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INTER-RELATIONSHIP BETWEEN THE CAPITAL STRUCTURE AND DISTRIBUTION POLICIES OF COMPANIES LISTED ON THE JSE

by

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Mpinda Freddy Mvita

Signed at_ _ _ _ _ _ _ _ _ _ __ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

On this _ day of _ _ _ _ _ _ _ _ _ _ _ **2020**

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ABSTRACT

Previous studies have invoked information costs, the trade-off theory and the pecking-order theory as well as agency problems to explain capital structure and distribution strategies independently. However, the theories of the signalling, pecking-order, trade-off and agency cost suggest that a company's capital structure and distribution strategies are interrelated not only through joint determinants, namely the company-specific attributes, but also directly to each other. Consequently, this research examined the inter-relationship between capital structure and distribution strategies (dividend payments and repurchase of shares) of companies listed on the Johannesburg Stock Exchange (JSE) in the four main sectors for the periods 1990 to 2017 and 1999 to 2017. The study was done for two periods because the repurchase of shares in South Africa only became legal during 1999.

Using the pooled regression model, the fixed-effects model, the random effects model, the generalised method of moments and the three-stage least squares estimation (full information), the results revealed that the financing patterns and the distribution strategies of JSE-listed companies were likely to be jointly determined. The results also indicated that the interdependence between capital structure and distribution policies could also be determined through some joint determinants.

Advanced threshold regression analysis was used. The empirical evidence supported the existence of an optimal capital structure and the threshold effect, for the payment of dividends over the period 1990 to 2017 and 1999 to 2017, which was consistent with the trade-off theory. However, the threshold effect did not affect share repurchases over the period 1999 to 2017. Furthermore, the results of the model of choice revealed that the choice between the dividend payments, both (dividend payments and the repurchase of shares) or none (neither dividend payments nor share repurchases) relative to share repurchases was driven by profitability, company size, cash flow, working capital and market volatility. The results indicated that with an increase in profitability as a determinant of choice, JSE-listed companies were more likely to choose to pay dividends only or pay dividends and repurchase shares at the same time. During periods of high market volatility (policy uncertainty in the market), the results showed that South African managers chose to reduce the amount paid in dividends and share repurchases or neither pay dividends and repurchase shares at all.

The sectoral analysis revealed that the four chosen sectors of the JSE were subjected to different challenges in terms of operating risk, technology requirement and environmental regulations, which resulted in different financing decisions and distribution strategies. The literature indicated that companies' financing and distribution decisions not only relied on companies' specific characteristics, but the nature of the sectors could also determine these decisions. This argument was consistent with the research findings.

The findings in the study have important implications for putting into practice good financing and distribution policies. The outcome of the analyses implies that South African companies in the four main sectors, namely basic materials, industrial, consumer goods and consumer services, and their managements teams must be aware of the inherent interactions among financing and distribution decisions in order to avoid undesirable side effects which may result from a wrong decision. Consequently, South African managers should consider the key corporate decisions simultaneously and through joint determinants.

Keywords: Distribution strategies, threshold capital structure (optimal capital structure), financial distress and sectoral effects.

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LIST OF ABBREVIATIONS

A&B	=	Arellano and Bond
AR1/AR2	=	first-/second-order autocorrelation
BCM	=	basic materials
CD	=	Cash dividend/Actual dividend paid
∆CD	=	changes in cash dividends
CDF	=	cumulative distribution function
CE	=	capital expenditure
CF	=	cash flow
CI	=	confidence interval
CNG	=	consumer goods
CNS	=	consumer services
DA	=	debt-to-asset ratio
DE	=	debt-to-equity ratio
∆DE	=	change in the debt-to-equity ratio
DEF	=	internal fund deficiency
DR	=	debt ratio
DS	=	distribution strategies
ER	=	equity ratio
FDS	=	financing decisions
FE	=	fixed effects
FGLS	=	feasible generalised least squares
GLS	=	generalised least squares
GMM	=	generalised method of moments
IND	=	industrial sector
JSE	=	Johannesburg Stock Exchange
LB	=	lower bound
LIQ	=	liquidity
LLB	=	Long-term debt ratio based on book value
LLM	=	Long-term debt ratio based on market value
LSDV	=	least squares dummy variables
LTB	=	Total debt ratio based on book value

LTM	=	Total debt ratio based on market value
LF	=	Leverage factor
NDTS	=	non-debt tax shields
POT	=	pecking-order theory
RA	=	return on assets
RE	=	random effect
SIZE	=	company size
2SLS	=	Two stage least squares
3SLS	=	Three stage least squares
SMS	=	simultaneous equation system
SRP	=	Share repurchases
TRA	=	threshold regression approach
UB	=	upper bound
VO	=	market volatility
WACC	=	weighted average cost of capital
ΔWC	=	changes in working capital

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND AND MOTIVATION FOR THE STUDY

The distribution of cash to shareholders induces the issuance of new shares, which alters the capital structure resulting in capital market monitoring and consequently, reduction in agency cost (Easterbrook, 1984). Such a change in agency cost rationally inter-relates the company's capital structure to its distribution policies and questions the traditional independence argument (Baker & Weigand, 2015). The interplay between the two policies has attracted much attention in the literature (Aggarwal & Kyaw, 2010; Al-Najjar, 2011, Banerjee & De, 2015; Chipeta & McClelland, 2018; Cooper & Lambertides, 2018; Dittmar, 2000; Frank & Goyal, 2009; Ghasemi, Razak & Muhamad, 2018; Kim, Rhim & Friesner, 2007; Lim, 2016; Noronha, Shome & Morgan, 1996, among others). Companies use internal and external funds to finance their investment projects and return cash to shareholders in an attempt to maximise their company value and thus shareholders' wealth. Internal funds are chiefly represented by retained earnings and non-cash expenses; and external funds mainly refer to the proceeds from issuing new debt and new equity. As a result, managers must make decisions on the capital structure as well as on the distribution policies. Financial decisions are concerned with how to finance the desired investment, which involves the appraisal of two financial choices. One is the choice of distribution policies; namely how much internally generated funds should be paid out to shareholders as dividend payments and share repurchases which otherwise could be retained in the company for future growth opportunities. The other is the external financing choice, namely how much external funds does the company have to raise from outside capital markets in order to finance its operating activities.

Although much effort has been put into investigating the behaviour of companies, capital structure decisions and distribution policies are typically separately and routinely examined in isolation rather than together. Indeed, the seminal works by Modigliani and Miller (1958) and Miller and Modigliani (1961) posit separately the capital structure irrelevance theorem and the distribution policy irrelevance theorem. The Modigliani-Miller theorems demonstrate that internal and external funds for a company are substitutes in a perfect market environment. Hence the capital structure and the dividend pay-out choices should have no impact on the company's value and be irrelevant to shareholders' wealth. This suggest that there is no statistical relationship among the set of companies' decisions within a perfect market environment, where there are no frictions. As a result, each of the two policies has been widely and intensively investigated in the literature on finance, but little is known about the interdependence that may exist between them.

However, the literature on prior research has provided reasons and evidence that when market imperfections are introduced, such as the insufficient availability of internal funds and limited access to new external funds (for example, when a company reaches its debt capacity), these imperfections may hamper companies' ability to return cash to shareholders. It is true that in practice, the capital structure and distribution policies are inter-related through the accounting identity, in that sources of funds must equal uses of funds. Consequently, when a company adjusts its capital structure, its distribution policies may also be affected. Therefore, companies should consider their distribution policies alongside their choices of the capital structure.

Although no consensus has been reached on the inter-relationship between the two policies, an important implication is that companies' capital structure and distribution strategies are likely to be interdependent on one another and simultaneously determined by management. The single-equation frameworks used by prior research without explicitly accounting for the interrelation among the two policies may be misspecified, which potentially leads to incomplete and biased results. Therefore, a simultaneous decision-making framework is likely to provide greater insight into the statistical relationship that may exist among the optimisation of the capital structure, the dividend payments and share repurchases, improving knowledge of JSE-listed companies' decision-making processes in the real world. It is important to point out that by referring to the simultaneous determination of the capital structure and distribution strategies throughout the thesis, the researcher argues that the capital structure, dividend payments and share repurchases are likely to be executed simultaneously so that the outcomes can be observed via a simultaneous decision-making approach.

Moreover, recent literature exploring the predictors of companies' distribution strategies has highlighted the importance of predictors of choice between the dividend payments and share repurchases (Wesson, Smit, Kidd & Hamman, 2018). However, the potential effect of the nature of capital structure, the different alternative measures of the capital structure and financial distress on the choice between the dividend payments, share repurchases, both (the dividend payments and share repurchase) and none (neither the dividend payments nor the share repurchases) has received little attention. Given the fact that the decision to repurchase shares, to pay dividends, to engage in both and to engage in none is made on the basis of maximising return and minimising risk, it is reasonable to argue that the nature of the capital structure, the different alternative measures of the capital structure and the company-specific variables are likely to influence the choice between the distribution strategies. Therefore, this research also extends the existing literature on corporate finance by investigating how the capital structure and financial distress were used by JSE-listed companies to choose between the decision to pay dividends, to repurchase shares, to engage in both (the dividend payments and share repurchases) and to engage in neither the dividend payments nor the share repurchases (none). The results provide insight into the influence of risk and return on the behaviour of distribution strategies.

1.2 RESEARCH PROBLEM STATEMENT

In practice, companies, managers and shareholders devote much time and resources to making and analysing financing decisions and distribution policies. Moreover, when market imperfections such as taxation, transaction costs, asymmetric information and agency conflicts are introduced, devoting time and resources to optimise the capital structure and return cash to shareholders in the form of dividend payments and share repurchases no longer appears a futile pursuit. Subsequently, few theoretical and empirical research has aspired to clarify how the two policies interrelate and create value for companies and shareholders.

Although there is growing interest in the examination of the causal statistical relationship between the capital structure and distribution policies, most prior research used an individual equation approach, which could be misspecified. Furthermore, most studies used the capital structure and the dividend payments to explain how the two policies were inter-related, while ignoring share repurchases as another form of distribution policy, for example, the work of Al-Najjar (2011). As a result, these studies had diverse findings and to date no consensus has been reached. In the main, the mixed results are a consequence of studies based on the financial soundness of companies, the definition of proxies for capital structure and distribution policies, the sample size, the time frame, model specification and the industry. This study used a combination of different proxies of capital structure, the three natures of the capital structure, two distribution policies, four different sectors, and a longer company observation time frame to develop a simultaneous decision-making model for the causal statistical relationship between the capital structure and distribution strategies for South African sectors. Therefore, the problem statement for the study was whether the investigation of the capital structure variables and the nature thereof could determine the distribution policies, and whether the distribution policies could determine the capital structure in two different economic periods within the four main sectors, namely the basic materials, industrial, consumer goods and consumer service, on the JSE. In attempting to solve the identified problem, the following research objectives were pursued.

1.3 OBJECTIVES OF THE RESEARCH AND RESEARCH QUESTIONS

1.3.1 Objectives of the research

Past research has concentrated not only on identifying the company-specific factors that affect the capital structure decision, but also on company-specific factors that affect the distribution policies of the company. In inter-relating the financing decision with the distribution policies, past research has focused on the statistical relationship between the dividend payments and the capital structure or between share repurchases and the capital structure.

The first objective of this study was to derive and test a model that inter-related the capital structure with the distribution policies, namely the simultaneous decision-making framework of the capital structure and the distribution policies, for the periods

1990 to 2017 (capital structure and dividend payments) and 1999 to 2017 (capital structure, dividend payments, share repurchases and the sum of the dividend payments and shares repurchases). Using the historical data set of the four main sectors, the study developed a regression model that linked financing decisions and distribution policies.

To depart from previous research, this study adopted similar research methodologies, but investigated the inter-relationship between financing decisions, dividend pay-out decisions and share repurchases within a simultaneous decision-making framework. In testing for the simultaneity decision-making hypothesis, the research extended the list of company-specific variables, which are discussed in Chapter 4. This research used different measures of the capital structure (for example, the debt-to-equity ratio, the debt-to-asset ratio and the leverage factor), the different natures of the capital structure (highly geared and lowly geared) and financial distress to explain how JSE-listed companies interrelated the capital structure to the distribution policies.

The second objective of the study was to determine how a threshold capital structure among other variables within the framework of joint determination affected the distribution strategies of JSE-listed companies separately and jointly (the dividend payments, share repurchases and the sum of the dividend payments and share repurchases) and how they were also used in the process of choosing between dividend payments, share repurchases, engaging in both (the dividend payments and share repurchases) and engaging in neither the dividend payments nor the share repurchases. In other words, to investigate how the level of risk and return associated with the capital structure affected the distribution policies. Using the historical data set of the four main sectors, the study developed regression models that linked threshold capital structure among other variables to dividend payments and share repurchases separately and jointly for the period 1999 to 2017.

Apart from investigating the interdependence between financing decisions and distribution policies for the full sample, the third objective of the research was to examine the inter-play between financing decisions and distribution policies across the four main sectors of the JSE to find out if they treated their policies differently because companies operating in the same sector in South Africa should have similar characteristics. These characteristics would affect the nature of the sector, for example, profitability and risks and follow common business policies and norms. Sectors were also subjected to different challenges in terms of operating risk, technology requirement and environmental regulations. The literature indicates that companies' financing and distribution decisions not only rely on companies' specific characteristics, but the nature of the sectors also determines these decisions.

1.3.2 Research questions

For the purpose of the study, the following are the research questions:

1) Are financing decisions and distribution policies interrelated directly and through joint determinants over the period 1990 to 2017 and the period 1999 to 2017 for JSE-listed companies?

Research Question 1 was investigated by means of the following hypotheses:

Hypothesis 1A: Different alternative measures of capital structure affect the perceived relationship between capital structure and distribution policies.

Hypothesis 2A: The nature of the capital structure affects the dividend payments and share repurchases differently.

Hypothesis 2.1A: A highly leveraged ratio has a negative effect on the dividend payments.

Hypothesis 2.2A: A lowly leveraged ratio has a positive effect on the dividend payments.

Hypothesis 2.3A: A highly leveraged ratio has a negative effect on share repurchases.

Hypothesis 2.4A: A lowly leveraged ratio has a positive effect on share repurchases.

Hypothesis 3A: The dividend payment has a positive effect on the capital structure

Hypothesis 4A: Share repurchases have a positive effect on the capital structure.

2) Is there a threshold effect of the different measures of the capital structure on the dividend payments and share repurchases over the periods 1990 to 2017 and 1999 to 2017 for JSE-listed companies? Is the capital structure a determinant of choice between distribution strategies?

Research Question 2 was investigated by means of the following hypotheses:

Hypothesis 1B: There is a positive threshold effect of the capital structure on the payment of dividend over the periods 1990 to 2017 and 1999 to 2017.

Hypothesis 2B: There is a positive threshold effect of the capital structure on share repurchases over the period 1999 to 2017.

Hypothesis 3B: The different alternative measures of the capital structure affect the choice between distribution strategies differently.

Hypothesis 4B: Companies that are lowly geared are more likely to repurchase shares.

3) Is there a sectoral effect on the interdependence between financing decisions and distribution strategies over the period 1990 to 2017 for JSE-listed companies?

Research Question 3 was investigated by means of the following hypotheses:

Hypothesis 1C: Sectoral effects such as the level of indebtedness and the level of cyclicality result in different treatments of financing and payout decisions across sectors and their interdependence thereof, directly and through joint determinants.

1.4 LISTING REQUIREMENTS OF SHARE REPURCHASES AND LIMITATIONS

The South African financial data source used for this research (Iress) did not record comprehensive share repurchase data on a consistent basis for the period 1999 to 2017, the second period covered for this research. The information was only available for a certain period. Share repurchases that were announced on the Security Exchange News Service (SENS) of the JSE also did not represent the full extent of share repurchases owing to the JSE listing requirements (JSE, 2007) not requiring all general or open-market share repurchases to be announced via SENS; an announcement was required only when a 3% limit was reached. Section 4.5.1 discusses the methodology used in capturing share repurchase data.

1.5 MOTIVATION

The study of the interdependence between the capital structure and distribution policies has raised the question of how companies have determined an appropriate debt level when deciding on the dividend payments and share repurchases or the other way around (Baker & Weigand, 2015:139-140).

Whereas many of the studies on the interdependence between the two policies have been conducted in developed countries, only a few have been completed in developing countries in Africa and according to Al-Najjar (2011), this is an under-researched topic. In researching journal articles on the subject of the simultaneous inter-relationship between capital structure and distribution policies, only some studies were found (Aggarwal & Kyaw, 2010; Al-Najjar, 2011; Chen & Steiner, 1999; Cooper & Lambertides, 2018; Crutchley, Jensen, Jahera & Raymond,1999; Crutchley & Hansen,1989; Ding & Murinde, 2010; Easterbrook,1984; Fama & French, 2002; Ghasemi *et al*., 2018; Jensen, Solberg & Zorn, 1992; Kim *et al.*, 2007 & Noronha *et al*., 1996). It is worth noting that the above-mentioned studies only examined the statistical relationship between the capital structure and the dividend payments without considering the statistical relationship between the capital structure and share repurchases or the total pay-out (the sum of the dividend payments and share repurchases).

Early research by Bhaduri (2002), Easterbrook (1984) and Rozeff (1982) found that agency models predicted that the payment of a dividend and the simultaneous increase in debt could reduce the problems related to information asymmetry. Paying dividends and the ability to issue debt serve as a mechanism to reduce cash flows under management control, and hence help mitigate agency problems. Easterbrook (1984) states that when paying dividends and raising capital are conducted simultaneously, the securities of companies appreciate in value relative to other securities, indicating that an increase in debt increases the dividend payments (hence a positive statistical relationship). This argument is supported by some authors (Batabyal & Robinson; 2017; Cooper & Lambertides, 2018; Lim 2016). By contrast, some studies found a negative but statistically significant relationship between the capital structure and the dividend payments (Arko, Abor, Adjasi & Amidu, 2014; Banerjee & De, 2015; Ben Amar, Ben Salah, Ben Amar, Ben Amar & Jarboui, 2018; Benavides, Berggrun & Perafan, 2016; Frank & Goyal, 2009; Labhane, 2018; Moon, Lee & Dattilo, 2015; Nizar Al-Malkawi, 2007; Noronha *et al*., 1995; Yusof & Ismail, 2016) . These authors argue that when companies borrow capital, they commit themselves to the payment of fixed interest charges, which include interest and a principal amount, and failure to meet these obligations may result in the companies facing the risk of liquidation and bankruptcy. In addition, Al-Najjar (2011) found no evidence of the interface between the capital structure and dividend payments.

Some studies indicate a statistical significant but negative statistical relationship between the capital structure and share repurchases, arguing that low leveraged companies are more likely to repurchase shares in order to optimise their capital structure (Andriosopoulos & Hoque, 2013; Bonaimé, Öztekin & Warr 2014; Chen, Harper & Iyer, 2018; Dittmar 2000; Jansson & Larsson-Olaison, 2010; Lie, 2002; Mitchell & Dharmawan, 2007; Reddy Yarram, 2014). By contrast, Harris (2015) found a positive but statistically significant relationship between financial flexibility through share repurchases and the capital structure. Furthermore, some authors found no evidence of the interplay between capital structure and share repurchases (Lee, Ejara & Gleason 2010; Moon, Lee & Dattilo, 2015).

Conflicting evidence may partly be explained by the fact that prior studies suffered from model misspecification problems, small unrepresentative sample sizes, unjustifiable choices for the proxies of capital structure and distribution policies, and shorter time spans. As a result, the findings of prior studies were fraught with limitations, which made it impossible to generalise the results. Furthermore, the above-mentioned studies also did not inter-relate share repurchases, dividend payments and the capital structure simultaneously. Hence a need existed for further research that could lead to new contributions to the scant body of knowledge of the causal statistical relationship between capital structure and distribution policies. Therefore, this study aimed to fill the current gap by examining how the capital structure, the dividend payments and share repurchases affected each other simultaneously in theory and practice for JSE-listed companies.

In the light of the direct and indirect statistical relationships among these policies through joint determinants, the motivation for a study of simultaneous decision-making framework between the capital structure and the distribution policies is clear. Careful analysis is required to distinguish any direct effects from indirect effects, resulting from the company's operating choices. A simultaneous decision-making equation framework is the natural tool to identify the effects of interdependent decisions.

1.6 CONTRIBUTION TO THE BODY OF KNOWLEDGE

Against the preceding backdrop, this study extends and complements the extant literature on the interrelationship between the capital structure and distribution policies by making three major contributions to the body of knowledge. Firstly, it provides further evidence of the interdependence between capital structure and the distribution policies within a simultaneous decision-making framework. This researcher argued that the financing decisions and distribution policies of JSE-listed companies were likely to be determined jointly.

Secondly, it provides further evidence of the effect of threshold capital structure for share repurchases and dividend payments by testing and evaluating how JSE-listed companies in the four main sectors of the Johannesburg Stock Exchange used the risk and return associated with the capital structure in paying dividends and repurchasing shares. The researcher argued that the balance in the debt-to-equity ratio, the nature of capital structure, and the joint determinants (company-specific variables affecting both the capital structure and the distribution policies) related to a decision on distribution policies. Further, the study provide evidence of the different alternative measures of the capital structure, the nature of the capital structure and company-specific variables as predictors of choice between the choice to pay dividends, to repurchase shares, to engage in both (dividend payments and share repurchases) and to engage in none (neither the dividend payments nor the share repurchases).

Thirdly, the study provides further evidence of the sectoral effect on financing decisions and pay-out decisions across the four main sectors of the JSE. The research argument was that companies operating in the same sector were likely to be influenced by the same level of risk, the same environmental regulations and the same level of cyclicality, which, in turn, might have an impact on financing decisions and pay-out decisions across sectors. Through the sectoral analysis, the research revealed the differences in distribution strategies and capital structure behaviours in each sector.

The implication of the findings serves as a base, both theoretically and empirically, for how South African companies listed in the four main sectors on the JSE within a simultaneous decision-making process interrelated the distribution policies to the capital structure and *vice versa*. Further, the findings serve as a base for understanding how JSE-listed companies could use company-specific variables, the nature of the capital structure, and the different alternative measures of the capital structure to predict the choice between the payments of dividend, the repurchase of shares, the engagement in both (the dividend payments and share repurchases) and the engagement in none (neither the dividend payments nor the share repurchases).

1.7 DEFINITION OF KEY TERMS

The key concepts used in the research are defined as follows:

1.7.1 Capital structure

The term *capital structure* refers to the way a company finances its operations by utilising the choice between debt and equity.

1.7.2 Optimisation of the capital structure

The term *optimisation* of the capital structure refers to the process of determining the best mix of debt and equity financing to use for operation and expansions.

1.7.3 Financial distress

The term *financial distress* is synonymous with financial constraints and refers to funding constraints that may restrict a company's ability to finance new or ongoing projects. The term *financial constraints* also mean the frictions or restrictions that impede access to external financing either through borrowing or issuing of shares.

1.7.4 Distribution strategies

The term *distribution strategies* refer to the choice a company makes between dividend payments and share repurchases given several determinants.

1.7.5 Leverage

The term *leverage* stands for the extent of the use of debt in the company's capital structure.

1.7.6 Joint determinants

The term *joint determinants* refers to company-specific variables that are common in explaining simultaneously the capital structure decision and the distribution policies.

1.7.7 Threshold effect

The *threshold effect* refers to the existence of a threshold and the effects of the threshold variable identified on the policy investigated. This threshold effect can be positive or negative depending on the sign and significance of the threshold variable identified in investigating a specific policy.

1.8 STRUCTURE OF THE THESIS

The thesis is organised into eight chapters, which provide supplementary material. The research problem statement, motivation, objectives and contributions are outlined in Chapter 1.

Chapter 2: Literature review of distribution strategies and capital structure theories

Chapter 2 offers a comprehensive and critical review of the main works of literature on companies' distribution strategies and optimisation of the capital structure decisions, starting from the Modigliani-Miller theorems. The main theories surveyed in this chapter are the pecking-order theory, the trade-off theory and the market timing theory on companies' financing decisions, as well as the theories of signalling, undervaluation, free cash-flow and tax clienteles on company's distribution strategies.

Chapter 3:
Literature review of the inter-relationship between capital structure and distribution policies

Chapter 3 reviews all relevant empirical literature on the interrelationship between capital structure and distribution strategies. The chapter also provides the possible channels through which the capital structure and distribution policies are likely to be interrelated and in particular the information approach, the signalling approach, the flow of fund approach, and the agency theory approach. Because the focus of this study was to understand how JSE-listed companies used the capital structure in the process of setting distribution policies and how they also used the distribution policies in the process of financing decisions, the chapter also provides the different ways in which previous researchers have attempted to optimise the capital structure.

It then discusses how past research has attempted to validate the theories associating the capital structure decisions with distribution decisions. This chapter focuses on the trade-off, pecking-order, agency cost, signalling, equity market timing and undervaluation theories. In terms of the signalling, agency cost and undervaluation theories, the effect of a target capital structure on dividend payments and share repurchases is evaluated. The trade-off, agency cost and pecking-order theories are used to evaluate the effect of dividend payments and share in the process of optimising the capital structure. Finally, in terms of the agency cost theory, the chapter investigates how companies choose between pay-out policies given the level of leverage.

Chapter 4:
Research methodology

Research methodology is defined as the general approach of a study in carrying out its research (Leedy & Ormrod, 2001). To this end, the chapter describes the research framework, the measures for all variables (dependent and the joint determinant variables), data, data sources, preliminary tests as well as model specifications for the empirical analysis.

Chapter 5:
Analysis of individual and simultaneous equations and interpretation of capital structure and distribution strategies

The interdependence between the capital structure and distribution strategies of South African companies is examined in this chapter. Testing for stationarity, multicollinearity, autocorrelation, normality, homoscedasticity, and validity of pooled, random and fixed-effects models are done (a detailed explanation of these test is provided in Chapter 4). In addition, hypotheses are tested using a single-equation fixed-effects approach, a random effects approach, a generalised method of moments and a simultaneous equation approach (three stage least squares), as well as advanced regression methods.

Chapter 6:

Threshold capital structure and predictors of choice between the distribution strategies: Analysis and interpretation

This chapter examines the threshold effect of the capital structure, namely the optimal capital structure, on the payments of dividends and share repurchases over the periods 1990 to 2017 and 1999 to 2017. Further, it investigates the predictors of choice between the dividend payments, share repurchases, the engagement in both (the dividend payments and share repurchase) and the engagement in none (neither the dividend payments nor the share repurchases). Hypotheses are tested using a threshold regression and a multinomial logistic regression.

Chapter 7:

Sectoral analysis of financing decisions and distribution strategies

This chapter investigates the sectoral effect (for example, of operating risk, technology requirement and environmental regulation, which result in different financing decisions and distribution strategies) on the capital structure and the dividend payment and the interdependence among them across the four sectors of the JSE, namely the basic materials, industrial, consumer goods and consumer services sectors. Hypotheses are tested using the fixed-effects model, random effects model and a simultaneous equation approach (three stage least squares).

Chapter 8:

Conclusions and recommendations

The chapter concludes the thesis by summarising the research questions and the key findings. The main contributions are highlighted, the broad implications are discussed, and the limitations are acknowledged. A number of promising ideas for future research are also proposed in this chapter.

1.9 CHAPTER SUMMARY

The chapter highlighted the importance of interrelating the capital structure to distribution strategies as well as attempts by academic researchers to reach a consensus on the interactions between capital structure and distribution strategies. Despite the results being inconclusive, the focus of many studies has been to examine the interplay using a single-equation approach while excluding share repurchases. There is little research about the interrelationship between the capital structure and distribution strategies within a simultaneous framework where the three decisions are likely to be executed simultaneously. Therefore, the study adds to the previous literature and attempts to contribute to the literature by studying the interdependence between the different natures of the capital structure and two distribution strategies (dividend payments and share repurchases) in the periods 1990 to 2017 and 1999 to 2017 with reference to South African-listed companies. The study provides new evidence of the interrelationship between the set of policies in two different periods, 1990 to 2017 (for the capital structure and the dividend payments) and 1999 to 2017 (for the capital structure, the dividend payments and share repurchase). Furthermore, the industry nuances are taken into consideration through a sectoral analysis.

The next chapter provides insight into the literature on distribution strategies and capital structure theories.

CHAPTER 2: LITERATURE REVIEW OF DISTRIBUTION STRATEGIES AND CAPITAL STRUCTURE THEORIES

2.1 INTRODUCTION

Optimisation of the capital structure and distribution strategies are two of a company's decision-making areas that have attracted much attention in the literature for more than half a century.

Since the seminal works by Modigliani and Miller, researchers have tried to explain how real-world complications alter perfect and efficient capital market conditions, and how market imperfections make companies' financing decisions relevant to distribution strategies and *vice versa.* Stated differently, researchers have been trying to find out how companies' financing decisions can be tied to distribution strategies (Baker & Weigand 2015:139-140). By relaxing Modigliani and Miller's assumptions and introducing market imperfections, corporate finance research has intensively scrutinised decisions about capital structure, dividend payments and share repurchases. Although much effort has been put into investigating the corporate behaviour of companies, the two sets of corporate decisions are typically discussed separately and routinely examined in isolation. The aim of this chapter is to introduce the leading theoretical themes in order to explain the distribution policies and the capital structure separately. This chapter also reviews the main empirical methodologies that have been developed in order to test these theories and presents some of the empirical evidence from the literature.

The remainder of this chapter proceeds as follows: Section 2.2 briefly reviews the theoretical literature on distribution strategies; Section 2.3 reviews the empirical literature on distribution strategies; Section 2.4 reviews the theoretical literature on the optimisation of the capital structure; Section 2.5 explores the main theories and empirical literature of the capital structure and Section 2.6 summarises the chapter.

2.2 THEORETICAL LITERATURE ON DISTRIBUTION STRATEGIES

2.2.1 First work of literature on distribution policy

In 1961, Miller and Modigliani contributed the first paper to the distribution policy literature in which they investigated the theory of dividend policy and concluded that given the existence of the perfect market assumptions, the dividend policy was unrelated to the value of the company. They argued that the value of the company depended on the income produced by its assets and not on how it was split between dividend payments and retained earnings. This supposition is known in the finance literature as the *dividend irrelevance theory*.

The supposition starts from presuming that the sources and the uses of the company's funds must be balanced over any given period. Supposing that the company has two sources of funds, which are retained earnings and funds financed externally, during the same period, the company expands its funds on either investment or dividends. The balance can be expressed as:

$$\mathrm{E(t)} + \Delta\mathrm{S(t)} = \mathrm{D(t)} + \mathrm{I(t)}, \quad (2.1)$$

where:

$E(t)$: denotes retained earnings at the start of the period t, $\Delta S(t)$ denotes the external funds financed during period t with ex dividend price. $D(t)$, and $I(t)$ respectively denote dividend and investments during time t.

However, given that the rate of return on each share of the company equals $r(t)$, the share price of the period t (denoted as $p(t)$) in perfect capital market can be expressed as:

$$\mathrm{p(t)} = \frac{1}{1+\mathrm{r(t)}}(\mathrm{d(t)} + \mathrm{p(t+1)}), \quad (2.2)$$

where

$d(t)$: denotes the dividend per share during time t and $p(t+1)$ denotes the ex-dividend share price. If the company does not raise external funds during the period t, the total value of the company at the start of the period (denoted as $\mathrm{V(t)}$) can be expressed as:

$$V(t) = \frac{1}{1+r(t)}(D(t) + V(t+1)) \quad (2.3)$$

Nevertheless, if the companies raise external funds $(\Delta S(t))$, Eq. (2.3) ought to be amended as Eq. (2.4):

$$V(t) = \frac{1}{1+r(t)}(D(t) + V(t+1) - \Delta S(t)) \quad (2.4)$$

Recalling Eq. (2.1), the divergence between total dividends and the raised funds equals the residual of retained earnings after investments. The equilibrium can be expressed as Eq. (2.5):

$$E(t) - I(t) = D(t) - \Delta S(t) \quad (2.5)$$

Thus Eq. (2.4) can be rearranged as Eq. (2.6):

$$V(t) = \frac{1}{1+r(t)}(E(t) + V(t+1) - I(t)) \quad (2.6)$$

Equation (2.6) reveals that, given the company's retained earnings, the decision of investments is the only element which determines the company value of the period t. Because the company value of the period $t+1$ is also predicted by the subsequent retained earnings and investments, the company value is determined by the sequential investment policy. With respect to the dividend policy decision during each period, after making the decision of investments, the divergence between total dividend and the external raised funds should be equal to the residual of the retained earnings. Consequently, for each level of dividend decided, the company could correspondingly finance externally to make a balance between the uses and the sources of funds. It follows that the dividend policy does not possess any influence on the company value in perfect capital markets.

2.2.2 Departure from the Miller and Modigliani proposition and the current thinking on distribution policies

Miller and Modigliani (1961) initiated a robust debate on distribution policy, which sparked a lot of empirical research on the subject. Scholars challenged the main findings of Miller and Modigliani (1961) because the assumption of a perfect market would not hold in the real world. The resulting empirical research produced many theories (imperfections) that attempted to explain the distribution policy behaviour and the choice between dividend payments and share repurchases.
The following are the predominant distribution strategy theories:

- the Miller and Modigliani irrelevance theory proposed by Miller and Modigliani (1961) implies that the dividend payment and share repurchase are perfect substitutes (given perfect and complete markets);
- the signalling theory developed by Bhattacharya (1979) has often been used to indicate the interdependence between capital structure and distribution policies;
- the substitution hypothesis derived from the work of Grullon and Michaely (2002);
- the free cash flow hypothesis advanced by Jensen (1988);
- the theory of agency problems advanced by Rozeff (1982) explains the interrelationship between capital structure and distribution policies;
- the tax differential between dividend and capital gains developed by Litzenberger and Ramaswamy (1979); and
- the catering theory of dividend proposed by Baker and Wurgler (2004).

