{it}}\right) + \beta_2(Eff.\ Tax\ Rate_{it}) + \beta_3\left(\frac{Intangible\ Assets_{it}}{Total\ Assets_{it}}\right) + \beta_4(Turnover_{it}) + \beta_5(Growth\ in\ Turnover_{it}) + \beta_6(c_{it}) + u_{it} \quad (10)$$

When the same regression as above is re-run using long-term debt over equity as the dependant variable, then there are fewer statistically significant variables.

**Table 5:**
**Results of fixed effect panel data regression on LTD/E**

Regression 1: LTD/E as dependant variable

| Variable | All (excl Finance) | Basic | Consumer Goods | General | IT | Resources | Services | Financials |
|---|---|---|---|---|---|---|---|---|
| *Intercept* | 0.24** (10.38) | 0.39** (3.03) | 0.10 (1.71) | 0.39** (7.06) | 0.13 (1.65) | 0.10** (5.50) | 0.41** (3.24) | 0.66** (4.64) |
| *EBIT/Turnover* | 0.00 (0.29) | -0.32 (-1.11) | -0.02 (-0.33) | -0.04 (-0.19) | -0.04 (-0.45) | 0.00 (0.16) | -0.11 (-0.34) | -0.02 (-0.55) |
| *Eff Tax Rate* | 0.00 (-0.08) | 0.00 (-0.35) | 0.26** (4.61) | 0.02 (0.34) | -0.03 (-0.39) | 0.00 (0.36) | 0.00 (-0.03) | 0.03 (0.25) |
| *Intangible/ Total Assets* | -0.18 (-1.18) | -0.85 (-0.89) | -0.05 (-0.13) | -1.47** (-3.72) | 0.35 (1.11) | 0.03 (0.31) | -1.26 (-1.36) | 5.52* (2.45) |
| *Turnover* | 0.00 (1.02) | 0.00 (0.25) | 0.00* (2.36) | 0.00 (0.86) | 0.00 (-0.24) | 0.00 (0.28) | 0.00 (0.62) | 0.00 (-0.82) |
| *Growth in Turnover* | 0.02 (1.23) | 0.04 (0.42) | 0.01 (0.69) | 0.12* (2.58) | -0.08 (-0.68) | 0.01 (0.88) | 0.14 (1.46) | 0.05 (0.40) |
| *N* | 930 | 205 | 190 | 160 | 85 | 185 | 105 | 305 |
| *R-squared* | 79% | 71% | 91% | 93% | 83% | 65% | 70% | 88% |
| *R-squared adjusted* | 74% | 62% | 89% | 90% | 75% | 54% | 58% | 85% |

*The table above represents 5 years of data (2009 – 2013) and consists of 186 firms in the full regression. * indicates significance at the 5% level, ** indicates significance at the 1% level. T-values are shown in the brackets.*

No variables are significant for the full regression or for firms in the basic industry. Intangible assets are found to be significant for the general and financial industries. It is noteworthy that the coefficient is positive for financials. The leverage of firms in the consumer goods industry is impacted by the effective tax rate and turnover. The turnover growth was also found to be significant for the general industry.

**Regression 1: Short-term debt**

$$\frac{Short\ Term\ Debt_{it}}{Equity_{it}} = \beta_1(\frac{EBIT_{it}}{Turnover_{it}}) + \beta_2(Eff.\ Tax\ Rate_{it}) + \beta_3(\frac{Intangible\ Assets_{it}}{Total\ Assets_{it}}) + \beta_4(Turnover_{it}) + \beta_5(Growth\ in\ Turnover_{it}) + \beta_6(c_{it}) + u_{it} \quad (11)$$

When only short-term debt is considered then intangible assets are still significant. Growth in revenue is found to be significant with a negative coefficient. Profitability is found to be significant for firms in the basic and service industry. Growth is significant in the consumer good and general industries. The asset tangibility ratio is found to be significant in the basic industry. The direction of the relationship is consistent with coefficients in previous regressions.

**Regression 2: Financing change in assets**

$$\frac{TA_{it}-TA_{it-1}}{TA_{it-1}} = \propto_i + \frac{\beta_1(P_{it}-Div_{it})}{TA_{it-1}} + \beta_2(NE_{it}/TA_{it-1}) + \frac{\beta_3(D_{it}-D_{it-1})}{TA_{it-1}} + u_{it} \quad (12)$$

This regression shows how firms finance a change in assets. If firms have a target debt ratio then it would be expected that the coefficients are equal. Under pecking order theory it is reasonable to expect firms to prefer internally generated funds, then debt and then equity.

**Table 6:**
**Results of fixed effect panel data regression on STD/E**

Regression 1: STD/E as dependant variable

| Variable | All (excl Finance) | Basic | Consumer Goods | General | IT | Resources | Services | Financials |
|---|---|---|---|---|---|---|---|---|
| *Intercept* | 0.91** (22.84) | 1.44** (9.64) | 0.91** (5.58) | 1.13** (14.44) | 0.90** (3.26) | 0.48** (9.92) | 0.90** (4.66) | 2.59** (7.34) |
| *EBIT/Turnover* | 0.00 (0.27) | -0.69* (-2.05) | -0.83 (-5.07) | -0.40 (-1.34) | -0.52 (-1.50) | 0.00 (0.12) | -1.26* (-2.54) | -0.02 (-0.37) |
| *Eff Tax Rate* | 0.00 (0.00) | -0.01 (-1.06) | 0.01 (0.08) | -0.08 (-1.04) | 0.41 (1.35) | -0.02 (-0.84) | -0.26 (-1.62) | 0.16 (0.46) |
| *Intangible/ Total Assets* | -0.50** (-1.98) | -5.22** (-4.66) | 0.29 (0.31) | -0.67 (-1.20) | -0.37 (-0.33) | -0.07 (-0.28) | -0.31 (-0.22) | 7.80 (1.39) |
| *Turnover* | 0.00 (0.23) | 0.00 (1.04) | 0.00 (1.36) | 0.00 (-0.91) | 0.00 (0.35) | 0.00 (-0.25) | 0.00 (0.72) | 0.00 (0.52) |
| *Growth in Turnover* | -0.04* (-2.14) | -0.05 (-0.42) | -0.13** (-2.49) | 0.23** (3.65) | -0.43 (-1.05) | 0.00 (-0.21) | 0.28 (1.91) | 0.08 (0.25) |
| *N* | 930 | 205 | 190 | 160 | 85 | 185 | 105 | 305 |
| *R-squared* | 85% | 72% | 95% | 91% | 74% | 63% | 67% | 86% |
| *R-squared adjusted* | 81% | 64% | 94% | 88% | 63% | 51% | 54% | 82% |

*The table above represents 5 years of data (2009 – 2013) and consists of 186 firms in the full regression. * indicates significance at the 5% level, ** indicates significance at the 1% level. T-values are shown in the brackets.*

**Table 7:**
**Results of fixed effect panel data regression on percentage change in assets**

Regression 2: Change in assets as dependant variable

| Variable | All (excl Finance) | Basic | Consumer Goods | General | IT | Resources | Services | Financials |
|---|---|---|---|---|---|---|---|---|
| *Intercept* | 0.037** (5.31) | 0.025** (2.88) | 0.026 (1.16) | 0.025** (2.66) | 0.026* (2.19) | 0.061** (2.80) | 0.028* (2.19) | 0.008 (0.79) |
| *Profit/ Total Assets* | 0.466** (11.28) | 0.875** (7.13) | -0.330 (-0.81) | 0.072 (0.25) | -0.146 (-0.92) | 0.531** (8.74) | -0.699 (-1.87) | 1.122** (7.46) |
| *Change Equity/ Total Assets* | 0.333** (5.39) | 0.384** (2.94) | 1.383** (3.80) | 1.115** (4.48) | 1.533** (7.67) | 0.152 (1.53) | 1.311** (4.45) | 1.446** (10.35) |
| *Change Liabilities/Total Asset* | 0.348** (4.74) | 0.942** (5.47) | -0.526** (-2.66) | 0.913** (7.81) | 0.935** (2.92) | 0.330* (2.29) | 1.333** (9.82) | 0.907** (5.25) |
| *N* | 930 | 205 | 190 | 160 | 85 | 185 | 105 | 305 |
| *R-squared* | 71% | 74% | 47% | 74% | 91% | 83% | 87% | 92% |
| *R-squared adjusted* | 62% | 64% | 26% | 64% | 87% | 76% | 81% | 89% |

*The table above represents 5 years of data (2009 – 2013) and consists of 186 firms in the full regression. * indicates significance at the 5% level, ** indicates significance at the 1% level. T-values are shown in the brackets.*

If the full regression (excluding finance) is considered, then it can be concluded that firms prefer internally generated funds, then debt and finally equity. A summary of financing preferences can be found in the table below:

**Table 8:**
**Summary of of fixed effect panel data regression on change in assets**

Regression 2: Ranking of coefficients

| Variable | Preference 1 | Preference 2 | Preference 3 |
|---|---|---|---|
| *All (excl Finance)* | Internally generated | Debt | Equity |
| *Basic Industries* | Debt | Internally generated | Equity |
| *Consumer Goods ** | Equity | Debt | NA |
| *General Industries* | Equity | Debt | NA |
| *IT ** | Equity | Debt | NA |
| *Resources* | Internally generated | Debt | NA |
| *Services ** | Debt | Equity | NA |
| *Financials* | Equity | Internally generated | Debt |

** Negative coefficients*

As mentioned above, the full regression excluding finance follows textbook pecking order behaviour. Firms in the basic industry prefer debt over internally generated funds and over equity. The consumer goods, general, IT and service industries prefer debt over equity. Resources prefer internally generated funds and then debt.

The regression on the change of assets gives us an indication of how firms finance a change in assets, but it cannot give a view on whether small or large firms choose their capital structure differently. To answer this the data was split in to three equal parts based on the firms' 2013 revenue.

**Table 9:**
**Results of fixed effect panel data regression on the percentage change in assets**

Regression 2: Change in assets as dependant variable

| Variable | Small Firms | Medium Firms | Large Firms |
|---|---|---|---|
| *Intercept* | 0.00 (0.26) | 0.04** (4.58) | 0.04** (4.41) |
| *Profit/ Total Assets* | 0.50 (7.83) | 0.83** (6.66) | -0.29* (-2.35) |
| *Change Equity/ Total Assets* | 0.24 (2.48) | 0.50** (3.70) | 1.34** (12.63) |
| *Change Liabilities/Total Assets* | 0.19 (1.57) | 0.79** (6.38) | 1.05** (7.49) |
| *N* | 63 | 62 | 61 |
| *R-squared* | 74% | 70% | 71% |
| *R-squared adjusted* | 64% | 58% | 61% |

*The table above represents 5 years of data (2009 – 2013) and consists of 186 firms in the full regression. T-values are shown in the parentheses.*
** indicates significance at the 5% level*
*** indicates significance at the 1% level.*

Small firms prefer to finance a change in assets first through retained income and then through equity. Medium firms follow the standard pecking order as they first prefer retained income, then debt and lastly equity. Large firms prefer equity, then debt and lastly retained income.

# 5. Discussion of results

### Regression 1: TD/E

Only asset tangibility was found to be significant in the full regression. The analysis shows a negative relationship between asset tangibility and leverage. This fits in with trade-off theory which states that a greater proportion of intangible assets can translate into higher levels of risk, since there are fewer assets that can be sold off and fewer assets that can be put up for collateral. Higher levels of risk translate into a lower debt target. Intangible assets are less likely to be financed through debt and are more likely to be financed using equity. It is notable that the turnover and growth variables are not significant. The high level data description revealed that one cannot conclude that small and large firms have the same debt-equity ratio, but this regression analysis does not indicate how this is different.

The results for the basic industry look similar to that of the overall regression. The main difference is that the coefficient on intangible assets is larger, so it can be concluded that asset tangibility has a larger role to play in the basic industry.

Consumer goods firms tend to select their debt differently to firms in other industries. The negative coefficient on EBIT/Turnover indicates that more profitable firms take on less debt. This supports findings by Frank and Goyal (2009). Larger firms also tend to be more highly leveraged, but the impact is small. Larger firms taking on more debt does support trade-off theory, since overall larger firms can be expected to be less risky and therefore be able to take on more debt. Higher growth firms take on less debt. Again, this supports Frank and Goyal's (2009) findings.

General industry's intangible assets have a negative relationship with their debt. This is in line with the full regression (excluding finance). Additionally, higher growth firms in the general industry take on more debt. This is different to the consumer goods industry and it contradicts Frank and Goyal's (2009) findings.

Services with high profitability take on less debt, which supports pecking order theory as these firms should have more retained income to finance their assets. This is in line with consumer goods. High growth firms in the services industry take on more debt, this contradicts Frank and Goyal (2009).