The above theories or hypotheses were an attempt by financial economists to explain distribution strategies of companies as a separate issue and some of them as indicated above were used to explain how financing decisions affect distribution policies and *vice versa* (Crutchley *et al.,* 1999; Ding & Murinde, 2010; Jensen *et al.,* 1992). The number of theories shows the complexity of the subject. These theories have conflicting predictions about the factors that affect share repurchases on the one hand and dividend payments on the other hand. These theories also provide inconclusive results when used to explain the inter-statistical relationship between leverage, dividend payments and share repurchases. The primary weakness of the Miller and Modigliani (1961) irrelevance theory is that it assumes that companies operate in a frictionless market, by implication, where dividend payments and share repurchase are perfect substitutes. These assumptions do not apply to a real market and therefore the theory was challenged to incorporate market imperfections. The adjusted theory provides a basis for the formulation of many other theories.

While information asymmetry exists between insiders (managers) and outsiders (investors), the information about shares and the underlying companies is no longer freely available for all traders. The underlying idea is that insiders know the real value of their companies in that they possess more information about investments and expected profits. By contrast, outsiders can only get the information from financial reports or speculate about the real company value based on the company's announcements such as dividend or share repurchase announcements. Therefore, this leads to the possibility that these announcements may be imposed by managers to change the outsiders' evaluation of their companies. According to the signalling theory of distribution strategies, managers use dividend payments or share repurchases to signal information to investors. Therefore, investors respond positively to dividend increases or share repurchases and negatively to dividend cuts.

The second imperfect element is the agency problem existing between managers and shareholders. Without complete contracts, managers may manage the companies for their own interests. However, the dividend payments and share repurchase could serve as a tool to reduce free cash flow available for managers and therefore alleviate the agency problem. Moreover, it follows that increases in dividend and share repurchases may likewise force the companies to issue new shares more frequently and thus get monitored by stakeholders.

The tax differentials are a third imperfection, which results in the investors no longer being neutral between the dividend and capital gains. A rand of dividend becomes less valuable than a rand of capital gains when the tax on dividend is higher, and *vice versa*. Similarly, with the same value of cash pay-out, the investors may also prefer share repurchases to dividends when capital gains are taxed at a lower rate. It follows that investors may be biased when evaluating the company value due to their different views between dividend payments and capital gains. The dividend clientele hypothesis predicts that investors will invest in shares whose distribution policy is consistent with their best interests. Much empirical research has been conducted to test the validity of each of these theories, but the evidence has been mixed, with conflicting results for each theory. This conflict is the main reason why the distribution policy of a company and the choice between dividend payments and share repurchases remain unresolved.

The following section discusses the literature on the distribution policy theories described above.

2.3 DISTRIBUTION POLICY: A THEORETICAL STUDY

The distribution policy theories mentioned in the previous section relate the distribution policy of a company to value creation, taxes, risk, undervaluation, signalling and agency conflicts. However, the main empirical studies on dividend payments and share repurchase focus on the tax hypothesis, undervaluation, signalling and agency theories. Therefore, the following discussion is based on these theories. Transaction costs that are incurred due to changes in the distribution policy are normally incorporated into each of these main hypotheses. These costs are commonly assumed to be a function of dependency on external finance and are controlled for by variables such as size, growth, or profit.

Testing the various approaches depends to a large extent on the hypothesis under investigation. The clientele effect is often assessed by event studies of the dividend payment days. Other tax studies look at the trading activity rather than the share price behaviour of ex-dividend days. Some tax hypothesis studies take a different approach, reviewing the impact of tax reform on relative prices while others regress the dividend policy on tax proxies to assess the importance of the latter in influencing the former.

According to Manos (2003), most studies that investigate the signalling hypothesis follow an event study of the dividend announcement period. Furthermore, a different way of testing the validity of the signalling hypothesis is by looking at the changes in the company characteristics (for example, the changes in earnings), following the change in dividend policy. Cross-sectional comparisons between companies of different characteristics are also used to assess how such differences may affect the value of the dividend signal.

Agency theory studies generally use regression analysis to assess the degree of substitutability among the capital structure and the distribution policies for controlling agency problems (for example, the studies of Jensen, Solberg & Zorn,1992; Ding & Murinde, 2010).

The literature review in this section examines studies dealing with the above-mentioned theories. However, some researchers have attempted to model the management decision-making process that determines dividend changes. Some of these behavioural models, notably that of Lintners (1956), have important implications for the signalling theory.

2.3.1 Dividend and the signalling theory

According to the signalling theory on dividend payments, managers of companies use dividend pay-outs to signal information to the market (Kapoor & Baker, 2015). What is proposed by Miller and Modigliani (1961) on the dividend irrelevant theory is founded on the assumption of perfect capital markets. An underlying assumption is that the distribution policy of a company may affect the value of the company if this assumption is held.

Bhattacharya (1979) developed the first signalling theory model using two distinct periods. In the first period, managers decide on the investment policy which they are going to carry out and thereby make a commitment of dividends to their shareholders. In the second period, managers distribute dividends which they committed in the previous period by using proceeds from investment projects.

A crucial assumption implicit in Bhattacharya's (1979) signalling model is that access to capital markets for external financing is costly. Considering this assumption, it is supposed that if companies are incapable of meeting the dividend commitments, the companies will be forced to finance externally and therefore incur transaction costs. The increasing frequencies of external financing are likewise considered to raise the transaction costs and, in turn, increase the cost of signalling. However, Bhattacharya's model fails to shed light on why dividends are paid and used as a signal tool when this process is costly (Allen & Michaely, 2003).

Miller and Rock (1985) developed a signalling model using dividend, investment and financing policies. First, they assume that there are two groups of shareholders who behave differently after dividend payments are announced. A group of shareholders sell their shares after dividend announcements but before dividend realisations, while the other group hold the shares. Second, the objective of companies is to set a compatible dividend policy and maximise the wealth of the above-mentioned two groups. Furthermore, as indicated by Miller and Rock (1985), the earnings are only used for new capital investment and paying dividends. Given the two assumptions, they developed an optimal dividend policy based on a specific level of earnings. This model clearly explains that dividend payments are made as earnings signal and to eliminate the information asymmetry. Unlike the signalling costs in Bhattacharya's (1979) model, the signalling costs in Miller and Rock's (1985) model are to lower funds allocated to productive investment. The model could also be applied to share repurchases in that the dividends discussed in Miller and Rock's (1985) model are the net dividends. However, the assumption that earnings are only used for investment and dividends is rarely the case in the real world.

Investigating the determinants of the dividend policy for Sri Lankan companies, Baker, Dewasiri, Yatiwelle-Koralalage and Azeez (2019) used the market data (secondary data) of 190 companies and 1 330 company-year observations. They found that company size, industry impact, corporate governance, free cash flow, past dividends, earnings, investment opportunities, net working capital, concentrated ownership structure, investors' preference and profitability represented the most important dividend determinants. The findings are in line with the signalling theory.

2.3.2 Dividend signalling and earnings performance

One of the implications of the test of the dividend signalling theory is estimating the associations of dividends with current and future earnings. In a classic study, Lintner (1956) conducted a series of interviews with the managers of 28 US industrial companies about their companies' dividend policies over seven years from 1947 to 1953. The survey indicated that companies tended to establish dividend policies with target pay-out ratios that were applied to current earnings. It was also found that companies' adjustment rates that determined the percentage of the target change by which dividend levels were changed depended on changes in earnings. Lintner (1956) also reported that although the target pay-out ratios and speed of adjustment varied across companies, in most cases, they stayed reasonably stable over time.

According to Lintner (1956), current net earnings play the most important role in determining dividend changes. This is because current earnings are widely available to shareholders and hence managers' view is that investors expect dividends to reflect changes in the profitability level of the company. It is worth pointing out that this study followed the Lintner model in investigating the impact of a target capital structure on the dividend payments.

Over the years, researchers have raised three questions about Lintner's model. First, some researchers investigated what determined the speed of adjustment and hence the degree to which smoothing in dividend payments took place. Second, some researchers tried to establish whether companies had long-term target pay-out ratios towards which they moved. Third, the question of whether current earnings were the key determinant of dividend was investigated. In general, however, empirical tests of Lintner's model confirmed its validity. One of the earliest studies is the one by Fama and Babiak (1968).

Fama and Babiak (1968), who later examined a larger sample (392 companies) for a period of 19 years, asserted Lintner's argument that this model could explain 85% of dividend decisions over the post-war period. In addition, Fama and Babiak (1968) suggested that including the lagged profit variables could possibly improve the predictive power of the model.

Mookerjee (1992) applied the Lintner model based on a US survey for a developing country (India) for the period 1949 to 1981, before significant reforms were introduced. Using annual data for the aggregate Indian corporate sector, the results indicated that the Lintner model performed well in explaining the dividend behaviour in India. Modification of the basic model, by adding the availability of external finance as an explanatory variable, improved the fit of the model. The lagged external finance, when added to the model, had a significant and positive estimated coefficient reflecting access to subsidised borrowing and hence a tendency to use borrowing to finance higher dividends. Mookerjee (1992) also indicates that the constant in the Lintner model is hypothesised to be significant and positive, reflecting the fact that companies are more willing to raise than lower dividends. Although the study found the constant to be significant under all specifications, it resulted in a negative sign in all regressions. This could be due to the impact of taxes. Furthermore, Mookerjee (1992) found that although the lagged earnings regressed with a negative coefficient, in all cases, they were also statistically insignificant. By contrast, Lee (1996) found stronger support for the view that permanent earnings, rather than current earnings, determined the dividend policy.

The study by Lee (1996) assessed whether there was a long-term statistical relationship between the various definitions of earnings and dividends. The study utilised a bivariate time series model of earnings and dividends obtained from annual observation of Standard & Poor's Index for the period 1871 to 1992. The model was sufficiently general to allow various specifications of target dividends to be included in the model. These restrictions were then tested, considering the non-stationarity of the dividend and earnings series and the co-integration between them. The results indicated that dividend behaviour was primarily determined by changes in permanent earnings and that the Lintner model performed better when the target pay-out ratio was a function of permanent rather than current earnings. This supports the signalling hypothesis in the sense that current earnings are not a good indicator of the long-term financial position, hence managers utilise dividends to signal this position.

Shirvani and Wilbratte (1997) also used co-integration (albeit multivariate rather than bivariate) techniques to test the validity of the Lintner model. However, their main aim was to resolve the second of the three questions mentioned above, namely whether companies had long-term pay-out ratios. Using the quarterly observation of Standard and Poor's index for the period 1948 to 1994, the first stage was to confirm the non-stationarity of the dividend and earnings and share price in the index series. The three variables were found to be co-integrated, and the tests of the coefficients in the co-integrated equation pointed to a long-run relation between earnings and dividends. In particular, the hypothesis that the coefficients on the long-term tendency of the dividend and earnings variables were equal and of the opposite signs was not rejected. Furthermore, Shirvani and Wilbratte (1997) estimated an error correction model to capture short-term deviations from the long-run target pay-out ratio and the speed of adjustment. The results indicated that companies applied different rates of adjustment in raising and lowering dividends. When the pay-out ratio was below its long-term target, the company would increase dividends. However, when the pay-out ratio was above its target, the company would hold the dividend constant and wait for earnings to grow so that the target pay-out ratio was achieved. This ratchet effect is interpreted in terms of the signalling theory, and as a way of avoiding bad signals associated with dividend reductions.

2.3.3 Shareholders' wealth and dividend announcements

Another implication of the dividend signalling theory is that markets respond positively to the good news conveyed by dividend increase and negatively to the bad news conveyed by dividend cuts. The market reactions to dividend announcements are usually measured by the abnormal returns around the announcement date. The underlying hypothesis is that if positive (negative) abnormal returns are found around the dividend increase date (cuts), the theory is confirmed.

De Wet and Mvita (2013) assessed whether there was a long-term statistical relationship between the dividend payments and market price in creating shareholders' wealth. The study utilised a sample of 46 companies listed on the Johannesburg Stock Exchange for the period 1995 to 2010. The restrictions were tested considering the non-stationarity of the dividend payments, profit and market price per share and the co-integration between them. These three series were found to co-integrate and the test in the co-integrated equation pointed to a long-run statistical relationship between the dividend payments and the market price per share. In addition, they estimated a vector error correction model to describe the short-run deviation from the long-run dynamics of the co-integrated variables towards their equilibrium values. The results indicated that the market price per share behaviour was primarily determined by changes in permanent dividend payments. This also supports the signalling hypothesis in the sense that the dividend payment is a good long-term indicator of wealth creation rather than the company's profit.

It is worth noting that financing decisions and distribution policies can also be used simultaneously to convey information to the market. For example, investors may react positively to any announcement of a dividend increase, and negatively to any deduction in dividend payments. On the other hand, the announcement of debt financing may be considered positively by investors, as outsiders (investors) may interpret this debt issuance as a signal for a good financial outcome (Koch & Shenoy, 1999). The signalling theory of the capital structure and the distribution policies are explained individually in this chapter and simultaneously in Chapter 3.

2.3.4 Dividend and the tax effect

The assumption of perfect capital markets for the dividend irrelevant theory of Miller and Modigliani (1961) is characterised by no tax and transaction costs, symmetric information and complete contracts. While the agency and the signalling theories respectively interpret the effect of incomplete contracts and asymmetric information on dividend policy, the clientele effect provides a different explanation to dividend policy by considering the tax and the transaction costs.

The basic tax hypothesis suggests that because personal taxes on dividend tend to exceed those on capital gains, companies have an incentive to adopt a conservative distribution policy and such policy should be value enhancing. A possible method to assess the validity of this hypothesis is to study market price and dividend policy changes in response to tax reforms. Hubbard and Michaely (1997) and Papaioannou and Savarese (1994) adopted this methodology. Alternatively, the importance of taxes to the dividend decision may be assessed by regressing dividend policy on proxies for the tax cost of dividends. Gentry (1994) and Lasfer (1996) adopted this methodology.

Using data on companies that are listed on either the NYSE or the AMEX for 1987 (65 companies) and 1988 (64 companies), Gentry (1994) found support for the tax hypothesis. The study investigated the dividend policies of corporations versus publicly traded partnerships in the oil and gas exploration industry. The publicly traded partnerships and corporations in the oil and gas industry were similar in size and this made them comparable. The main difference between the publicly traded partnerships and corporations was that during the period of study, the publicly traded partnerships were not taxed at corporate level and hence escaped the US double-taxation system. Accordingly, if the tax hypothesis is valid, because publicly traded partnerships have lower tax cost associated with the payment of dividends, their pay-out rates should be larger. Using the cross-sectional instrumental variable technique, the dividend pay-out was regressed on an organisational form dummy as well as on several other variables. The results showed that companies considered taxes when formulating their dividend policies and that, coherent with the tax hypothesis, publicly traded partnerships paid more dividends than corporations did.

Lasfer (1996) provided support to the tax hypothesis by investigating 108 companies quoted on the LSE for the period 1973 to 1983. The study considered both personal and corporate taxes by running a regression of the partial adjustment model. The original partial adjustment model was adapted to incorporate the effect of both personal and corporate taxes on the determination of the long-run target dividend level. Lasfer (1996) tested whether the target dividend (and therefore also the actual dividend) was a function of earnings, of the tax discrimination variable and of the tax exhaustion dummy. The tax discrimination variable, surrogating for the effects of personal taxes, varied inversely with the income tax rate. When the tax discrimination was larger than one, income tax on dividends was cheaper than tax on capital gains and the company was expected to prefer a high distribution policy. The tax exhaustion dummy, surrogating for the effects of the company's tax position, was set to one if the taxable profit was lower than gross dividends and advanced corporation tax (ACT) was irrecoverable. When ACT was irrecoverable, the company was expected to prefer a low dividend pay-out, and hence the coefficient was expected to be negatively signed. In addition, the results of an event study presented in the second part of the journal article also supported the tax hypothesis, rejecting the tax-induced clientele effect. Specifically, significant and positive abnormal returns were reported on the ex-dividend day consistent with the notion that the price drop on the ex-dividend day was systematically less than the value of the dividends. The reason for this was dividend taxation, which caused the value of the dividends to investors to be less than their nominal amount. The study concluded that taxes affected both the dividend policy and ex-dividend returns, and that companies set their dividend policies to maximise the after-tax returns to their shareholders as well as to minimise their own tax liabilities.

To measure the share price behaviour on ex-dividend days, Elton and Gruber (1970) developed a price-drop-to-dividend ratio. The tax discrimination between ordinary incomes and capital gains leads to investors' different appetites for dividends. Investors selling their shares before the shares go ex-dividend, lose the right to claim upcoming dividend but get more capital gains. Making transactions before ex-dividend days, these investors are more likely in higher tax brackets and adverse to dividends. As dividends are levied by ordinary income tax, investors may prefer to sell their shares at a higher price and pay the capital gains tax at a lower rate. By contrast, investors in a lower tax bracket or exempted from ordinary income taxes may prefer to receive dividends and keep their shares if the gains from after-tax dividends are not smaller than the price drop on the ex-dividend day. Considering all the above-mentioned factors, the basic condition for investors to keep their shares is to maintain their wealth on the ex-dividend day. The price-drop-to-dividend ratio is derived from the wealth equilibrium on the ex-dividend day and on the day before the stock goes ex-dividend.

If the tax clientele effect exists, then the ratio of the drop in the price relative to the nominal dividend amount should be closer to unity for highly dividend yield stock and less than a unity for low-dividend yield stock. This is because highly yield stock is held by investors who face lower tax rates on dividends. By contrast, investors in low-dividend yield stock are those facing high taxes on dividends. For these higher yield taxpayers, the after-tax value of the dividend is substantially less than the amount received and the required compensation for receiving the dividend is therefore higher. Furthermore, Elton and Gruber (1970) divided their sample, 4 148 stocks listed on the NYYSE which paid dividend in the 12-month period from 1 April 1966, into 10 groups according to the value of the dividend yield. They found that tax brackets were negatively related to the company's dividend policies. This supports the tax clientele effect and suggests that a change in dividend policy rather than the dividend policy itself could affect value.

2.3.5 Effects of overinvestments on dividend decisions

Lang and Litzenberger (1989) were the first to apply the Tobin's Q-ratio to examine the agency theory of dividend. Companies with Tobin's Q greater than unity are designated to be at the value-maximising level of investment, while companies with a Q-ratio less than unity are labelled as overinvestment companies. Accordingly, they separated the sample into two groups and compared the abnormal returns on dividend announcement days for value-maximising and overinvesting companies. They tested the free cash flow hypothesis, which states that the excess free cash flow would prompt managers to overinvestment while dividends could help reduce free cash flow available. As a result, dividend increases for companies with a Q-ratio less than unity signified lower probability of overinvestment. By only examining dividend changes greater than 10%, their findings showed that the overinvesting companies induced larger market responses on the dividend announcement day regardless of the signs of dividend changes. This evidence that the dividend changes for overinvesting companies convey more information about reducing free cash flow is consistent with the notion of the agency theory.

Yoon and Starks (1995) extended the investigation of Lang and Litzenberger (1989) by additionally using the variables of capital expenditure. In their examination of the free cash flow hypothesis, they found that dividend increases for the overinvesting companies had a larger positive impact on the share price than those of the value-maximising companies. Nonetheless, no significant difference in the market responses to dividend cuts between overinvesting and value-maximising companies was found by Lang and Litzenberger (1989).

2.3.6 Signalling theory of share repurchases

In their study of corporate common share repurchases, Vermaelen (1981) identified information signalling as the main motivation for the premium self-tender offers. Likewise, to the prediction for dividend pay-out and changes in capital structure, the signalling hypothesis predicts that share repurchases signal the information about the current or future earnings. The explanation most widely discussed in the literature is that companies' managers use share repurchases to signal their optimism to the market about the company prospects. There are two explanations for this information signalling theory (Grullon & Ikenberry, 2000). Firstly, repurchases are intended to convey managers' optimism of future increases in earnings, cash flows and shares, which are not at that point shared by the market. Secondly, management does not attempt to convey new information to the market but rather expresses its disagreement with how the market prices the company's performance. In either case, the company's management views the shares as undervalued. The disagreement between the two versions is based on the discrepancy between price and fair value. In the first case, it is the company's ability to communicate its prospects convincingly to the market; in the second, it is the market's failure to reflect publicly available information in the current price.

A company's management is better informed about the company's true value than outside shareholders. This information symmetry can lead to a share being priced below its intrinsic value. Management can only convey its private information in a credible way not only by simply telling investors, but by engaging in actions like share repurchase plans (Miller & Rock, 1985). Management views the repurchase of shares as a good investment when the shares are undervalued.

Investigating the actual share reacquisitions in open-market repurchase programs Stephens and Weisbach's (1998) results indicated that share repurchases activity was negatively related to prior share returns, implying that shares were repurchased when share prices were perceived to be undervalued. In addition, repurchases were positively related to the levels of cash flow, which is consistent with the liquidity arguments.

Examining the key factors that drive the dividend payments and share repurchases decisions Brav, Graham, Harvey and Michaely (2005) findings suggested that, share repurchase activity was negatively related to prior share returns, implying that shares were repurchased when share prices were perceived to be undervalued. In addition, the findings revealed that rather than increasing dividend, many companies now use share repurchases as an alternative. Dividend increases and the level of share repurchases are generally paid of residual cash flow, after investment and liquidity needs are met.

The McNally (1999) results of the model showed that:(1) the repurchase proportion was a positive signal for earnings, (2) given the repurchase level, companies with higher insider ownership were related to the higher earnings. The first suggestion is the basic implication of the signalling hypothesis. The rational for the second implication is that, because companies with higher insider holding exposed their insiders to greater undiversified risk for a given level of earnings, companies with higher insider ownership would like to repurchase less. Given the repurchase level as constant, the market would infer the greater earnings to the higher insider holdings.

Examining the changes in operating performance around the open-market share repurchase announcements, Lie (2005) showed that over eight quarters following the announcements, the repurchase companies had significant improvement in operating performance. Furthermore, because the companies announcing open-market repurchases did not necessarily repurchase shares later, the test of whether the divergent behaviour contained different information about future earnings showed that the companies which repurchased shares experienced improvement in the subsequent operating performance, whereas the companies which merely made the announcements did not. The results support the signalling hypothesis.

Compiling an index of US companies which repurchased more than 5% of their shares during the period 2000 to 2011, Stonehage (2011) showed that companies which repurchased shares had outperformed the S&P shares by more than two times over the period; the shares repurchased index had surpassed its earlier record levels in 2007 (the S&P did not); and the share repurchase index seldom underperformed.

Lie and McConnell (1998) tested the information signalling of fixed price and Dutch auction tender offer repurchases. Their results revealed that the signalling hypothesis suggested that the operating performance of the repurchase companies was better than that of their industry peers, and the outperformance continued for up to five subsequent years. However, the operating performances were not different between the two repurchase methods.

2.3.7 Substitution hypothesis of share repurchases

The substitution hypothesis of dividend is a consequence of an increase in open-market share repurchases as an alternative distribution policy. The substitution hypothesis indicates that managers make share repurchases as a substitutive pay-out method for dividends. Bagwell and Shoven (1989) argue that managers learn to use share repurchases for replacing dividends because of the tax advantage inherent in the former pay-out mechanism. However, a survey-based study, implemented by Wansley, Lane and Sarkar (1989), revealed managers' view on share repurchases by indicating that about half of the respondents disagreed with the statement that repurchases were a substitute for cash dividends. Among the repurchasing companies, the percentage of the disagreement was even higher, which was about 60%. The dramatic increase in share repurchase activities in the US since the 1980s raised questions whether share repurchases were substituting cash dividends.

The Fama and French (2001) findings revealed a drop in the proportion of dividend-paying companies from 66,5% in 1978 to only 20,8% in 1999. This decline was ascribed to a change in the general profile of listed companies following the surge of the listing of small companies. These small companies had a low profitability but high growth opportunities, which made them less likely to pay dividends. Other companies, irrespective of their characteristics, were also found to be less likely to pay dividends, indicating that the benefits of dividends had declined over time. Some of the reasons offered for this decline included lower transaction costs for selling shares, larger holding by managers preferring capital gains, and better corporate governance technologies (Fama & French, 2001).

The Grullon and Michaely (2002) results revealed that companies paying only dividends had similar characteristics to companies paying dividends and repurchase shares. Relatively, companies which only made share repurchases had similar characteristics to companies which did not pay out any cash. The dividends forecast errors turned to be negative as the repurchase yields increased. The evidence by regression analysis also showed a negative relation between repurchase expenses and dividend forecast errors. Testing whether the market perceived dividends and share repurchases as substitutes, the results revealed that when companies cut dividends, those which did not make a share repurchase experienced -1,93% of three-day abnormal cumulative returns, while those which made repurchases only experienced -0,45% abnormal return. The evidence supporting the substitution hypothesis is explicit.

The Dittmar and Dittmar (2008) results indicated that the underlying economic conditions drove the wave of corporate finance transactions and not the tendency of market undervalued shares. More specifically, the growth in the gross domestic product (GDP) was the most important determinant of repurchases.

Investigating US companies for the period 1980 to 2005, Skinner (2008) found the changes in earnings helped to explain changes in the distribution policy for this period and that repurchases had increasingly become a substitute for dividends. Further, while other factors helped to explain the timing of share repurchases, the overall level of repurchases was fundamentally determined by earnings.

The DeAngelo, DeAngelo and Skinner (2004) results revealed that, although the number of dividend-paying US industrials declined by more than 50% from 1978 to

2000, the real value of dividends paid by these industrial companies increased. These findings reflected the practice of a few large dividend-paying companies paying even larger dividends, while companies paying small dividends stopped paying dividends altogether. Despite the increased prevalence of share repurchases, dividends were found to still be very much part of a company shareholder distribution policies.

The Brav *et al.* (2005) results indicated that, for managers, dividend decisions took priority over investment decisions which, in turn, took priority over share repurchase decisions. The results implicitly rejected the substitution hypothesis between share repurchases and the dividend payments. Furthermore, the results showed that companies were reluctant to cut dividends, the current level of dividend payments was taken as given (except in extreme cases). At the same time, the results also showed that share repurchases were at that time an important form of pay-out because the interviewed managers stated that the flexibility of repurchases (relative to dividend payments) was one of the main reasons that share repurchases increased. This flexibility allows managers to alter pay-out in response to the availability of good investment opportunities, to accommodate time-varying attempts to affect the earnings per share or stock valuation, to offset stock option dilution, or simply to return capital to investors at the appropriate time.

The Lee and Rui (2007) results indicated that share repurchases were associated with temporary cash flows and the dividend with permanent cash flows and that there was a strong evidence of substitution between the two-over time. In addition, the authors argue that if share repurchases are primarily associated with temporary components of earnings, it remains somewhat puzzling why the stock market reacts strongly to share repurchase announcements.

2.3.8 Undervaluation hypothesis

One of the implications of the undervaluation hypothesis is that the share repurchase announcements are preceded by undervalued share prices (Stephens & Welsbach, 1998; Vermaelen, 1981). This phenomenon of share undervaluation stems from the information asymmetry between managers-insiders and the external investors.

Companies that are undervalued can inform the market about it through corporate transactions such as repurchase, acquisition and dividend payments. As a result, companies and managers attempt to profit from the private information about the true value of the companies by repurchasing shares that are cheaper. Since this undervaluation contains information relevant for stock prices, investors are inclined to revise their valuation upwards upon the release of the private information. Furthermore, in a share repurchase, managerial behavioural changes in terms of purchase or sale of ownership rights indicate the extent of the quality of the private information (Lee, Mikkelson & Partch, 1992). This hypothesis underlines the financial management goal of maximising shareholder value and any attempt to repurchase at a price higher than the undervalued price will destroy shareholder value. With significant manager share ownership in the company, such repurchase transactions align the interests of managers with the interests of the shareholders.

Repurchase of undervalued shares at low share prices stimulate high or improved stock prices. This is because repurchase of shares represents a favourable information signal to the market about the prospects of the company. Stephens and Weisbach (1998) assert that repurchase is negatively related to the prior stock price performance. In other words, undervalued shares perform better after a share repurchase announcement. In a study of 450 open-market repurchases from 1981 to 1990, Stephen and Weisbach (1998) found significant effects of low stock price on increasing the number of shares repurchased. Consistent with the free cash flow hypothesis and the liquidity argument, they further found evidence of the levels of cash flows driving the repurchases (Jensen, 1986; Dittmar, 2000; Grullon & Michaely, 2004).

Rau and Vermaelen (2002) investigated the long-term return performance preceding and following the UK repurchase announcements for open-market share repurchases. They found -2.47% of cumulative abnormal returns (CARs) during the one-year period preceding the announcements. They argued that the reason for the smaller excess returns is because the regulatory provisions in the United Kingdom make it less likely that companies can use superior information to repurchase shares when their shares are undervalued.

Extending Rau and Vermaelen's (2002) study, Oswald and Young (2004) focused on examining open-market share repurchases with a more complete sample. The results indicated that the one-year pre-announcement CARs were -10.08% and -5.46% for the two subsamples. This is consistent with the findings of Vermaelen (1981), showing that the cumulative abnormal returns during the period of 60 to two days preceding the open-market repurchase announcement were -7.08%. For robustness check, Oswald and Young (2004) estimated the regression model of the percentage of share repurchased on the abnormal returns over the 12 months preceding and following the share repurchases completion. The results revealed that the preceding abnormal returns were negatively related to the percentage of share repurchases. In other words, the lower the preceding share prices were, the more the managers repurchased shares.

2.3.9 Free cash flow hypothesis of share repurchases

Another factor that may define the share repurchase behaviour of companies is the free cash flow hypothesis, namely companies with excess cash flows distribute it to the shareholders rather than investing in value-destroying projects. In other words, share repurchases preserve shareholder value more than suboptimal investment for companies with excess cash flows. The separation of ownership creates two kinds of conflicts, namely conflict between management and shareholders and conflicts between shareholders and bondholders (Jensen and Meckling, 1976). The conflict between managers and shareholders creates an agency problem because managers are more likely to pursue their interests at the expense of the owners. Therefore, managers may commit a company's resources to activities that benefit them, such as extensive perquisites, empire building and investment in value-destroying activities. Repurchases like the dividend payments limit available cash and restrict the overinvestment projects (Jensen, 1986).

The prediction of the free cash flow hypothesis also asserts that managers forgo capital expenditure and disgorge excess cash flows to shareholders. This effect discounts the conflict of interests that persists between managers and shareholders. The agency theory demonstrates an inherent motivation for managers to seek to enhance their benefits at the expense of shareholders. Companies with limited growth opportunities should reduce agency costs of free cash flows by paying out excess cash flows to shareholders (Botanic, 2010; Grullon & Michaely, 2004). In this spirit, share repurchases should correlate negatively with capital expenditure and research and development expenditure.

2.3.10 Equity market timing

Another theory that interplays the distribution policy to capital structure is the equity market timing theory. The equity market timing theory by Baker and Wurgler (2002), based on the initial empirical work of Korajczyk, Lucas and McDonald (1991) and Lucas and McDonald (1990), challenges both the trade-off and the pecking-order theories and argues that companies time issuance of new equity to periods of high market performance. It means that the companies are inclined to issue more equities when market value of shares is high, and then companies will repurchase equities at market value if the market value of shares is low. The underlying reason for the timing behaviour of corporate finance decisions could be the cost of selection. The intention is exploiting the temporary fluctuation in the cost of equity relative to other forms of capital. This theory reflects that there is a reverse statistical relationship between market value and capital structure. Therefore, it states that leverage changes are strongly and positively related to their market timing measure. Thus, the capital structure of a company is the cumulative outcome of past attempts to time the equity market (share repurchases and share issuance). Empirical evidence of equity market timing is provided in Chapter 3.

2.3.11 Share repurchases and investments

The free cash flow hypothesis predicts that repurchases significantly reduce cash, cash flow and investment. It also assumes that companies with limited growth opportunities undertake repurchase to distribute excess cash to shareholders in lieu of investing in value-destroying activities. In that sense, companies can reduce risk and costs of capital because repurchase is less risky than the assets in which they invested (Grullon & Michaely, 2004). It is anticipated that growth companies would repurchase shares based on information signalling and mature companies would be motivated by the free cash flow hypothesis (Grullon & Michaely, 2004; Liang, Chan, Lai & Wang, 2013). Generally, repurchase reduces cash flow and liquidity in a way that would limit investment. Therefore, companies that repurchase shares should invest less in the capital market because more cash is distributed to shareholders (Jensen, 1986; Hahn & Lee, 2009). However, companies could still invest in assets as far as the cash flow is not significantly depleted after the repurchase announcement.

Another way of looking at the investment and share repurchase statistical relationship is to consider the overinvestment hypothesis, which posits that when companies do not have attractive investment opportunities, they will consider the implementation of share repurchases. Boudry, Kallberg and Liu (2013) examined the overinvestment motivation for share repurchases using a sample of 139 real estate trust investments (REITS) between 1996 and 2010. Controlling for other share repurchase rationales, the results indicated that poor investment opportunities were related to higher levels of share repurchases. Moreover, examining investment opportunities, they found that the level of cash was positively related to share repurchases only for companies where low investment opportunities were present, and a negative statistical relationship existed between share repurchase announcements and capital investment. This negative statistical relationship indicates support for the overinvestment hypothesis.