The yearly dummy variables tell the same story as *Figure 7*. *Figure 10* shows that firms were highly leveraged in 2009, and then there was a large dip towards 2010. Leverage has been increasing since, but it has not returned to the 2009 levels.

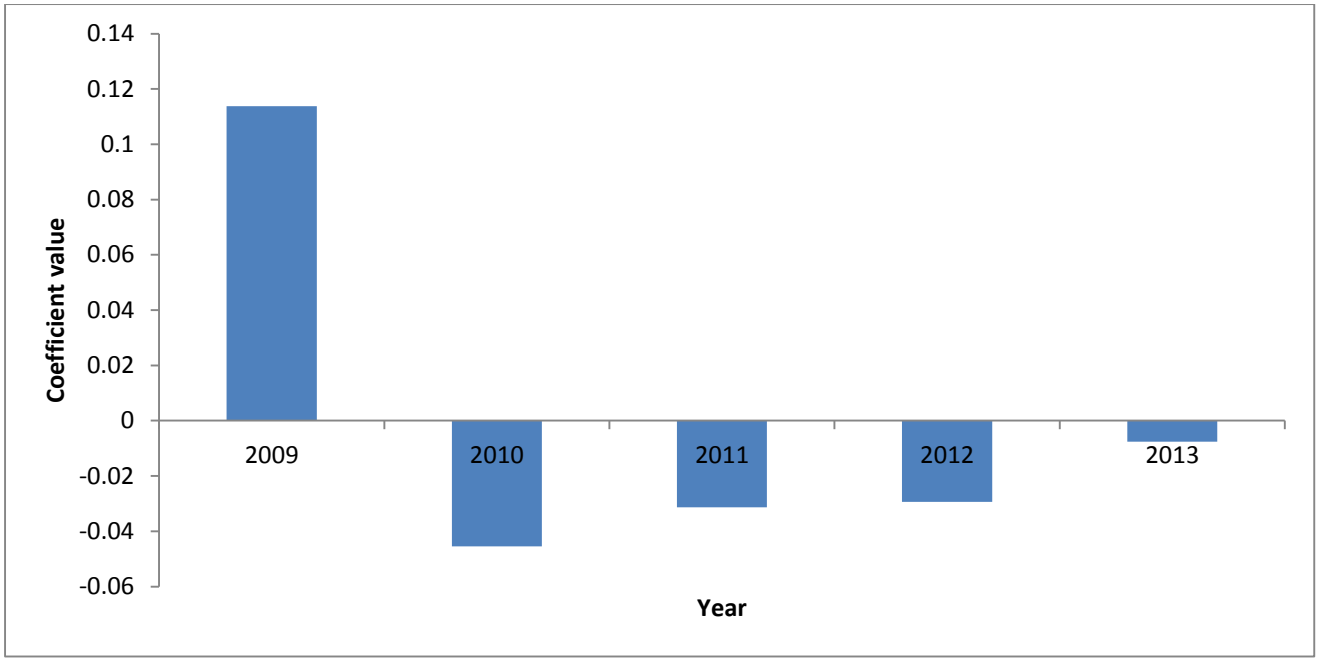


*Figure 10: Impact of year dummy variables on leverage in regression 1*

It is already clear from the first regression and the data description that firms in different industries choose their debt differently. They have different debt levels, their debt levels have moved differently over time and the regression shows that there are different factors impacting their choices.

This regression is the most comparable to Moyo's (2013) study. The negative correlation between leverage and asset tangibility and non-debt tax shields are observed in both Moyo's (2013) paper and the results above. A positive relationship is observed between leverage and firm growth rates in Moyo's (2013) paper. The results above show that growth in turnover is negatively correlated with leverage in most sectors, however we do observe that the growth rate is positively correlated to leverage in the general industry. Moyo's study is restricted to firms in the retail, manufacturing and mining sector, so it is possible that this result differs because of a different universe of firms being considered in the analysis. Moyo (2013) finds a positive correlation between firm profitability and leverage. This paper generally finds a negative correlation.

**Regression 1: LTD/E**

The most noteworthy industries in this analysis are the consumer goods and general industries. The leverage of firms in the consumer goods industry is impacted by the effective tax rate. This is indicative of the classic Modigliani and Miller capital structure theory (1963). A higher tax rate means that there is a larger benefit in holding debt. Turnover is also significant, but the coefficient is very small.

The intangible asset ratio and turnover growth were found to be significant for firms in the general industry. The negative coefficient for intangible assets and the positive coefficient for turnover growth is consistent with pecking order theory.

Firms in the financial industry show a positive relationship with intangible assets. This coefficient is large and in the opposite direction of the other industries. This is contrary to pecking order theory.

It is again clear that firms are choosing their debt levels differently, but are not definitively following one of the two mainstream theories.

**Regression 1: STD/E**

Results from these regressions were largely consistent with findings when TD/E was used as the dependant variable.

**Regression 2: Change in assets**

We observe coefficients of different sizes in the different industries. Overall pecking order theory holds better than trade-off theory.

It is noteworthy that firms in the financial industry follow a different order to pecking order theory. They prefer equity, then internally generated funds and finally debt. This may be related to them having a very high debt-equity ratio.

Firms from consumer goods, IT and services all show higher levels of intangible assets and have negative retained income coefficients. Consumer goods also has a negative debt

coefficient. The high levels of intangible assets explain these negative coefficients. If the firm's intangible assets increase then it is likely that this will be financed through equity as the asset cannot be used as collateral.

It is interesting to note that large firms have a negative relationship between retained income and their change in assets. Another regression was considered that used the same dependant and independent variables, but excluded intangible assets. This had no material impact on the direction or the size of the coefficients, so it seems that intangible assets do not impact the relationship. Retained income excludes dividends. The top decile of firms paid out 73% of dividends in 2013, so the negative coefficient may be indicative of large firms' dividend strategy rather than its capital structure choice.

What is clear is that there is a distinct difference between how firms of different sizes choose their debt. Smaller firms are more prone to use internally generated funds than larger firms. This relationship is confirmed by De Vries and Erasmus (2010), who found a positive relationship between revenue and leverage.

# 6. Limitations and opportunities for future research

This paper could be expanded and improved upon as there is scope for future research in this area. Most importantly, a different dataset could be used to consider non-listed firms. It is possible that these results are skewed by the fact that all firms are listed. Even small listed firms tend to be larger than most businesses in South Africa and may show a higher degree of financial sophistication.

It could also be beneficial to divide industries into sub-industries. This could expose some further nuances and test if there are differences within industries. Additionally, firms that delist during the time period could be included to compensate for any survivorship bias that may exist in this data sample.

The dataset could be expanded to include different countries. Other studies have suggested that firms in different countries may choose their debt differently. Also, the dataset could consider a longer time-frame to analyse the impact of the recession.

This paper specifically focussed on the two main theories: trade-off and pecking order. It did not consider less dominant theories. The paper could also be expanded to consider the dynamic adjustment of a firm's capital structure over time. Bringing in dynamic methods could study the differences in the reaction times of small and large firms in their capital structure decisions.

It would also be interesting to retest the findings of this paper using qualitative methods. A case study approach would be particularly useful. Interviewing and having conversations with the management of small and large firms and contrasting their experiences would add a lot to this discussion.

The negative coefficients found in the accounting equation regressions could also be studied in more detail. This paper hypothesises that these negative coefficients are largely due to the impact of intangible assets, but this could be investigated more thoroughly.

# 7. Conclusion

This paper made a contribution to the field of study as it considered a larger sample and a different time period when compared to many South African studies. Also, the use of Watson and Wilson's (2002) methodology on South African data has not been observed in other South African studies. This tests for how the change in assets is financed and can serve as a specific test for pecking order theory.

Regression 1 shows that different factors are statistically significant in determining the capital structure of a firm, however there is very little consistency across the different industries. It is possible to conclude that firms in various industries choose debt in different ways, but the mixed results show that it is not possible to conclude much else. Regression 1 does not clearly indicate if trade-off or pecking order theory are being followed. The results also show that the choice between debts of different maturity levels is largely consistent. Coefficients generally did not differ significantly between short-term and long-term debt.

Regression 2 seems to confirm that firms overall tend to follow pecking order theory, but coefficients and preferences change, so it confirms the results from Regression 1 showing that firms in different industries choose debt differently.

Regression 2 gives more insight into the relationship between firm size and debt. Smaller firms prefer internally generated funds more than large firms. Based on these two regressions the main hypothesis and research questions can be answered:

1. ***$H_0$:*** **Trade-off theory explains the capital structure choice of firms in all industries**
2. ***$H_0$:*** **Pecking order theory explains the capital structure choice of firms in all industries**

   This paper rejects the first two null hypotheses, as it is not conclusive that either of the theories correctly predict the capital structure decision of a firm, but pecking order theory does seem more persuasive.
3. ***$H_0$:*** **The capital structure of firms in different industries is determined by the same factors**

   Again, this null hypothesis is rejected based on the results. Regression 1 makes it clear that different factors impact firms in various industries differently.
4. ***$H_0$:*** **The size of the firm impacts its capital structure decision**

   This paper does not reject this null hypothesis. Regression 2 does indicate that smaller firms are less likely to prefer debt.

Put differently, the size and the industry a firm is in does impact its leverage, but their choice is not definitively explained by the main capital structure theories.

# 8. References


Betiner, M.S., Robinson, C. & McGoun, E. 1994. The case for qualitative research in finance. *International review of financial analysis*. 3(1):1–18.

Chen, J.J. 2004. Determinants of capital structure of Chinese-listed companies. *Journal of business research*. 57(12):1341–1351.

Correia, C. & Cramer, P. 2008. An analysis of cost of capital, capital structure and capital budgeting practices: A survey of South African listed companies. *Meditari accountancy research*. 16(2):31–52.

Dhawan, R. 1997. Asymmetric information and debt financing: The empirical importance of size and balance sheet factors. *International journal of the economics of business.* 4(2):189–202.

Erasmus, P. 2009. Capital structure and debt maturity choices for South African firms: Evidence from a highly variable economic environment. *12th international conference on finance & banking: Structural & regional impacts of financial crises.* 1(1):134-147.

Frank, M.Z. & Goyal, V.K. 2003. Testing the pecking order theory of capital structure. *Journal of financial economics.* 67(2):217–248.

Frank, M.Z. & Goyal, V.K. 2005. Tradeoff and pecking order theories of debt. *Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=670543.*

Frank, M.Z. & Goyal, V.K. 2009. Capital factors structure decisions: Which are reliably important? *Financial management*. 38(1):1–37.

Gwatidzo, T. & Ojah, K. 2009. Corporate capital structure determinants: Evidence from five African countries. *The African finance journal*. 11(1):1-23.

De Jager, P. 2008. Panel data techniques and accounting research. *Meditary accounting research.* 16(2):53–68.

Johnsen, P.C. & McMahon, R.G.P. 2005. Cross-industry differences in SME financing behaviour: An Australian perspective. *Journal of small business and enterprise development*. 12(2):160–177.

Lemmon, M.L. & Zender, J.F. 2008. Debt capacity and tests of capital structure theories. *University of Utah and University of Colorado working paper. Available at leeds-faculty.colorado.edu/zender/papers/LZ2_July_30_2007.pdf*

Lim, S.C., Marcias, A.J. & Moeller, T. 2014. Intangible assets and capital structure. *Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2514551.*

Mans, N & Erasmus, PD. 2011. The combined effect of changes in the South African business environment on capital structure. *Management dynamics: Contemporary research.* 20(1):19-31.

Miller, M.H. 1998. The M&M propositions 40 years later. *European financial management*. 4(2):113–120.

Modigliani, F. & Miller, M.H. 1958. The cost of capital, corporation finance and the theory of investment. *The American economic review.* 48(3):261–297.

Modigliani, F., & Miller, M.H. 1963. Corporate income taxes and the cost of capital: a correction. *The American economic review.* 53(3):433-443.

Moyo, V. 2013. Modelling the capital structure of manufacturing, mining and retail firms listed on the Johannesburg Stock Exchange. *University of Pretoria. Available at http://repository.up.ac.za/handle/2263/37220*

Myers, S.C. 1984. The capital structure puzzle. J*ournal of finance*. 39(3):574–592.

Naidu, G.N. 1986. Capital structure strategies of Australian and South African firms. *Management international review*. 26(2):52–61.

Negash, M. 2002. Corporate tax and capital structure: Some evidence and implications. *Investment analysts journal*. 31(56):17-27.

Ozkan, A., 2001. Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data. *Journal of business finance & accounting*. 28(1):175–198.

Ramjee, A. & Gwatidzo, T. 2012. Dynamics in capital structure determinants in South Africa. *Meditari accountancy research*. 20(1):52–67.

Sale, J.E.M., Lohfeld, L.H. & Brazil, K. 2002. Revisiting the quantitative-qualitative debate: Implications for mixed-methods research. *Quality and quantitiy.* 36(1):43–53.

Shah, S.K. & Corley, K.G. 2006. Building better theory by bridging the quantitative – qualitative divide. *Journal of management studies*: 43(1).

Shyam-Sunder, L. & Myers, S.C. 1999. Testing static tradeoff against pecking order models of capital structure. *Journal of financial economics*. 51:219–244.

Thompson, S.B. 2011. Simple formulas for standard errors that cluster by both firm and time. *Journal of financial economics*. 99(1):1-10.

Titman, S. & Wessels, R. 1988. The determinants of capital structure choice. *Journal of finance*, 43(1):1-19.

De Vries, A. & Erasmus, P.D. 2010. Determinants of capital structure: A South African study. *Corporate ownership and control.* 8(1):590-599.

Watson, R. & Wilson, N. 2002. Small and medium size enterprise financing: a note on some of the empirical implications of a pecking order. *Journal of business finance & accounting.* 29(3-4):557-578.

# 9. Appendix

## Unit root test of first difference regression

**Table 10:**
**Results of unit root test on a first difference regression**

| Unit Root Test | t-stat (Prob) |
|---|---|
| *Levin, Lin & Chu t* | -123.944 (0) |
| *ADF - Fisher Chi-square* | 753.655 (0) |
| *PP - Fisher Chi-square* | 907.411 (0) |
| *N* | 558 |
| *Cross-Sections* | 186 |

*The table above represents the unit root test of a first difference regression*

**Table 11:**
**Descriptive Statistics**

| Variable | Min | Max | Mean | Median | StDev |
|---|---|---|---|---|---|
| TD/E | -5.25 | 11.20 | 1.08 | 0.85 | 1.27 |
| LTD/E | -0.00 | 6.15 | 0.25 | 0.09 | 0.55 |
| STD/E | -5.25 | 6.28 | 0.84 | 0.64 | 0.97 |
| EBIT/Turnover | -5079% | 52% | -32% | 6% | 383% |
| Eff Tax Rate | -147% | 324% | 21% | 26% | 32% |
| Intangible/ Total Assets | 0% | 87% | 12% | 7% | 15% |
| Turnover (R mill) | 0 | 637 | 22 | 3 | 61 |
| Growth in Turnover | -62% | 151% | 10% | 8% | 24% |
| Total Assets (R mill) | 0 | 1 333 | 31 | 3 | 123 |

*Note: Excluding financial sector*

**Table 12:**
**Durbin Watson statistics by regression**

| | Durbin Watson statistics | | | |
|---|---|---|---|---|
| | Regression 1 | | | Regression 2 |
| Industry | TD/E | STD/E | LTD/E | TD/E |
| *Full (Excl Finance)* | 1.31 | 1.59 | 0.97 | 2.17 |
| *Basic* | 0.91 | 1.16 | 0.74 | 2.66 |
| *Consumer Goods* | 1.63 | 1.61 | 1.30 | 2.27 |
| *General* | 1.39 | 1.44 | 1.68 | 2.50 |
| *IT* | 2.07 | 2.27 | 1.73 | 2.60 |
| *Resources* | 1.73 | 1.95 | 1.44 | 2.42 |
| *Services* | 1.48 | 1.64 | 1.34 | 2.55 |
| *Financials* | 1.3 | 1.19 | 1.58 | 2.73 |
| *Small Firms* | NA | NA | NA | 2.85 |
| *Medium Firms* | | | | 2.10 |
| *Large Firms* | | | | 2.17 |

*This table shows the Durbin Watson statistics for each of the regressions found in this paper. It indicates that serial correlation is generally not present in the regressions*

# Correlation matrices (Regression 1, TD/E as dependent variable)

**Table 13:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (Full excl Finance) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.01 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 14:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (Basic) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.06 | -0.01 | 0.00 | -0.22 | 0.00 | 0.00 |
| EBIT/Turnover | -0.01 | 0.28 | 0.00 | -0.02 | 0.00 | -0.01 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.22 | -0.02 | 0.00 | 3.11 | 0.00 | -0.03 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | -0.01 | 0.00 | -0.03 | 0.00 | 0.04 |

**Table 15:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (Consumer Goods) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.03 | 0.00 | 0.00 | -0.16 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.03 | 0.00 | -0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.03 | -0.02 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.16 | -0.01 | -0.02 | 1.08 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 16:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (General Industry) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.01 | 0.00 | 0.00 | -0.03 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.12 | 0.00 | -0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.03 | -0.01 | 0.00 | 0.42 | 0.00 | -0.01 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.01 |

**Table 17:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (IT) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.08 | 0.00 | -0.01 | -0.22 | 0.00 | -0.01 |
| EBIT/Turnover | 0.00 | 0.13 | -0.01 | 0.02 | 0.00 | 0.02 |
| Eff Tax Rate | -0.01 | -0.01 | 0.10 | -0.08 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.22 | 0.02 | -0.08 | 1.37 | 0.00 | 0.07 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | -0.01 | 0.02 | 0.00 | 0.07 | 0.00 | 0.18 |

**Table 18:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (Resources) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 19:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (Services) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.07 | -0.02 | -0.01 | -0.44 | 0.00 | 0.02 |
| EBIT/Turnover | -0.02 | 0.47 | -0.04 | -0.20 | 0.00 | -0.03 |
| Eff Tax Rate | -0.01 | -0.04 | 0.05 | 0.07 | 0.00 | -0.02 |
| Intangible/ Total Assets | -0.44 | -0.20 | 0.07 | 3.72 | 0.00 | -0.07 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.02 | -0.03 | -0.02 | -0.07 | 0.00 | 0.04 |

**Table 20:**
**Correlation Matrix**

| Regression 1: TD/E as dependant variable (Financial) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.20 | 0.00 | -0.01 | -2.58 | 0.00 | -0.02 |
| EBIT/Turnover | 0.00 | 0.01 | -0.01 | 0.10 | 0.00 | 0.00 |
| Eff Tax Rate | -0.01 | -0.01 | 0.19 | -0.26 | 0.00 | -0.02 |
| Intangible/ Total Assets | -2.58 | 0.10 | -0.26 | 51.29 | 0.00 | 0.18 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | -0.02 | 0.00 | -0.02 | 0.18 | 0.00 | 0.15 |

# Correlation matrices (Regression 1, LTD/E as dependent variable)

**Table 21:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (Full excl Finance) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.01 | 0.00 | 0.00 | 0.11 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 22:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (Basic) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.02 | 0.00 | 0.00 | -0.07 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.08 | 0.00 | -0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.07 | -0.01 | 0.00 | 0.93 | 0.00 | -0.01 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.01 |

**Table 23:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (Consumer Goods) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | -0.02 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.02 | 0.00 | 0.00 | 0.12 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 24:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (General Industry) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.04 | 0.00 | -0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.01 | -0.01 | 0.00 | 0.16 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 25:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (IT) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.01 | 0.00 | 0.00 | -0.02 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.01 | -0.01 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.02 | 0.00 | -0.01 | 0.10 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 |

**Table 26:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (Resources) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 27:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (Services) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.02 | -0.01 | 0.00 | -0.10 | 0.00 | 0.00 |
| EBIT/Turnover | -0.01 | 0.11 | -0.01 | -0.05 | 0.00 | -0.01 |
| Eff Tax Rate | 0.00 | -0.01 | 0.01 | 0.02 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.10 | -0.05 | 0.02 | 0.85 | 0.00 | -0.02 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | -0.01 | 0.00 | -0.02 | 0.00 | 0.01 |

**Table 28:**
**Correlation Matrix**

| Regression 1: LTD/E as dependant variable (Financial) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.02 | 0.00 | 0.00 | -0.26 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.02 | -0.03 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.26 | 0.01 | -0.03 | 5.08 | 0.00 | 0.02 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.02 |

# Correlation matrices (Regression 1, STD/E as dependent variable)

**Table 29:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (Full excl Finance) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.01 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 30:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (Basic) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.02 | 0.00 | 0.00 | -0.09 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.11 | 0.00 | -0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.09 | -0.01 | 0.00 | 1.25 | 0.00 | -0.01 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.01 |

**Table 31:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (Consumer Goods) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.03 | 0.00 | 0.00 | -0.13 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.03 | 0.00 | -0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.02 | -0.02 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.13 | -0.01 | -0.02 | 0.88 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 32:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (General Industry) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.01 | 0.00 | 0.00 | -0.02 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.09 | 0.00 | -0.01 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.02 | -0.01 | 0.00 | 0.31 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 33:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (IT) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.08 | 0.00 | -0.01 | -0.21 | 0.00 | -0.01 |
| EBIT/Turnover | 0.00 | 0.12 | -0.01 | 0.02 | 0.00 | 0.01 |
| Eff Tax Rate | -0.01 | -0.01 | 0.09 | -0.08 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.21 | 0.02 | -0.08 | 1.26 | 0.00 | 0.06 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | -0.01 | 0.01 | 0.00 | 0.06 | 0.00 | 0.17 |

**Table 34:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (Resources) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 |
| EBIT/Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Eff Tax Rate | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Intangible/ Total Assets | -0.01 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**Table 35:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (Services) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.04 | -0.01 | -0.01 | -0.23 | 0.00 | 0.01 |
| EBIT/Turnover | -0.01 | 0.25 | -0.02 | -0.11 | 0.00 | -0.02 |
| Eff Tax Rate | -0.01 | -0.02 | 0.03 | 0.04 | 0.00 | -0.01 |
| Intangible/ Total Assets | -0.23 | -0.11 | 0.04 | 1.95 | 0.00 | -0.04 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.01 | -0.02 | -0.01 | -0.04 | 0.00 | 0.02 |

**Table 36:**
**Correlation Matrix**

| Regression 1: STD/E as dependant variable (Financial) | | | | | | |
|---|---|---|---|---|---|---|
| Variable | Intercept | EBIT/Turnover | Eff Tax Rate | Intangible/ Total Assets | Turnover | Growth in Turnover |
| Intercept | 0.04 | -0.01 | -0.01 | -0.23 | 0.00 | 0.01 |
| EBIT/Turnover | -0.01 | 0.25 | -0.02 | -0.11 | 0.00 | -0.02 |
| Eff Tax Rate | -0.01 | -0.02 | 0.03 | 0.04 | 0.00 | -0.01 |
| Intangible/ Total Assets | -0.23 | -0.11 | 0.04 | 1.95 | 0.00 | -0.04 |
| Turnover | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Growth in Turnover | 0.01 | -0.02 | -0.01 | -0.04 | 0.00 | 0.02 |

# Correlation Matrices (Regression 2, Change in assets as dependent variable)

**Table 37:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Full excl Finance) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.00 | 0.00 | 0.00 |
| Change Equity/ Total Assets | 0.00 | 0.00 | 0.00 | 0.00 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.00 | 0.01 |

**Table 38:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Basic) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.02 | -0.01 | 0.00 |
| Change Equity/ Total Assets | 0.00 | -0.01 | 0.02 | 0.00 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.00 | 0.03 |

**Table 39:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Consumer Goods) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.17 | -0.11 | -0.01 |
| Change Equity/ Total Assets | 0.00 | -0.11 | 0.13 | 0.02 |
| Change Liabilities/Total Assets | 0.00 | -0.01 | 0.02 | 0.04 |

**Table 40:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (General Industry) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.08 | -0.05 | 0.00 |
| Change Equity/ Total Assets | 0.00 | -0.05 | 0.06 | 0.00 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.00 | 0.01 |

**Table 41:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (IT) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.03 | -0.02 | 0.01 |
| Change Equity/ Total Assets | 0.00 | -0.02 | 0.04 | -0.01 |
| Change Liabilities/Total Assets | 0.00 | 0.01 | -0.01 | 0.10 |

**Table 42:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Resources) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.00 | 0.00 | 0.00 |
| Change Equity/ Total Assets | 0.00 | 0.00 | 0.01 | 0.00 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.00 | 0.02 |

**Table 43:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Services) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.14 | -0.10 | -0.02 |
| Change Equity/ Total Assets | 0.00 | -0.10 | 0.09 | 0.01 |
| Change Liabilities/Total Assets | 0.00 | -0.02 | 0.01 | 0.02 |

**Table 44:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Financials) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.02 | -0.02 | 0.00 |
| Change Equity/ Total Assets | 0.00 | -0.02 | 0.02 | 0.01 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.01 | 0.03 |

**Table 45:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Small firms) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.00 | -0.01 | 0.00 |
| Change Equity/ Total Assets | 0.00 | -0.01 | 0.01 | 0.00 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.00 | 0.01 |

**Table 46:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Medium firms) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.02 | -0.01 | 0.00 |
| Change Equity/ Total Assets | 0.00 | -0.01 | 0.02 | 0.00 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.00 | 0.02 |