2.4 LITERATURE ON THE OPTIMISATION OF THE CAPITAL STRUCTURE

2.4.1 Historical review of the capital structure

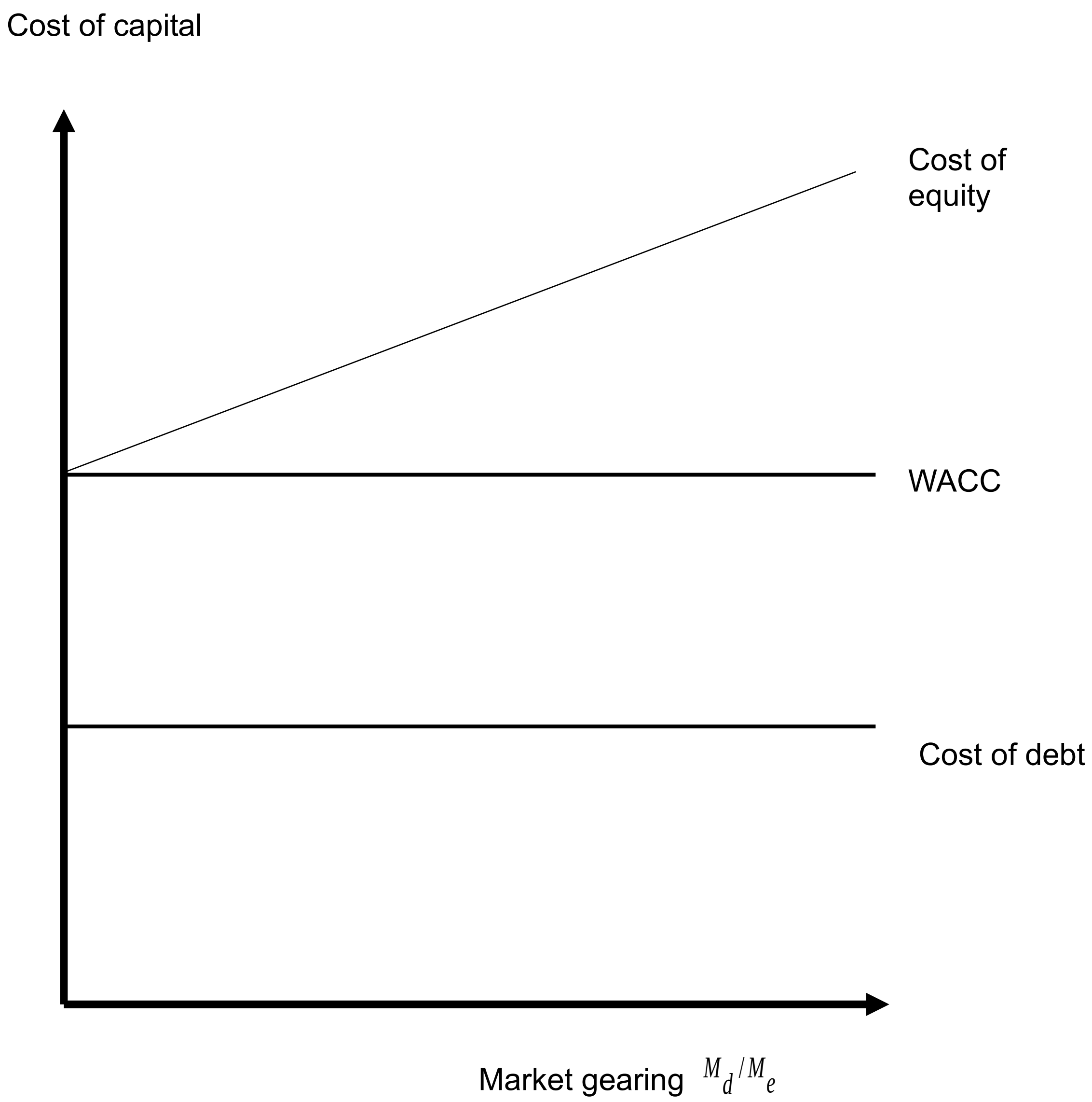
The debate around the capital structure and the influence thereof on the value of the company, was first started by Modigliani and Miller in their seminal work in 1958. In this publication, Modigliani and Miller (1958) argued that capital structure was irrelevant in the company valuation. Since its publication, the article has ignited a widespread debate on the composition of a company’s capital structure. In their publication, and assuming perfect and frictional capital markets, Modigliani and Miller (1958) came up with four propositions regarding capital structure decisions and the value of the company. They assumed that capital markets were frictionless, that companies and individuals could borrow and lend at a risk-free rate, that there were no bankruptcy costs, that all companies were in the same risk class, that there were no corporate and personal taxes, that all cash streams were perpetuities, that there was zero information asymmetry, and that there was zero agency cost.

Proposition Ⅰ state that the market value of any company is independent of its capital structure. Equivalently, it states that companies in a similar risk class will have similar average cost of capital (WACC) regardless of the proportion of debt-to-equity ratio.

Proposition Ⅱ states that the rate of return on equity grows linearly with the debt-to-equity ratio expressed in market values. That is, when managers raise cheaper debt capital, the gain in terms of lower cost of debt will be offset by the correspondingly higher cost of riskier equity capital.

Figure 2. 1: Modigliani and Miller Proposition I and II - zero arbitrage statistical relationship between the weighted average cost of capital and the market gearing (no taxes)

Figure 2.1 indicates that the rate of return on equity grows linearly with the debt-to-equity ratio expressed in market values.



Source: Ryan (2007)

Proposition Ⅲ states that the distribution of dividends does not change the company's value, it only changes the mix of equity and debt in the financing of the company. It is worth noting that in this proposition, their highlighting of the importance of the distribution strategies in the process of the financing decisions, was a first theory in this regard. Modigliani and Miller's proposition implies that the distribution policy of the company, among other variables, can be used in the process of a financing policy. Myers and Majluf (1984) incorporated a distribution policy of a company (dividend payment) as a financial deficiency variable in explaining the pecking-order theory. This argument is explained under the pecking-order theory in this chapter.

Proposition Ⅳ states that to decide on an investment, a company should expect a return of at least equal to its return on equity**,** no matter where the finance would come from. This means that the marginal cost of capital should be equal to the weighted average cost of capital. The constant return is sometimes called the hurdle rate (the required rate of return for capital investment).

These propositions laid down the foundations for the capital structure irrelevance theory, which has remained valid under the assumptions of a perfect market. . However, real-world markets are imperfect because in the real world, capital markets are not frictionless; there are transaction costs; companies and individuals cannot borrow and lend at a risk-free rate; companies do not face the same risk class; investors and companies both pay taxes; cash flow streams are perpetuities as assumed; and information asymmetry, agency costs and bankruptcy costs are a reality. These market imperfections are the order of the day and they invalidate the capital structure irrelevance theory. Because of these imperfections, Modigliani and Miller revised their 1958 and 1963 papers to incorporate the impact of taxes, bankruptcy costs and other market imperfections into the capital structure decisions.

The main market imperfections that Modigliani and Miller (1963) incorporated into their analysis were taxes, financial distress and agency costs.

2.4.2 Impact of taxes and debt ratios

Modigliani and Miller (1963) amended their irrelevance theory by dealing with the tax effect and found that, owing to tax shields on interest, gearing increased the value of a company. Furthermore, Miller (1977) states that, when personal tax is considered, the irrelevance theory is still correct, and argues that bankruptcy costs are too small to consider. Extending Miller's analysis, DeAngelo and Masulis (1980) assert that each company has a different optimal gearing ratio based on different debt and equity issuing prices, earnings and tax rates. In Modigliani and Miller's (1963) amended theorem, a company's value increases as leverage levels increase, which is caused by the tax shields. The interest tax shield effectively reduces the company's WACC:

After-tax cost of debt: $K_d^{'} = K(1-T)$

where

T = corporate tax rate

The after-tax required rate of return on debt is $R_d' = (1-T)$

After-tax WACC (The weighted average cost of capital):

$$WACC = \frac{D}{(D+E)} * K_d^{'} + \frac{E}{(D+E)} * K_e \qquad (2.7)$$

Where

D=Market value of debt

E=Market value of Equity

K_d =Cost of debt

K_e=Cost of equity

As a result, **Proposition Ⅰ** is reduced to:

$$K_{eg} = K_{eu} + \frac{D}{E} * \left(K_{eu} - K_d^{'}\right) \qquad (2.8)$$

Where

K_{eg} =Cost of equity for a geared company

K_{eu} =Cos of equity for an ungeared company

Proposition Ⅱ is reduced to:

$$R_e = R_{eu} + (R_{eu} - R_d^{'}) * \left(\frac{MV_d}{MV_e}\right) \qquad (2.9)$$

Where:

R_e=Required rate of return on equity

R_d =Required rate of return on debt

R_{eu} =Required rate of return on equity for an ungeared company

R_{eg} =Required rate of return on equity for a geared company

MV_d =Market value of debt

MV_e =Market value of equity

$$MV_L = MV_{UL} + PV_{TS} \quad (2.10)$$

where:

MV_L =Market value of geared company

MV_{UL} =Market value of ungeared company

PV_{TS} =Present value of tax shields

The implication of the above equations is that the company's WACC decreases as the leverage ratio increases, and the market value (MV) increases as the debt-to-equity ratio increases. Therefore, managers should use as much debt as possible to maximise the value of companies.

2.4.3 Bankruptcy probability and costs

Bankruptcy occurs when a company breaches its loan covenants. At the extreme, the company defaults in servicing its debt and this may lead to bondholders filing bankruptcy. Bankruptcy is very costly, because the company must sell its assets at discounted prices to settle with creditors. At extreme levels of gearing, the costs of both equity and debt should rise as investors begin to factor in the costs of financial distress in pricing these securities. The argument of Modigliani and Miller (1963) and Miller (1977) is that bankruptcy costs are not extremely high compared with tax shields; and in terms of asymmetric information theories, such as those of Myers (1984), Myers and Majluf (1984), Harvey, Lins and Roper (2004) and others, agency costs are greater than bankruptcy costs. All these researchers suggest that bankruptcy costs are too small to be considered. Miller (1977) argues that bankruptcy costs are not important when compared with tax shields in determining the value of the company. However, DeAngelo and Masulis (1980), Marsh (1982) and Bris, Welch and

Zhu (2006)and others state that bankruptcy costs significantly affect the financial structure of a company. Therefore, companies with bankruptcy costs cannot hold too much debt even if there are tax benefits.

There are two kinds of bankruptcy costs, direct and indirect (Warner, 1977). Direct costs occur when a company goes bankrupt, indirect costs can occur before bankruptcy. Direct bankruptcy costs include fees for lawyers, accountants and other professionals as well as the managerial costs involved in administering the bankruptcy. On the other hand, Altman (1984) indicates that indirect bankruptcy costs include the reduction of product demand, increasing production costs because suppliers of raw materials may be reluctant to continue to sell to the high-risk companies except under fairly significant restrictions and higher costs.

2.4.4 Departure from Modigliani and Miller theories

Over the years, since Miller and Modigliani's theories (1958), almost all assumptions of frictionless environment were relaxed, subsequently giving rise to a number of theories, such as the trade-off and the pecking-order theory, to explain the financing decisions of companies. According to Myers (2001), the predominant capital structure theories are as follows:

- the Modigliani and Miller capital structure irrelevance theory proposed by Modigliani and Miller (1958);
- the trade-off theory originally introduced by Kraus and Litzenberger (1973);
- the pecking-order theory proposed by Myers (1984) and Myers and Majluf (1984);
- the agency cost theory proposed by Jensen and Meckling (1976) and Jensen (1986); and
- the signalling theory and the market timing theory proposed by Baker and Wurgler (2002), Korajczyk, Lucas and McDonald (1992) and Lucas and McDonald (1990).

The above-mentioned theories have conflicting predictions about the factors that determine the optimisation of the capital structure of a company. The first weakness of the Modigliani and Miller capital structure irrelevance model is that it assumes that companies operate in a frictionless environment with no taxes and no informational gap (Myers, 1984; Jensen, 1986). However, patterns such as industry-specific leverage ratios are reasonably observable in the market, which implies that capital market imperfections do exist, and thus validate the relevance of the capital structure. The adjusted theory provided a basis for the formulation of the trade-off theory of corporate financing.

In a purely static trade-off theory, which rarely exists, the implication is that a company always maintains an optimal debt ratio (Myers, 1984). This strict form of the trade-off theory is that it holds all other company characteristics constant except the costs and the benefits of leverage. As a result, a more practically realistic dynamic trade-off theory allows for a period of deviation from the target and allows other company-specific factors to determine the adjustment process although it maintains a target leverage. Due to the cost involved in the adjustment process, the dynamic trade-off theory implies that the observed leverage is not optimal; however, companies gradually adjust to the target (optimal) level. This dynamic form of the trade-off theory has sparked a contentious stream of research to determine cross-sectional variations in the speed of readjustment to the target level.

An important element to note within the trade-off framework, is how researchers with agency perspective try to explain debt financing. This goes beyond the simplistic underlying theoretical construct of the trade-off theory. For example, Jensen and Meckling (1976), Jensen (1986) and Hart and Moore (1994) argue that debt can be utilised as a disciplinary tool to reduce the free cash flow problem and Myers (1977) state that debt may mitigate shareholder-manager conflict but may wind up exacerbating shareholder-debtholder conflicts.

The main rival of the trade-off theory is the pecking-order theory, which avers that companies do not have a leverage target, but that they rather aim to maximise their financial solvency. The theory asserts that the financing of companies follows a hierarchy which descends from internal funds to external debt and external equity and this order reflects the increasing risk of securities. This hierarchy is caused by the asymmetry of information between managers and investors, and it creates a signalling effect. Further information asymmetry theories include the signalling theory and the market timing theory. The agency theory hypothesises that financing decisions have an impact on the capital structure because the managerial investment and operating decisions play some role. Information asymmetry theories attempt to explain financing behaviour with reference to the existence of information differences between managers and investors, whereas the agency theories attempt to explain financing decisions with reference to the costs of conflict of interests between managers and investors. Much empirical research with a number of explanatory variables has been conducted in an attempt to test the validity of each of these theories. However, the empirical evidences are mixed, and the directional impact is not always consistent. This conflict is the reason why the capital structure optimisation question remains unsolved to this day.

The following sections discuss the capital structure theories described above.

2.5 THEORIES AND EMPIRICAL LITERATURE ON THE CAPITAL STRUCTURE

2.5.1 Trade-off theory

The trade-off theory is a direct consequence of an extension of the work done by Modigliani and Miller (1963), as well as the work of traditional theorists such as Solomon (1963). In 1973, Kraus and Litzenberger formalised these ideas into the trade-off theory. According to the static trade-off theory, companies have an optimal debt-to-equity ratio. This ratio is reached when the marginal value of tax shields on additional debt is just offset by the increase in the present value of possible financial distress costs (Myers, 2001). The implication is that this changes Modigliani and Miller's proposition I to the equation:

$$V = D + E = \overline{V} + (PV_{TS} - PV_{FD} - PV_{AC}) \quad (2.11)$$

In reality, this equation must relate to the market values of both debt and equity, that is:

$$V = MV_D + MV_E = \overline{V} + (PV_{TS} - PV_{FD} - PV_{AC}) \quad (2.12)$$

Where

$\overline{V}$ =market value of an ungeared company

PV_{AC} =present value of agency cost

PV_{FD} =present value of financial distress costs

Shackelton (2009) stipulates that this optimal capital structure coincides with WACC minimisation and value maximisation, and this point is mathematically defined by taking the first-order condition derivative as:

$$V \frac{\partial R_V}{\partial X} = (r - R_V) \frac{\partial V}{\partial X}$$

$$(V \neq 0) \qquad \frac{\partial y}{\partial X} = 0 \Rightarrow \frac{\partial R_V}{\partial X} = 0$$

where

V=company value

X=face value of the debt yields

∂= 1st derivative

R_V = WACC

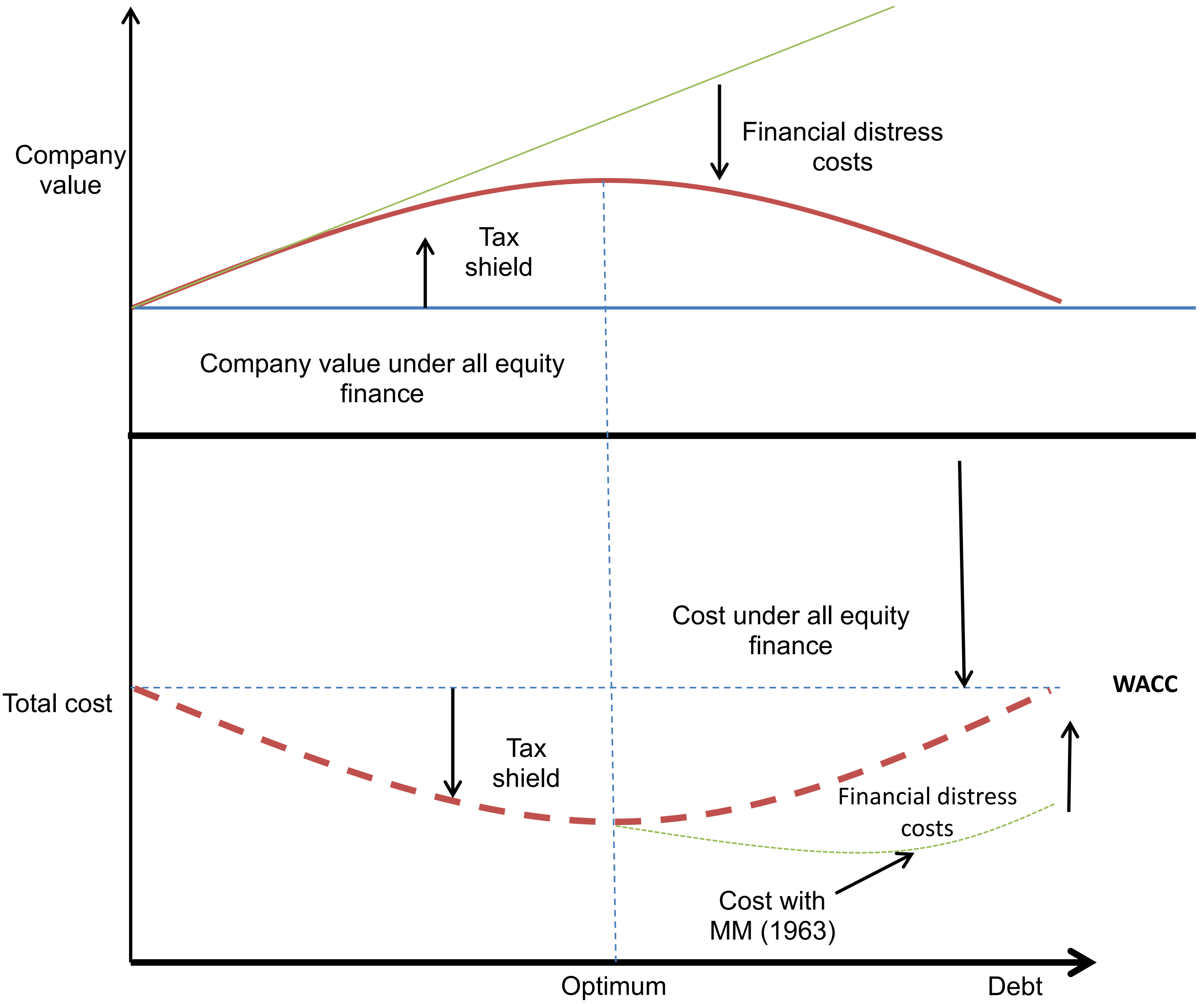
y dependent variable

X= face value of debt yields

r=interest rate

At an optimal leverage, the value of the company is maximised, while the WACC is minimised. The static trade-off theory argues that the financing decisions are driven by the need to achieve and maintain an optimal capital structure. Therefore, the aim is to avoid too much or too little debt, as both situations destroy the value of the company (Barclay & Smith, 1999). If the company has too little debt, it loses leverage benefits, because it does not maximise its tax shields. Such a company will pay higher taxes, if it is profitable. To move its leverage to the optimal level, the company should either issue more debt or increase its capital distribution to shareholders as dividend payments and share repurchases. Too much debt means that the company destroys value, as the present value of financial distress and the agency costs exceed the present value of its tax shield. The company should therefore reduce its leverage to the optimal level by either issuing equity or adjusting its dividend policy to retain higher earnings (Smith, Ikenberry, Nayar, Anda, McVey & Stewart, 2005). However, the adjustment process will depend on several company-specific and macro-specific variables. The leverage as an explained variable, according to the capital structure literature, purposefully varies among researchers. And some of the conflicting results are due to this variation and the inherent measurement error of this variable.

Figure 2. 2: Optimal capital structures in a static trade-off theory



where,

: Firm value without financial distress costs;

: WACC without financial distress costs;

: Firm value with tax shield and financial distress costs;

: WACC with tax shield and financial distress costs;

: Firm value under all equity finance; and

: WACC under all equity finance

Figure 2.2 indicates that the static trade-off theory assumes that companies balance the tax shields against financial distress costs. The WACC indicates that an optimal

capital structure is structured where the company's highest market value is at the same point at which the WACC is at its lowest level.
The optimal capital target ratio can be defined either in terms of the market values or in terms of the book values of both debt and equity.

Using the trade-off theory to explain the interdependence between the capital structure and the dividend policy, Rozeff (1982) argues that riskier companies pay out lower dividends indicating a negative statistical relationship between dividends, bankruptcy cost and the amount of debt used by a company.

Effendi (2017) determined the optimal capital structure, which could maximise profits and corporate value, using a quantitative descriptive analysis. He used maximum corporate value (stock price), maximum profit (EPS) and minimal cost of capital to construct his model. The model is constructed as follows (Effendi, 2017):

First, calculate the capital structure by conducting an analysis of the capital structure over a time frame (ratio of total debt and total equity). The equation is:

$$\text{Debt} - \text{Ratio(DR)} = \frac{\text{D}}{\text{A}} \tag{2.13}$$

$$Equity - Ratio(ER) = \frac{E}{A} \tag{2.14}$$

where
D= the Total debt
E= the Total equity
A=the Total asset
Then, calculate the leverage ratio (debt ratio and debt-to-equity ratio/DER). The equation is as follows:

$$\text{Debt} - \text{to} - \text{Equity} \quad \text{Ratio} = \frac{\text{D}}{\text{E}} \tag{2.15}$$

Moreover, calculate the cost of capital or the cost of debt (k_d), the cost of common stock (k_e), the cost of preferred stock (k_p) and the cost of retained earnings (k_s). The equations are:

$$k_i = k_d(1-T) \tag{2.16}$$

$$k_d = \frac{Cost-of-Debt}{Debt} \tag{2.17}$$

$$k_e = \frac{EAT}{E} \tag{2.18}$$

$$k_p = \frac{d_p}{N_p} \tag{2.19}$$

where

$k_i =$ Cost of debt after tax

$T =$ Tax

$d_p =$ Dividend preferred stock

$N_p =$ Net proceeds from the sale of preferred stock.

Next, calculate the weighted average cost of capital (WACC). The equation is:

$$WACC = w_d.k_d(1-T) + w_p.k_p + w_e.k_e \tag{2.20}$$

where

$w_d =$ Weighting of debt

$w_p =$ Weighting of preferred stock

$w_e =$ Weighting of common stock

Second, calculate the profitability (EPS). The equation is:

$$EPS = \frac{EACS}{NSCS} \tag{2.21}$$

where

EACS =earnings available for common stock

NSCS = Number of shares of common stock

Third, see the corporate value for the stock price. Fourth, analyse the optimisation of the capital structure by comparing the company's capital structure (the composition of debt and equity), cost of capital (WACC), profit and the value of the company, which is reflected in the share price over the chosen time frame. Last, use MS Excel to calculate the financial ratio. The computation is done for each company.

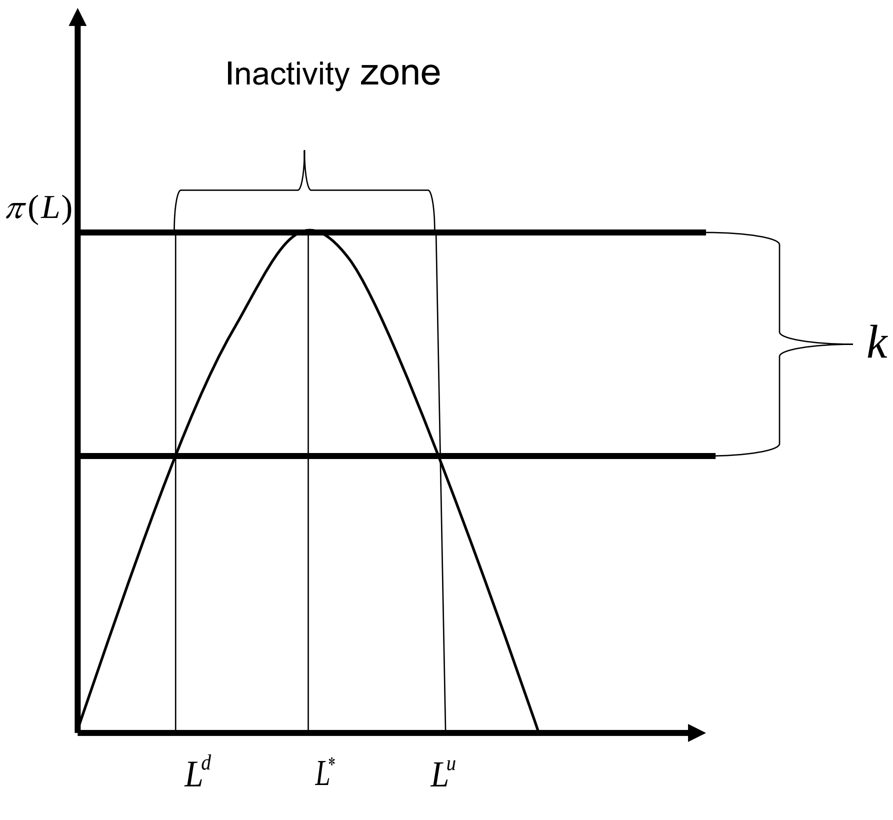
Studies by Fischer, Heinkel and Zechner (1989) and Hovakimian, Hovakimian and Tehranian (2004) suggest that, with the existence of agency costs, companies positively change their capital structure earnings and losses, and let the debt ratios deviate from the target ratio until adjustment costs are exceeded by the cost of having a non-optimal leverage level. Therefore, it is the changes in expected debt ratio, based on dynamic movements, which point in the same direction as the pecking-order theory, namely the capital structure adjustment cost is greater than the staying costs in the non-optimal capital structure. This implies that profits and losses from a company's operations are negatively and positively related respectively to the debt ratios until the company adjusts its capital structure.

Fischer *et al.* (1989) developed a dynamic optimal capital structure choice in the presence of recapitalisation costs. The implication of the model is that the debt ratio is discontinuous and monotonic in the bankruptcy cost parameter. Building on the traditional tax/bankruptcy cost theory of capital structure relevance, they argue that the model provides distinct predictions relating to company-specific properties to the range of optimal leverage ratios: smaller, riskier, lower-bankruptcy cost companies exhibit wider swings in their debt ratios over time. Using the arguments and assumptions of Fischer et al. (1989), Korteweg and Strebulaev (2015) present the model as follows:

The (S, s) model as recently brought forward by Korteweg and Strebulaev (2015) emphasises how company characteristics and macroeconomics influence recapitalisation thresholds and target leverage of companies. This method is best suited to the field of dynamic capital structure for two reasons. Firstly, the (S, s) model accounts for the presence of adjustment costs, as discussed by Leary and Roberts (2005), and thereby allows for infrequent and lumpy refinancing events. Secondly, it distinguishes between the characteristics of companies' dynamic capital structure policy that collectively define mean leverage ratios. This is because it separates companies' lower and upper refinancing thresholds and target leverage ratios, as has been proposed by fundamental contributions to the dynamic trade-off theory (Fischer *et al*., 1989).

The basic underlying assumption of the (S, s) model is the existence of the concave function, $\pi(L)$, and fixed adjustment costs, k. The payoff function expresses a company's benefit to stay close to its optimal target leverage, L^*, and accounts for the exploitation of the tax shields, avoidance of financial distress as well as agency costs. The fixed costs of the leverage adjustment prevent companies from engaging in refinancing events, unless the leverage deviates far from its target value and the loss from deviation from target leverage exceeds the adjustment costs from recapitalising (Korteweg & Strebulaev, 2015).

Figure 2. 3: Static illustration of the inaction region between the lower and upper refinancing thresholds L^d and L^u.



Source: Korteweg and Strebulaev (2015)

Where

$\pi(L)$=The company's value

L^* =optimal leverage or target leverage

L^d =lower boundary of leverage

L^u =upper boundary of leverage

Figure 2.3 indicates that in a dynamic setting, this refinancing policy therefore results in a combination of periods of inaction and periods of discrete adjustments. If the leverage lies between L^d and L^u , the company exerts no control of its leverage ratio and leverage; therefore, follows an exogenously determined process due to changes in the market value of equity. Whenever leverage hits the lower or upper boundary, the payoff gain from refinancing to the target justifies the associated adjustment costs. Consequently, the company conducts a refinancing event such that the target leverage is reached in the subsequent period. The fixed costs of leverage adjustment and the costs of deviation from the target can vary not only across companies but also within companies over time. This causes time-varying leverage targets and leverage thresholds. An important consideration for the application of the (S, s), is the definition of a *refinancing event*. For example, Leary and Roberts (2005) identify a material capital structure adjustment as more than 5% and calculated as the net change in book equity or debt from period t-1 to t, divided by the book value of total assets at the end of the period t-1. The estimated model is based on Korteweg and Strebulaev (2015), who estimate the following model to make conclusions about the determinants of target leverage and refinancing thresholds:

$$L^*_{it} = X'_{it}\beta + u^*_{it} \tag{2.22}$$

$$L^d_{it} = L^*_{it} - \exp\left(X'^{\theta^d}_{it} + u^d_{it}\right) \tag{2.23}$$

$$L^u_{it} = L^*_{it} + \exp\left(X'^{\theta^u}_{it} + u^u_{it}\right) \tag{2.24}$$

Where

Equation (2.22) estimates the determinants of target leverage, Equations (2.23) and (2.24) estimate the determinants of the leverage spread between the leverage target and the lower boundary and the upper boundary respectively. Furthermore, X'_{it} represents a vector containing all explanatory variables, which are the same for all three equations.

Equations (2.23) and (2.24) induce non-linearity because the explanatory variables and the associated coefficients enter the equation in an exponential expression with the base of Euler's number e. The reason for this is to ensure that the lower and the upper leverage boundaries lie strictly below and above the leverage target respectively. To improve the feasibility of the regression, some modification to the regression model is made. The result is an adjusted version of the original approach by Korteweg and Strebulaev (2015).

To reduce the complexity of the estimation procedure while keeping the model's desired properties and reaching comparable results, Schröder and Sosman (2017) extended the model as follows:

$$
\begin{aligned}
L_{it} = {} & \beta_0 + I_{L_{it}=L^*_{IT}}\left(\beta^* X'_{it}\right) + I_{L_{it}=L^d_{it}}\left(\beta^* X'_{it} - \exp\left(\theta^d X'_{iit}\right)\right) + \\
& I_{L_{it}=l^U_{IT}}\left(\beta^* X'_{it} + \exp\left(\theta^u X'_{it}\right)\right) + \\
& I_{L^d_{it}<L_{it}<L^u_{it}}\left[I_{L^d_{it}<L_{it}<L^*_{it}}\left(\beta^* X'_{it} - \exp\left(\theta^d X'_{it}\right)\right) + I_{L^*_{it}<L_{it}<L^u_{it}}\left(\beta^* X'_{it} + \exp\left(\theta^u X'_{it}\right)\right)\right] + u_{it}
\end{aligned}
\tag{2.25}
$$

The adjusted model allows for the estimation of equation (2.22) to equation (2.24) jointly for all observations of L_{it}. As in the likelihood function of the original model, the adjusted model includes several indicator variables, $I_{a=x}$, which equal 1 if $a = x$ and zero otherwise. This allows for the allocation of each observation to exactly one component of the model and estimates the coefficient β^*, θ^d and θ^u jointly. The model's first part is estimated with observations of leverage and explanatory variables from the periods of the companies' recapitalisation events, when the companies return

to target leverage, such that $L_{it} = L^{*}_{it}$. This is congruent with the original model. Accordingly, the second and the third parts cover the observations that are one period before that, such that $L_{it} = L^{d}_{it}$ or $L_{it} = L^{u}_{it}$ respectively, although the period prior to a refinancing event offers the best estimate of such a bound of L^{d}_{it} or L^{u}_{it}. The research follows the approach of Korteweg and Strebulaev (2015) and uses all observations between refinancing events in estimating the effect of regression coefficient of the leverage boundary. The implication is that it enhances statistical efficiency, because an increased frequency of observations enhances the chances that the estimated boundary on the L^{d}_{it} and L^{u}_{it} will match the true refinancing boundaries. Therefore, Part 4 of the model captures observations where leverage lies within the leverage range. Parts 2 and 3 estimate the effects on the leverage boundary and differentiate between cases where L_{it} is above or below the subsequent L^{*}_{it}. including the fourth part of the model, slightly changing the interpretation of the boundaries. Instead of analysing the actual upper boundaries, the maximum lower and the minimum upper boundaries are investigated. Additionally, to the joint estimation of leverage thresholds and target, the adjusted model allows incorporating the desired exponential expressions and thereby assures that the target leverage is strictly above (below) the lower (upper) refinancing thresholds. The regression is estimated using nonlinear least squares estimation.
Several researchers tested both the static and the dynamic theories against its main rival, the pecking-order theory; and the results were mixed.

Another way of computing an optimal capital structure when investigating the effects of share repurchases is to calculate one for each company. For example, Lei and Zhang (2016) following Flannery and Rangan (2006) and Faulkender, Flannery, Hankins and Smith (2012) estimated the target leverage for each company per year using the following model:

$$MDR_{i,t+1} = \beta X_{i,t} + \varepsilon_{it} \qquad (2.26)$$

where $MDR_{i,t+1}$ is the company's $i's$ market debt ratio, i.e. the book value of debt divided by the sum of the book value of debt and the market value of equity, at year

$t+1, X_{i,t}$ is a vector of company characteristics related to the cost and benefits of adjusting leverage ratio. They include EBIT_TA, MB, DEP_TA, LnTA, R&D_DUM and Industrial median.

EBIT_TA= earnings before interest and taxes as a proportion of total assets
MB = market-to-book ratio of assets
DEP_TA = depreciation as proportion of total assets
Ln_TA = log of asset size
FA_TA = fixed assets proportion of total assets
R&D_TA = R&D expenses as proportion of total assets
R&D_DUM = a dummy variable that equals one if the company does not report R&D expenses.
Industrial median = the median industry market debt ratio calculated for each year based on the industry grouping in Fama and French (2002).

After β is estimated, the predicted value of $MDR_{i,t+1}$ is the target leverage ratio for company i at year $t+1$. A company is defined as overleveraged (underleveraged) if its actual market debt ratio is higher (lower) than the target debt ratio, for example, before the repurchase announcements.