**Table 47:**
**Correlation Matrix**

| Regression 2: Change in assets as dependant variable (Large Firms) | | | | |
|---|---|---|---|---|
| Variable | Intercept | Profit/ Total Assets | Change Equity/ Total Assets | Change Liabilities/Total Assets |
| Intercept | 0.00 | 0.00 | 0.00 | 0.00 |
| Profit/ Total Assets | 0.00 | 0.02 | 0.00 | 0.00 |
| Change Equity/ Total Assets | 0.00 | 0.00 | 0.01 | 0.00 |
| Change Liabilities/Total Assets | 0.00 | 0.00 | 0.00 | 0.02 |

## Residual Analysis

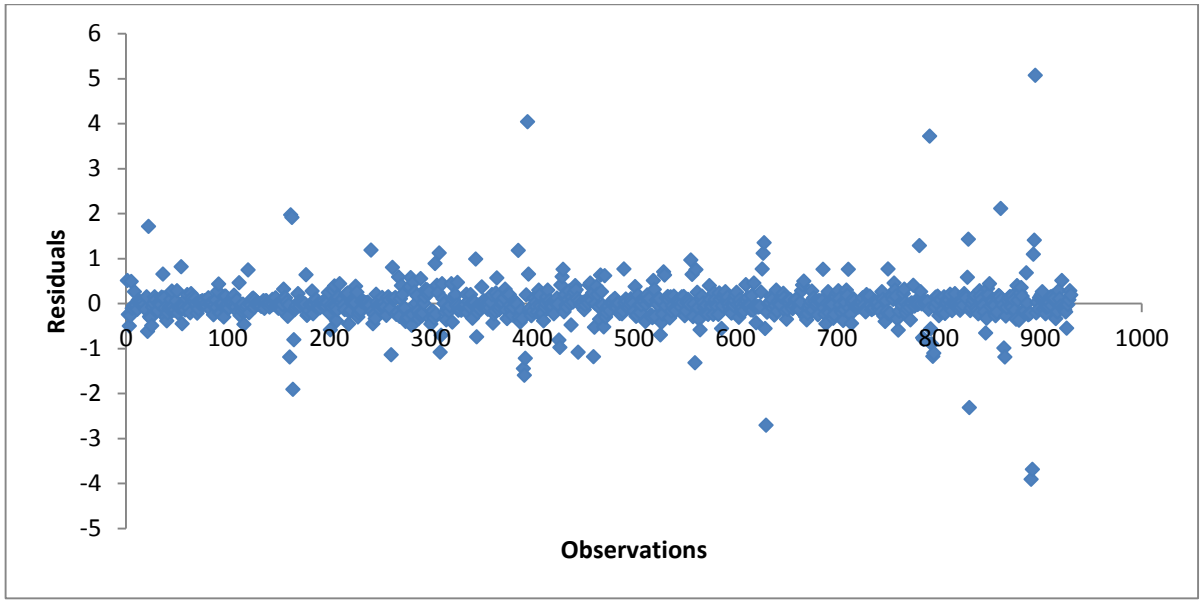


*Figure 11: TD/E as dependant variable, Full Regression (excl Finance)*

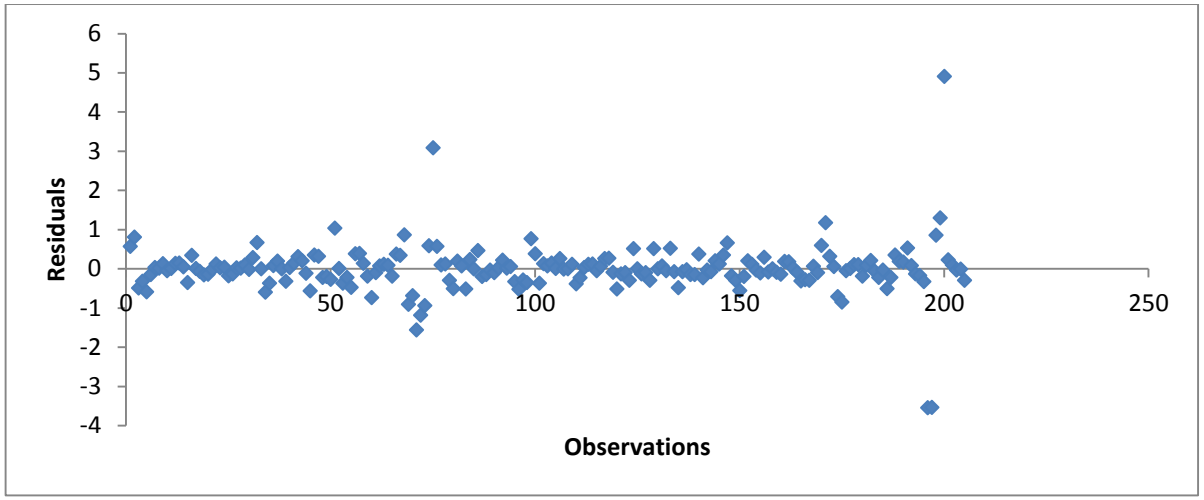


*Figure 12: TD/E as dependant variable, Basic Industry*

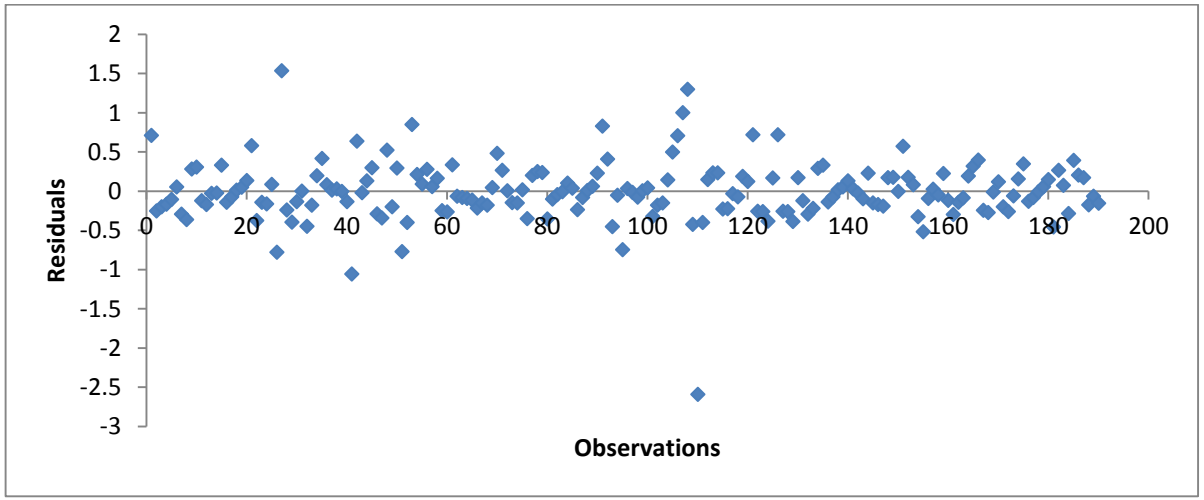


*Figure 13: TD/E as dependant variable, Consumer Goods*

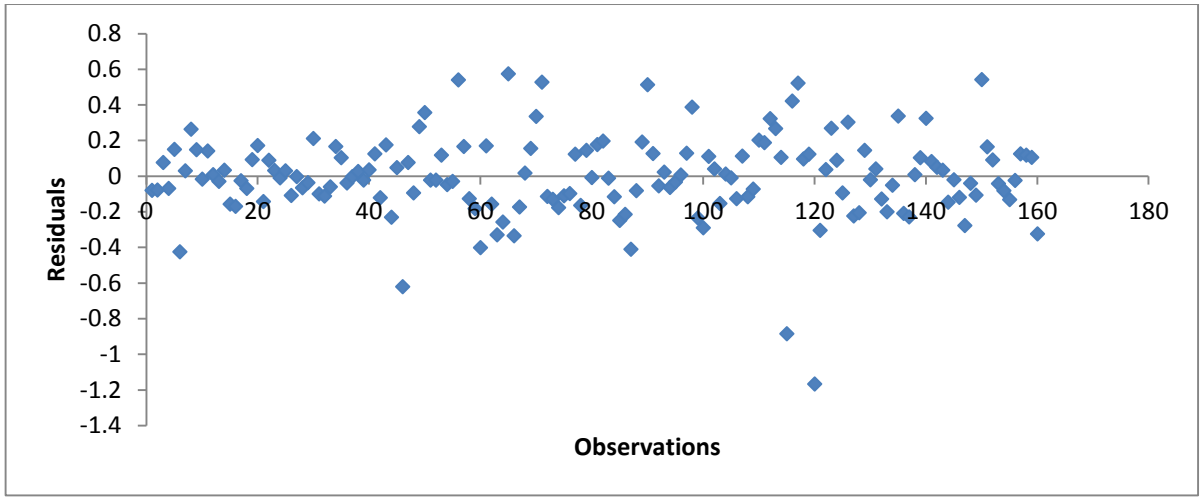


*Figure 14: TD/E as dependant variable, General Industry*

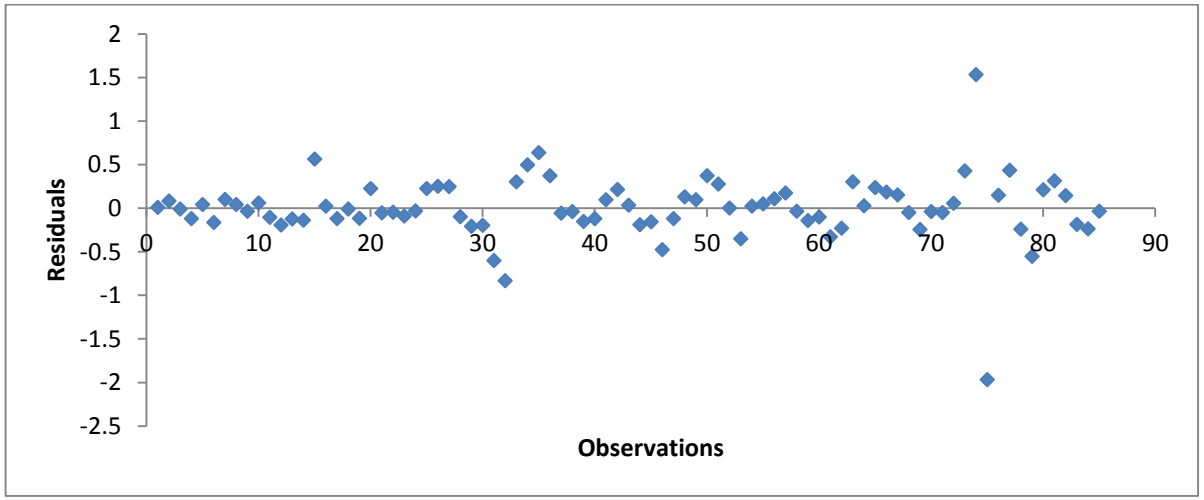


*Figure 15: TD/E as dependant variable, IT*

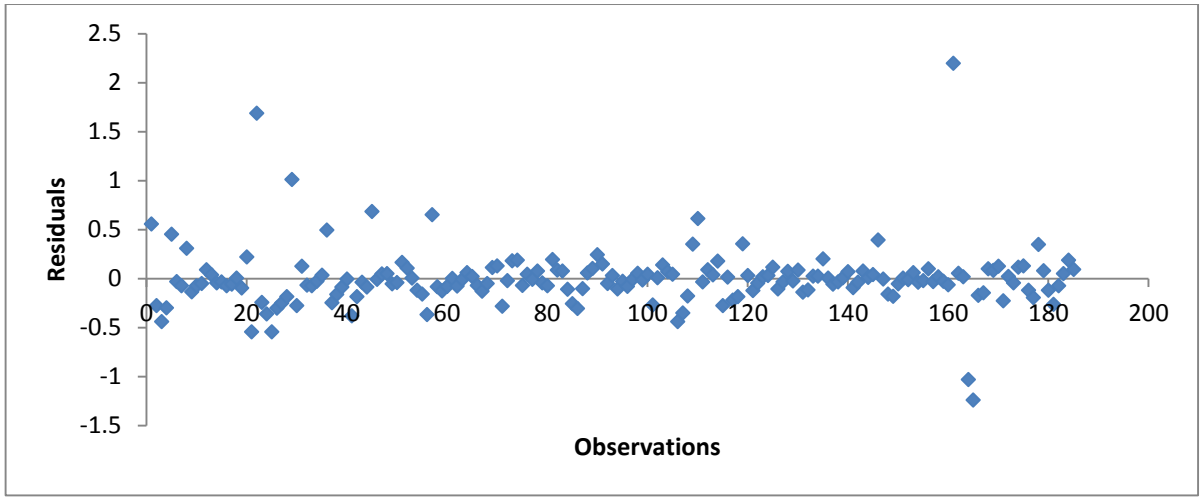


*Figure 16: TD/E as dependant variable, Resources*

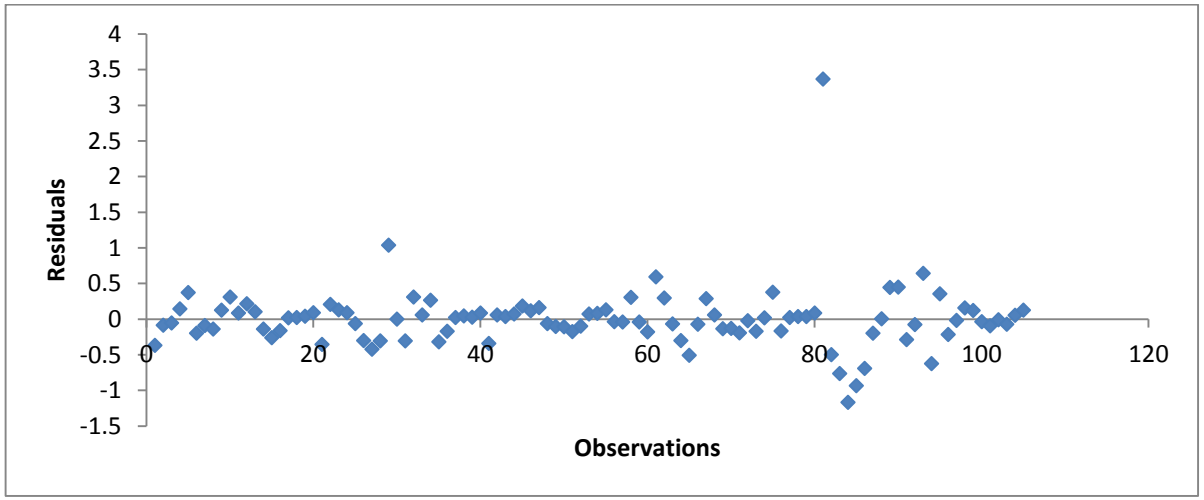


*Figure 17: TD/E as dependant variable, Services*

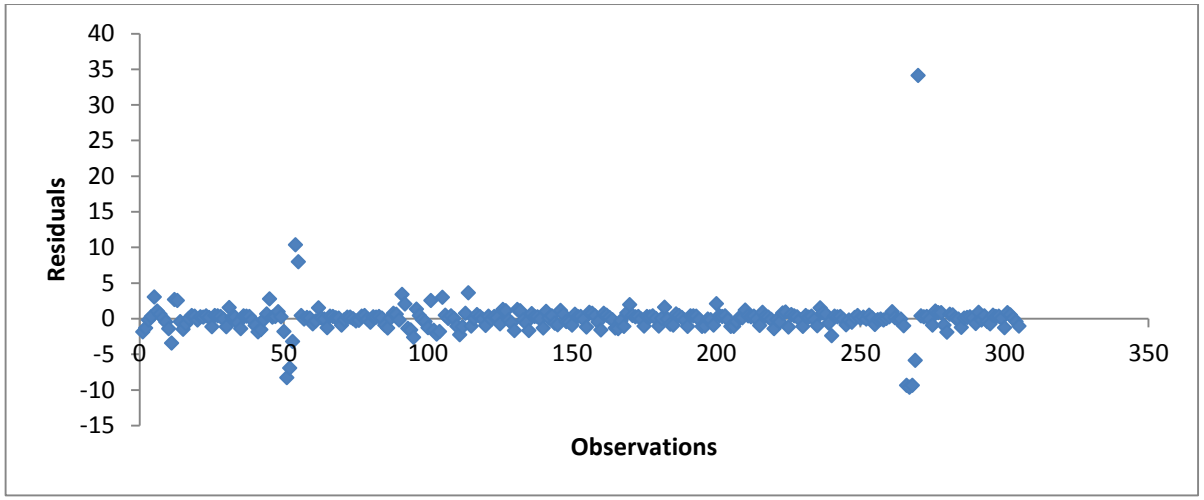


*Figure 18: TD/E as dependant variable, Financial*

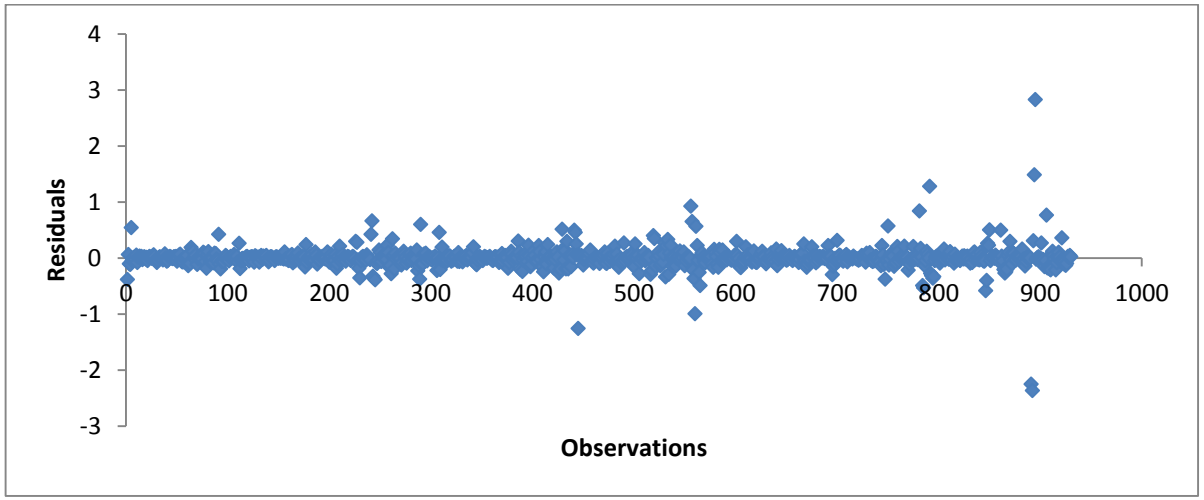


*Figure 19: LTD/E as dependant variable, Full Regression (excl Finance)*