Hovakimian, Opler and Titman (2001) used data drawn from S&P's index for the period 1979 to 1997 to test the target adjustment behaviour. The sample size was made up of 39 387 companies. The results indicated that companies had target leverage ratios. The target adjustment process was aimed at maintaining these targets as hypothesised by the trade-off theory.

Ozan (2001) used a panel of data from 390 UK companies to investigate the determinants of a target capital structure and the adjustment behaviour. The results revealed that companies had long-term target ratios and they adjusted towards these ratios rapidly; the adjustment costs were very important. Profitability, liquidity, NDTS and growth options negatively correlated with leverage. Company size was not an important determinant.

Barclay, Smith, Clifford and Morellec (2006) used data from 9 037 US companies to investigate the statistical relationship between growth options and leverage. The results confirmed that companies had an optimal capital structure. The debt capacity of growth options was negative; this is consistent with the trade-off theory.

Kayhan and Titman (2007) investigated how cash flow, investment expenditures and stock price histories affected debt ratios. They found that these variables had a substantial influence on changes in the capital structure. Specifically, the stock price changes and the financial deficit (for example, the amount of external capital raised) had strong effects on the capital structure changes, but in contrast to the previous conclusion, the authors found that over long horizons, their effects were partially reversed. These results revealed that although companies' histories strongly influenced their capital structure, over time, their capital structures tended to move towards target debt ratios that were consistent with the trade-off theories of the capital structure.

Chang and Dasgupta (2009) used data from samples of US companies listed in the Computat-Industrial Annual Files for the period 1971 to 2004. The sample size was 112 035 company years. The results were in favour of the target behaviour, supporting the trade-off theory.

Harford, Klasa and Walcott (2009) investigated 1 188 large acquisitions in the US to establish whether companies had leverage targets. The results indicated that companies had leverage targets. Even though the observed ratios deviated from this target, managers corrected them over time through a financing mix. Of the deviations, 75% were correct within years.

Effendi (2017) determined the optimal capital structure which could maximise profits and corporate value using the method of quantitative descriptive analysis for the period 2011 to 2015. His results indicated that companies which had optimal capital structures were in line with the trade-off theory models. The capital structure was optimal, and the debt levels were to a certain extent at a level that the corporate value would increase to. However, if the debt limit passed a certain degree, profit and corporate value would decrease, while the pecking-order theory in the research does not conform and cannot be said to be optimal because of the low debt level describing the opposite result with the theory of low profits.

2.5.2 Pecking-order theory

The pecking-order theory is one of the capital structure theories that link the distribution policy of a company to its financing policy. This theory is based on the work of Myers (1984) and Myers and Majluf (1984). They argue that in the existence of asymmetric information, a company will follow a pecking order in their financing, in which a company would prefer an internal source of financing (retained earnings) to external financing alternatives, and that the company adjusts its target dividend pay-out ratio (distribution policy) to investment opportunities. However, if the retained earnings are insufficient, the company will borrow rather than issue new stock, which causes the debt ratios to increase. Myers (1984) argues that companies prefer debt financing rather than issuing equity, because debt financing has lower information costs. Therefore, the last option of the company is to issue shares. According to this theory, highly profitable companies should be less leveraged than less profitable companies, as they will have more internal funds available, and this lowers their financing deficit. The pecking-order theory asserts that companies prioritise maximisation of their financial slack, and they achieve this by retaining a higher proportion of earnings. In addition, according to the pecking theory, these companies build the financial slack by adopting conservative or sticky dividend and share repurchases. As a result, that companies can only consider generous dividend payment or share repurchases once they have achieved the required capacity of debt.

The main problem with this model is that it does not define and qualify the maximum capacity of debt, or the costs associated with having too much or too little debt (Shamdasani & Zenner, 2005). It also does not specify when the company should move to the next source of finance. The model derived from the traditional pecking-order theory only accounts for quantifiable variables. In these models, the qualitative and behavioural factors are excluded. This model also includes only one distribution policy, namely the dividend payments. Share repurchases are not part of the models although the model includes the issue of equity, which is equal to zero because under the pecking theory, the company rarely issues equity. The models are derived from the traditional pecking-order theory as well as from the pecking-order model, which attached importance to internal funds deficiency as the main driver of changes in debt issue. Shyam-Sunder and Myers (1999) define the pecking-order model as follows:

$$DEF_{it} = DIV + X_{i,t} + \Delta WC_{i,t} + R_{i,t} - C_t \equiv \Delta D_{i,t} + \Delta E_{i,t} \qquad (2.26)$$

where

DIV_{it} = dividend payments of company i in period t

$X_{i,t}$ = capital expenditure of company i in period t

$\Delta WC_{i,t}$ = changes in working capital of company i in period t

$R_{i,t}$ = current portion of long-term debt of company i in period t

C_t = operating cash flows after interest and tax

$\Delta E_{i,t}$ = the change in net equity issue of company i from period $t-1$ to period t

This model shows that the change in new debt issues is a linear function of the company's financing deficit. The company will only issue debt if it has insufficient internal funds. Because companies rarely issue equity in the pecking-order model, the change in equity is equal to zero $(\Delta E_{i,t} = 0)$, leading to the following equation:

$$DEF_{i,t} = DIV_{i,t} + X_{i,t} + \Delta WC_{i,t} + R_{i,t} - C_T \qquad (2.27)$$

The pecking-order model was extended to include company-specific and macro-specific variables to capture their effects on changes in leverage. For example, Shyam-Sunder and Myers (1999), and Frank and Goyal (2003; 2009) relate the changes in leverage to the distribution policy (only the dividend payments which are part of the deficiency measures) of a company among other variables and argue that the distribution policy of a company is positively related to its financing decision.

This theory implies that value companies are expected to have the lowest leverage, while growth companies are expected to have the highest leverage, because they face higher internal funds deficits due to their lower profitability, which also leads to lower dividends or no dividends. Taxes and financial distress cost are not the primary drivers of corporate financing policies. Companies follow the pecking-order theory in financing their internal fund deficit. The theory further implies that young and growing companies, which are characterised by high internal funds deficits, should use more debt. Therefore, the pecking-order theory implies that young and unprofitable companies should be highly leveraged. Cooper and Lambertides (2018) state that large dividend increases are followed by a significant increase in leverage, consistent with management increasing the dividend to use up excess debt capacity. The argument might be that young companies follow the pecking-order theory to finance their dividend through debt.

Graham's (2000) study estimated the value of the debt interest tax shields and then investigated the leverage patterns of different companies against other capital structure determinants. The results showed that quality companies had very low leverage. This evidence rejects the trade-off theory and supports the pecking-order model. The value of the tax shields is overstated

Minton and Wruck (2001) investigated a sample of 5 613 financial conservative US companies for the period 1974 to 1998. The results revealed that underleveraged companies followed the pecking-order theory. The companies concentrated on building financial slack and they had high tax rates and non-debt tax shields. Financial conservatism is largely transitory.

Tong and Green (2005) tested the pecking-order and the trade-off hypotheses using a cross-section of the largest Chinese-listed companies. The results showed a significant negative correlation between leverage and profitability, a significant positive correlation between current leverage and past dividends. These results are consistent with the pecking-order theory.

Lemmon and Zender (2010) modified the current capital structure test models by incorporating debt capacity measures, and then re-tested the theories. They found that after accounting for debt capacity constraints, the pecking-order theory was a good descriptor of company financing decision of a broad cross section of companies. Furthermore, the findings indicated that small and high growth companies demonstrated a preference for equity finance which is explained by their growth levels and restrictive debt capacity constraints. They argued that when this type of company seeks equity financing, it will experience a lower price drop at the announcement of the offering despite the greater amount of asymmetric information concerning its value.

2.5.3 Signalling theory

The signalling theory, which is an extension of the pecking-order theory and which is also based on the existence of information asymmetry, originated from Ross (1977). The signalling theory explains a company's financing decisions by incorporating the private information possessed by managers. Ross (1977) argues that corporate finance choices could be affected when it takes practical aspects into account in that not all investors have equal amounts of information. Managers can signal their confidence in the company's prospect through security issuance decisions (Miglo, 2010). By its nature, debt commits a company to regular interest payments, and thus management can only consider issuing debt if it believes that the future earnings of the company will be enough to cover these payments (Ross, 1977). Unlike equity, debt providers are very strict on contractual commitments. On the other hand, equity does not commit the company to any future cash payments. Management can therefore signal its confidence in terms of prospects by issuing debt rather than equity. Debt issuance sends a signal to the market and the result is that the issuance of debt is normally accompanied by an increase in share prices. If management is not confident about the company's future earnings, it will not commit to increase interest payments; hence it will issue equity to signal this. The market will pick up this signal and the share price will fall (Miglo, 2010).

It needs to be noted that, even though the information asymmetry theories explain the share price reaction to both equity and bond issuances, they do not state how much debt the company needs in its capital structure. If companies are doing well, debt will never be issued and if companies are not doing well, equity will never be issued. However, this is impractical.

2.5.4 Bankruptcy and business risk theory

Bankruptcy costs exist when a company's fixed obligations cannot be paid, and hence the ownership is possibly transferred, and the company's financing decisions and destitution policies are restructured. The costs of such transfer are classified into direct costs such as legal and accounting charges, and indirect costs such as the opportunity costs in case of interruption in the company's suppliers and customers' relation (Haugen & Senbet, 1978).

Business risk is an indicator of financial distress and economic failure in the setting of the capital structure and distribution strategies. Because debt involves a commitment of periodic interest payments to the lender, highly leveraged companies are prone to financial distress costs. Thus, companies with volatile returns are expected to use less debt in their capital structure than those with stable returns (Bhaduri, 2002). Furthermore, such companies are less likely to pay dividends.

2.6 CHAPTER SUMMARY

This chapter offered a comprehensive and critical review of the main works of literature on companies' distribution strategies and optimisation of the capital structure decisions, starting from the Modigliani-Miller theorems. The main theories surveyed in this chapter were as follows: the pecking-order theory, the trade-off theory, the market timing theory on companies' financing decisions, the signalling theory, the undervaluation theory, the free cash-flow theory and the tax clientele on company's distribution strategies.

The next chapter presents the empirical literature on the inter-statistical relationship between the capital structure and distribution strategies in validating the above-mentioned theories. The models used are also discussed.

CHAPTER 3: LITERATURE REVIEW OF THE INTER-RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND DISTRIBUTION POLICIES

3.1 INTRODUCTION

This chapter reviews the literature on empirical evidence of the validity of the theories of the inter-relationship between the capital structure and distribution policies in order to answer the research question established in Section 1.3.2. Past attempts to reach a conclusion have been complex, contentious, unsuccessful and under researched (Al-Najjar, 2011).

The complexity and contention stem from the single-equation approach, the model specification, the problem of interpretation and the difficulty of the same data which appear consistent with conflicting theories. The interactions among the capital structure, the dividend payments and share repurchase, to a large extent, have been overlooked in the literature. Nonetheless, some studies have attempted to investigate how various market frictions in the real world may drive the interrelationship among the two policies. Several mechanisms through which the set of policies may be interdependent have been identified. A simultaneous decision-making framework between the capital structure and the distribution strategies can be derived from the following main sources, namely the institutional underpinning of modern companies' framework, the flow-of-funds approach framework, the agency cost approach framework, the information approach framework, the pecking-order theory framework, the trade-off theory framework and the signalling theory framework.

Section 3.2.1 reviews the empirical evidence of the interdependence between the capital structure and distribution within the institutional approach framework. Section 3.2.2 reviews the empirical evidence of the interdependence between the capital structure and distribution within the flow-of-funds framework. Section 3.2.3 reviews the empirical evidence of the interdependence between the capital structure and distribution within the information approach. Section 3.2.4 reviews the empirical evidence of the interdependence between the capital structure and distribution within the agency approach framework. Section 3.2.5 reviews the empirical evidence and the models used in investigating the interdependence between the capital structure and the distribution policy when testing within the agency theory framework. Section 3.2.6 reviews the empirical evidence of the interplay between the capital structure and distribution strategies when testing within the signalling theory framework. Section 3.2.7 reviews the empirical evidence on the interplay between the capital structure and distribution strategies when testing within the pecking-order theory framework. Section 3.2.8 reviews the empirical evidence of the interplay between the capital structure and distribution strategies when testing within the trade theory framework. Section 3.6 reviews the empirical evidence of leveraged shares. Section 3.2.9 reviews the empirical evidence of the equity market timing. Section 3.2.10 reviews the empirical evidence of capital structure and financial distress as determinants of choice between the dividend payments and share repurchases. Section 3.3 summarises the chapter.

3.2 SIMULTANEOUS DECISION-MAKING FRAMEWORKS

3.2.1 Institutional approach

Stressing the simultaneity of many decisions of a company, Mueller (1967:58) emphasises that in making corporate decisions, one must be aware of the inherent interactions among many of the company's decisions, but also be certain that these interactions do not actually result in the negation of the primary goal of a decision. Therefore, given the institutional underpinning of modern companies, it is reasonable to believe that a company's decisions are likely to be implemented simultaneously so that the outcome can be observed via a strategic simultaneous decision-making approach in order to avoid undesirable side effects which may stem from a given policy. It should be kept in mind that the simultaneity among the key company decisions does not require them to be made at the same time. In addition, Mueller (1967) also indicates that because the company's behaviour is complex, statistical models of the same complexity should be formulated in order to carry out valid and robust empirical investigation. However, most existing works of literature on corporate finance employ an individual equation approach, which does not allow for interactions among corporate decisions and fails to capture the complexity of the corporate decision-making processes. To gain a deeper and more comprehensive insight into the complex interdependence of the corporate behaviour, in particular the inherent simultaneity among the key corporate decisions, more sophisticated and more statistically correct techniques, which allow for a strategic simultaneous decision-making framework, must be used.

3.2.2 Flow-of-funds framework for companies' behaviour

Dhrymes and Kurz (1967) argue that the relationship between the investment, dividend and external finance behaviour of companies is often alluded to but rarely studied systematically. Given the institutional *milieu* of the modern corporation, there exists at least a presumption that these aspects of a company's decision-making process exhibit some interactions, yet, in the current literature, the view is that these corporate decisions are independent and should be studied as one issue at a time using an individual equation approach. However, the flow-of-funds approach is based on the argument that companies' financing and distribution decisions are interconnected within a flow-of-funds framework for companies' behaviour. It takes the view that a company faces an outflow of funds represented mainly by its variable and fixed costs, taxes and dividend payments, as well as investment outlays. Meanwhile, the company relies on an inflow of funds, represented chiefly by its sales and proceeds of various forms of external finance such as debt or stock issuance.

Accordingly, Dhrymes and Kurz (1967) state that the major problems of a company are raising funds from profits, new debt and equity, and spending it on investment and distribution policies, where the overriding constraint is the flow-of-funds identity (for example, sources of funds must equal uses of funds). If the capital markets are sufficiently imperfect, companies are likely to have a marked reliance on internal funds and a strong aversion to resort to external capital markets. Under such circumstances, companies must consider their fund-raising choices alongside their fund spending decisions, and trade-off between outlays for capital investment and distribution policies. Therefore, in a world where the capital markets are sufficiently imperfect, financing decisions and distribution strategies are likely to be determined jointly and must be determined in the context of simultaneous equation. If the flow-of-funds conjectures about the interactions are empirically relevant, the jointly determined company decisions, which are endogenous to a company, should be significantly interdependent on one another (Dhrymes & Kurz, 1967).

To empirically verify and validate the predictions of the flow-of-funds approach, Dhrymes and Kurz (1967) set up a three-equation simultaneous system in which investment spending, new debt financing and dividend payments were treated as endogenous variables, and each equation contained the other two endogenous variables as explanatory variables. They state that when the single-equation methodology is adopted, the endogenous variables are generally significant in the equation where they serve as explanatory variables, but do not have the sign implied by the flow-of-funds approach. However, when the three corporate behavioural equations are put into a system and estimated within a strategic simultaneous decision-making framework, the sign on the endogenous variables becomes consistent with the predictions of the flow-of-funds approach, and significant in most instances. Therefore, Dhrymes and Kurz (1967) conclude that ignoring the interdependence of corporate decision-making is likely to result in an incomplete and potentially misleading view of the complex corporate decision-making processes.

Switzer (1984) used a general flow-of-funds model to explain the aggregate research and development investment behaviour along the lines initially established by Dhrymes and Kurz (1967) and found that, in contrast with Dhrymes and Kurz (1967) but consistent with Fama (1974), the independence of capital investment from financing could not be rejected in the simultaneous procedure, as opposed to the individual equation results. Furthermore, the results indicated that within a simultaneous decision-making framework, the endogenous long-term debt is positively and significantly correlated with the dividend payments, while the coefficient of the endogenous variable dividend payments was negative and statistically insignificant in the long-term debt equation, suggesting no interdependence between the two policies.

3.2.3 Information approach of simultaneous decision-making framework

The theoretical contribution of the information approach in finance provides a promising direction to justify the interdependence between the capital structure and distribution policies. The intuitive idea is that the asymmetric information (the information gap between insiders as managers and outsiders as investors and banks) between insiders and outsiders may constrain distribution strategies by reducing the elastic supply of internal funds as well as limiting the access to external funds, thus evoking simultaneity among financing and distribution strategies.

For this theory, poor companies should not send any false signals to the market, and consequently, companies can distinguish between companies using such signals. For example, on the one hand, investors may react positively to any announcement of dividend increase, and negatively to any deduction in dividend payments. On the other hand, the announcement of debt financing may be considered a positive signal by investors, because outsiders may interpret this issuance as a signal for good financial prospects (Koch & Shenoy, 1999; Ryen, Vasconcellos & Kish, 1997).

When companies are committed to cash outflows, two financial policies may be used, namely dividend and debt service. Investigating financial signalling, Ravid and Sarig (1991) found sufficient conditions for the informational equilibrium to entail concomitant use of both dividend and leverage in the cost-minimising combination of the commitment to signal. In addition, in the equilibrium, better companies pay higher dividends and are more highly levered than the lower quality companies. The results provide evidence of a positive relationship between capital structure and dividend payments.

Evaluating motives for share repurchases using a unified framework where a company had a target capital structure and had equity that could be mispriced, Bonaimé *et al.* (2014) found that capital structure adjustments were a value-increasing motive for repurchases and that the extent to which adjusting capital structure through a repurchase created value depended on the undervaluation of the company. Furthermore, underleveraged and undervalued companies enjoy the greatest economic gains from a repurchase, as evidenced by the share price reaction to the repurchase announcement, and these companies are more likely to announce a share repurchase programme.

Investigating the capital change and stability when dividend payments convey signals, Sourav and Richard (2017) found that dividend policy directly affected the company' value in two ways: (1) the value of equity was determined by the present value of the company's expected future dividend stream; (2) retentions, the opposite of dividend payments, increased capital, which produced future dividends. One of the most important issues in finance is whether dividend changes contain information about future earnings and profitability. The authors state that an optimal control-type continuous time model shows that the dividend signalling in an equilibrium expansion slightly violates the classical rules and a growth strategy for a company can be an increase in the pay-out ratio in conjunction with an increase in capital, which could be interpreted as signalling a rapid increase in capital productivity, meaning that the company is sufficiently confident with dividend increases.

Examining whether the earnings management is an important determinant of the dividend policy in French non-financial companies listed on the CAC All Tradable index, Ben Amar *et al*. (2018) found that the dividend policy of a firm was affected by discretionary accruals. The result is consistent with the signal theory, which showcases managers' high motivation to manage earnings with the aim of highlighting to the market the ability of a company to distribute dividends to shareholders. Furthermore, they found that both liquidity and the corporate risk positively affected the dividend policy. By contrast, the company's debt had a significant negative impact on the dividend policy.

Chen *et al.* (2018) investigated the extent to which small and large repurchases convey a signal to the market during financial crisis. They found that lower-leveraged companies were more likely to announce share repurchase programmes and repurchase a higher percentage of share repurchase following their open market share repurchases announcement. However, lower-leveraged companies tended to announce smaller share repurchase programmes. In addition, they found that the capital structure had a negative significant relationship with the share repurchase announcements, a positive and significant relationship between authorised share repurchases and leverage and a negative relationship between the completion rate and leverage. The positive relationship contradicts the hypothesis that low-leveraged companies will repurchase shares. It is worth noting that Chen *et al.* (2018) did not provide a clear explanation for why the relationship was negative when the company announced, positive with the number of shares authorised to be repurchased and negative with the actual number of shares repurchased (completion rate). Chen *et al.* (2018) used the following regressions to examine the motive for share repurchase announcements, authorised shares to be repurchased and the actual number of shares repurchased:

$$\begin{aligned} \text{Ann}_{i,t} = {} & \alpha_i + \beta_1 \text{Rrv}_{i,t} + \beta_2 \text{Csh} + \beta_3 \text{Chflow}_{i,t} + \beta_4 \text{Lev}_{i,t} + \beta_5 \text{takeoverpr}_{i,t} \\ & \beta_6 \text{m/b}_{i,t} + \beta_7 \text{Size}_{i,t} + \beta_8 \text{Saindaix}_{i,t} + \beta \text{Div}_{i,t} + \beta_{10} \text{Opt}_{i,t} + \varepsilon_i \end{aligned} \quad (3.1)$$

$$\begin{aligned} \text{Authshare}_{i,t} = {} & \alpha_i + \beta_1 \text{Rrv}_{i,t} + \beta_2 \text{Csh} + \beta_3 \text{Chflow}_{i,t} + \beta_4 \text{Lev}_{i,t} + \beta_5 \text{takeoverpr}_{i,t} \\ & \beta_6 \text{m/b}_{i,t} + \beta_7 \text{Size}_{i,t} + \beta_8 \text{Saindaix}_{i,t} + \beta \text{Div}_{i,t} + \beta_{10} \text{Opt}_{i,t} + \varepsilon_i \end{aligned} \quad (3.2)$$

$$\begin{aligned} \text{Completionrate}_{i,t} = {} & \alpha_i + \beta_1 \text{Rrv}_{i,t} + \beta_2 \text{Csh} + \beta_3 \text{Chflow}_{i,t} + \beta_4 \text{Lev}_{i,t} + \beta_5 \text{takeoverpr}_{i,t} \\ & \beta_6 \text{m/b}_{i,t} + \beta_7 \text{Size}_{i,t} + \beta_8 \text{Saindaix}_{i,t} + \beta \text{Div}_{i,t} + \beta_{10} \text{Opt}_{i,t} + \varepsilon_i \end{aligned} \quad (3.3)$$

where

$\text{Ann}_{i,t}$=a dummy variable that takes the value 1 if the company announced a share repurchase programme, and 0 when otherwise.

$\text{Authshare}_{i,t}$= the number of shares to be bought back by a company i in open-market share repurchase announcements

$\text{Completionrate}_{i,t}$=is the completion rate of a company i defined as the ratio of the number of shares bought back within one year following the open-market repurchase announcement, to the number of shares authorised in the open-market share repurchase announcement.

$\text{Rrv}_{i,t}$= the mispricing of company i

$\text{Takeoverprob}_{i,t}$= the takeover probability of a company i

$\text{m/b}_{i,t}$= the market-to-book value of a company i

$\text{Saindex}_{i,t}$= Financial constraint

Div= the dividend of company i

$Opt_{i,t}$= options of company i

$Size_{i,t}$= the size of company i

$Chflow_{i,t}$= the cash flow of company i

$Lev_{i,t}$= the leverage of company i

Banerjee and De (2015:375-376) investigated the influence of capital structure decisions on the dividend pay-out ratio for the companies belonging to BSE500 India during the pre- and post-period of the 2008 global recession. They found that the degrees of operating leverage and financial leverage were significant variables influencing the dividend pay-out ratio in the pre-recession period, while financial leverage was a significant variable influencing the dividend pay-out ratio in the post-recession period. They found that with the decrease of leverage in the capital structure, companies preferred to pay fewer dividends. Due to the recessionary situation, companies were wary of increasing more debt component in their capital structure as it could increase their financial risk and could lead to bankruptcy. Decrease in leverage of the companies could have an impact on their profitability because companies with high debt seemed to be more profitable due to the advantage of the tax shield. Due to the decrease in leverage, companies preferred to pay lesser dividend and aimed towards retaining more for future growth and expansion. Due to the decrease in the leverage of the companies, they preferred to declare fewer dividends and retained more.

Banerjee and De (2015:370) used the financial leverage and operating leverage as proxies of capital structure as follows:

Financial leverage = average total debt/average total assets

The degree of operating leverage = $\frac{\text{AVG}\{(\text{EBIT}_t - \text{EBIT}_{t\text{-}1})/\text{EBIT}_{t-1}\}}{\text{AVG}\{(\text{SALES}_t - \text{SALES}_{t-1})/\text{SALES}_{t-1}\}}$

where

$EBIT_t$=earnings before interest and tax for the year t

$EBIT_{t-1}$=earnings before interest and tax of t-1 year

$SALES_t$=net sale of year t
$SALES_{t-1}$= net sale of t-1year

Yusof and Ismail (2016) investigated the determinants of the dividend policy of 147 public-listed companies in Malaysia They found that the debt level significantly affected the dividend payments. The authors state that higher levels of debt lead to lower dividend payments to shareholders. This is because companies with huge debt have a greater obligation to the creditors in terms of the debt repayment and interest charged. As the companies' main priority is to the creditors, the amount to be distributed to the shareholders as dividend is subject to the balance available after settling the debt obligations, which therefore leads to lower dividend payments.

Moon *et al*. (2015) investigated the determinants of the pay-out (dividend payments and share repurchases) decision in the airline industry due to it being characterised as a high-debt dependency. They found that the level of debt affected the dividend payments negatively and this relationship was significant for all three models. Regarding share repurchases, the level of debt affected share repurchases negatively in Model 1 and positively in the remaining two models and this relation was insignificant in all three models. The findings demonstrate that the level of debt plays an important role in predicting the dividend payment when debt dependency is high. In addition, the study found that the total debt in the airline industry accounted for 1.026 times the total assets. However, the level of debt is not an important variable in predicting share repurchases. The authors argue that share repurchases are regarded as a more flexible way of cash management than the dividend payment because the dividend payment is a permanent resource transfer from the managers' side to the shareholders' side (DeAngelo, DeAngelo & Skinner, 2009) and as a result, the dividend payments are influenced by one more component (debt ratio) than the decision to share repurchases. Investigating the determinants of UK corporate share repurchase decisions, Benhamouda and Watson (2010) also found an insignificant negative relationship between debt and share repurchases. Therefore, the likelihood of dividend payment is diminished when airlines are financially distressed by high-debt dependency because airlines spend resources for dividends on repaying the debt to prevent undesired conditions (e.g. bankruptcy and takeover). The assessment of the level of debt on both the dividend payments and share repurchases was tested using the following logistic equations:

$$\frac{DIV_t}{1-DIV} = Exp(\beta_0 + \beta_1 SIZE_t + \beta_2 CASH + \beta_3 DEBT_t + \beta_4 ROA_t + \beta_5 STAGE_t + \beta_6 MBT_t + \beta_7 DIV_{t-1} + \beta_8 GDP_t + \beta_9 Oil_t + \beta_{10} ALLI_t + \beta_{11} LCC_t + \beta_{12} INT_t + \varepsilon_t) \quad (3.4)$$

$$\frac{SR_t}{1-SR_t} = Exp(\beta_0 + \beta_1 SIZE_t + \beta_2 CASH + \beta_3 DEBT_t + \beta_4 ROA_t + \beta_5 STAGE_t + \beta_6 MBT_t + \beta_7 DIV_{t-1} + \beta_8 GDP_t + \beta_9 Oil_t + \beta_{10} ALLI_t + \beta_{11} LCC_t + \beta_{12} INT_t + \varepsilon_t) \quad (3.5)$$

where

(DIV) = dividend payments, measured by binary variable (1=Dividend payment, 0 = Non-dividend payment)

$DIV_t/1-DIV_t$ =stands for the airlines to pay dividend or not. Share repurchases (SR) are measured by binary variable (1 = share repurchase, 0 = Non-share repurchase)

$SR_t/1-SR_t$ =the airlines to implement a share repurchase or not

Exp = exponential in logistic regression to compute odds ratio

Debt = the leverage and calculated by total debt/total assets

Size = the company size measured by total assets

Cash = cash holding computed by cash/total assets

ROA = return on assets measured as net income/total assets

MTB = investment opportunities measured by total market value/total book value GDP = gross domestic product of US from BEA

ALLI = alliance measured by binary variables (1 = companies in airline alliance, 0 companies not in airline alliance)

OIL = oil price per barrel for a given year

LCC = low-cost carrier measured by binary (1 = low-cost carrier, 0 = non-low-cost carrier), and international route

INT = measured by binary variable (1 = airlines on international route, 0 = airlines, not on international route)

Investigating the determinant of dividend policy in India and using financial leverage as one of the determinants, Labhane (2018) argues that when companies borrow capital from debt finance, they commit themselves to the payment of fixed interest charges, which include interest and a principal amount, and failure to meet these obligations may result in the companies facing the risk of liquidation and bankruptcy. Therefore, a negative relationship of financial leverage and the dividend payment decision is expected. Financial leverage is proxied by the debt-to-capital ratios, which are measured as the ratio of total debt to the total capital employed. The results indicate a significant negative relationship between leverage and the dividend payments in the standalone companies, which is consistent with the hypothesis, whereas, it has a significant positive relationship for the business group-affiliated companies. Gopalan, Nanda and Seru (2014) provide reasons for the difference in sign, alluding that the business group insiders lower the cost of external finance: first, by distributing dividends from the cash-rich companies to other members in the group and second, by participating in the equity financing by companies in their group. This argument is supported by Abdulkadir, Abdullah and Wong (2016), who also found a negative relationship when examining Nigerian companies and asserted that companies were less likely to pay dividend when debt level was high. These companies tried to minimise the transaction costs associated with raising external finance. As a result, there was less likelihood to pay dividends to reduce raising more external finance, which would lead to an increase in transaction cost. It is also consistent with Rozeff's (1982) view that leveraged companies maintain low dividends.

Taken together, the imperfect information not only impedes the ability of companies to raise funds from internal finance but limits their access to external finance. In the real world, the alternative sources of funds are no longer perfect substitutes, owing to the costs created by managers' superior information (Myers & Majluf, 1984). In the presence of information asymmetry, managers' effort to issue risky securities tends to be rationally interpreted as a signal that the company is overvalued. Therefore, information asymmetry justifies the pecking-order behaviour of corporate financing. Specifically, managers prefer to finance all the uses of funds with internally generated cash flow if possible, which is not subject to the information problem and hence has a cost advantage. When internal cash flow is exhausted and external finance is required, managers raise external funds with external financing, which is less affected by revelations of managers' superior information. In addition, information asymmetry constrains companies' ability to raise internal finance via its effects on dividends and share repurchases and limits their access to external finance via its effects on the issuance of securities. Therefore, corporate decisions are likely to be made systematically and simultaneously by managers, with full recognition of competing needs for funds and alternative sources of funds.

3.2.4 Agency approach

Agency models predict that the dividend payment and debt financing can reduce the problems related to information asymmetry. Paying dividends and the ability to issue debt serve as a mechanism to reduce cash flows under management control, and hence help to mitigate agency problems (Rozeff, 1982; Easterbrook, 1984; Bhaduri, 2002).

By observing that companies often pay dividends and raise new capital simultaneously, Easterbrook (1984) explains that the capital structure is likely to be interrelated to the distribution policy by the agency costs approach. In the light of the Easterbrook (1984) theory, because of imperfect contracts (for example, the agency problem), shareholders must bear the costs of monitoring managers. This, in turn, shows that the dividend could be made to mitigate the agency problem. There are several explanations for this result. Firstly, dividend payments may force companies to finance externally (for example, issuing debt). As entering capital markets, the company's financial condition will be reviewed by investment banks, lawyers or accountants. While the company with worse financial conditions will incur higher cost of capital, managers in need of frequently raising money will more likely act in shareholders' interest. Secondly, dividends, if made by internal cash, may reduce free cash flow available to managers (agents), leading to mitigation of the agency problem. Despite the scenario that shareholders are incapable of directly monitoring the behaviour of managers, lower free cash flow would reduce the possibility that managers lavish money beyond optimal investments. Thirdly, dividends, to some extent, could prevent shareholders' wealth from being taken advantage of by managers. By paying dividends and issuing new debt, managers restore the initial debt-to-equity ratio and this should be conducted in such a way that the risk is minimised, and the return is maximised.

To validate his narrative, Easterbrook (1984) uses the following numerical example: assuming a company has an initial capitalisation of 100, of which 50 is debt and 50 equity. It invests the 100 in a project. The company prospers, and the earnings raise its holdings to 200. The creditors now have substantially more security than they started with, and correspondingly, the residual claimants are now paying to the creditors a rate of interest unwarranted by current circumstances. They can correct this situation by making a dividend payment of 50 while issuing new debt worth 50. The company's capital continues to be 200, but the debt-to-equity ratio has been restored, and the interest rate of the original debt is again appropriate to the creditors' risk. In addition to this illustration, Easterbrook (1984) notes that the shares of companies appreciate relative to other shares when paying dividend and raising capital are conducted within a simultaneous decision-making framework.

Investigating the simultaneity of dividend payments and capital structure decisions as stipulated by Easterbrook (1984), Noronha *et al.* (1995:450) tested the hypothesis by estimating a two-equation simultaneous model in which capital structure and dividend pay-out rates are endogenous variables:

$$POR=f(EQR, A) \quad (3.6)$$

$$EQR=f(POR, B) \quad (3.7)$$

Where

POR = the pay-out ratio

A = a vector of variables that are largely based on the Rozeff (1982) specification

EQR = the equity ratio measured as a 20-year average of the market value of equity over the sum of the market value of equity and the book value of the long-term debt.

B = vector of variables related to debt agency costs. For an industry sample in which the dividend decision is primarily motivated by equity agency cost considerations, the coefficients of EQR and POR along with those of A and B are expected to be significant and validating the simultaneity hypothesis. The results indicate that the simultaneity of the dividend payments and capital structure decisions is contingent upon the validity of the monitoring rational for dividends. For example, using different panels, where the dividend monitoring rational is observed to be weak, no simultaneity exists as indicated by insignificant coefficient of EQR (in the POR specification) and POR (in the EQR specification). The coefficient of vector A in POR continues to be insignificant. In the POR regression, the equity ratio has a negative sign implying that capital structure decisions affect the dividend payments negatively, whereas in the EQR relationship regression, the POR has a positive sign implying that the pay-out policy of a company positively affects the financing decision of a company. In addition, Noronha *et al.* (1995) argue that alternative non-dividend mechanisms for controlling equity agency costs and/or growth-induced capital market monitoring invalidates Easterbrook's agency rationale for dividends, and the hypothesised attendant simultaneity will not be observed in agency framework. As a result, Easterbrook's agency argument for dividend payments and consequent simultaneity is dependent on companies' characteristics. Further taking into consideration a given debt-to-asset ratio, a company's (exogenous) growth rate, which is supported by retained earnings and debt financing at a specific pay-out rate, Noronha *et al.* (1995) used the following model:

$$g = (1 - P_0) r \qquad (3.8)$$

where:

g=the growth rate

$(1 - p_0)$= retention rate

and

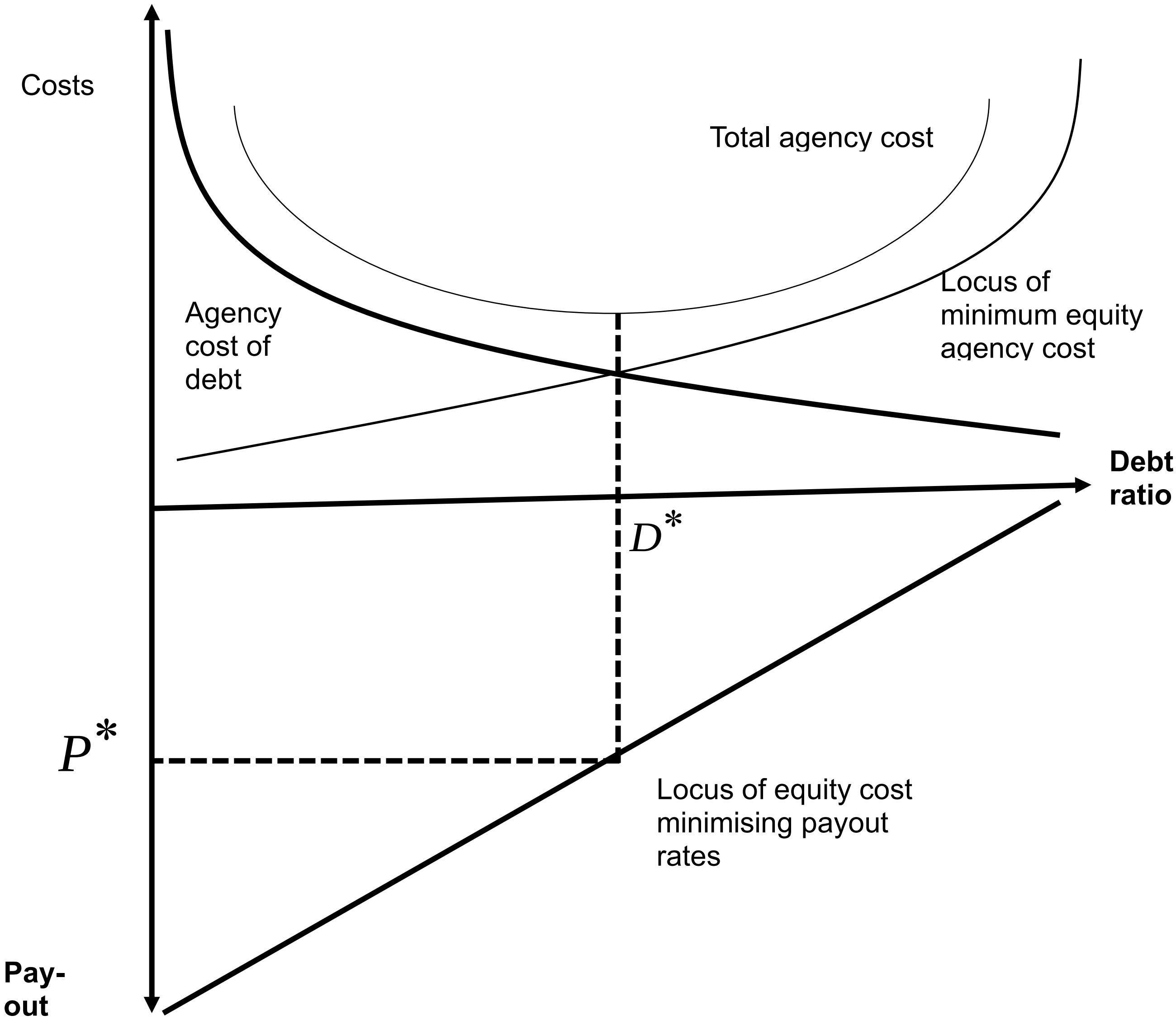
r = return on equity = net income to shareholders/common equity

So

$$P_0 = 1 - g/r$$

At pay-out rate P_0, the company issues debt but avoid equity financing; its transaction cost is a minimum, as is the capital market monitoring. At any pay-out rate above P_0, the company is forced to issue debt and equity, if its debt-to-asset ratio is maintained. It then incurs high transaction cost but lower equity agency cost through increased capital market monitoring associated with issuance of securities. As the pay-out increases above P_0 , the frequency of security issuance increases, transaction cost increases, and equity agency cost decreases. The total equity agency cost is minimised at the pay-out rate where the marginal cost and the benefit are equal, as indicated in Rozeff's work (1982). As a result, for a given debt ratio D_L , each company has a unique minimum transaction cost pay-out rate $P_0(L) = 1 - g/r$ and a total equity agency cost minimising pay-out rate $p^*(L) > p_0$. At a higher debt ratio D_H, *ceteris paribus*, r , is higher and from eq. (1), the minimum transaction cost pay-out rate $p_0(H)$ is higher. For example, lower retention is required to sustain a given growth rate at a higher debt ratio. At this higher debt ratio, there is less dispersion of external equity ownership and consequently, equity agency cost is lower. The minimum total equity agency cost is, in turn, lower and occurs at a higher pay-out rate $p^*(H) > p^*(L)$.

Figure 3. 1: Simultaneous determination of the optimal pay-out ratio and optimal capital structure



Source: Noronha *et al.* (1995)

The figure depicts the simultaneous determination of the company's optimal dividend and capital structure. In the upper panel, the locus of minimum total equity agency costs based on the trade-off between dividends-induced monitoring and transaction cost is combined with the Jensen and Meckling (1976) debt agency cost curve, increasing in debt ratio. The optimal debt ratio D^* is the one at which the marginal (dividend-driven) equity agency cost is equal to the marginal debt agency cost and the global total agency cost is minimised. This optimal debt ratio D^* has corresponding to it an optimal pay-out rate P^* (shown in the lower panel), at which the sum of transactions and equity agency costs are minimised for that debt ratio. Thus, the optimal debt ratio and optimal pay-out rates are simultaneously determined. Noronha *et al*. (1996) did not deal with the issue regarding share repurchases because of restrictions (the IRS did not permit a policy of regular repurchases). They argue that repurchasing shares (via tender offer) also involves transaction costs and capital market monitoring and trade-off between transaction costs and monitoring benefits would lead to a second minimum at $P^* < P_0$. The repurchase mechanism may be more effective than the dividend mechanism in controlling equity agency cost, resulting in a lower minimum to the left of P_0 than the dividend-driven minimum to the right of P_0.

Following Jensen and Meckling (1976), these studies assume that managers of a widely held company will lavish expenses and consume perquisites in their interests. The existence of agency problems rules out the assumption of perfect capital markets imposed in the Miller and Modigliani (1961) assumption.

Explaining the dividend from the aspect of agency cost, Jensen's (1986) theory suggests that the dividends (or share repurchases) are paid by managers possessing free cash flow. If managers do not pay dividends out of cash, they may lavish the cash on perquisites or invest in low-return projects. Furthermore, managers may further commit permanent increase in dividends to control the use of further cash flow and imply that they act in shareholders' interests.

Kim *et al*. (2007) investigated the interrelationship between the capital structure, the dividend payment and the ownership structure in South Korea using a simultaneous equation framework, which allowed testing both the convergence of interest theory and entrenchment theory with a sample of publicly traded South Korean manufacturing companies. They found that debt policy and ownership structure had a significantly positive impact of dividend policy. Furthermore, debt and dividend policy were significantly positively related to ownership structure. The findings support both the theory of convergence of interest between management and ownership and the entrenchment theory. Following the simultaneity hypothesis, they used the CF [(net income + depreciation)/total assets], CR (current assets/current liabilities, PRO (net income/net sales) and Size (natural log of market value of equity) as the joint determinants in the three equations. Examining the signs and the significance of these coefficient estimates allowed them to infer about both the nature of simultaneity across each of the three policies, as well as whether the convergence of interest theory and the entrenchment theory was diametrically opposed. To test for the simultaneity hypothesis, they used the following structural equation:

$$LEV = a_0 + a_1 OWN + a_2 DIV + a_3 CF + a_4 CR + a_5 PRO \quad (3.9)$$

$$DIV = b_0 + b_1 OWN + b_2 LEV + b_3 CF + b_4 CR + b_5 PRO \quad (3.10)$$

$$OWN = c_0 + c_1 LEV + c_2 DIV + c_3 CF + c_4 CR + c_5 SIZE \quad (3.11)$$

Where

LEV= the debt ratio (total debt/total assets)

DIV=the dividend payments (dividends/operating income)

OWN=the ownership structure (percentage of stock owned by insiders)

CF=The cash flow ((net income +depreciation)/total assets)

CR=Current ratio (current assets/current liabilities)

PRO=profitability (net income/sales)

SIZE=Size of the company (natural log of market value of equity)

Al-Najjar (2011) investigated the interdependence between dividend payments and capital structure for the period 1994 to 2003 in the Jordanian market using the joint determinants for both policies. He found that there was a positive relationship between debt-to-asset ratio on the one hand, and asset tangibility, profitability, market-to-book, liquidity, company size and industry classification on the other hand. In addition, there was a positive relationship between dividend pay-out ratio on the one hand, and profitability, asset tangibility, market-to-book and industry classification on the other hand. The findings showed an insignificant negative relationship between the dividend payments and capital structure, an insignificant negative relationship between capital structure and the dividend payments. The results contradict Noronha *et al*. (1996) findings. The results of the reduced form equations show that the capital structure and the dividend policy have the following common determinants: profitability, asset tangibility, market-to-book, industry classification and limited evidence of institutional ownership.

Al-Najjar (2011) used the following system equation models to investigate the joint determinants between dividend payment and capital structure:

$$LEV_{i,t} = \beta_0 + \beta_1 PIO_{it} + \beta_3 ROE_{it} + \beta_4 BR_{it} + \beta_5 TANG_{it} + \beta_5 LIQ_{it} \\ \beta_6 MB_{it} + \beta_7 SIZE_{it} + \beta_8 IND + \varepsilon_{it} \quad (3.12)$$

$$DPO_{i,t} = \beta_0 + \beta_1 PIO_{i,t} + \beta_3 ROE_{it} + \beta_4 BR_{i,t} + \beta_5 TANG_{it} + \beta_5 LIQ_{it} \\ \beta_6 MB_{it} + \beta_7 SIZE_{i,t} + \beta_8 IND + \varepsilon_{it} \quad (3.13)$$

where

$LEV_{i,t}$ and DPO_{it} are the endogenous variables, which represent capital structure and dividend policy as defined previously.

$ROE_{i,t}$= profitability of company i in period t

PIO= the percentage of institutional ownership

$BR_{i,t}$= business risk of company i in period t

$TANG_{i,t}$= tangibility of company i in period t

$LiQ_{i,t}$=liquidity of a company i in period t

$MB_{i,t}$=market-to-book ratio of company i in period t

$SIZE_{i,t}$=the size of a company i in period t

$IND_{i,t}$=industry effect

According to Al-Najjar (2011), joint determinants variables have a simultaneous effect on the dividend payments and the capital structure. The summary of the effects of the joint determinants on the capital structure and the dividend payments as discussed by Al-Najjar (2011) is presented in Table 3.1 below:

Table 3. 1: Joint determinants between capital structure and dividend policy

Policies	Capital structure	Dividend policy
Determinants		
PIO=percentage-of institutional ownership	(+)	(+)
ROE=return on equity	(-)	(+)
BR=business risk	(-)	(-)
TANG=tangibility	(+)	(-)
LIQ=liquidity	(+)	(-)
MB=market-to-book ratio	(+)	(+)
SIZE=size	(+)	(+)
IND=industry effect	(+)	(+)

Source: Al-Najjar (2011)

Nizar Al-Malkawi (2007) used a company level panel data set of all publicly traded companies on the Amman Stock Exchange (ASE) between 1989 and 2000 to investigate the determinants of corporate dividend policy. The results provide strong support for the agency cost hypothesis and are broadly consistent with the pecking-order hypothesis with no support for the signalling hypothesis. In addition, the results indicate a significant negative relationship between debt and the dividend payments (Nizar Al-Malkawi, 2007:61). Nizar Al-Malkawi (2007:61) argues that when a company acquires debt financing, it commits itself to fixed financial charges embodied in interest repayments and the principal amount, and failure to meet these obligations may lead the company into liquidation. Therefore, the risk associated with high degrees of financial leverage may result in low dividend payments because, *ceteris paribus*, companies need to maintain their internal cash flow to pay their obligations rather than distributing cash to the shareholders. Moreover, Rozeff (1982) states that companies with high financial leverage tend to have low pay-out ratios to reduce the transaction costs associated with external financing.

Ding and Murinde (2010:54) investigated the simultaneous decision-making framework between the capital structure and the dividend policy for UK companies in an agency theory framework. Their evidence confirmed that simultaneity of financial decision-making existed in the sample of UK companies, contradicting the results of

Al-Najjar (2011). They also found that insider holding, share returns, growth opportunities, total assets and the volatility of operating income were significant determinants of the dividend and leverage policies. The evidence suggested that financial managers had a backward-looking strategy. In addition, the model worked particularly well when lagged values of the dependent variables were included in the specifications and the model supported the monitoring rationale for dividends. Specifically, it was found that a high proportion of institutional shareholdings in the company ownership structure resulted in better monitoring of company management and operations. The results also indicated a significant negative relationship between leverage and the dividend payments and a significant negative relationship between the dividend payments and leverage for all systems. To test for simultaneity between leverage and the dividend policy, they used the following single-equation specification (least squares estimation) based on the agency framework by Easterbrook (1984) and NSM:

$$POR_{it} = \alpha_0 + \alpha_1 EQR_{it} + \alpha_2 INS_{it} + \alpha_3 LNSH_{it} + \alpha_4 VRET_{it} + \alpha_5 LNAST + \alpha_6 GR_{it} + \mu_{it} \quad (3.14)$$

$$EQR_{it} = \beta_0 + \beta_1 POR_{it} + \beta_2 ADRD_{it} + \beta_3 SIGMA_{it} + \beta_4 NDTS_{it} + \mu_{it} \quad (3.15)$$

where

POR_{it} = the pay-out ratio of the company

EQR_{it} = the equity ratio

INS_{it} = the insider-holding of the common shares, by directors, out of the total outstanding shares of the company

$LNSH_{it}$ = measured as the log number of shareholders. The size effect is removed by taking the natural logarithm.

$VRET_{it}$ =the standard deviation of the daily shares returns on equity

$LNAST$ = the log of total assets. This is the measurement of the size of a company.

GR_{it} = the forecast growth rate of the company, which is measured as a product of the retention rate and the return on equity.

$ADRD_{it}$ =the advertisement and R&D expenses, divided by sales

$SIGMA_{it}$ = the earnings volatility of the company, measured as the change in earnings before interest, depreciation and taxes divided by total assets.

$NDTS_{it}$ =the non-debt tax shields, defined as the annual depreciation divided by earnings before interest, depreciation and tax.

Using five joint determinants to test the agency theory of managerial ownership, corporate leverage and corporate dividend, Crutchley and Hansen (1989:42) argue that, based on the agency theory narrative, managers choose the policy of managers stock ownership, outside leverage and dividend payments to minimise agency costs. Therefore, the three policies are determined by the impact of five company-specific characteristics (company size, flotation cost, earnings volatility, advertising research and developments, and managers diversification). The findings indicate that managers substitute between the levels of the three policies, taking advantange of the benefit-cost tradeoffs between the policies in a way that reduces agency costs. The findings are generally consistent with the conclusion that ownership, leverage and the dividend payments are chosen in tandem by managers to control agency costs. It is worth pointing out that Crutchley and Hansen (1989:42) did not treat the three policies as endogenous variables to capture their direct effect on each other.

Crutchley *et al*. (1999:194) examined agency problems and the simultaneity of financial decision-making taking into consideration the role of institutional ownership. They found that four decisions, namely leverage, dividend pay-out, insider ownership, and institutional ownership, were determined somewhat although not completely simultaneously. For 1987, insider ownership did not affect the choice of leverage and dividends, and for 1993, leverage and insider ownership only weakly affected the choice of institutional ownership. Furthermore, the results indicated a significant negative relationship between leverage and the dividend payments and a significant negative relation between the dividend payment and leverage (Crutchley *et al.,* 1999:191). The results also indicated that the level of debt and the dividends affected the choice of insider-ownership negatively, but that insider ownership did not affect the choice of debt and dividends. They used the following three least squares set-up to investigate the simultaneous determination of financing decisions:

$$DEBT_{it} = \alpha_0 + \beta_1 DIV_{it} + \beta_2 INSIDER_{it} + \beta_3 INSIDER_{it}^2 + \beta_4 INST_{it} + \beta_5 RISK_{it} + \beta_6 RISK_{it}^2 + \beta_7 ROA_{it} + \beta_8 R\&D_{it} + \beta_9 FASSETS_{it} + \varepsilon_{it} \quad (3.16)$$

$$DIV_{it} = \alpha_0 + \beta_1 DEBT_{it} + \beta_2 INSIDER_{it} + \beta_3 INSIDER_{it}^2 + \beta_4 INST_{it} + \beta_5 RISK_{it} + \beta_6 RISK_{it}^2 + \beta_7 ROA_{it} + \beta_8 SALEGROW_{it} + \beta_9 INV_{it} + \varepsilon_{it} \quad (3.17)$$

$$INSIDER_{it} = \alpha_0 + \beta_1 DEBT_{it} + \beta_2 DIV_{it} + \beta_3 INST_{it} + \beta_4 RISK_{it} + \beta_5 RISK_{it}^2 + \beta_6 R\&D_{it} + \beta_7 SIZE_{it} + \beta_8 DIVISION_{it} + \varepsilon_{it} \quad (3.18)$$

$$INST_{it} = \alpha_0 + \beta_1 DEBT_{it} + \beta_2 DIV_{it} + \beta_3 INSIDER_{it} + \beta_4 INSIDER_{it}^2 + \beta_5 ROA_{it} + \beta_6 R\&D_{it} + \beta_7 SIZE_{it} + \beta_8 BETA_{it} + \varepsilon_{it} \quad (3.19)$$

Jensen *et al.* (1992:247) investigated the simultaneous determination of insider ownership, debt and dividend policies. They found that these policies were related not only directly, but also indirectly, through their relationship with operating characteristics of companies. In addition, using a three-stage least squares (3SLS) estimation, the debt equation results indicated that higher ownership led to less debt. The negative coefficient of insider ownership was consistent with two complementary explanations. Firstly, the results conformed to the claim that insiders with a major stake were less diversified and had more incentive to reduce financial risk. Secondly, companies with higher insider ownership should have lower agency costs of equity and higher agency costs of debt because the incentives of managers would be more closely aligned with owners than with creditors. The negative sign of the dividend ratio suggested that companies with high dividend pay-outs found debt financing less attractive than equity financing. This was consistent with the explanation that companies with high fixed financial costs were unwilling to commit simultaneously to higher dividend pay-outs. In the dividend equation, the negative significant sign of the coefficient of insider ownership indicated that it was an important determinant of a company's dividend policy. The coefficient of debt variable in the dividend equation was negative in both periods, but only significant for 1987. In the insider ownership equation, both debt and the dividend pay-out were insignificant. As a result, they found no evidence that financial policy was an important determinant of the stake insiders would have on the company. Taken with the results of the debt and the dividend equations, the evidence is consistent with the view that more insider ownership permits managers to control the financial policies of the company (Jensen *et al.,*1992:255-256). To test the simultaneity hypothesis, they used the following structural equations:

DEBT=DE(INSIDER, DIVIDEND,BUSINESSRISK, PROFITABILITY, R&D, FIXED ASSETS) (3.20)

DIVIDEND=DI(INSIDER, DEBT, BUSINESS RISK, PROFITABILITY, GROWTH, INVESTMENT) (3.21)

INSIDER=IN(DEBT, DIVIDEND, BUSINESS RISK, SIZE, DIVISION, R&D) (3.22)

The exogeneous variables include research and development expense, business risk and profitability, fixed assets, growth, investment, size and number of divisions.

Ghasemi *et al*. (2018) investigated a two-way causal relationship that can exists between pay-out decisions and debt policies in Malaysian listed companies on the Main board of Bursa Malaysia during the period 2006-2014. The analysis was performed by applying a simultaneous equation model (3SLS). The main findings indicated that when the dividend payments is treated as an endogenous variable, there is a positive effect on leverage. However, leverage is found to have a simultaneous negative impact on the dividend payments. The findings also showed that liquidity and performance positively affect dividends, although they have a negative effect on leverage. In addition, the results documented an inverse relation between tangibility and debt, a direct relation between reputation and debt, and also confirms that larger companies tend to pay out a higher percentage of dividend per share. To test the simultaneity hypothesis, they used the following structural equations:

$$\mathrm{Div}_{i,t} = \alpha_0 + \alpha_1 \mathrm{Lev}_{i,t} + \alpha_2 \mathrm{Perf}_{i,t} + \alpha_3 \mathrm{Asset}_{i,t} + \alpha_4 \mathrm{Cr}_{i,t} + \varepsilon_{i,t} \quad (3.23)$$

$$lev = \beta_0 + \beta_1 Div_{i,t} + \beta_2 Perf_{i,t} + \beta_3 Cr_{i,t} + \beta_4 Asset_{i,t} + \beta_5 Rep_{i,t} + \varepsilon_{i,t} \quad (3.24)$$

Where

$Div_{i,t}$ =dividend of a company i in period t

$Lev_{i,t}$ =leverage of a company i in period t

$Perf_{i,t}$ =Performance of a company i in period t

$Asset_{i,t}$ =Asset tangibility of a company i in period t

$Cr_{i,t}$ =Current ratio of a company i in period t

$Rep_{i,t}$ =Reputation of a company i in period t

Taken together, the implication of the literature on agency theory surveyed above is that the interdependence among capital structure and distribution policies might be driven by agency cost considerations, especially in large companies where the ownership is considerably dispersed, and the free cash flow is substantial. Companies with high levels of capital expenditures are more likely to face severe agency problems of overinvestment, thus should be closely monitored by using either debt financing or picking up a higher distribution as monitoring mechanism. In such an agency setting, shareholders demand high levels of debt financing or dividend pay-outs not because these are valuable in themselves, but because they promote more careful and value-oriented investment decisions.

3.2.5 Pecking-order theory of simultaneous decision-making framework

Fama and French (2002) tested the trade-off and the pecking-order predictions about how the long-term leverage and the dividend pay-out ratio varied across companies with the main driving variables proposed by the two models, namely profitability and investment opportunities for a period of 35 years (1965-1999), They found that highly profitable companies and companies with less growth options paid higher dividends. Profitable companies were less leveraged; this is consistent with the pecking-order theory. Companies with more growth options were less leveraged; this confirms the predictions of the trade-off theory. Short-term investment variations deficit was mostly absorbed by debt; this is consistent with the pecking-order theory. Moreover, testing predictions about the interdependence of long-term leverage and dividend pay-out, they modelled the dividend payments and the leverage jointly. They tested the trade-off model's prediction that leverage was mean reverting and tested the pecking order prediction about how financing decisions responded to short-term variations in earnings and investments. The dividend predictions of the trade-off and the pecking-order models were tested in the context of Lintner's (1956) model, which seemed to provide a good description of the dividend behaviour (Allen & Michaely, 2003). In terms of the model, the company has long-term target pay-out ratios, TP, which relate its target dividend for the year t+1.

, TD_{t+1} , to common stock earnings, Y_{t+1},

$$TD_{t+1} = TP * Y_{t+1} \tag{3.25}$$

Because the adjustments costs of the company move only part way to the target in year $t+1$.

Testing the joint effects between leverage and the dividend payments, Fama and French (2002) computed the following equation:

$$\begin{aligned} D_{t+1}/A_{t+1} = a_0 + (a_1 + a_{1V}V_t/A_t + a_{1E}E_t/A_t + a_{1A}dA_t/A_t \\ + a_{1D}RDD_t + a_{1R}RD/A_t + a_{1S}\ln(A_t) + a_{1L}TL_{t+1})Y_{t+1}/A_{t+1} + e_{t+1}. \end{aligned} \tag{3.26}$$

For simplicity, Fama and French (2002) omitted the company subscript that should appear on the variables and the residual in the equation and the year subscript that should appear on the regression coefficients. Rather than estimating the regression, they followed equation 3.20 and put common stock earnings Y_{t+1} on the right of equation 3.21 . This avoids the influential observation problem that arises when earnings are near zero. The exogenous variables in the equation include investment opportunities $(V_t/A_t, dA_t, \text{and } RD_t/A_t)$ and the profitability of asset in place $(E_t/A_t \text{ and } V_t/A_t$, where E_t, is the pre-interest after tax earnings). The log of the company size, $\ln(A_t)$, RDD_t is a dummy variable that 1 for companies with zero or no reported R and D and TL_{t+1} is target leverage, the fitted value from the first stage reduced form estimate of target book or market leverage for dividend payers.

Following the partial adjustment model, Fama and French (2002) also attempted to explain the leverage behaviour in which the book leverage partially absorbed the differences between target leverage $(\mathrm{TL}_{t+1}\ \text{and lagged leverage}, \mathrm{L}_t/\mathrm{A}_t)$ by using the following regression model:

$$\mathrm{L}_{t+1}/\mathrm{A}_{t+1} = b_0 + b_1\mathrm{V}_t/\mathrm{A}_t + b_2\mathrm{ET}_t/\mathrm{A}_t + b_3\mathrm{Dp}/\mathrm{A}_t + b_4\mathrm{RDD}_t + b_5\mathrm{RD}_t/\mathrm{A}_t + b_6\ln(\mathrm{A}_t)$$
$$b_7\mathrm{TP}_{t+1} + e_{t+1} \qquad (3.27)$$

The proxies for profitability are: $\mathrm{E}_t/\mathrm{A}_t$ (ET_t is earnings before interest and taxes) and $\mathrm{V}_t/\mathrm{A}_t$ (primarily used for investment opportunities), $\mathrm{Dp}_t/\mathrm{A}_t$ depreciation, the log assets $\ln(\mathrm{A}_t)$ and TP_{t+1} is the target pay-out ratio as indicated in the dividend payments model. The results indicated that the dividend payment was negatively related to target leverage.

Cooper and Lambertides (2018) investigated whether increases in dividend payments were followed by increases in leverage. Their results indicated that large dividend increases were followed by a significant increase in leverage, consistent with management increasing the dividend to use up excess debt capacity. However, the leverage increase was not captured by standard partial adjustment model leverage. Nor did it reflect variables known to be related to dividend increases, such as company maturity, investment and risk. Instead, the dividend increases signalled a complex change in the way companies adjusted to their optimal level, but it did not signal a change in the target. This provides evidence in support of the pecking-order theory. To measure the fixed effects of leverage changes for dividend change companies, they augmented Stage 2 of Kayhan and Titman (2007) by including two dummy variables. The first variable, DIV_INCR, takes the value of 1 if the company has a dividend increase at time 0, and 0 otherwise. The variable, DIV_DECR takes the value of 1 if the company dividend decreases at time 0, and 0 otherwise. Because the dividend payments are known to signal variables that could also be related to changes in leverage, Cooper and Lambertides (2018) augmented the Kayhan and Titman (2007) procedure with variables that are known to follow dividend changes and could also be related to leverage changes, namely the levels of operating CFs (Brook, Charlton & Hendershott, 1998; Faulkender & Wang, 2006), variability of return on equity (SD ROE) (Skinner & Soltes, 2011), company maturity (age) (Grullon , Michaely & Swaminathan, 2002), Capex (Grullon, Michaely & Swaminathan, 2002), , and credit rating (Charitou, Lambertides, & Theodoulou, 2011). After controlling for the above-mentioned variables in the Kayhan and Titman (2007) stage 2 regressions, the results indicated that the level of CF was significantly negatively related to changes in both leverage measures, but the earnings stability variables were either insignificant or went in the wrong direction. The rating target variable was insignificant, as was the capex for book value leverage. Age was marginally significant. Capex was insignificant for the market value leverage, but age was significant in both regressions. To capture the interaction between being dividend-paying and the speed leverage adjustment found by Fama and French (2002), Cooper and Lambertides (2018) augmented the Kayhan and Titman (2007) procedure in other ways by interacting the dividend-paying dummy with the $LevDef$ (leverage deficit). The results showed that this coefficient was significantly positive, indicating that the dividend-paying companies adjusted more slowly to their leverage targets than non-payers, as found by Fama and French (2002). Finally, including the interactions between the dividend change dummies and the leverage deficit to allow for different responses to deficit by the change in dividend because companies might be in an adjustment phase of their leverage, which could indicate faster reversion to target (Hovakimian & Li, 2010), the book value regression revealed that these interactions were insignificant, but in the market leverage regression, the interaction of the $LevDef$ with the dividend increases and initiation dummies was significantly positive. This indicated that the dividend-increasing and initiating companies responded more slowly to their market $LevDefs$ than other companies did. As a result, although these companies had larger $LevDefs$ than other companies and were making a major financial choice in the form of major change in the dividend pay-out policies, they appeared to adjust more slowly towards their leverage targets if the standard partial adjustment formulation was used (Cooper & Lambertides, 2018).

Lim (2016) investigated how companies shifted their dividend policies and leverage policies in response to the economic shock caused by the 2008 financial crisis for the

United States, Great Britain, France, Germany, Australia, Japan, China and Korea. The author found that the empirical relationship of companies' dividend policies with their capital structures and earnings was likely to undergo a major change around the 2008 financial crisis, as companies adjusted their capital structures and dividend policies in response to the extreme credit crunch caused by financial crisis. The extent and the speed that companies deleveraged themselves and reduced their dividends were likely to be influenced by countries' cultural and social norm. The results indicated a higher correlation between dividends and leverage before the 2008 crisis (positive relationship), and this correlation strengthened after the crisis except for Great Britain and Korea. The finding is more consistent with the pecking-order theory than with the trade-off theory of leverage.

Examining the dividend pay-out policies for companies in six Latin American countries from 1995 to 2013, Benavides *et al*. (2016) found that, as predicted by the pecking-order and the trade-off models, the dividend pay-out was positively linked to profitability and negatively linked to past indebtedness and investment opportunities. The results also indicated that the target dividend pay-out ratio was positively related to governance indicators at country level. Furthermore, the speed to which companies adjusted their dividends to change earnings was lower in high governance countries in the region. Therefore, companies were smoothing dividends more in countries with higher governance scores. However, Benavides *et al*. (2016) did not find evidence supporting the life cycle theory nor illiquidity effects on dividends.

Aggarwal and Kyaw (2010) investigated the relationship between the dividend payments and the capital structure of multinational companies accounting for interdependence between the two policies and controlling for appropriate other variables. They compared domestic companies with multinational companies and found that multinational companies had significantly lower debt ratios decreasing with increasing multinationality. Furthermore, the results indicated a significant negative relationship between the dividend payments and capital structure and the capital structure and the dividend payments (endogenous and exogenous variables respectively). These findings are robust accounting for the simultaneity of the capital structure and the dividend payment decisions and seem to support the pecking-order theories of capital structure and dividend policy. They used the following simultaneous equations framework to test for the interdependence between financing decisions and pay-out decisions:

$$
\begin{aligned}
Lev_{i,t} = {} & \beta_1 + \beta_2 DivPO_{i,t} + \beta_3 BusRisk_{i,t} + \beta_4 ROA_{i,t} + \beta_5 MTB_{i,t} + \beta_6 COL_{i,t} \\
& + \beta_7 UNQ + \beta_8 NDTS_{i,t} + \beta_9 Lsize_{i,t} + \beta_{10} DOL + \beta_{11} FunDef_{i,t} + \beta_{12} Tax + \varepsilon_{i,t}
\end{aligned}
\tag{3.28}
$$

$$
\begin{aligned}
DivPO_{i,t} = {} & \beta_0 + \beta_1 Lev_{i,t} + \beta_2 Beta_{i,t} + \beta_3 + SaleGR_{i,t} + \beta_4 FreeCFLS_{i,t} \\
& + \beta_8 Lsize_{i,t} + \beta_9 + M + \varepsilon_{i,t}
\end{aligned}
\tag{3.29}
$$

where

Lev = the leverage ratio of long-term debt +market value of equity

$DivPO$ = the total dollar amount of dividends on common stock divided by income before extraordinary items

$BusRisk$ = the business risk, standard of deviation of the first difference in EBIT divided by the average total assets over five-year period

ROA = the income before extraordinary items divided by total assets

MTB = the market-to-book ratio, market value divided by book value of the company at the end of the fiscal year

COL = collaterals, ratio of net property, plant and equipment to total assets

UNQ = uniqueness, ratio of R & D and advertising expenses to total sales

NDTS = ratio of depreciation amortisation expenses to total sales

LSIZE = company's size, natural log of total sales

TAX = tax

M = the dummy for multinationality

$FundDef$ = the funding deficit

$FundDef_t = DIV_t + X_t + \Delta W_t + R_t - C_t$

C_t = the operating cash flow, after interest and taxes

DIV_t = dividend payments

X_t = the capital expenditure

ΔW_t = net increase in working capital

R_t = current portion of long-term debt

Chipeta and McClelland (2018) tested the validity of the trade-off and the pecking-order theories of capital structure for non-financial companies listed on the Johannesburg Stock Exchange. The results showed that, first, the pecking-order model was superior to the partial adjustment regressions at rejecting random financing behaviour. Second, the tests on real data showed that the partial adjustment regressions confirmed (rejected) target adjustment behaviour for off- (on-) target companies. However, when falsely generated random financing gap was used, the GMM model recorded a higher error rate than the censored tobit regressions. Finally proposing alternative tests of both theories, the results revealed that the pecking-order theory worked well, except under conditions where companies with reported financial deficits were at the bottom of the pecking order. They used the following equation:

$$\Delta Lev_{i,t} = \alpha + \beta_1 FinDS_{i,t} + \beta_2 Z'_{i,t-1} + e_{i,t} \qquad (3.30)$$

$$FinDS_{i,t} = Div_{i,t} + Inv_{i,t} + \Delta Nwc_{i,t} - Ocf_{i,t} \qquad (3.31)$$

De Jong, Verbeek and Verwijmeren (2011:1312) investigated companies' debt-equity decisions when the static trade-off and the pecking-order theory disagreed. They found that companies that were overleveraged but not restricted in their debt issuing, still increased leverage by issuing debt, which is strong evidence against the static trade-off theory but in line with the prediction of the pecking-order theory. Furthermore, for the repurchase decisions to be effective and while focusing on underleveraged companies that do have sufficient debt outstanding to repurchase equity, De Jong *et al*. (2011:1312) results revealed that most companies in this situation repurchased equity, which is evidence against the pecking-order theory for repurchase decisions. In line with the previous findings of Myers and Majluf (1984) and Shyam-Sunder and Myers (1999), De Jong *et al.* (2011:1312) stress that research on companies' financing decisions should clearly distinguish between issue and repurchase decisions.