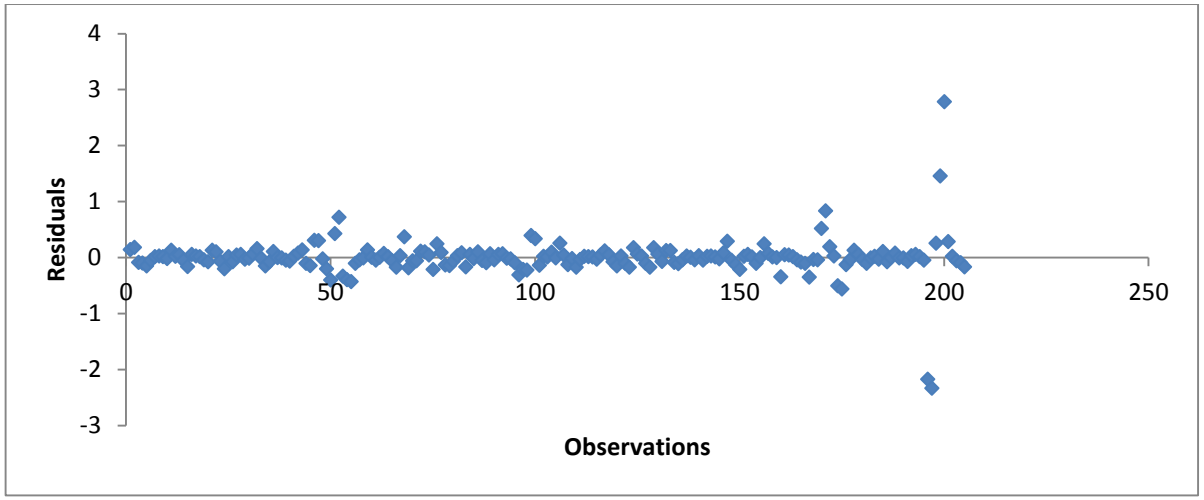


*Figure 20: LTD/E as dependant variable, Basic Industry*

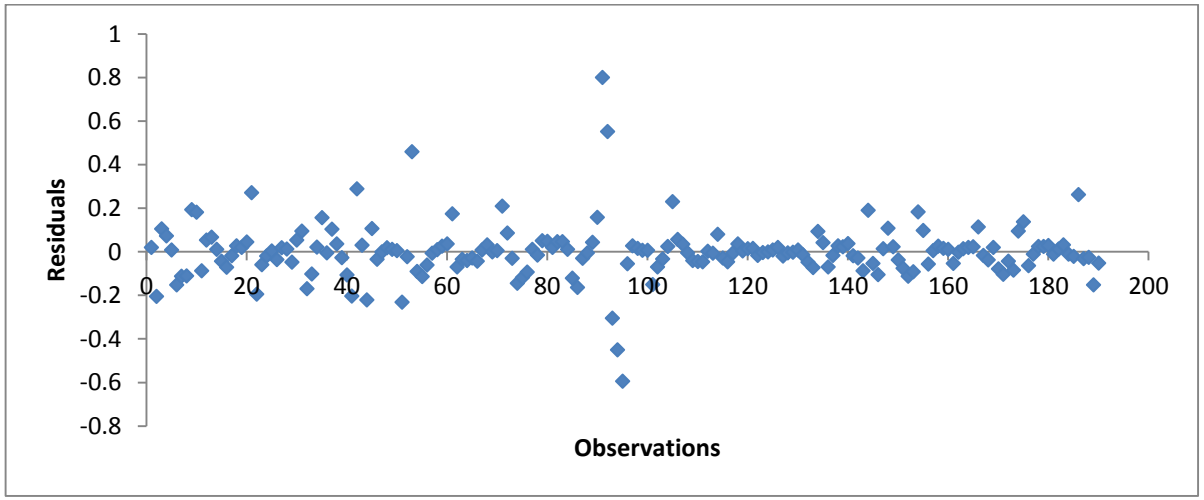


*Figure 21: LTD/E as dependant variable, Consumer Goods*

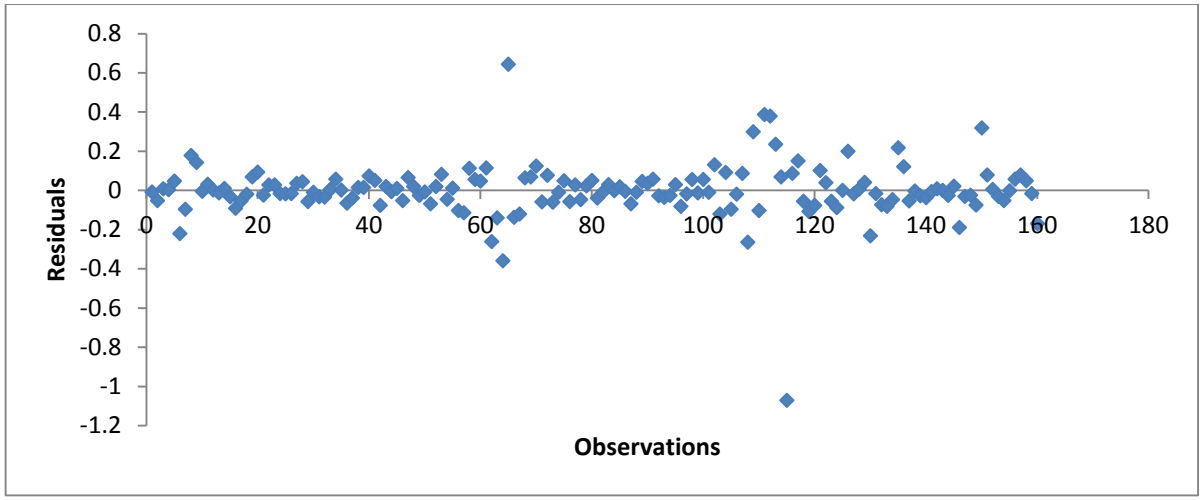


*Figure 22: LTD/E as dependant variable, General Industry*

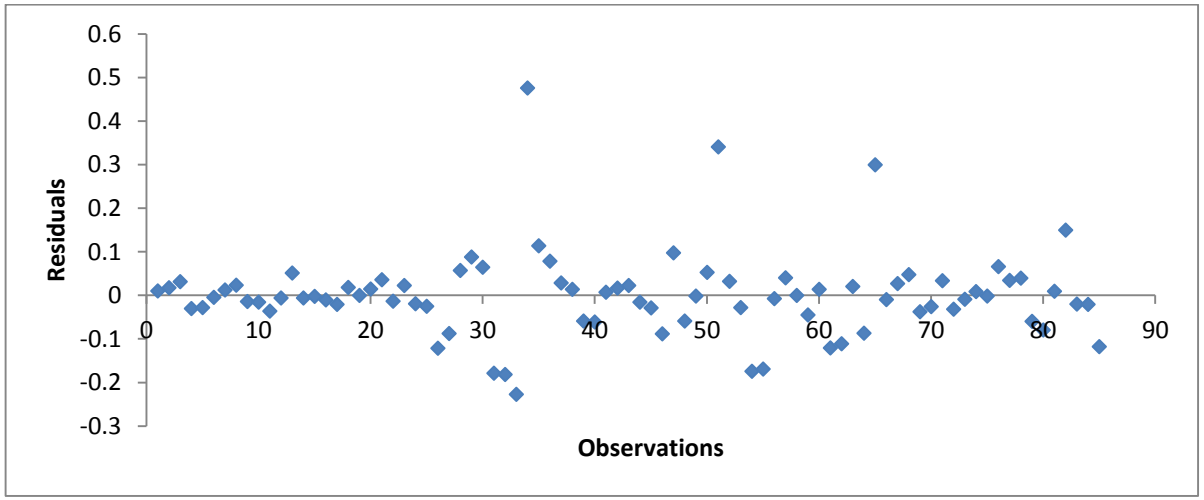


*Figure 23: LTD/E as dependant variable, IT*

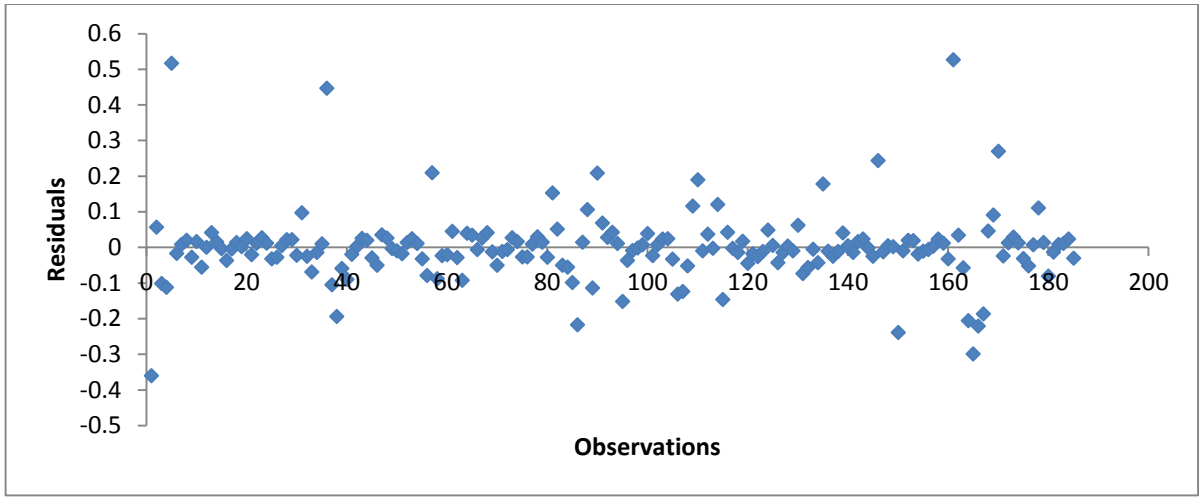


*Figure 24: LTD/E as dependant variable, Resources*

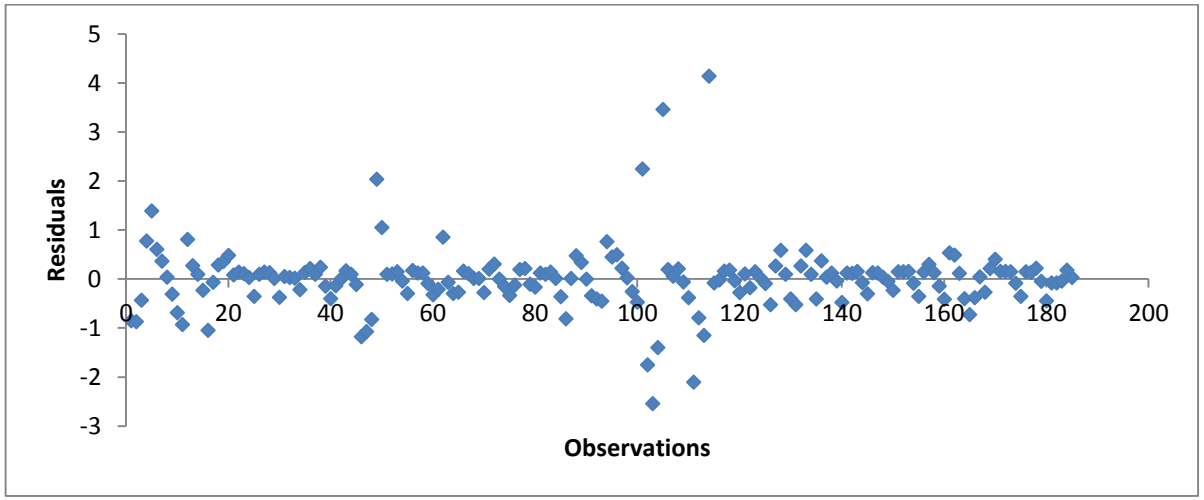


*Figure 25: LTD/E as dependant variable, Financial*

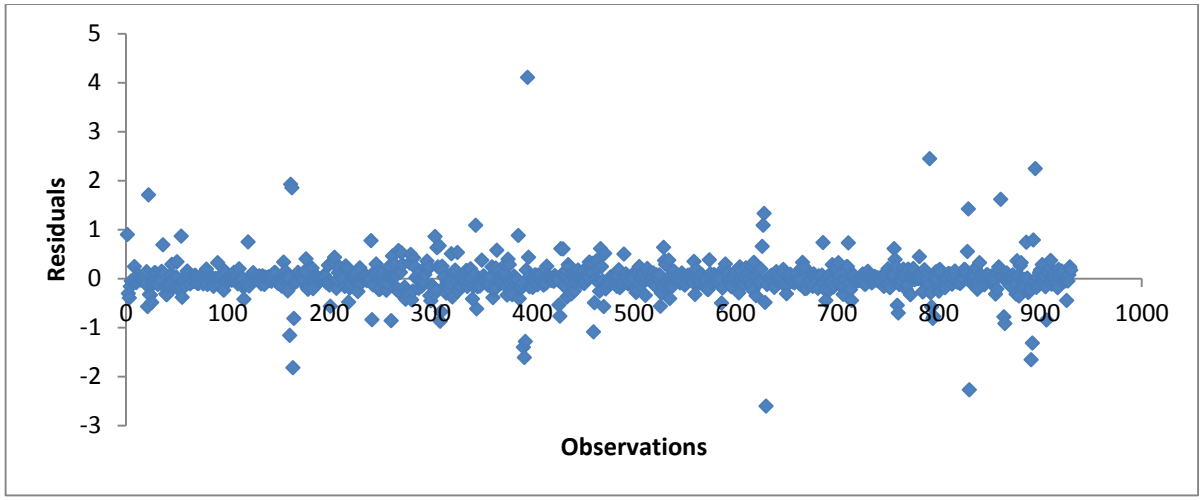


*Figure 26: STD/E as dependant variable, Full Regression (excl Finance)*