3.2.6 Trade-off theory

Frank and Goyal (2009) examined the factors that are reliable in the determination of financing decisions. They found that the factors that were reliably important in capital structure decisions were as follows: median industry leverage (+ effect on leverage), market-to-book assets ratio (-), tangibility (+), profit (-), log of assets (+), and expected inflation (+). Furthermore, they found that dividend-paying companies tended to have a "lower leverage" and when considering book leverage, somewhat similar results were found. However, for the book leverage, the impact of the company size, the market-to-book ratio, and the effect of the inflation were not reliable. The empirical evidence seems reasonably consistent with some versions of the trade-off theory.

Analysing the literature review of dividend policy, the Baker and Weigand (2015) findings showed that companies tended to follow a managed dividend policy rather than a residual dividend policy, which involved paying dividends from earnings left over after meeting investment needs while maintaining their target capital structure. The implication is that companies pick up a dividend policy that allows them to move towards an optimal capital structure.

Bonaimé *et al*. (2014) extended previous research on market reactions to share repurchases by studying the association between stock returns to share repurchase announcements and capital structure policy. They state that the trade-off theory predicts that the benefits from a share repurchase should accrue to underleveraged companies because these companies move towards their optimal debt ratio by repurchasing equity. But underleveraged companies must weigh the benefits of adjusting to their target capital structure against the cost of repurchasing equity. The market timing theory states that undervalued companies should repurchase equity to exploit mispricing opportunities, while overvalued companies should not. The theory also states that companies will benefit more from the capital structure adjustments achieved by share repurchases when their equity is undervalued. On the other hand, capital structure adjustments requiring repurchases of overvalued shares will be costlier and hence less beneficial. Consistent with the predictions, the results indicate that market reactions to open-market share repurchase are magnified (dampened) if the company is underleveraged and undervalued (overleveraged and overvalued). Bonaimé *et al*. (2014) indicate that the results are robust to different methods of measuring equity mispricing, alternative definition of leverage, and adding controls for some well-known determinants of share repurchases. Furthermore, companies recognise the relationship between capital structure and valuation as the source of economic benefits to share repurchases and are more likely to announce a share repurchase when they are underleveraged and undervalued. Capital structure adjustments are a value-increasing motive for share repurchase. The extent to which adjusting capital structure through share repurchase creates value depends on the undervaluation of the company.

Dittmar (2000) examined the characteristics of companies that repurchased shares in an effort to test various hypotheses for why companies repurchased shares. As a part of the analysis, Dittmar (2000) documented that repurchasing companies tended to have a low leverage relative to non-repurchasing companies and that the magnitude of share repurchases decreased with leverage. In addition, the evidence supports the argument that companies repurchase shares to alter their leverage ratio. However, Dittmar (2000) did not distinguish between the different means of repurchasing shares (open-market repurchases, targeted repurchases, and self-tender offers). Moreover, because of the broader scope of the paper, Dittmar (2000) stopped short of examining the leverage hypothesis more closely. Dittmar (2000) used the following tobit model:

$$\begin{aligned} REP_{it} = \alpha_{it} &+ \beta_1 CASHFLOW_{i(t-1)} + \beta_2 CASH_{i(t-1)} + \beta_3 MKBK_{i(t-1)} + \beta_4 PAYOUT_{i(t-1)} \\ &+ \beta_5 \ln ASST_{i(t-1)} + \beta_6 RETURN_{i(t-1)} + \beta_7 LEVER_{i(t-1)} + \beta_8 TAKEOVER_{i(t-1)} + \beta_9 OPTIONS_{i(t-1)} \end{aligned} \tag{3.32}$$

It is also worth noting that the share repurchases shown in the above model in period t depended on the previous capital among other variables in period $t-1$.

Examining whether companies optimised their capital structure around self-tender offers from 1990 to 1997, Lie (2002) found that companies undertaking self-tender offers generally had a debt ratio below their predicted levels before the offers. Stated differently, the probability of a tender offer depended on a company’s distance from target leverage (defined using predicted values from annual OLS regressions) but did not depend on undervaluation (defined using four different measures based on EBITDA, assets, sales and the residual income model). The debt ratios following non-defensive self-tender offers were close to predicted levels, while the ratios following defensive self-tender offers were above predicted levels. Furthermore, 20% and 43% of debt ratings were downgraded following non-defensive and defensive self-tender offers. Finally, the increases in debt ratios around the offers were negatively related to the difference from the predicted ratio before the offers. Multivariate analyses showed that companies' debt ratios negatively affected the probability of self-tender offers and the increases in debt ratios were negatively related to the deviation from the predicted ratios before the offers. These relations held even when controlling for variables that should capture any efforts to undertake a self-tender offer to manage companies' cash levels or signal insider information. Moreover, these results suggested that the debt ratios of the sample companies drifted away from their historical levels, such that the debt ratio could be lower than the optimal at the time of the announcement. From the year before to the year after the transaction, there were significant increases in debt ratios for both types of companies used in the research. Collectively, these results are consistent with the notion that companies conduct non-defensive self-tender offers to move debt ratios to more optimal levels and defensive self-tender offers to move debt ratios beyond optimal levels. Finally, Lie (2002), argues that tender offers, although generally large enough to significantly alter the capital structure, are somewhat rare.

Investigating the determinant of share repurchase programmes for French, German, Italian and British companies, Lee *et al*. (2010) argue that companies may use share repurchases as a way of increasing their debt ratios to move towards an optimal capital structure. This implies that companies with below-target leverage ratios tend to repurchase in larger amounts than companies with an optimal capital structure. Repurchases reduce equity and increase debt, especially if the money to repurchase comes from additional debt. However, their results indicated no evidence of the optimal leverage hypothesis, contradicting Dittmar (2000), who found evidence in support of this hypothesis. Lee *et al*. (2010) used a logistic regression to define an optimal leverage as a change in debt taking into consideration the debt ratio after repurchasing and debt ratio before repurchasing.

Hovakimian *et al*. (2001:14) examined the debt equity choices and found that companies tended to move towards a target capital structure when they either issued or repurchased securities. The coefficient of the three leverage deficit variables had the expected signs and were all statistically significant in the repurchase regressions. They found that in the debt/equity issue choice regression, the deviation of the actual leverage from the industry mean was highly significant, but the deviation of the industry from the regression-based target was only marginally significant. The findings suggest that factors proposed by static trade-off models are quite important in the choice of the security being repurchased but are only marginally important in the choice of the security being issued. Stated differently, companies are more inclined to repurchase decisions rather than issue decisions. Furthermore, companies with high past profits tend to issue debt rather than equity and repurchase equity rather than debt, which is consistent with the idea that companies tend to readjust their capital structure to offset the effect of accumulated earnings.

Andriosopoulos and Hoque (2013) aimed to identify the main factors and financial company characteristics that influence the managers' decision to make a share repurchase announcement. They employed a sample of 970 share repurchase announcements in the UK, France and Germany and found that a share repurchase reflected the management's preference to use debt instead of equity in order to move closer to an optimal leverage ratio. This finding is line with the findings by some authors (Bagwell & Shoven,1988; Jagannathan & Stephens, 2003; Hovakimian *et al*., 2001). Following Dittmar (2000) and Grullon and Michaely (2002), Andriosopoulos and Hoque (2013) employed the ratio of total debt to total assets at the year-end prior to the repurchase announcements as a proxy for leverage. Using a binary logit model, the results indicated a negative relationship between the propensity to announce an open-market share repurchase and the leverage for Germany and a positive relation for the United Kingdom when using the matched market-to-book Using the matched size, the results indicated a negative relationship between the propensity to announce an open-market share repurchase and the leverage for the three countries. Using the unmatched size, the sign remained negative for the United Kingdom and Germany, but positive for France. Using the industry matched, the sign was negative for UK and Germany and positive for France and the industry matched relationship was insignificant for all three countries. It needs to be noted that Andriosopoulos and Hoque (2013) did not explain clearly why there was a positive relationship or negative relationship. The argument could be that French companies made use of leveraged shares, which resulted in an increase in the level of debt, while UK and Germany financed repurchases by internal sources rather than issuing debt. In other words, the capital structure management can only be undertaken if the company is given access to excess debt capacity.

Investigating the incentives for on-market share repurchases from a transparent share repurchase regime, Mitchell and Dhawan (2007) found evidence for the target capital structure hypothesis in the on-market share repurchase activities in Australian companies, indicating that the greater the excess debt capacity or the lower debt-to-equity ratio relative to optimal capital structure, the greater the likelihood of conducting an on-market share repurchase. In addition, the capital structure as an incentive to share repurchases for small companies can only take place if there is some excess debt capacity. The argument is that the ability of a company to conduct a share repurchase depends on the excess of debt capacity and debt-to-equity ratio that is underleveraged. Using a logit regression, the results indicated a significant negative relationship between the debt-to-equity ratio and share repurchases in all five models. Mitchell and Dhamawan (2007) also state that a debt incentive among the determinants was the main incentive in contrast to the lack of growth opportunities and the growth in asset relevant to the univariate results.

Examining the sources of economic gain in stock repurchases, Chan, Ikenberry and Lee (2004) found little support for the leverage hypothesis. Their results revealed that low-leveraged companies where the economic benefit of leverage from repurchasing share would seemingly be high did not have a significant drift. Focusing on the change in leverage and where managers might be using repurchases as a tool to reshape capital structure, the results showed little evidence of the drift being associated with these cases. Furthermore, companies with high leverage were not common in the sample and the high leverage cases appeared to be indicative of a confident management that perceived its shares as mispriced.

Examining the effect of corporate governance on share repurchases, Jansson and Larsson-Olaison (2010) found evidence of Swedish companies repurchasing shares to increase leverage when no dominant shareholder existed. They argue that management-controlled companies may be motivated to repurchase shares to alter their capital structure towards optimum, which according to the agency theory, is likely to increase the value of the company. This assertion gained empirical support when tested with US data by, for example, Wansley *et al*. (1989) and Dittmar (2000), although the results of Chan *et al*. (2004) seemed to contradict this finding. For an autonomous manager subject to the discipline of share market, increasing the value of the company is attractive, especially if the manager's remuneration is tied to the performance of the company's shares. Moreover, according to the agency theory, a higher value of the company generally increases the management team's market value on the managerial labour market (Fama, 1974), and makes the company less attractive as a takeover target (Jensen, 1986) or target for shareholder activism (Strickland, Wiles & Zenner, 1996). Hence, the more a company's leverage negatively differs from the optimal level (for example, the more free-cash flow the company generates, the greater the volume of share repurchases may be expected according to this rational, all other things being equal). The results indicate a significant negative relationship between leverage and share repurchases only for companies with no owner.

Reddy-Yarram (2014) investigated the factors that influenced on-market share repurchase decisions in Australia in a sample of non-financial companies in the AOI for the period 2004 to 2010. The results provide evidence in support of the view that companies repurchase shares to reach their target optimal capital structure. The results indicated that leverage had negative and significant influence on the decision to repurchase shares in Australia. This indicated that companies repurchased shares to target an optimal capital structure by increasing leverage (Ofer & Thakor, 1987). This finding is consistent with that of Mitchell and Dharmawan (2007) and supports the view that companies target optimal capital structure and repurchases are undertaken to reduce the proportion of equity. Therefore, the findings support the leverage hypothesis in the context of share repurchase decisions of Australian companies.

Adjasi and Amidu (2014) investigated the influence of dividend decisions of companies in sub-Saharan African countries (South Africa, Nigeria, Ghana and Kenya). They found that South Africa and Kenya recorded a significant negative relationship between leverage and dividend payments, signifying that companies with higher debt ratio in both countries had a lower probability to pay dividend. This result confirms the recorded abhorrence of debt holders to dividends. Due to the abhorrence, debt is usually issued with covenants which restrict the dividend payments to curb the agency conflicts between shareholders and debtholders. Furthermore, the payment of interest reduces the cash flow available for management dissipation. Moreover, interest and principal payments (which are made by companies with debt in their capital structure) reduce the cash available for dividend payments. As a result, highly leveraged companies in South Africa and Kenya had a lower probability to pay dividend, while companies with lower leverage had higher probability of paying dividends. Ghana, on the other hand, recorded a significant positive relationship between the dividend payment and leverage. Thus, as debt increased in the capital structure of Ghanaian companies, their probability to pay dividend also increased. Adjasi and Amidu (2014) argue that even though the finding is in sharp contrast to their expectations, it is consistent with Easterbrook's (1984) argument that once a firm has issued debt, it is beneficial for the shareholders if it pays dividends. This is because debtholders consider the debt-to-equity ratio of companies before charging interest on debt. Therefore, when a company issues debt and finances its investment later from retained earnings, it reduces the debt-to-equity ratio (and the financial risk), based on which debt was issued first. This activity benefits bondholders at the expense of shareholders, by transferring wealth from shareholders to bondholders (when the bondholders are paid higher interest rates based on the initial and higher debt-to-equity ratio). Consequently, Ghanaian shareholders benefited from increased dividend payments, once the companies had issued debt. They also provided another reason for this positive relation, asserting that the stock market in Ghana was relatively small, compared with those of other countries. As a result, Ghanaian companies were likely to rely more on debt financing for their investment. However, the bond market in Ghana was almost non-existent. Thus, Ghanaian companies who utilised debt were also likely to be profitable. Consequently, high-debt users in Ghana (who were also profitable) had higher capability of paying dividends and hence the recorded positive relationship.

Examining the relationship between capital structure and pay-out policies through financial flexibility of share repurchases, Harris (2015) asserts that debt in the capital structure is viewed as a limitation on the ability of the company to maintain its flexibility. Similarly, dividends have been viewed as another form of financial commitment that may reduce flexibility. However, instead of looking at either pay-out policy or capital structure as an individual decision, companies may instead be balancing the flexibility benefits of both policies. The results indicated that the relationship between capital structure and financial flexibility was significant and positive. Further evidence indicated that this positive relation was specifically observed among high leverage companies which might otherwise lack financial flexibility in the form of additional debt capacity. The results indicated that managers considered both capital structure and pay-out policies to maintain flexibility. Companies increasing their flexibility through pay-out policy decisions are an indication that companies are also willing to accept less flexibility through increased debt levels. To assess the level of flexibility through share repurchases, Harris (2015) followed the model of Frank and Goyal (2009) to identify the independent variables of interest and used the following regression:

$$\begin{aligned}(\text{Debt})_{it} = {} & \alpha_i + \beta_1 \text{industryDebt}_{t-1} + \beta_2 \text{MB}_{t-1} + \beta_3 \text{Tangibility}_{t-1} + \beta_4 \text{Profit}_{t-1} \\ & + \beta_5 \text{Size}_{t-1} + \beta_6 \text{Inflation}_{t-1} + \beta_7 \text{Flexibility}_{t-1} + \varepsilon_{it}\end{aligned} \tag{3.33}$$

where flexibility is equal to repurchases as a percentage of total pay-out. Following Bonaimé *et al.* (2014), and similar to Frank and Goyal (2009), Harris used more than one measure of debt. It needs to be noted that Harris (2015) only captured the effect of flexibility on debt and not the other way around.

Varma, Singh and Munjal (2018) investigated corporate restructuring through share repurchases for companies listed on the Bombay Stock Exchange. They found that financing decisions were negatively and significantly correlated with both tender offers and open-market share repurchases. This finding suggested that Indian companies were highly leveraged and less likely to repurchase shares. In addition, they found that both the tender offer share repurchases, and the open-market share repurchases were used for capital structure correction.

Examining why companies decided to stop their repurchase programmes, Mietzner's (2017) empirical findings indicated that the probability that a company would complete a share repurchase programme increased with the level of cash in the year prior to the announcement and changes in the market-to-book ratio (∆MTBV). By contrast, it was more likely that a company would cancel an announcement share repurchase when the duration (time span) and its size (relative size) increased. Furthermore, lower levels of investments and investment opportunity variables in the year prior to the initiation increased a company's willingness to complete a proposed share repurchase. This finding suggests that repurchases occur when there is a lack of already attractive growth options. The coefficient of leverage was found to be positive and statistical insignificant.

3.2.7 Leveraged share repurchases

Over the past decade, it has been increasingly popular for companies to finance their share repurchases programmes by issuing debt, which has generated controversy (Lei & Zhang, 2016). In leveraged share repurchases, the cash paid out to shareholders is raised from debtholders, which has a larger impact on the company's leverage than cash-financed share repurchases. Lei and Zhang (2016) assert that share repurchases from undervalued companies may convey favourable information to the market even if they are financed by debt, mitigating the problem of information asymmetry or market undervaluation. Issuing debt to finance share repurchase may also reduce the agency cost of free cash flows as money borrowed is paid overtime. In addition, it may save taxes for companies as interest payments are tax deductible, or because it is costly to repatriate cash trapped overseas. Hence from a standard trade-off view of optimal capital structure, *ex ante* underleveraged companies with substantial debt capacity, high marginal tax rate, or declining future growth options may conduct leveraged share repurchases to optimise their leverage, which, in turn, benefits shareholder value.

On the other hand, the informational, agency and tax benefits of the leveraged share repurchases may decrease with the *ex-ante* leverage of the company. It is likely that leveraged share repurchases lead to excessive debt, which is detrimental to the company value. The optimisation of the capital structure associated with the leveraged share repurchases, which is akin to a debt-to-equity swap, may increase the company's debt beyond its optimal level and raise the probability of bankruptcy sub-optimally. It may also lead to investment-related agency issues such as the debt overhang problem, where a positive net present value project is not invested, and the company value is destroyed (Myers, 1977).

The argument of the free cash flow hypothesis is consistent with share repurchase financing through excess cash flows. In order, to restrict investment in value-destroying projects and the payment of excessive perquisites, companies with free cash flows are expected to distribute the same to the existing shareholders. As a result, cash-rich companies utilise their internal cash to pay for the purchase of their own shares, which ultimately reduces equity and increases debt in support of the trade-off theory. Stated differently, cash-rich companies are unlikely to borrow to finance their share repurchase transactions. The potential reduction of the agency cost because of distributing excess cash flow to shareholders through share repurchase transactions is positive news to the shareholders (Jensen, 1986). Therefore, cash-poor companies with excess debt capacity will tend to use debt-financed repurchases (Minnick & Zhao, 2006). However, like the dividend payments as explained in the agency cost model, cash-poor companies incur huge costs of financial distress from simultaneous debt issue and share repurchases, especially if they do not have excess debt capacity. Thus, the effect of increasing debt through borrowings might limit cash-poor companies from conducting debt-financed share repurchases. Debt issues during periods of share repurchases have become common place in recent corporate events. In fact, a significant amount of leveraged share repurchases occurred in the period prior to the financial crisis in 2008. The amount of such debt-financed repurchases peaked at more than $700 billion in 2007 (Milken, 2009).

According to the precautionary motive for holding cash, future uncertainties in the capital market motivate companies to build cash buffers, which will allow them to undertake future investment (Bates, Kahle & Stulz, 2009). This motive also holds for issues when the interest rates are a record low. More significantly, it also relates to the asymmetric information effects of external financing (high information asymmetry causes an increase in the costs of external financing). Myers and Majluf (1984) posit that companies should obtain external financing during periods of low information asymmetry. The precautionary motive also predicts that debt issues are less information sensitive and as such involves low costs of issuing them. Moreover, the level of information asymmetry reflects the degree of company internal financial distress. All else equal, non-financially distressed companies are likely to have low information asymmetry compared with an otherwise financially distressed company. Therefore, the cost of debt financing should be low for non-financially distressed companies.

The agency cost of debt is a significant factor that affects debt financing by companies. Due to the agency costs of debt, companies are unable to issue a significant amount of debt capital. Highly leveraged companies face default and bankruptcy risks that prevent them from obtaining debt financing that will allow them to undertake investment projects. Therefore, the agency cost of debt results in underinvestment (Myers, 1977) and asset substitution (Jensen & Meckling, 1976). The prospects of agency cost of debt imply that the degree of financial distress will determine the financing of share repurchases. Highly leveraged companies are more likely to face high agency costs of debt because of limited cash flow and the associated high costs of external financing. Conversely, companies that are not financially distressed with excess debt capacity are able to increase their debt ratios without significant agency costs.

Chen and Wang (2012) provided evidence of share repurchase effects on cash, cash flow, leverage and investments. They found that financially distressed companies generally experienced significant declines in cash, cash flow, investments, and significant increases in leverage after repurchase activity. Likewise, non-financially distressed companies also experienced declines in cash and increases in leverage but no changes in cash flow and investment. This evidence suggests that leverage is more likely undertaken to finance repurchase programmes by financially distressed companies. Conversely, for non-financially distressed companies, the additional leverage provides a cash buffer to maintain investment expenditure. Overall growth opportunities have an impact on share repurchases, especially for financially distressed companies.

Lei and Zhang (2016) investigated whether leveraged share repurchases were consistent with shareholder value maximisation and economic efficiency. They collected a comprehensive sample of debt-financed open-market share repurchases in the US from 1994 to 2012. For comparison, they also constructed a sample of open-market share repurchases that were cash financed for the same period. The results indicated that debt-financing share repurchases generated positive short-term and long-term abnormal returns. Leveraged share repurchase companies had more debt capacity, higher marginal tax rate, lower excess cash and lower growth prospects ex ante, increased leverage and reduced investments more sharply *ex post* than cash-financed companies. Companies that were overleveraged ex ante were associated with lower returns and real investments following leveraged share repurchases. The lower announcement returns of overleveraged companies were concentrated on companies with weaker corporate governance. The evidence is consistent with the leveraged share repurchases, enabling companies to optimise their leverage, on average, benefiting shareholders. The benefits decrease with a company's leverage ex ante.

3.2.8 Equity market timing

Empirical evidence indicates that few or no shares are repurchased following the repurchase announcements (Stephens & Weisbach, 1998). If managers truly have timing ability, they will increase the actual purchase of shares already announced when the prices are low. As a result, Chan *et al*. (2004) relate mispricing with the actual share repurchase activity and long-run stock performance. There is only pseudo-market timing if stock performance depends on repurchase announcement behaviour (Schultz, 2003). Chan *et al* (2004) found that different portfolio techniques yielded similar returns and that past stock performance did not have a negative relationship with repurchase announcements. However, they found significant evidence for the increased actual share repurchase activity when the past stock prices fell. This is consistent with the managerial timing ability that open-market share repurchases are conducted when managers perceive that shares are undervalued.

Baker and Wurgler (2002) argue that the existence of windows of opportunities allows companies to reduce overall cost of capital by issuing equity when market conditions are favourable. The existence of windows opportunities predicts that companies tend to announce equity issuance after information releases. Because this theory assumes that the degree of information asymmetry is time varying, the companies will issue equity and build up cash reserves for future periods or hoard financial slack when information symmetry is temporarily low. Moreover, due to corporate governance problems and lack of company law, share capital has become a free source of finance and not binding. Bessler, Drobetz and Gruninger (2011) state that cash will increase dramatically when a company issues equity and information asymmetry is temporarily low, suggesting that equity issuances can generate a large amount of money in a short time compared with other financing options.

Smith (1986) reviewed the theory and evidence of the process by which corporations raised debt and equity capital and the associated effects on security prices and found that the share price of industrial companies could fall as much as 3.14% after the announcement of a share issue. The intuition for the market timing equity issuances is that managers want to maximise their proceeds from security issuances, and they can only achieve this if the shares are either correctly priced or overpriced. There are no incentives in issuing under-priced shares. Evidence from the survey done by Graham and Harvey (2001) confirms the persistence of market timing behaviour among CFOs. Evidence from the research by Alti and Sulaeman (2012) confirms that the likelihood of issuing equity peaks when high share returns coincide with a strong demand from institutional investors.

Testing for the pecking-order theory using an international sample with more than 6 000 companies over the period 1995 to 2005, Bessler *et al*. (2011) argue that the high correlation between net equity issuance and financing deficit indicated by the results discredits the pecking-order theory. Testing the core assumption that information asymmetry is an important determinant of capital structure decisions, the findings support the dynamic pecking-order theory and its two testable implications. First, the probability of issuing equity increases with less pronounced company-level information asymmetry. Second, companies exploit windows of opportunity by making relatively larger equity issuances (for example, companies will issue equity when stock prices are high) and build up cash reserves (slack) after decline in company-level information asymmetry. Furthermore, companies from common law countries use part of their proceeds from an equity issuance to redeem debt and to rebalance their capital structure.

3.3 CAPITAL STRUCTURE AND COMPANY-SPECIFIC VARIABLES AS PREDICTORS OF CHOICE BETWEEN DISTRIBUTION STRATEGIES

The conventional literature on corporate finance has overlooked the effects of risk and return in the choice between dividend payments and share repurchases. Recent studies seeking to explore the determinants of choice between dividend payments and share repurchases have highlighted the importance of the different natures of capital structure and company specific variables when choosing between distribution strategies. Several channels through which the capital structure and company specific variables may influence the choice between dividend payments and share repurchases have been identified and examined. Nonetheless, the findings on capital structure and company-specific variables as predictors of choice between the distribution strategies remain theoretically ambiguous and empirically inconclusive. The omission of the different natures of capital structure, different alternative measures of the capital structure and company-specific variables in the choice between distribution policies is likely to generate misleading results and lead to inappropriate inferences, casting doubt on the conclusion drawn from the existing literature.

According to Wesson, Smit, Kidd and Hamman (2018) and Caudill, Hudson, Marshall and Roumantzi (2006), the choice between dividend payment and share repurchases is also expected to be influenced by company-specific characteristics. Caudill, Hudson, Marshall, and Roumantzi, (2006) argue that pay-out methods are not perfect substitutes because of market imperfections. Furthermore, industries and companies face different macroeconomic and microeconomic risk and fortunes. Companies and industries differ in terms of profitability, growth option, legal and tax frameworks of countries where they operate, asset structures, calibre of management, and operational risks. The design of the company's choice between the dividend payments and share repurchases must incorporate all these factors and enable it to minimise risk and maximise return. The choice between dividend payments and share repurchases is expected to vary between countries, industries and company sizes. The dividend payments and share repurchase are expected to be greatly influenced by both macroeconomic and microeconomic factors, as well as by the uniqueness of each company (companies' heterogeneity). Past empirical research has identified several factors that ultimately determine the choice between dividend payments and share repurchases. Distribution strategy theories use the following variables to explain pay-out choices of companies:

- **Company-specific factors**: company size, institutional ownership, number of shareholders, officers' and directors' ownership, level of debt, dividend payment history, size of distribution, level of company undervaluation, share performance prior to distribution, takeover threats, and executive share options (Caudill *et al.,* 2006; Wesson *et al.,* 2018).
- **Country-specific factors:** global and local macroeconomic conditions, business cycles, corporate governance systems, and the level of development of the local capital market.

Using a logistic regression, Wesson *et al.* (2018) found that the level of debt per sector was statistically significant, whereas in the total sample, this variable was not found to be statistically significant. This is an indication that decisions made in financing could have strong implications for the choice between the dividend payment and share repurchases. They argue that the level of debt (based on debt variable) and the choice of open-market share repurchase were reported. Their findings do not support the international empirical evidence, which postulates that lower debt levels are associated with the choice for open-market share repurchases, mainly because share repurchases are usually financed through debt, hence resulting in increased financial leverage for companies with below-target leverage levels. Furthermore, in the South African regulatory environment, the reported results may indicate that open-market share repurchases are not financed through debt, as is globally the case, but rather financed by utilising cash reserved. It is worth noting that Wesson *et al.* (2018) did not use the different alternative measures for the capital structure and different natures of the capital structure. The effects of the determinants of choice between share repurchases and the dividend payments as discussed by Wesson et al. (2018) and Caudill *et al*. (2006) are summarised in Table 3.2 below:

Table 3. 2: Effects of predictors of choice on share repurchases and dividend payments

	Effect on open-market share repurchases and dividend payments	
Determinants	Share repurchases	Dividends
Company size	Negative	Positive
Institutional ownership	Positive	Positive
Number of shareholders	Positive	Positive
Officers' and directors' ownership	Positive	Positive
Level of debt	Negative	Positive
Dividend payments history	Negative	Positive
Level of company undervaluation	Positive	Negative
Share performance prior to distribution	Negative	Negative
Takeover threats	Positive	Negative
Executive share options	Positive	Negative
Source: Wesson et al. (2018) and Caudill et al. (2006)		

Renneboog and Trojanowsk (2011) investigated the decision to distribute funds as well as the choice of the pay-out channel (e.g. the dividend payment, the repurchase of shares, both the dividend payments and the share repurchases and neither the dividend payments nor the share repurchases). Their findings demonstrated that the importance of share repurchases increased, but the dividend payments still constituted a vast proportion of the total pay-out. They used company-specific variables as determinants of choice between the dividend, repurchase, dividend and share repurchase and no pay-out (neither the dividend payments nor share repurchases) for United Kingdom companies. Their findings showed that UK companies that were profitable and large in size were more likely to pay dividend relative to non-paying companies . They found that leverage was a decreasing predictor of the dividend payment and companies that were highly leveraged were less likely to pay dividend.

Companies in the UK that were profitable and large in size were more likely to repurchase shares relative to non-paying companies (neither the dividend payments nor the share repurchases). Companies that were highly leveraged were less likely to repurchase shares relative to non-paying companies. UK companies that were profitable and large in size were more likely to engage in both the dividend payment and share repurchases relative to non-paying companies. It is worth noting that Renneboog and Trojanowsk (2011) did not distinguish between the natures of the capital structure. The effects of company specific variables on the choice between channels of pay-out relative to non-paying as discussed by Renneboog and Trojanowsk (2011) are summarised in Table 3.3 and Table 3.4 below.

Table 3. 3: Choice between channels of pay-out relative to non-paying

	Dividend	**Repurchases**	**Both (DP and SRP)**
Firm size	(+) pay dividends	(+) repurchase	(+) both
Profitability	(+) pay dividends	(+) repurchase	(+) both
Tobin's Q proxy	(-) non-paying	(-) non-paying	(-) non-paying
Leverage	(-) non-paying	(-) non-paying	(-) non-paying
Voting power of tax-exempt fin. inst.	-	-	
Voting power of another fin. inst.	-	-	
Voting power of executive directors	-	-	(+) both (DP&SRP)
Voting power of non-exec. directors	-	-	
Voting power of outside individuals	-	-	
Voting power of industrial and commercial companies	(-) non-paying	-	(-) non-paying
The choices are made relative to the reference category: the non-paying (meaning the engagement in neither the dividend payments nor the share repurchases) Source: Renneboog and Trojanowsk (2011)			

Table 3. 4: Choice between channels of pay-out relative to dividend-paying

	Repurchases	**Both (DP and SR)**
Firm size	(-) pay dividends	-
Profitability	(-) pay dividends	-
Tobin’s Q proxy	(+) repurchases	(-) pay dividends
Leverage	-	-
Voting power of tax-exempt fin. Inst.	-	-
Voting power of other fin. inst.	-	-
Voting power of executive directors	-	-
Voting power of non-exec. directors	-	-
Voting power of outside individuals	-	-
Voting power of industrial and commercial companies	(-) non-paying	-
The choices are made relative to the reference category: paying dividends. Source: Renneboog and Trojanowsk (2011)		

Jagannathan, Stephens and Weisbach (2000) used a multinomial logistic regression in investigating the financial flexibility and the choice between the dividends and share repurchases. They found that share repurchases, and dividends were used at different times, by different kinds of companies. Share repurchases were very pro-cyclical, while dividends steadied over time. Dividends were paid by companies with higher permanent operating cash flows, while repurchases were used by companies with higher temporary, non-operating cash-flows. Repurchasing companies also had more volatile cash flows and distributions. Finally, companies repurchased shares following poor market stock performance and increased dividends following performance. These results are consistent with the narrative that the financial flexibility inherent in repurchase programmes is one reason why they are sometimes used instead of dividends. It is worth noting that using company-specific variables such as company size, operating income, institutional ownership and prior pay-outs as predictors of choice, Jagannathan, Stephens and Weisbach (2000) looked at the following decisions: increase in pay-outs, repurchase announcements, repurchase announcements and dividends increases, and dividend increases. The capital structure was not considered in this research.

De Jong, Van Dijk, and Veld (2003) used single and multinomial logistic regression in investigating the dividend and share repurchases of Canadian companies listed on the Toronto Stock Exchange. Their findings are firstly consistent with the structure in which the company first decides whether it wants to pay out cash to its shareholders or not, and secondly, the company decides on the form of pay-out: dividend payments, share repurchases, or both. Pay-out is determined by free cash flow. The choice of dividend and share repurchases depends on the behavioural and tax preferences. Furthermore, the pay-out is less likely to be dividend if the company has executive stock option plans. Finally, in line with the model by Brennan and Thakor (1990), the empirical evidence of De Jong *et al*. (2003) validates the existence of asymmetric information among outsiders based on the narrative that it is associated with the preference for the dividend payments over share repurchases. It is worth pointing out that the capital structure was not used as one of the predictors and they did not find evidence of the free cash flow and overinvestment as determinants of the dividend payments relative to share repurchases.

Hauser and Thornton (2017) used a logistic regression to define a comprehensive life cycle model of the likelihood of the dividend payment. They found that companies that were profitable, larger in size, and had higher retained earnings were more likely to pay dividends. Further, the results also revealed that companies that had growth opportunities were less likely to pay dividend. Finally, the results showed that companies that were equity financed were more likely to pay dividend. Hauser and Thornton (2017) did not use share repurchases.

This research extends the list of company-specific factors in choice between the decision to pay dividend, to repurchase shares, to engage in both and engage in neither the dividend payments nor the share repurchases.

3.4 SUMMARY

The chapter offered a comprehensive review of the main empirical literature on the interrelationship between capital structure and distribution strategies. The main theories surveyed to explain the statistical relationship in this chapter are the following: agency cost, trade-off, pecking-order, levered shares, equity market timing, the flow-of-funds approach and the information approach. These company decisions have captured the interest of researchers over the last decades, but they remain theoretically ambiguous and empirically inconclusive. However, a number of conclusions can be drawn from the literature.

First, the literature review shows that, although much effort has been put into investigating the interdependence between the two policies in the literature, the capital structure, the dividend payment and share repurchase decisions have typically been studied as separate factors and hence there has been little analysis of the simultaneity among them. However, previous studies provided reasons and evidence that the companies' capital structure optimisation and distribution strategies were likely to be interdependent upon one another and jointly determined by management. One implication is that the capital structure and distribution strategies are potentially interrelated in several ways. Therefore, they should be better analysed within a simultaneous decision-making framework. The few studies on the interrelationship between the two policies provide guidance in modelling company behaviour to avoid the danger of drawing spurious conclusions. However, none of the early studies is sufficiently comprehensive in the sense that they do not provide enough insight into the theoretic mechanism through which the set of company decisions may be bonded together and determined simultaneously. Furthermore, most of the significant empirical studies that investigated the joint determination were based on data from the US, and the body of evidence on the other markets outside the US is still rather small. Al-Najjar (2011) points out that the interdependence of the two policies is an under researched topic.

Second, the literature also shows that share repurchases are associated with low-leveraged companies, indicating capital structure adjustments towards target. However, the competing theories provide equally good reasons for both a positive (for example, the case of leveraged shares) and a negative relationship between capital structure and share repurchases, leaving the sign of the nature of capital structure distribution strategies unclear from a theoretical point of view.

Third, most studies on the interdependence between the capital structure and the distribution policy used a single nature of capital structure, one distribution policy (the dividend payment) and one sector or a combination of sectors. The exclusion of share repurchases may lead to an ambiguous interpretation of the results given the potential interactions that exist between the dividend payments and share repurchases.

Fourth, even though the agency cost theory proposes that dividends mitigate agency problems, its weakness is that it does not show managers' strong incentives to pay dividends. Furthermore, dividend payments, share repurchases, and debt can be used in the same way to mitigate agency problems. Another drawback mentioned by Allen and Michaely (2003) is that the theory provides a reasonable explanation for dividend increase but is much less clear on dividend cuts. In addition, it should be noted that the monitoring rationale for debt and dividends is only a partial explanation of corporate financing and pay-out policies, and not all companies base their financial decisions on agency cost considerations (Noronha *et al*., 1996). In particular, the effect of agency cost consideration on corporate behaviour may not be as important for rapidly growing companies with large and profitable investment projects but insufficient free cash flow.

Fifth, an emerging body of literature on the choice between the dividend payments and share repurchases reveals that prior research ignored the nature of capital structure, some company specific variables and financial distress as determinants of choice. Prior research focused on the level of debt without clearly establishing what happened to the choice when companies were highly leveraged, lowly leveraged and at target.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter focuses on the research methodology used in the study and how it relates to the research objectives in Section 1.2.1. *Research methodology* is defined as the general approach a study takes in carrying out the research project (Leedy & Ormrod, 2001:14).

The main aim of the study was to explore and understand how distribution strategies affected a company's optimal capital structure and how an optimal capital structure affected the distribution strategies for the period before 1999 and the period after 1999. As already mentioned in previous chapters, the literature review indicated that there was no consensus in research findings on the interrelationship between financing decisions and distribution strategies and that it was an underreseached topic. Furthermore, the literature riview highlighted that such contrast in research findings could be due to the nuances associated with the proxies of capital structure and distribtion strategies, different periods, estimation methods, industry-specific factors, the financial soundness of companies and the type of distribution strategy. To this end, this chapter describes the methology that was used in undertaking the research and justifies the application of panel data techniques on JSE-listed companies using a single-equation GMM approach and 2SLS and 3SLS estimations for the simulataneity between the target capital structure, the dividend payments and share repurchases. The empirical models employed to test the interrelationship between the two policies within a simulataneous framework are presented as system equations in section 5.3 of chapter 5.

The chapter is structured as follows: Section 4.2 outlines the objectives of the research. Data collection is presented in Section 4.3. The details of the sources of data in the study are discussed in Section 4.4 and Section 4.5 reveals the criteria for data selection. Section 5.6 provides the data framework sample and Section 4.7 elaborates on the measurement and analyses of the variables. Section 4.8 discusses the panel data analysis and Section 4.9 presents the model specification (one-way error component model) and the different tests for the acceptance or rejection of the model. Section 4.10 discusses the model specification (two-way error component model). Section 4.11 discusses the current research hypotheses and empirical models and Section 4.12 deals with controlling for sample bias. Finally, the chapter is concluded in Section 4.14.

4.2 RESEARCH OBJECTIVES

The aim of the research was to investigate simultaneously the interdependence between the capital structure and the distribution strategies (dividend payments and share repurchases). The research area interfaced financing decisions and pay-out policies together with their joint determinants. As already mentioned in Section 1.2.1, to achieve the research aim, the objectives of this study were as follows:

- to determine the interrelationship between financing decisions and distribution policies of JSE-listed companies within a strategic simultaneous decision-making framework over the periods 1990 to 2017 and 1999 to 2017;
- to determine the effect of a threshold capital structure on the payments of dividends and share repurchases over the periods 1990 to 2017 and 1999 to 2017;
- to determine the effect of the different alternative measures of the capital structure, the nature of the of capital structure and company-specific variables as predictors of choice between distribution strategies; and
- to determine how the sectoral effect affects the treatment of the financing and the distribution policies across sectors over the period 1990 to 2017.

4.3 SECONDARY DATA COLLECTION

This section summarises the process of data collection. According to Creswell and Creswell (2018), quantitative research collects data on predetermined instruments that yield statistical data. Furthermore, Denzin and Lincoln (1994:4) posit that quantitative research emphasises the measurement and analysis of causal relationships between variables. Ghauri and Gronhaug (2005:19) assert that because of the adequacy of secondary data, there is no need to collect primary data if the secondary data are available to answer the research questions. Therefore, this research used secondary data to measure the interplay between financing decisions and distribution policies.

The sample companies used to examine interdependence between the optimisation of the capital structure and distribution strategies were drawn from companies listed on the JSE Ltd, South Africa.

For the purpose of this study, data were collected for the periods 1990 to 1999 and 1999 to 2017. These periods were chosen to test the interrelationship between target capital structure and distribution strategies because it reflected the change in distribution strategy practices after the introduction of share repurchases in 1999. In addition, this period also mirrored the 2008 financial crisis, which provided the researcher with an opportunity to investigate how JSE-listed companies made decisions between financing issues and distribution policies during this period because it had a major impact on the financial markets, greatly reducing share issuance by companies and lending by financial institutions.

4.4 DATA AND SOURCES

Two main types of data together with their joint determinants were employed when examining the interrelationship between capital structure and distribution strategies of South African-listed companies. The first category consisted of capital structure variables and the second category consisted of distribution strategies variables. These were all collected from the Iress database. The Iress database is South Africa's leading provider of financial data feeds as well as organisational information including annual reports and financial statements (Bussin & Modau, 2015:7).

4.5 CRITERIA FOR SELECTING THE FINAL SAMPLE

The population of this study consisted of all firms listed on the four main sectors on the JSE Securities Exchange for the periods 1990 to 1999 and 1999 to 2017. Data for the study was obtained from the Iress database. The database contained information required for the purposes of the study.

For inclusion in the sample, the firms had to meet the following criteria:

1) The firm had to be listed on the JSE Securities Exchange between 1990 to 1999 and 1999 to 2017.
2) Firms had to be listed either on the main board or Alt-X board or other boards of the JSE Securities Exchange. Main board firms tended to be the large and older firms. Alt-X firms and firms from other boards were usually smaller and younger. Sample firms were therefore representative of the distribution of companies in the South African market.

The sectoral classification of companies analysed in the study was according to the JSE Securities Exchange. Although the sectoral classifications could be broad and could combine companies whose activities might be different, even if they were in the same industry, the grouping assisted in identifying how the four sectors treated these two policies within a simultaneous framework. Hence, apart from the full sample, the industrial classification was used in the study in line with previous studies.

Companies in the sample belonged to the four sectors, namely basic materials (BCM), consumer goods (CNG), consumer services (CNS), and industrials (IND). Abbreviations in brackets were used as industry codes (ID) for the purposes of this study. Each industry was represented by a dummy variable and only significant industry variables were included in the models. Table 4.1 contains the four industrial compositions of the South African-listed companies between the period 1990 and 2017. The third column shows the number of companies listed for each industry and the fourth column shows the proportion of listed companies per industry. Panel B shows the breakdown of the sample of 68 companies listed on the JSE for 1990 to 2017.

Table 4. 1: Summary of the sample selection procedure

Panel A		
Sectoral classification code	Number of listed firms by industry as at 31 December 2017	Percentage of firms in industry (%)
Basic materials BCM	64	33
Consumer goods CNG	23	12
Consumer services CNS	48	24
Industrial IND	61	31
Total companies to be sampled	196	100
Total selected sample	68	34
Panel B		
Industrial composition of sampled companies with full data	Number in each industry	Percentage of sample (%)
Basic materials	23	33
Consumer goods	09	13
Consumer services	16	23
Industrial	21	31
Final selected sample	68	100
Source: The JSE Market data 2017		

Data over several years for a single company was studied. The data was collected per year; hence each annual data observation was a data point. Data on capital structure, dividend payments and share repurchase were collected at the end of each year. The joint determinant variables were also collected for the same period and the data would be spread over the year, because companies have year-ends on different months. Hence the version of data collected from Iress for these three sets of variables was "Annual Published".

4.5.1 Share repurchases data

As stated in Chapter 1 under the limitation section of this research, data on share repurchases in countries like the United States of America, the United Kingdom, Canada and Australia are readily available owing to their share repurchase announcement requirements. However, in South Africa, none of the financial data providing agencies keeps a detailed record on share repurchases. As a result, for the purpose of this study, the approach used by Wesson *et al.* (2018) was followed, namely, to collect data on share repurchases. Two data collection methods were applied.

Firstly, the companies included in the sample were searched via SENS (as obtained from the Iress product called News) under each of the following keywords: *repurchase* or *buyback*. Secondly, an electronic annual report of each company included in the sample was retrieved for the period 1999 to 2017 via the Iress. Therefore, different sections of each annual report had to be scrutinised to identify share repurchase activities and to determine the number of shares and the rand value. The directors' report, the statement of financial position, the cash flow statement, the statement of changes equity and the ordinary share capital note to the statement of financial position were for the most part used.

4.6 DATA FRAMEWORK

The study used a panel data framework, which followed prior research (Al-Najjar, 2011; Aggarwal & Kyaw, 2010; Crutchley *et al*., 1999; Ding & Murinde, 2010; Ghasemi *et al*., 2018; Jensen *et al.,*1992; Kim *et al.,* 2007).

4.6.1 Panel data

Panel data refers to pooling of observations on a cross-section of subjects over several time periods; that is, each subject is observed over repeated periods of time (Balaji, 2013; Hsiao , 2005; Verbeek, 2012). This represents a special case of clustered samples. The panel data is constructed by observing a large number of subjects (N) over a time period (T), which is usually a minimum of two years. These panels can either be balanced or unbalanced. An unbalanced panel has missing observations. Because distribution strategies and capital structure were variables which had to be studied over time and across different companies in retaining their heterogeneity for the purposes of this study, panel data analysis was an appropriate approach. The structure of data used in this research met the definition of unbalanced panel data because some variables missed data for some periods.

4.7 VARIABLES OF THE STUDY

4.7.1 Capital structure and distribution strategies

In studying the effect of capital structure on distribution strategies and the effect of distribution strategies on capital structure, the dependent, independent, industry and joint determinants were examined. Capital structure was represented by leverage as the independent variable when examining the extent to which it affected distribution policies and was measured using book value and market value. Long-term, short-term and total debt were the specific variations of leverage employed in the study. In addition, the leverage factor and the degree of operating leverage were also used. Distribution strategies were represented by share repurchases and the dividend payments. Following the simultaneity hypothesis highlighted by previous researchers when examining the interdependence between the two policies, joint determinants were also included in this study. The definition variables are provided in Table 4.2, Table 4.3 and Table 4.4.

Table 4.2: Distribution strategies defined

Alternative measures of distribution strategies		
CODE	**Variable description**	**Formula**
$DPR_{i,t}$	Dividend payment ratio	Dividend paid/Net income after interest and tax
$CD_{i,t}$	Cash dividends	Reported total dividends paid on shares scaled by total assets
$SRP_{i,t}$	Share repurchases	Number of shares repurchase times the repurchase price
$\Delta CD_{i,t}$	Change in cash dividend	$(CD_{i,t}-CD_{i,(t-1)})$
∆DPR	Change in the dividend pay-out ratio	$(DPRit-DPR_{it-1})$
$\Delta SR_{i,t}$	Change in share repurchases	$(SR_{it}-SR_{i(t-1)})$
$DS_{i,t}$	Sum of cash dividend and share repurchases	$(CD_{it}+SR_{it})$

Table 4.3: Capital structure defined

Alternative measures of the capital structure					
Book values			**Market values**		
CODE	**Description**	**Formula**	**Code**	**Description**	**Formula**
LLB	Long-term debt ratio based on book value	Long-term debt/Total assets	**LLM**	Long-term debt ratio based on market value	Long-term debt/ (Total debt + market value of equity)
LTB	Total debt ratio based on book value	Total debt/Total assets	**LTM**	Total debt ratio based on market value	Total debt/ (Total debt + market value of equity)
DE	Debt-to-equity ratio	(Total long-term loan capital+total current liabilities)/Total owners' interest			
DA	Debt-to-asset ratio	(Total long-term loan capital+total current liabilities)/total assets			
LF	Leverage factor	(Profit after taxation/Total owners' interest)/((Profit before interest and tax (EBIT) -Total profits extraordinary nature – Taxation /Total assets)			
∆DE	Change in debt-to-equity ratio	DE_{it}-DE_{it-1}			

Using the book value approach, the denominator incorporated the value of equity at cost. The denominator under the book value approach did not change across the three types of debts, namely long-term, short-term and total debt. *Total assets* were defined as excluding intangible assets. Leverage based on market values was calculated by changing the denominator to be the sum of debt (long-term, short-term or total) at book value and market value of equity. *Market value of equity* was defined as the product of the number of shares in issue at the company's year-end and the value-weighted share price at the year-end (VWEP). The value-weighted share price at the end of the year was calculated by dividing the total value of shares traded during the month of the year-end by the total number of shares traded in the same month. The reason for using a weighted price was to avoid high spikes or low dips in prices being used as a representation of the share prices at the company's year-end. However, if the share price during the last month of the year was not representative of the share price during the year, then the problem of being unrepresentative remained. Because the share price could be considered a snapshot at any time, the weighted average method was considered realistic. The leverage factor was the extent to which money borrowed by a business was used and essentially reflected the return on equity divided by return on assets. The definition for the joint determinants' variables is provided in Table 4.4.

Table 4.4: Joint determinant variables for distribution strategies and capital structure

Joint determinant variables		
CODE	Variable description	Formula
GW	Growth sales or growth in Total assets	$(Sales_{it} – Sales_{it-1})/ Sales_{it-1}$ or $(Total\ assets_{it} - Total\ assets_{it-1})/ Total\ assets_{it-1}$
LIQ	Liquidity Current ratio Quick ratio	Total current assets/Total current liabilities or (Total current assets – Total stock)/Total current liabilities
INVEST	Investments	Actual fixed assets acquired/Total assets
NDT	Non-debt tax shields	Depreciation/Total assets Earnings before interest, tax, depreciation and amortisation or operating income Earnings before interest, tax, depreciation and amortisation/Depreciation
PRF	Performance/ Profitability/Return on assets Return on equity	((Profit before interest and tax (EBIT) – Total profit of extraordinary nature)/Total assets * 100 or (Profit after taxation/Total owners' interest) * 100
DOL	Business risk (degree of operating leverage)	$\frac{AVG\{(EBIT_{t} - EBIT_{t-1})/EBIT_{t-1}\}}{AVG\{(SALES_{t} - SALES_{t-1})/SALES_{t-1}\}}$
SZE	Firm size	Logarithm of sales and total assets
TAN	Asset tangibility	Net fixed assets/Total assets
VO	Market volatility (annualised)	The product of the daily standard deviation of the stock price by the square root of the number of trading days during the historical year for which the volatility measure is quantified (expressed as percentage)
CE	Capital expenditure	(Change in fixed asset plus depreciation)/Total assets or (fixed asset acquired)/Total assets
WCA	Working capital	(Current assets-Current liabilities)/Total assets
∆WCA	Change in working capital	WCAit-WCAit-1
CF	Cash flow	Sum of net income plus depreciation expenses/Total assets or Cash flow from operating activities/Total assets

4.8 ANALYSIS OF DATA

The study of the interrelationship between distribution strategies (the dividend payments and share repurchase) and capital structure used EViews Version 11 (X64) and IBM SPSS to analyse the data. This analysis was meant to indicate any links between the variables in question. Additionally, tests were conducted for multicollinearity (such as the variance inflation factor or its equivalent), the coefficient of correlation and Granger causality.

Multiple regression analysis was conducted for further analysis of the extent of the relationships between the variables. Pooled, fixed and random effects (GMM) and logistic models were considered to analyse the relationships between distribution strategies and capital structure. The main advantage of using panel data in experimental research is that they offer the researcher an increased sample size, and that they enable the researcher to control for unobserved heterogeneity among the subjects. Panel data give the researcher a large number of data points, which increases the degree of freedom and reduces collinearity (Hsiao, 2005). Panel data also allow the researcher to distinguish in-group correlation from between-group correlation. Panel data allow subjects to retain their heterogeneity, which can be studied separately, as some estimators accommodate these individual effects. In addition, because panel data combine both cross-sectional and time series effects, they improve the estimation efficiency of the two types of data, and this broadens the scope of inference. Furthermore, panels are more informative than cross-sections, because they reflect dynamics and Granger causality across variables.

However, panel data have some limitations, and the main disadvantages of using panel data are heterogeneity and sample selectivity biases. Panel data also suffer from autocorrelation, multicollinearity and attribution. These limitations can be resolved by the choice of the estimators used. The estimators are mainly differentiated by the way they approach solutions to the problems of heteroskedasticity, autocorrelation and multicollinearity. The estimators fall in the following three categorifies:

- static panel estimators;
- dynamic panel estimators, and
- tobit-type estimators.

Static estimators include pooled ordinary least squares (OLS) regression, fixed-effects and random effects estimators. In these models, the dependent variable does exhibit temporal autocorrelation, and least squares linear regression models were used. Both fixed-effects and random effects estimators can be applied as one-way or two-way error component regression models. Dynamic panel estimators use the lagged dependent variable as additional explanatory variable; this makes them efficient estimators in dynamic panels. The tobit estimators specify the lower limit, the upper limit, or both limits for the dependent variable. This implies that tobit estimators can either be single censored or double censored, depending on the nature of the dependent variable. Furthermore, tobit models can either be static, with fixed effects, or they can be dynamic.

The pooled OLS estimator takes the form (Baltagi, 2008):

$$y_{i,t} = \alpha_i + X'_{i,t}\beta + u_{i,t} \quad (4.1)$$

Where

$y_{i,t}$= the dependent variable where i is the entity and t the time

α_i = (i=…1) the x common y-intercept

$X_{i,t}$ =Vector of explanatory variables in time of company i in period t

β = the regression coefficient of the explanatory variables

$u_{i,t}$ = is the error term

The pooled OLS estimators assume that $X''_{i,t}$ is uncorrelated with both μ_i and $\upsilon_{i,t}$, the model allows for both the company fixed and the idiosyncratic errors, which vary between companies and over time. The pooled model is the most restrictive of all the specifications and does not acknowledge any cross-section heterogeneity within the selected listed companies on the JSE. In case, the model yields large standard errors (small t-statistics); it would be the indication of warning signal that the groups are not homogeneous. However, the OLS method ignores the individual and time effects that could lead to the risk of observing overestimate bias in the significance of coefficients (Bevan & Danbolt, 2004).

4.9 ONE-WAY ERROR COMPONENT MODEL

The one-way error component model is of the form (Baltagi, 2008):

$$y_{it} = \alpha + X'_{it}\beta + u_{it} \quad (4.2)$$

The one-way error component model allows cross-section heterogeneity in the error term:

$u_{it} = \mu_i + \upsilon_{it}$

The error becomes the sum of an (unobservable) individual specific effect (time invariant) and a "well-behaved" (remainder) disturbance. These individual specific effects are modelled using fixed or random effects models.

4.9.1 Fixed effects estimation: LSDV and Within, Q, estimation

For the least squares dummy variable (LSDV), the model is of the form:

$$y_{it} = \alpha + X_{it}^{'}\beta + u_{it}; \qquad (4.3)$$

where $u_{it} = \mu_i + \upsilon_{it}$

μ_i -fixed parameter to be estimated and X_{it} are independent from the error terms, υ_{it} $\forall\ i,t$. The LSDV model is appealing, but the researcher needs to consider the number of parameters to be estimated especially with a larger N $(K+1+(N-1)=K+N)$. The problem of too many estimators is solved by using the within estimation.

For the Within, Q, estimation of the model is of the form:

$$y_{it} - \bar{y}_{i\bullet} = \beta(X_{it} - \bar{X}_{i\bullet}) + (\upsilon_{it} - \bar{\upsilon}_{i\bullet}) \qquad (4.4)$$

The WITHIN estimation still assumes individual effects, although no longer directly estimates them. The data is demeaned, "wipe out the individual effects" to estimate only the β, and then calculate the individual effects. As a result, the individual effects are solved not estimated with the assumption: $\sum_{i=1}^{N}\mu_i = 0$ and solving $\bar{\alpha} = \bar{y}_{\bullet\bullet} - \tilde{\beta}\bar{X}_{\bullet\bullet}$;

$\tilde{\mu}_i = \bar{y}_{i\bullet} - \tilde{\alpha} - \tilde{\beta}\bar{X}_{i\bullet}$ for i=1, 2,…,N.

In other words, the first order conditions are used to derive individual effects. it is worth pointing out that the total individual effect is the sum of the common constant and the constructed individual components, $(\tilde{\alpha}+\tilde{\mu}_i)$.

4.9.2 Random effects with generalised least squares GLS

The problem of too many parameters with fixed effects, loss of degrees of freedom, "can be avoided" if μ_i is assumed random (drawn from a given distribution). The benefit of the approach is that it allows for a variation across the cross-sections, but do not estimate $N-1$of these variations. The approach introduces a more complicated variance structure and OLS is not appropriate.

The random effects estimator derived from a one-error components model is defined as:

$$(y_{it}-\theta\bar{y}_i)=\beta_0(1-\theta)+\beta_1(X_{it}-\theta\bar{X}_i)+\{(1-\theta)\upsilon_i+(u_{it}-\theta\bar{u}_i)\} \quad (4.5)$$

Where

$$\theta=1-\sqrt{\frac{\sigma_\nu^2}{T\sigma_\mu^2+\sigma_\nu^2}}$$

In the case where $\theta=1$, the random effect estimator is reduced to a fixed-effects estimator, and when $\theta=0$, the estimator is reduced to pooled OLS estimator; the estimator is therefore efficient when $0<\theta<1$

According to Baltagi (2008), using the Wallace and Hussein (1969) estimator (which first estimates the pooled OLS and then uses the residual to estimate the variance components), the random effect model can be written as follows (after transformation of the original equation):

$$(y_{it}-\theta\bar{y})=(x_{it}-\theta\bar{x}_i)\beta+(\nu_{it}-\theta\bar{\nu}_i) \quad (4.6)$$

4.9.3 Testing for the random effects

The Breusch and Pagan (1980) LM test for the random effect in a linear model is based on the pooled ordinary least squares (OLS) residuals, while the alternative model involves a generalised least square estimation (GLS) based on a two-step procedure or maximum likelihood.

4.9.4 Testing for the joint validity of fixed effects and time effect

For the joint validity of fixed effects, the researcher first considers individual (cross-sectional) effects:

$H_0 : \sigma_\mu = 0$

$H_A : \sigma_\mu^2 \neq 0$

$$LM = \frac{NT}{2(T-1)}\left[\frac{\sum^{N}\left[\sum^{T} e_{it}\right]^2}{\sum^{N}\sum^{T} e_{it}^2} - 1\right]$$

$$= \frac{NT}{2(T-1)}\left[\frac{\sum^{N}[T\bar{e}_{i\bullet}]}{\sum^{N}\sum^{T} e_{it}^2}\right]^2 \sim \chi^2(1) \text{ Under } H_0$$

$H_0 : \mu_1 = \mu_2 = ... = \mu_{N-1}$, no individual effects; same intercept for all cross-sections

H_A :Not all equal to 0

Where

μ_i =unobservable individual effects

The null hypothesis of no individual effects is tested with applied Chow or F-test, combining the residual sum of squares for the regression both with constraints (under the null) and without (under the alternative): $RRSS-OLS$, on the pooled model (constant intercept) $URSS-LSDV$.

$$F=\frac{(RSS-URSS)/(N-1)}{URSS/(NT-N-K)}\sim F_{(N-1),(NT-N-K)}$$

Where

URSS: the unrestricted residual sums of squares

RSS: residual sum of squares

If N is large enough, the WITHIN estimation can be used instead of LSDV for the residual sum of squares. The researcher rejects H_0 if $F>F_{crit}$ and concludes that fixed effects are valid (significant) and therefore JSE-listed companies are heterogeneous and should not be pooled.

For the joint validity of time effects, the following is considered:

$H_0:\lambda_1=\lambda_3=...=\lambda_{t-1}$ (No time effects; same intercept for all cross-sections)

H_A :: Not all equal to 0

Where

λ_t =unobservable time effects

The null hypothesis of no time (or period) effect is tested with an applied Chow or F-test, combining the residual sum of squares for the regression both with constraints (under the null) and without (under alternative):

$RRSS-OLS$ on pooled model (constant intercept)

$URSS-LSDV$

$$F=\frac{(RSS-URSS)/(T-1)}{URSS/(NT-T-K)}\sim F_{(T-1),(NT-T-K)}$$

4.9.5 Choice between fixed-effects and random effects estimations

The Hausman-Wu (1978) test for random effects is used to decide whether to use fixed or random effects estimators. The test takes the following form:

$H_0 : E(u_{it}/X_{it}0) = 0$

$H : E(u_{it}/X_{it}0) \neq 0$

where

H_0 := null hypothesis

H := alternative hypothesis

If the null hypothesis is rejected, then the fixed-effects estimators should be used instead of the random effects.

The static models did consider the nature of panel data, but they ignored the lagged dependent variable. The exclusion of the lagged dependent variables led to a correlation between the error term and the explanatory variables (the endogeneity problem); and this led to a bias in the estimators. The models did not consider the fractional nature of the dependent variable.

4.9.6 Dynamic panel data estimators

These models included a lagged dependent variable as one of the explanatory variables. The general dynamic panel model is stated as (Wooldridge, 2009):

$$y_{it} = \delta y_{i,t-1} + X_{it}^{'}\beta + u_{it} \qquad (4.7)$$

$i = 1,.., N$ And $t = 1,..., T$

$i = 1,..., N \; t = 1,..., T$

Assuming a one-way error component model, $u_{it} = \mu_i + \upsilon_{it}$

This model is characterised by autocorrelation, which results from the lagged dependent variable and heterogeneity among the subject. The lagged dependent variable $\left(y_{i,t-1}\right)$ correlates with the error term. Therefore, the OLS cannot be used to estimate the model, as it is biased and inconsistent (Baltagi, 2009). Furthermore, both the fixed-effects (within estimator) and the random effects GLS are also biased in dynamic panel data sets. The dynamic panel estimators make use of the difference and system generalised methods of moments (GMM) estimation technique. The GMM estimators are especially suitable for large panels that exhibit heteroskedasticity and autocorrelation. The leading estimators are as follows:

- the Arellano and Bond Estimator;
- the Arellano and Bovver Estimator, and
- the Blundell and Bond Estimator.

According to Baltagi (2009), the main advantages of a dynamic panel data (two-step GMM system estimator) can be derived from the five major aspects. First, the GMM system estimator allows solving econometric problems in panel data with few time periods (T) and many individual cross-sections (N). Second, the GMM models overcome the limitations of the other models and they do not have a strong assumption on distribution. The GMM estimator also corrects the problem that independent variables are not strictly exogenous. It exploits the restrictions of linear moment that follow from the assumption of no serial correlations in the errors. Third, due to the existence of autocorrelation in time series and endogeneity in econometric models, the GMM estimation deploys additional instruments by utilising orthogonality conditions that exist between the disturbances and the lagged values of the dependent variable to solve for heteroskedasticity and autocorrelation problems within individuals. Fourth, the GMM system estimator also overcomes the problem of weak instruments found in the GMM difference models. It further has the advantage of robustness to endogeneity and short-pane bias (Greene, 2008). Fifth, the GMM system's two steps take advantage of one-step residuals to construct asymptotically optimal weight matrix. The two step GMM is considered more efficient than the one-step estimator because it controls for the correlation of errors over time, heteroscedasticity across companies in a large sample data (Roodman, 2009).

The serial correlation and the residuals are also checked and show the results by first-order $(AR1)$ and second-order $(AR2)$ autocorrelation in the result. It should be autocorrelation of the first order but not the second order. Further, the results present the Sargan statistic as the test of the validity of the overidentifying restrictions.

4.10 TWO-WAY ERROR COMPONENT MODEL

According to Baltagi (2009), a two-way error components model is given by:

$$y_{it} = \alpha + X_{it}^{'}\beta + u_{it} \tag{4.8}$$

where

$$u_{it} = \mu_{it} + \lambda_t + \upsilon_{it}$$

$$i = 1, 2, 3..., N$$
$$t = 1, 2, 3,..., T$$

with

μ_i : Unobservable individual effects

λ_t : Unobservable time effects

υ_{it} : Unobservable disturbance

The error term, u_{it}, is now the sum of the above three components. For the fixed effects (least squares dummy variables), it is just an extension of the one-way model assumptions, where μ_i and λ_t are parameters to be estimated $(i = 1,..., N; t = 1,..., T)$ and $\upsilon_{it} \sim IDD\left(0, \sigma_{\upsilon}^{2}\right)$. Estimation with the LSDV requires the estimation of $\{(N-1)+(T-1)\}$ dummies. This can potentially introduce a rather severe loss of degrees of freedom. To avoid the possible degrees of freedom problem, the within/Q transformation, which is similar to the one-way model, is conducted. Now, however, the researcher demeans across both dimensions. Transforming Q wipes out μ_i and λ_t which are calculated and not estimated.

The within estimation model is of the form:

$\tilde{y} = Qy$ on $\tilde{X} = QX$

To obtain the Within estimator $\tilde{\beta} = (X'QX)^{-1} X'QY$. The typical elements of $\tilde{y}$ are:

$\tilde{y}_{it} = (y_{it} - \bar{y}_{i\bullet} - \bar{y}_{\bullet t} + \bar{y}_{\bullet\bullet})$ and $\bar{y}_{\bullet\bullet} = \frac{\sum_{i=1}^{N} \sum_{t=1}^{T} y_{it}}{NT}$. Performing a simple regression (one x regressor, OLS for example), the equation becomes:

$$(y_{it} - \bar{y}_{i\bullet} - \bar{y}_{\bullet t} + \bar{y}_{\bullet\bullet}) = (x_{it} - \bar{x}_{i\bullet} - \bar{x}_{\bullet t} + \bar{x}_{\bullet\bullet})\beta + (v_{it} - \bar{v}_{i\bullet} - \bar{v}_{\bullet t} + \bar{v}_{\bullet\bullet}) \quad (4.9)$$

To capture the individual effects the researcher, need to constraint:

$\sum_i \mu_i = 0$ and $\sum_t \lambda_t = 0$

OLS gives the estimates for β, which are used to recapture intercept, and individual effects by:

$$\bar{\alpha} = \bar{y}_{\bullet\bullet} - \tilde{\beta}\bar{X}_{\bullet\bullet}$$

$$\mu_i = (\bar{y}_{i\bullet} - \bar{y}_{\bullet\bullet}) - \tilde{\beta}(\bar{X}_{i\bullet} - \bar{X}_{\bullet\bullet})$$

$$\tilde{\lambda} = (\bar{y}_{\bullet t} - \bar{y}_{\bullet\bullet}) - \tilde{\beta}(\bar{X}_{\bullet t} - \bar{X}_{\bullet\bullet})$$

4.10.1 Testing for the joint validity of fixed effects (individual and time effect)

The researcher uses an F-test to test the null hypothesis of one common intercept across time and cross-sections versus the alternative of an intercept for each year and cross-section. The test takes the following form:

$H_0 : \mu_1 = \mu_2 = \ldots \mu_{N-1}$ and $\lambda_1 = \lambda_2 = \ldots = \lambda_{T-1} = 0$

H_A :not all equal to 0

$$F_1 = \frac{(RRSS - URSS)/(N+T-2)_{H_0}}{URSS/(N-1)(T-1)-K)} \sim F_{(N+T-2);(N-1))(T-1)-K)}$$

With the degree of freedom of the denominator:

$= NT - (N-1) - (T-1) - (K+1)$

$= (NT - N - T + 1) - K$

$= (N-1)(T-1) - K$

For the random effect using a two-way error component model, the correlation is introduced across two dimensions.