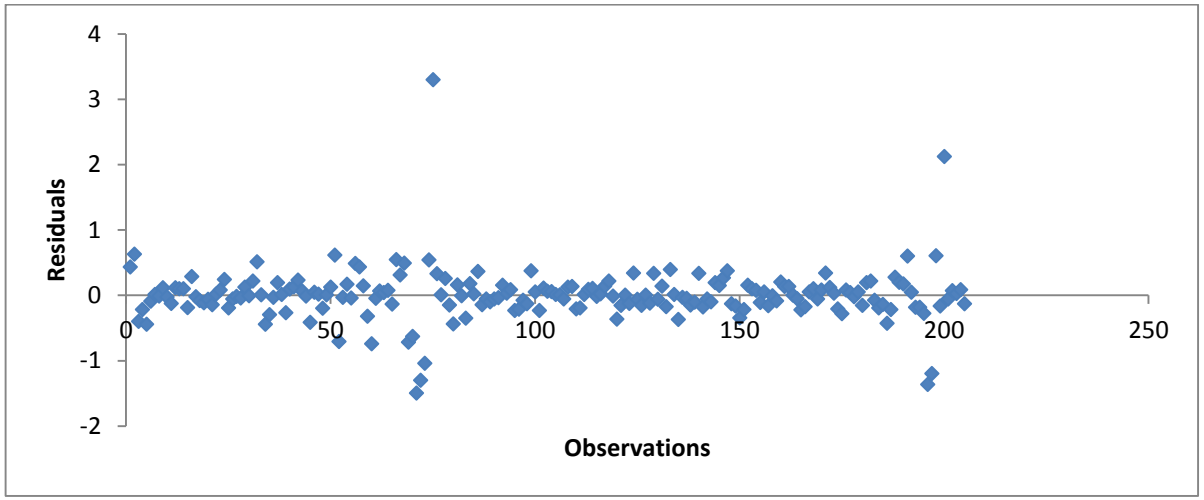


*Figure 27: STD/E as dependant variable, Basic Industry*

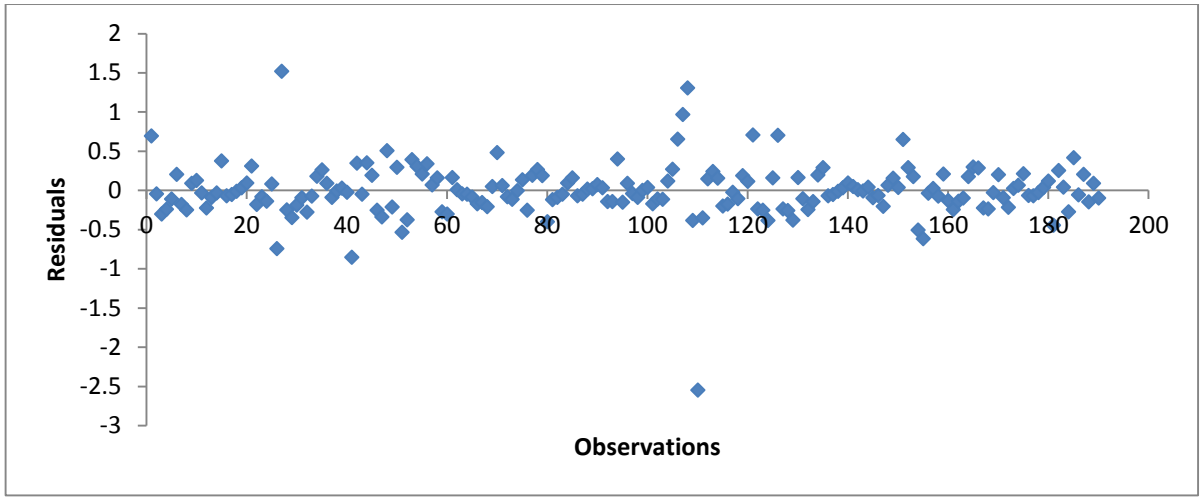


*Figure 28: STD/E as dependant variable, Consumer Goods*

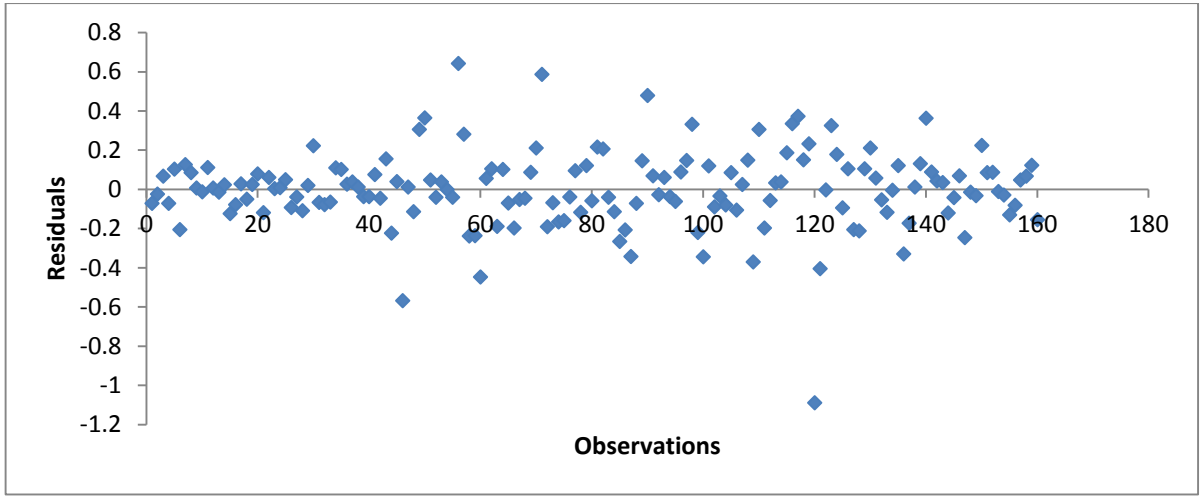


*Figure 29: STD/E as dependant variable, General Industry*

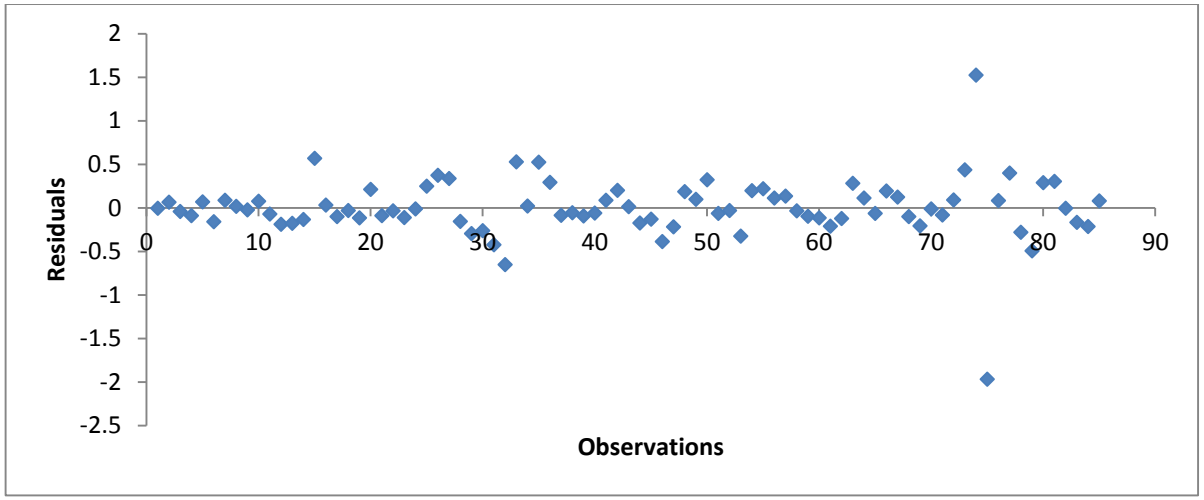


*Figure 30: STD/E as dependant variable, IT*

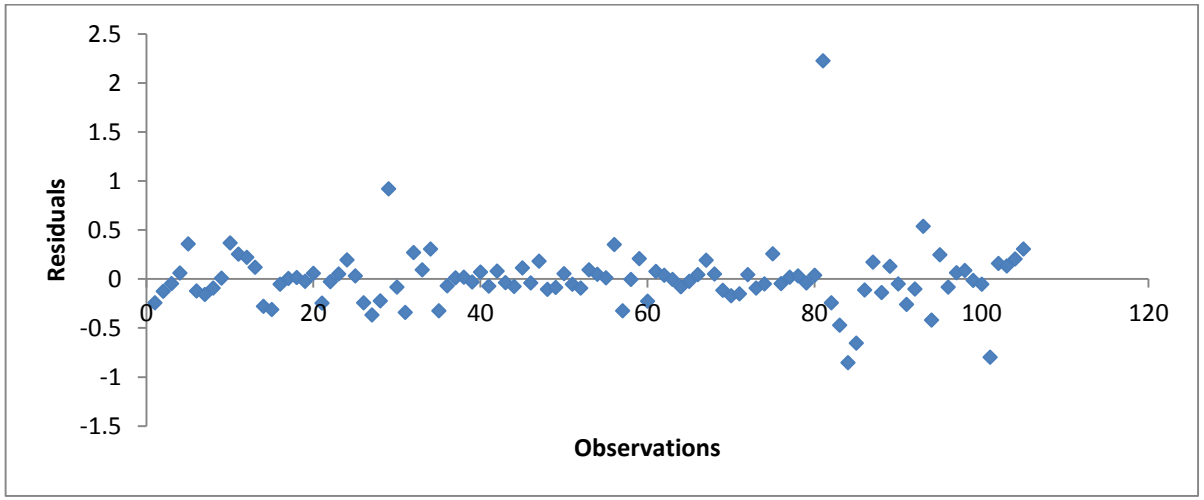


*Figure 31: STD/E as dependant variable, Services*

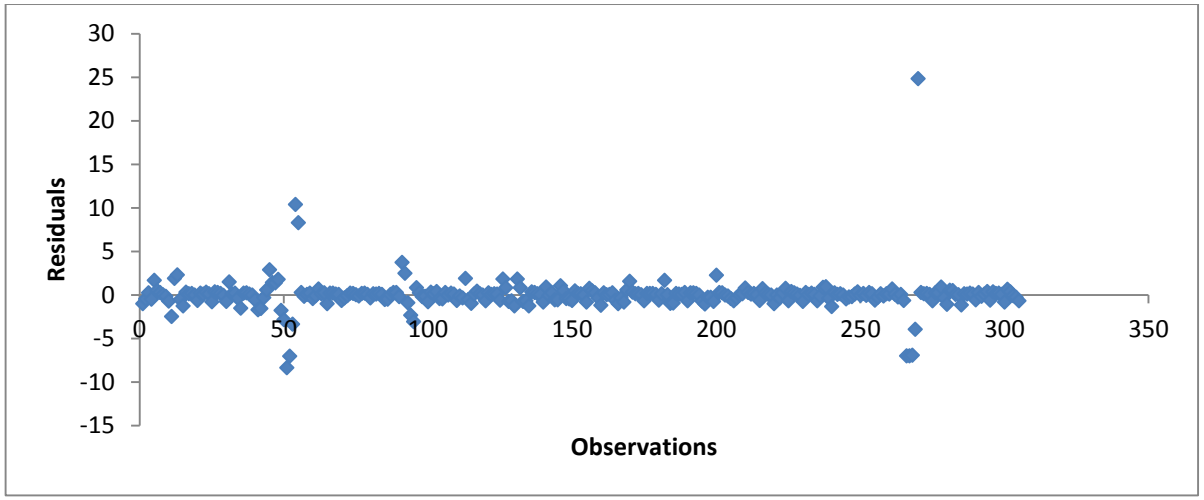


*Figure 32: STD/E as dependant variable, Financial*

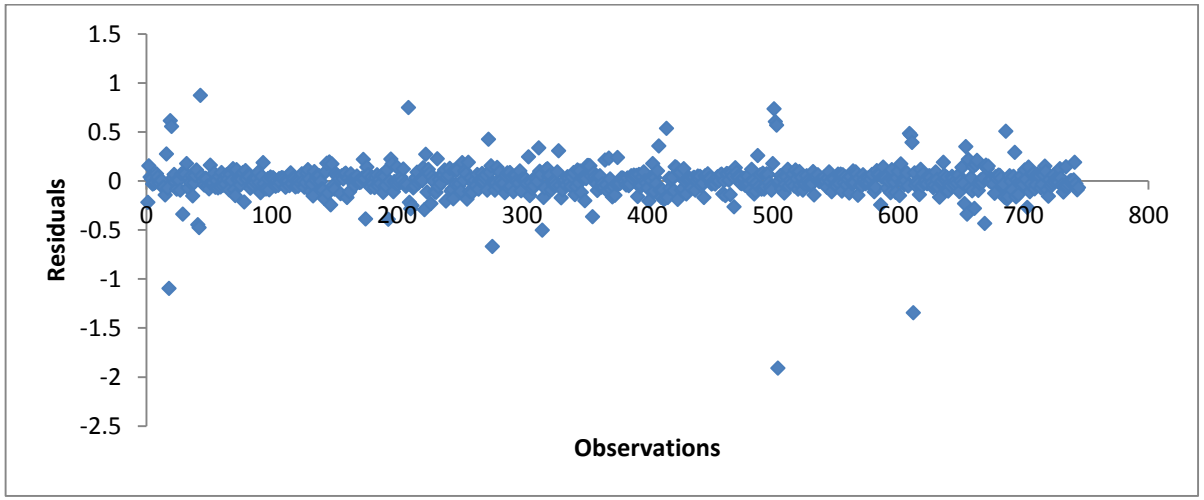


*Figure 33: Change in assets as dependant variable, Full Regression (excl Finance)*

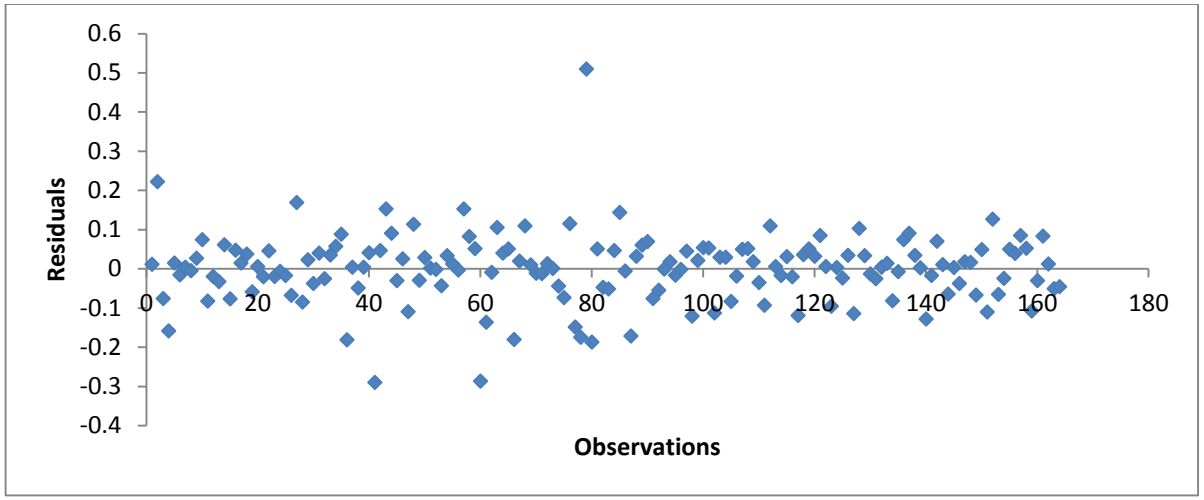


*Figure 34: Change in assets as dependant variable, Basic Industry*

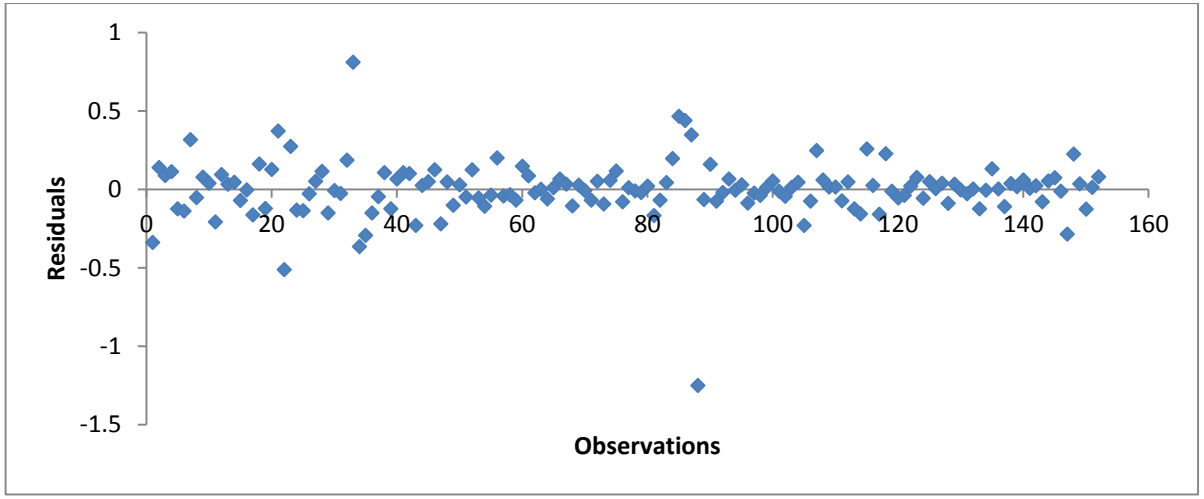


*Figure 35: Change in assets as dependant variable, Consumer Goods*

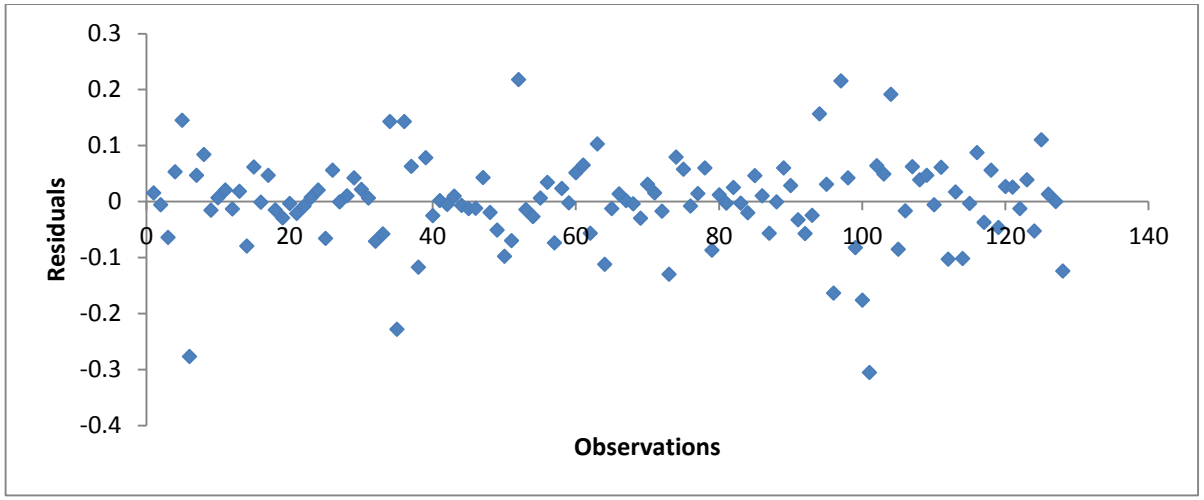


*Figure 36: Change in assets as dependant variable, General Industry*

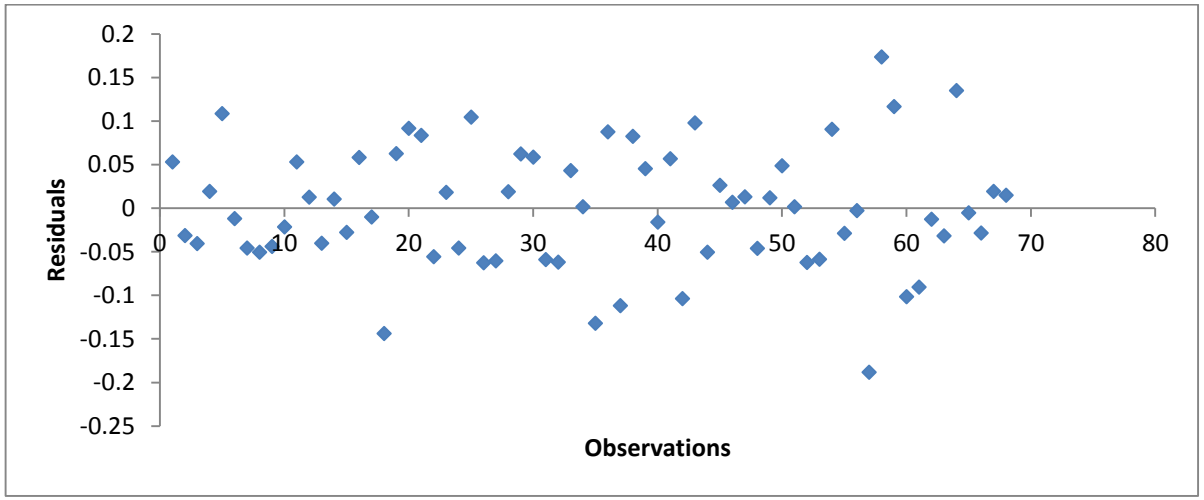


*Figure 37: Change in assets as dependant variable, IT*

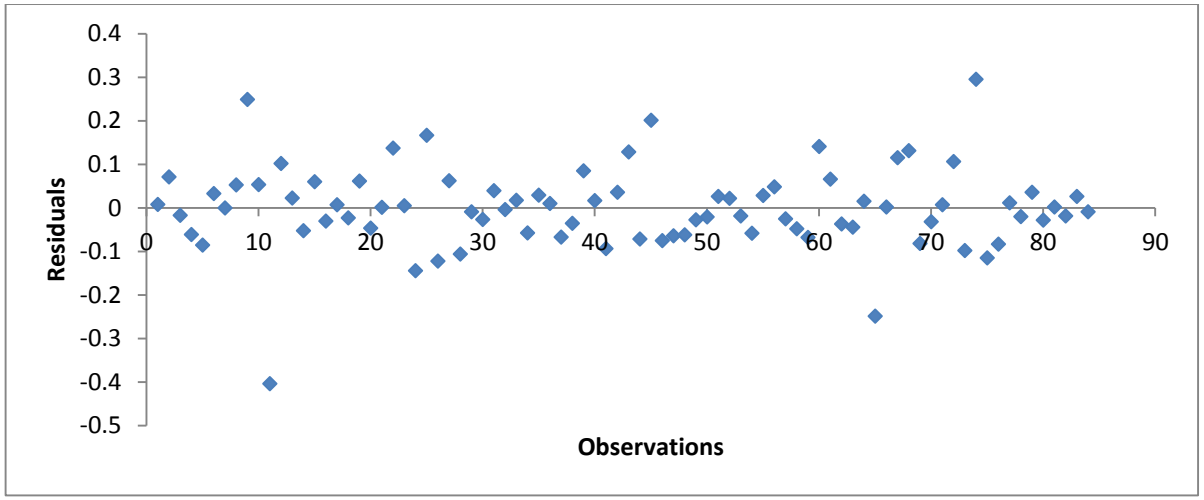


*Figure 38: Change in assets as dependant variable, Services*

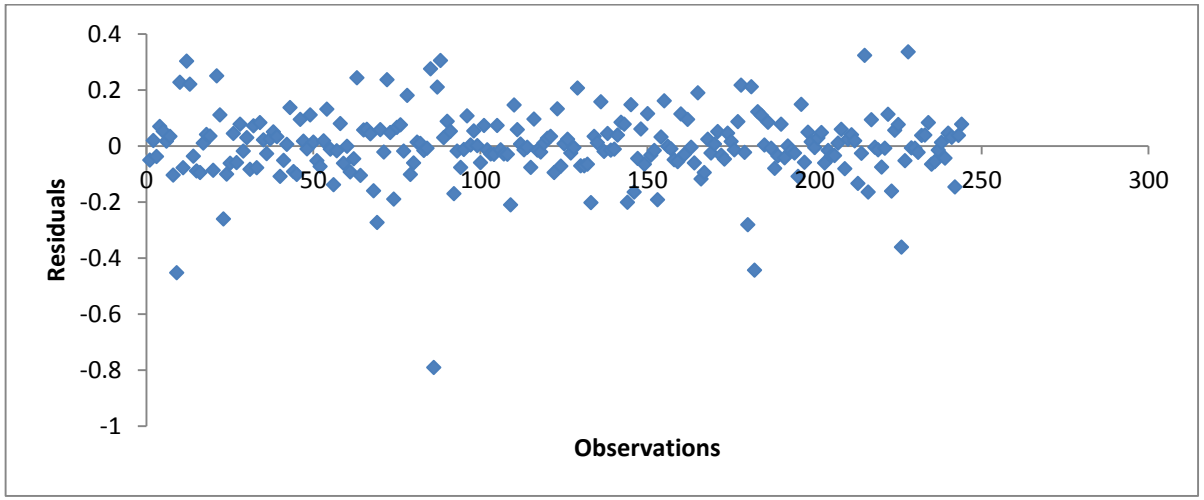


*Figure 39: Change in assets as dependant variable, Financial*

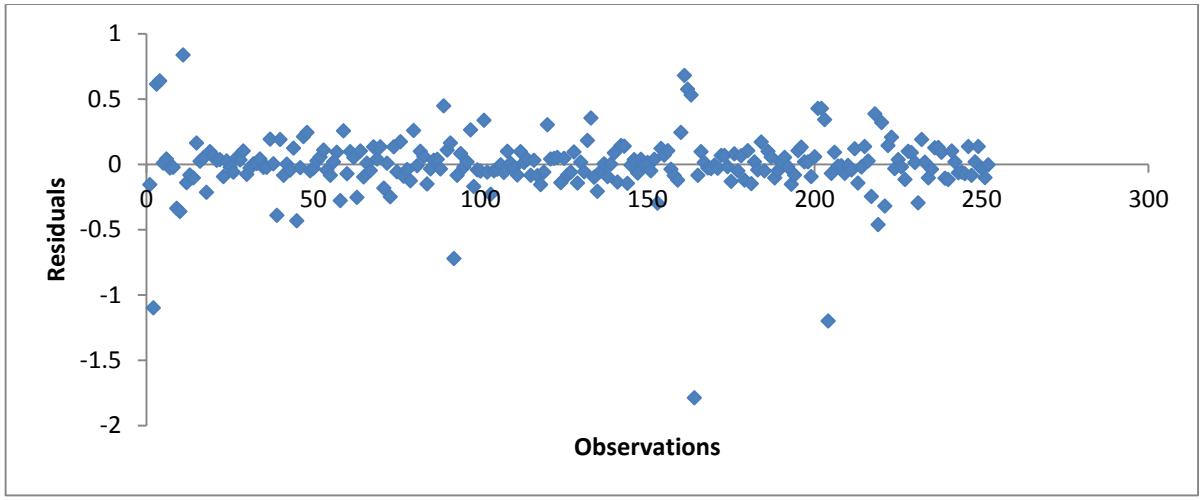


*Figure 40: Change in assets as dependant variable, Small Firms*

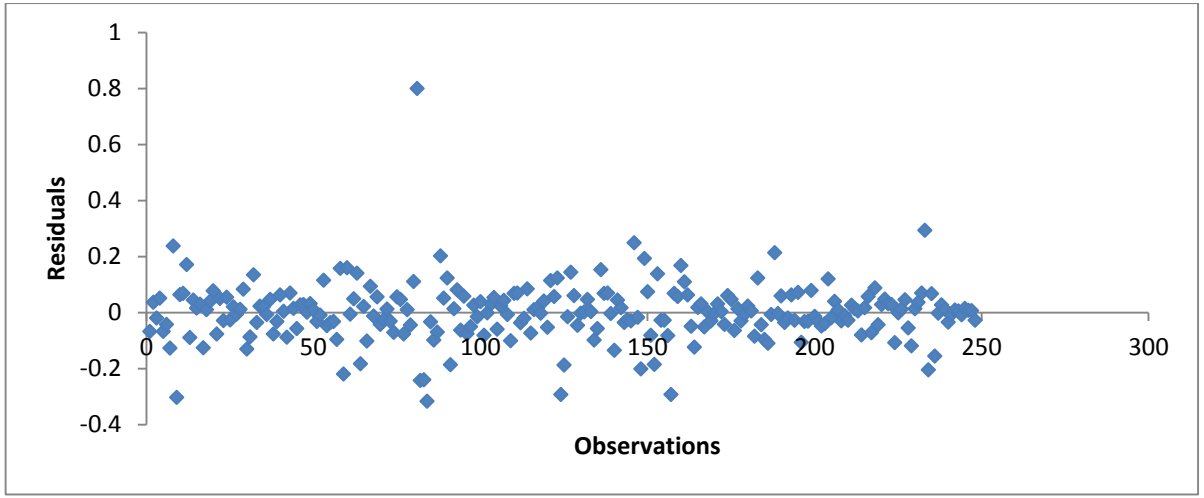


*Figure 41: Change in assets as dependant variable, Medium Firms*

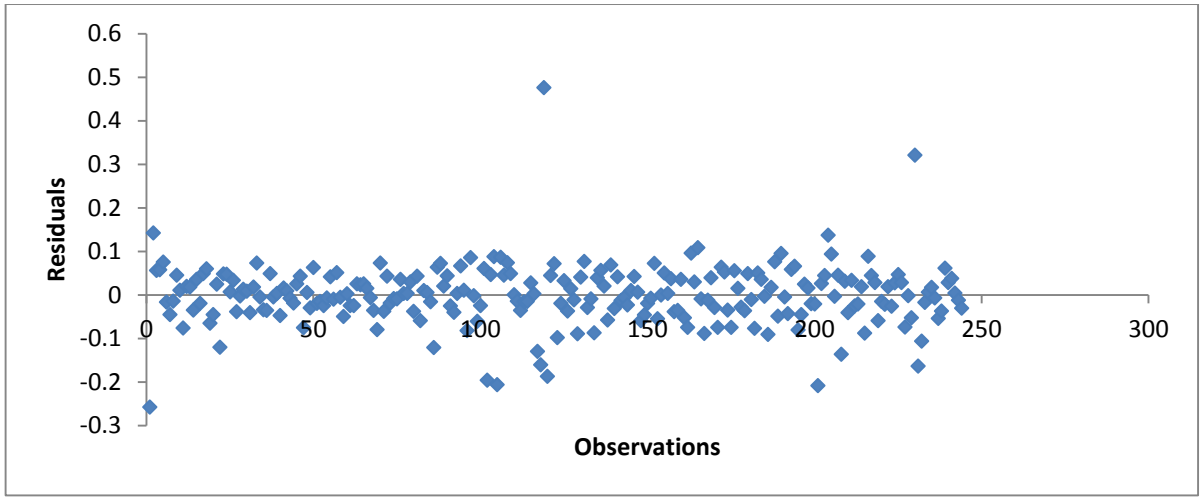


*Figure 42: Change in assets as dependant variable, Large Firms*