4.11 SPECIFICATION TESTS

In order to build a reliable model that can provide reliable and non-spurious results, certain tests are conducted:

4.11.1 Testing for the presence of outliers

A box plot is used to identify outliers in the study. Data points that are outside the inner fence are known as outliers. Outright rejection of outliers is not always a wise procedure as sometimes the outlier provides information that other data points cannot provide since the outlier arises from unusual combinations of circumstances which may be of vital interest to the study (Gujarati, 2004:541). The interdependence between the capital structure and distribution strategies is investigated in this study over two different periods and the two policies adjust over time. Therefore, it is vital that outliers are not removed but the data be winsorised and an estimator that is robust to the presence of outliers is employed. Consequently, the study uses a single-equation fixed-effects model, random effects model, generalised method of moments (GMM) and 3SLS full information simultaneous equation system. In addition, it is worth pointing out that the winsorisation improves the normality of the data.

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4.11.2 Panel data unit root test and cross-sectional dependence

Non-stationary (trended) time series data can potentially be a major problem for empirical econometrics (Brooks, 2019). It is well known that trends, either stochastic or deterministic, may cause spurious regressions, uninterrupted student t values and other statistics, as well as goodness-of-fit measures which are too high and, as a rule, trends make regressions rather difficult to evaluate. However, most financial econometrics time series are subject to some type of trend. There are various unit root tests to examine stationarity of series. Unit root tests such as the ADF test are weak and tend to accept the null hypothesis (Gujarati, 2004:821). Further, individual unit root tests have limited power. However, in a panel data setting, the Levin, Lin and Chu (LLC) model is recommended as it allows for both cross-section-specific and time-specific effects (Brooks, 2019). Furthermore, Baltagi (2009) suggests a remedy; namely to difference a series successively until a stationary state is achieved. A panel data unit root test can increase the number of observations and the time period; hence it can improve the power of the test. The null hypothesis is that unit root exists, indicating that the data is non-stationary.

4.11.3 Heteroskedasticity

Previous models assumed that disturbances were homoscedastic with the same variances across time and individuals. This may not be true, for example, when cross-sectional units are of varying size, and as a result, exhibit different variances. The implication is that estimating errors with the assumption homoscedasticity will yield consistent estimates, but they will not be efficient. The standard errors of the estimates will be biased. For the OLS pooled model, the test for heteroskedasticity is conducted as follows:

$H_0 : \sigma_i^2$ for all i (Homoscedastic error)

$H_A :$ not equal for all i

if LM exceeds $LM_{crt} = \chi^2(N-1)$, therefore, the null of homoscedasticity is rejected and it is concluded that heteroscedasticity in the residuals does exist and that the researcher should correct for it.

When heteroscedasticity comes from the individual effects μ_i or alternatively from the remainder disturbance term, ν_{it} Baltagi (2013) proposes different transformations in each case to correct for the problem. Further, for the purpose of this study, the researcher uses a white cross-section weight for the fixed-effects model.

4.11.4 Serial correlation

Serial correlation may be introduced by random effects by cross-section. The random effects cause off-diagonal elements to be non-zero. More common situations may be found where residuals are correlated across time (the standard time series problem). Ignoring serial correlation when it exists causes consistent but inefficient estimates, and biased standard errors. Testing for the serial correlation jointly with the individual effects takes the form (LM) for first-order serial correlation given fixed effects:

$H_0 : \rho = 0$ (given μ_i are fixed parameters)

$H_A : \rho > 0$

If the LM is greater than the critical value, the researcher rejects the null of no first-order serial correlation and random individual effects, in favour of the alternative that $\rho \neq 0$ $(\lambda \neq 0)$, inferring the joint existence of random effects and serial correlation. The Prais-Wintson transformation is used to transform correlated errors into serially uncorrelated classical errors.

4.11.5 Endogeneity

Endogeneity refers to a correlation between the error term and one or more of the independent variables. There is a potential endogeneity between the dependent variable and some of the explanatory variables, which can lead to biased estimates.

However, testing for endogeneity in panel models is a complicated matter. The study uses a three-stage least squares estimation to overcome the endogeneity problem observed between financing decisions and distribution policies.

4.11.6 Multicollinearity

The issue of multicollinearity appears if two or more variables are highly correlated, which may affect the estimation of the regression parameters. Multicollinearity causes loss of precision. For example, the adjusted R-squared will be high but the individual coefficients have high standard errors and inference is not reliable (Brooks, 2019). To check for multicollinearity, the researcher uses the coefficient variance decomposition criteria as suggested Belsley, Kuh and Welsch (2005). Multicollinearity can also be examined by using the covariance matrix.

4.11.7 Granger causality test

Although the regression analysis deals with the dependence of one variable on the other variable, it does not imply causation. The basic idea of the panel regression Granger causality test is that if past values of the distribution policy are significant predictors of the current value of the capital structure even when past values of the capital structure have been included in the model, then the distribution policy exerts a causal influence on the capital structure. Further, Gujarati (2004) believes that everything causes everything. The researcher uses the following specifications in line with Granger (1969:427):

$$\Delta CS_{it} = \lambda_0 + \sum_{i}^{m} \lambda_{1i} \Delta CS_{t-i} + \sum_{i}^{n} \lambda_{2i} \Delta DP_{it-i} + \mu_{it} \quad (4.10)$$

$$\Delta DP_{it} = \varphi_0 + \sum_{i}^{m} \varphi_{1i} \Delta DP_{it-i} + \sum_{i}^{n} \varphi_{2i} \Delta CS_{it-i} + \varepsilon_{it} \quad (4.11)$$

where

CS represents the different alternative measures of the capital structure and the

DP is the distribution policy. The dividend pay-out ratio; m and n represent the number of lagged variables; and u_{it} and ε_{it} represent the white noise error processes.

The null hypothesis of DP does not Granger-cause CS is rejected if λ_{2i} is jointly significant in equation 4.10. Similarly, in equation 4.11, the null hypothesis of CS does not Granger-cause, and DP is rejected if φ_{21} is jointly significant.

4.12 PANEL THRESHOLD REGRESSION

According to the trade-off theory of capital structure, when the debt ratio increases, the interest tax shield increases; however, leverage-related costs increase to offset the positive effects of the debt ratio on the company value and subsequently on the distribution strategies because they decrease the value of shareholders. Therefore, assuming that there is an optimal debt-to-equity ratio, the research examines whether there is a threshold effect between the capital structure and distribution strategies of JSE-listed companies. To capture the threshold effects (optimal debt), the research uses the following single set-up threshold model in line with Hansen (1999, 2000) and Chan (1993):

$$ds_{i,t} = \begin{Bmatrix} \mu_i + \varphi' h_{i,t} + \omega_1 de_{i,t} + \varepsilon_{i,t} & \text{if } de_{i,t} \leq \gamma \\ \mu_i + \varphi' h_{i,t} + \omega_2 de_{i,t} + \varepsilon_{i,t} & \text{if } de_{i,t} > \gamma \end{Bmatrix} \quad (4.12)$$

$$\varphi = (\varphi_1, \varphi_2, \varphi_3, \varphi_4, \varphi_5)^t$$

$$h_{i,t} = (size_{i,t}, ra_{i,t}, cf_{i,t}, vol_{i,t})$$

where

$ds_{i,t}$ = the distribution strategies (cash dividend paid, or share repurchases) of a company i in period t

$de_{i,t}$ = the debt equity ratio and is also a threshold value

γ = the specific estimated threshold value

$h_{i,t}$ = the five control variables namely size, profitability (ra), free cash flow (cf), and market volatility (vol) of a company i in period t

$\mu_{i,t}$ = the fixed effects, which represent the heterogeneity of companies under different operating conditions

$\varepsilon_{i,t}$ =the errors terms, assuming that they are independent and identically distributed (i.i.d), with mean zero. The finite variance is $\sigma^2 (\varepsilon_{i,t} \sim \text{i.i.d.}\ (0, \sigma^2))$.

For the sake of simplicity equation (4.12) can be written as:

$$ds_{i,t} = \mu_{i,t} + \varphi' h_{i,t} + \omega_1 de_{i,t} I(de_{i,t} \le \gamma) + \omega_2 de_{i,t} I(de_{i,t} > \gamma) + \varepsilon_{i,t}$$

(4.13)

where $I(\bullet)$ represents an indicator function and $ds_{it} = \mu_{i,t} + \varphi' h_{i,t} + \omega' de_{i,t}(\gamma) + \varepsilon_{i,t}$ can be written as:

$$ds_{i,t} = \mu_i + [\varphi', \omega'] \begin{bmatrix} h_{i,t} \\ de_{it}(\gamma) \end{bmatrix} + \varepsilon_{i,t}$$

$$ds_{i,t} = \mu_i + \beta' x_{i,t}(\gamma) + \varepsilon_{i,t} \qquad (4.14)$$

$$de_{i,t}(\gamma) = \begin{bmatrix} de_{i,t} I(d_{i,t} \le \gamma) \\ de_{i,t} I(de_{i,t} > \gamma \end{bmatrix}$$

where, $\omega = (\omega_1, \omega_2)'$, $\beta = (\varphi', \omega')$ and $x_{i,t} = (h'_{i,t}, d'_{i,t}(\gamma))'$

It is worth pointing out that the observations are divided into two regimes depending on whether the threshold variable de_{it} is smaller or larger than the threshold value (γ). The regimes are distinguished based on the different regression slopes ω_1 and ω_2. The known $ds_{i,t}$ and $de_{i,t}$ are used to estimate the parameters $(\gamma, \omega, \varphi \text{ and } \sigma^2)$.

In the estimation process, the averages of (4.14) are taken over the time index t to derive:

$$\bar{ds}_{i,t} = \mu_i + \beta' \bar{de}_{i,t}(\gamma) + \bar{\varepsilon}_{i,t} \tag{4.15}$$

where $\bar{ds}_i = (1/T)\sum_{T=1}^{T} ds_{i,t}$, $\bar{\varepsilon}_i = (1/T)\sum_{t=1}^{T} \varepsilon_{i,t}$, and

$$\bar{de}_i(\gamma) = \frac{1}{T}\sum_{t=1}^{T} de_{i,t}(\gamma) = \begin{bmatrix} \frac{1}{T}\sum_{t=1}^{T} de_{i,t} I(de_{i,t} \le \gamma \\ \frac{1}{T}\sum_{t=1}^{T} de_{i,t} I(de_{i,t} > \gamma \end{bmatrix}$$

When the difference between (4.14) and (4.15) is taken, it yields:

$$ds^*_{i,t} = \omega' de^*_{i,t}(\gamma) + \varepsilon^*_{i,t} \tag{4.16}$$

where,
$ds^*_{i,t} = ds_{i,t} - \bar{ds}_i$, $de^*_{i,t}(\gamma) = de_{i,t}(\gamma) - \bar{de}_{i,t}(\gamma)$, and $\varepsilon^*_{i,t} = \varepsilon_{i,t} - \bar{\varepsilon}_i$

Considering that:

$$ds^*_i = \begin{bmatrix} ds^*_{i2} \\ . \\ . \\ . \\ ds^*_{it} \end{bmatrix}; \qquad de^*_i(\gamma) = \begin{bmatrix} de^*_{i,2}(\gamma)' \\ . \\ . \\ . \\ de^*_{it}(\gamma)' \end{bmatrix}; \text{ and } \qquad \varepsilon^*_i = \begin{bmatrix} \varepsilon^*_{i2} \\ . \\ . \\ . \\ \varepsilon^*_{it} \end{bmatrix}$$

The researcher denotes the stacked data and errors for an individual, with one time period deleted. Then the researcher lets $ds^*, de(\gamma)$ and e^* denote the data stacked over all individuals. Thus:

$$ds^* = \begin{bmatrix} ds_1^* \\ . \\ . \\ . \\ ds_i^* \\ . \\ . \\ . \\ ds_n^* \end{bmatrix}; \qquad de^*(\gamma) = \begin{bmatrix} de_1^* \\ . \\ . \\ . \\ de_i^* \\ . \\ . \\ . \\ de_n^* \end{bmatrix}; \qquad \text{and } e^* = \begin{bmatrix} e_1^* \\ . \\ . \\ . \\ e_i^* \\ . \\ . \\ . \\ e_n^* \end{bmatrix}$$

Using this notation, (4.15) is equivalent to:

$$ds_{i,t}^* = de_{i,t}^*(\gamma)\omega + e_{i,t}^* \tag{4.17}$$

Threshold equation (4.17) represents the major equation estimation model for the threshold effect. For any given γ, the slope coefficient ω can be estimated using the OLS as follows:

$$\hat{\sigma}(\gamma) = (DE^*(\gamma)'DE^*(\gamma)^{-1}DE^*(\gamma)'DS^* \tag{4.18}$$

The vector regression of the residual is

$$\hat{e}^*(\gamma) = DS^* - DE^*(\gamma)\hat{\omega}(\gamma) \tag{4.19}$$

and the SSEs are:

$$\begin{aligned} SSE_1(\gamma) &= \hat{e}^*(\gamma)'\hat{e}^*(\gamma) \\ &= DS(I - DE^*(\gamma)(DE^*(\gamma)'DE^*(\gamma))^{-1}D^*(\gamma)')DS^* \end{aligned} \tag{4.20}$$

Chan (1993) and Hansen (1999) recommend that the threshold γ , must be estimated using the least squares estimation. This is easily achieved by minimising the concentrated SSEs (ts09). Hence the least squares estimator of the threshold (γ) is

$$\hat{\gamma} = \arg\min SSE_1(\gamma) \tag{4.21}$$

Once $\hat{\gamma}$ is obtained, the slope coefficient estimate is $\hat{\omega} = \hat{\omega}(\hat{\gamma})$. The residual vector is $\hat{e}^* = \hat{e}^*(\hat{\gamma})$, and the estimator of residual variance is

$$\hat{\sigma}^2 = \hat{\sigma}^2(\hat{\gamma}) = \frac{1}{n(T-1)}\hat{e}^{*\prime}(\hat{\gamma})\hat{e}^*(\gamma) = \frac{1}{n(T-1)}SSE_1(\hat{\gamma}) \qquad (4.22)$$

where n indexes the number of the sample and T indexes the period of the sample.

4.12.1 Testing for a threshold

To test for the significance of the model, the null and the alternative hypotheses can be respectively represented as:

$$\begin{Bmatrix} H_0 : \omega_1 = \omega_2 \\ H_1 : \omega_1 \neq \omega_2 \end{Bmatrix}$$

When the null hypothesis (the coefficient $\omega_1 = \omega_2$) holds, this indicates that the threshold effect does not exist. On the other hand, when the alternative hypothesis (the coefficient $\omega_1 \neq \omega_2$) holds, the threshold effect between financing decisions and distribution strategies exists.

Under the null of no threshold, the model is:

$$ds_{i,t} = u_i + \varphi' h_{i,t} + \omega' de_{i,t}(\gamma) + \varepsilon_{i,t} \qquad (4.23)$$

After fixed-effect transformation is done, the researcher obtains:

$$ds^*_{i,t} = \omega_1' H^*_{i,t} + e^*_{i,t} \qquad (4.24)$$

The regression parameter is estimated using OLS, which yields estimated $\tilde{\omega}_1$, residual $\tilde{e}^*$ and the sum of the square errors $SSE_0 = \tilde{e}^*/\tilde{e}^*$.

Hansen (1999) suggests that the relevant $F-\text{test}$ approach and the sup-Wald statistic be used to test for the threshold effect and to test the null hypothesis respectively, as follows:

$$F = \text{Sup}F(\gamma)$$

$$F(\gamma) = \frac{SSE_0 - SSE_1(\hat{\gamma})/1}{SSE_1(\hat{\gamma})/n(T-1)} = \frac{SSE_0 - SSE_1(\hat{\gamma})}{\hat{\sigma}^2}$$

where

SSE=the sum of squared of errors

Under the null hypothesis, some coefficients (for example, the pre-specified threshold) (γ) do not exist; therefore, a nuisance parameter exists.

4.13 VALIDITY AND RELIABLITY

When the research has been done, the question arises of whether the empirical evidence is valid and reliable. According to Bryman and Bell (2014), *validity* refers to how well the measurements used in the research correspond to what the research intended to investigate. Validity is always divided into two categories, namely internal and external validity. Internal validity of research means to determine how much control was achieved in the research bearing in mind that the interdependence between financing decisions and distribution policies might not be affected by other confounding factors. In order to achieve high internal validity, the research excludes companies not intended to be researched (for example, financial companies, because they have different objectives from those of non-financial companies). In addition, a combination of different models and techniques derived from previous studies combined with diagnostic and robustness tests increases the chance of the research findings being valid. *External validity* refers to whether there is support for the generalisation of the research results.

According to Bryman and Bell (2014), the results of the research are reliable if the same results are repeatedly found. While conducting this research, reliable data sources were used, and the methodological approach was followed closely. This research is also described thoroughly so that replication is possible.

4.14 MODEL OF CHOICE BETWEEN DISTRIBUTION STRATEGIES

To determine the effects of the different alternative measures of the capital structure, the nature of the capital structure and company-specific variables as predictors of choice between distribution policies, a multinomial logistic regression is used in line with Jagannathan *et al.,* (2000). The logistic model for binary response can be extended for more than two outcomes that are not ordered, assuming that y, which is the distribution strategy, denotes a random variable taking on more than two values (for example, 1, 2, …, J). Further, since the probabilities must sum to unity, $\Pr(y = 1/x)$ is determined once all the probabilities for $j = 1,...,J$ are known. Therefore, the probability that y takes on the value j can be written as:

$$\Pr(y = j) = \frac{e^{\beta_j x_i}}{1 + \sum_{k=1}^{j-1} e^{\beta'_k x_i}} \text{, for j=1, 2…, J-1} \qquad (4.25)$$

$$\Pr(y = J) = \frac{1}{1 + \sum_{k=1}^{J-1} e^{\beta'_k x_i}} \qquad (4.26)$$

where there are J categories and J is the reference category (share repurchases for the purpose of the study). The marginal effects on the particular outcomes are:

$$\frac{\partial P_j}{\partial x_i} = P_j \left[\beta_j - \sum_{k=1}^{J} P_k \beta_k \right]$$

4.15 CURRENT RESEARCH: HYPOTHESES

In order to determine whether there is an inter-statistical relationship between the capital structure and the distribution policies directly and through joint determinants, a number of hypotheses are formulated in conjunction with previous research based on the literature review. Furthermore, on the basis of the objectives of this thesis, the selected variables and their measurement are largely adopted with prior empirical works of literature (for example, Crutchley *et al.,* 1999; Nizar Al-Malkawi, 2007; Frank and Goyal, 2009; Ding & Murinde, 2010; Baker *et al.,* 2019), which can provide a meaningful comparison of the research finding with existing empirical results in both developed and developing economies. For the interdependence between financing and distribution decisions, the research uses different alternative measures of the capital structure (the debt-to-equity ratio, the debt-to-asset ratio and the leverage factor) and two measures of distribution strategies (dividend payments and share repurchase). An attempt is made to find out if the interrelationship between the policies changes with different measures.

4.15.1 Endogenous variables

The hypotheses for the predicted correlation between the capital structure and the distribution policies are explained below. The correlations serve as a test for the validity of the strategic simultaneous decision-making framework of the two policies on the basis of the agency cost theory, signalling theory, the trade-off theory and the pecking-order theory.

4.15.1.1 Hypotheses for the interrelationship between capital structure and distribution strategies

The distribution of cash and the ability to issue debt serve as mechanisms for reducing cash flows under management control, and hence help mitigate agency problems (Easterbrook, 1984; Bhaduri, 2002; Lim, 2016; Sourav and Richard, 2017; Cooper & Lambertides, 2018). In addition, companies with a reputation of paying dividends face less asymmetric information when they enter the equity market. The dividend payment represents a signal of improved financial health, and hence of more debt-issuing capacity (Bhaduri, 2002; Miller & Rock, 1985). As a result, in the agency theory framework, a negative relationship is expected between the dividend payments and the capital structure, while in the signalling theory framework a positive relationship is expected between the dividend payments and the capital structure. On the other hand, the capital structure is a determinant of the dividend payments. There is a positive relationship between the leverage and the dividend payments, because the positive relation between leverage and the dividend payments infers a negative relationship between leverage and the retention rate, suggesting the preference of retentions to debt financing (Al-Najjar, 2011:215). Therefore, a positive relationship is expected between the capital structure and the dividend payments. Studies by Sim (2011), Chang and Rhee (1990) and Gill, Biger and Tibrewala (2010), for example, found that the capital structure positively correlated with the dividend payments. However, when companies borrow capital from debt finance, they commit themselves to the payment of fixed interest charges, which include interest and a principal amount, and failure to meet these obligations may result in the companies facing the risk of liquidation and bankruptcy, indicating a negative relationship between the capital structure and the dividend payments (Arko *et al*., 2014; Banerjee & De, 2015; Benavides *et al*., 2016; Crutchley *et al.,* 1999; Ding & Murinde, 2010; Kaźmierska-Jóźwiak, 2015; Moon, Lee & Dattilo, 2015; Nizar Al-Malkawi, 2007; Frank & Goyal; 2009; Noronha *et al*., 1995; Ben Amar *et al.,* 2018; Yusof & Ismail, 2016)

Moreover, Shyam-Sunder and Myers (1999:225) describe the pecking-order theory regarding repurchasing decisions as follows: “Managers who are less optimistic than investors naturally prefer to pay down debt rather than repurchasing shares at too high a price. The more optimistic managers, who are inclined to repurchase, force up stock prices if they try to do so. Faced with these higher stock prices, the group of optimistic managers shrinks, and the stock price impact of an attempted repurchase increases. If the information asymmetry is the only imperfection, the repurchase price is so high that all managers end up paying debt.” As result, they argue that under the pecking-order theory, companies would prefer repurchasing debt over repurchasing equity. The static trade-off theory argues that companies only repurchase debt when they are above their target. Companies that are underleveraged are expected to repurchase equity to increase their leverage (Dittmar, 2000; Lie, 2002; Mitchell & Dharmawan 2007; Jansson & Larsson-Olaison 2010; Andriosopoulos & Hoque, 2013; Reddy-Yarram, 2014, Bonaimé *et al*., 2014; Chen *et al*., 2018). On the other hand, Moon *et al*., (2015), Lee *et al*. (2010) found no evidence of the interplay between capital structure and share repurchases, while Harris (2015) found a significant positive relationship.

Given the conflicted prediction of the interrelationship between the capital structure and the distribution strategies, it is likely that, in the presence of agency costs, information asymmetry, the trade-off theory, the pecking-order theory and signalling framework, both internal and external funds will be constrained and as a result, the nature of capital structure affects the distribution strategies differently and the distribution strategies affect the capital structure differently within a simultaneous structure.

The first hypotheses for the study are as follows:

Hypothesis 1A: Different alternative measures of capital structure affect the perceived relationship between capital structure and distribution policies.

Hypothesis 2A: The nature of the capital structure affects the dividend payments and share repurchases differently.

Hypothesis 2.1A: A highly leveraged ratio has a negative effect on the dividend payments.

Hypothesis 2.2A: A lowly leveraged ratio has a positive effect on the dividend payments.

Hypothesis 2.3A: A highly leveraged ratio has a negative effect on share repurchases.

Hypothesis 2.4A: A lowly leveraged ratio has a positive effect on share repurchases.

Hypothesis 3A: The dividend payment has a positive effect on the capital structure.

Hypothesis 4A: Share repurchases have a positive effect on the capital structure.

The above hypotheses are summarised in Table 4.5 below.

Table 4. 5: Endogenous corporate decision variables and hypothesised interaction framework

Variables	Finance arguments	Expected sign
LEV→DPR	Increases in leverage reduce dividend payments	(-)
LEV→SR	Increases in leverage reduce share repurchases	(-)
DPR→LEV	Increases in dividend payments limit access to retained earnings and force the company to rely more on debt	(+)
SR→LEV	Increases in share repurchases increase leverage	(+)

4.15.2 Hypotheses for the joint determinants with distribution strategies

Following the simultaneity hypothesis, this section discusses the joint determinants in the interrelationship between capital structure and distribution strategies. The examination of the signs and significance of the coefficient of the joint determinants allow inferences about the nature of simultaneity across each of the two policies. For example, if profitability is found to be statistically significant within the policies, this will indicate that profitability exhibits a two-way (simultaneous) causality. On the other hand, if profitability is not statistically significant, then the two-way causality will not exist (Al-Najjar, 2011; Crutchley & Hansen, 1989; Noronha *et al*.,1996). Furthermore, the joint determinants are chosen to reflect the costs and the benefits of the three decisions. They are mainly chosen based on the signalling, agency cost, trade-off and pecking-order theory frameworks following prior research (Al-Najjar, 2011; Noronha *et al.,* 1996; Ding & Murinde, 2010; Crutchley, Jensen *et al.,*1999; Easterbrook,1984; Yusof and Ismail, 2016).

4.15.2.1 Profitability and distribution policies

The literature on the distribution policy suggests that companies' profitability is one of the most important determinants affecting distribution strategies (Al-Najjar, 2009; Grullon, Michaely, Benartzi & Thaler, 2005). Because dividends are usually distributed from annual profits, profitable companies tend to pay higher amounts of dividends. Therefore, a positive relationship is anticipated between the company's profitability and its distribution policy. For example, Bhattacharya (1979) and Miller and Rock (1985) interpret large dividend payments as a signal of future profitability because managers have better information about their companies' expected future profitability than outsiders and when managers are confident about the future prospects of their companies, they distribute larger cash dividends as good signals for the investors. In fact, several studies conducted from different emerging markets reported evidence that there was a strong positive relationship between profitability and dividend payments (Al-Najjar, 2009; Ahmed & Javid, 2009; Al Shabibi & Ramesh, 2011; Anil & Kapoor, 2008; Baker et *al.,* 2019; Hashemi & Zadeh, 2012; Imran, 2011; Juma'h & Pacheco, 2008; Kirkulak & Kurt, 2010; Kowalewski, Mehrani, Moradi & Esk, 2011; Nizar Al-Malkawi, 2007; Stetsyuk & Talavera, 2007; Yusof & Ismail, 2016). Similarly, this result is also supported by the residual dividend theory and the pecking order theory. The residual dividend theory suggests that more profitable companies have more internally generated funds, and only after all positive net present value investments have been undertaken, will they distribute larger dividends than less profitable companies (Saxena, 1999). However, some researchers found a negative but significant effect of profitability on the dividend payments arguing that companies using retained earnings as a capital source were less likely to pay dividends (Booth, Aivazian, Demirgüc-Kunt & Maksimovic, 2001; Gill *et al*., 2010; Kaźmierska -Jóźwiak, 2015; Kester, 1986; Rajan & Zingales, 1995; Titman & Wessels,1988). At the same time, some scholars found an insignificant effect of profitability on dividend payments (Anil & Kapoor, 2008; Sim, 2011). In this respect, it is hypothesised that more profitable South African companies listed on the JSE pay higher dividends in order to signal their good financial performance.

Hypothesis 5A: There is a positive relationship between profitability of the company and the dividend payments.

4.15.2.2 Business risk and distribution policies

The higher the risk is, the more likely it is that the company will be bankrupt and hence the less chance of the company paying dividends (Al-Najjar, 2009:193). Indeed, the transaction costs are directly related to the company's risk. If a company has higher operating and financial leverage, other things being equal, the company's dependence on external financing is increased due to the greater volatility in its earnings (Rozeff, 1982). Both these operating and financial leverages can be translated into a high total risk of the company's stock returns. High fixed operating costs or business risks tend to affect the company' s dividend pay-out (Farinha, 2003). Furthermore, some researchers reported a negative correlation between business risk and dividend payment, which supports the narrative that companies that have higher uncertainty about their earnings tend to none or lower dividend pay-outs (Al-Najjar, 2009; Al-Shubiri, 2011; Farinha, 2003; Jensen *et al.*,1992; Juma'h & Pacheco; 2008; Kowalewski et al., 2007; Manos, 2003; Mehta; 2012; Ramli, 2010). To the contrary, some authors reported a positive effect of the company's risk on the dividend payments (Al Shabibi & Ramesh, 2011; Reyna , 2017). In this respect, the research hypothesis is as follows:

Hypothesis 6A: There is a negative relationship between business risk and the dividend payments of JSE-listed companies.

4.15.2.3 Free cash flow and distribution policies

Jensen (1986) argues that cash dividend payments help control the agent-principal conflicts (agency problem) by reducing large amounts of excess cash, which he calls free cash flow, under managers' discretion, because managers may act in ways not in the shareholders' best interests. Instead of undertaking a positive net present value investment project with this cash, they might overinvest by accepting marginal investment projects with negative net present values. However, substantial cash dividend payments would lessen the amount of free cash flow that managers may misuse as well as the scope of overinvestment, thereby increasing the market value of the company. Conversely, a dividend decrease would result in undertaking more negative net present value projects and decreasing the market value of the company. Free cash flows correlate with the possibility of agency problems, which implies higher dividend payments in order to overcome these free cash flow problems. This finding is supported by some scholars (Chen & Dhiensiri, 2009; Reyna, 2017). To the contrary, a negative but significant relationship was reported by prior research (Baker *et al*., 2019; Imran, 2011; Utami & Inanga, 2011). By contrast some researchers found no significant relationship between free cash flow and the dividend payments (Al-

Kuwari, 2010; Al-Shubiri; 2011; Mehrani *et al.*, 2011). Therefore, the research hypothesis is as follows:

Hypothesis 7A: There is a positive relationship between free cash flow and the dividend payments of JSE-listed companies.

4.15.2.4 Liquidity and distribution policies

The company's liquidity is one of the most important management goals in maintaining financial manoeuvrability of the company, which is also crucial in determining its dividend policy within the capital budgeting process (Darling, 1957). Manos (2003) argue that liquidity is an inverse proxy for transaction costs and therefore has a positive impact on the dividend payments. Similarly, Ho (2003) found that more liquid companies, stated differently companies with high cash availability, paid higher dividends than others with insufficient cash availability. Most previously mentioned researchers reported a positive correlation between liquidity and the dividend payments. Therefore, higher liquidity indicates positive signals to the market that the company is able to pay its obligations easily and thus involves lower risk of default (Gupta & Parua, 2012). Although Al-Najjar (2009) and Kisman (2016) state that liquidity of a company does not have any effects on its dividend policy, they predict that liquidity will have a positive effect on the dividend payments. Therefore, the research hypothesis is as follows:

Hypothesis 8A: There is a positive relationship between company liquidity and the dividend payments of JSE-listed companies.

4.15.2.5 Tangibility of assets and distribution policies

According to Aivazian, Booth and Cleary (2003:381) asset tangibility has an inverse relationship to the dividend payments, especially in developing economies. They argue that when the assets are more tangible, fewer short-term assets are available for a financial institution to lend against. As a result, this imposes financial constraints on companies operating in more traditional financial systems, where the source of debt is short-term bank financing. This argument is also supported by Al-Najjar (2009:193), who argues that the more collateralised the asset in the company, the fewer the short-term assets to be used as collateral for short-term loans. Consequently, companies will rely on their retained earnings, which will reduce the chance to pay dividends. Therefore, the research hypothesis is as follows:

Hypothesis 9A: There is a negative relationship between asset tangibility and the dividend payments of JSE-listed companies.

4.15.2.6 Company size

Company size is another factor that anticipates describing a company's dividend payments in the dividend literature. This is because company size can be an important determinant of both agency cost and transaction cost arguments. Lloyd, Jahera and Page (1985) argue that large companies are likely to have a more dispersed ownership structure and, in this context, face higher potential agency costs. Furthermore, larger companies are more likely to be mature and have easier access to capital markets to raise external finance at lower costs. Hence the lower transaction costs and higher potential for agency problems suggest a positive relationship between company size and dividend payments as a control mechanism. Similarly, Fama and French (2001) state that growth companies are mostly smaller and likely to find dividend payments more costly, compared with larger companies. The costs of external finance are likely to be higher for smaller companies than for larger, well-established companies with much easier access to capital markets. This supports the conclusion that the company size is positively related to the dividend payments. This positive relationship is also reported in prior studies (Al-Najjar,2009; *Baker et al*., 2019; Farinha, 2003; Gaver & Gaver,1993; Hashemi & Zadeh,2012; Juma'h & Pacheco, 2008; Kisman, 2016; Kowalewski *et al.*, 2007; Mehrani *et al*.; 2011; Mehta, 2012; Moh'd, Perry & Rimbey,1995; Ramli, 2010; Redding,1997; Yusof & Ismail, 2016) . By contrast, studies by Ahmed and Javid (2009) and Huda and Farah (2011) reported a negative effect of the company size on dividend payments, while Chen and Dhiensiri (2009) and Sim (2011) reported an insignificant relationship between the company size and the dividend payments. Therefore, the research hypothesis is as follows:

Hypothesis 10A: There is a positive relationship between company size and the dividend payment of JSE-listed companies.

4.15.2.7 Investment and growth opportunities

A company's funds requirements for investment purposes appear to influence companies' dividend payments (Higgins,1972; Fama, 1974). The transaction cost theory suggests that with high growth, there is more need for funds to finance investments. Therefore, the company is more likely to preserve earnings for investments rather than paying dividends, because the external finance is costly. Accordingly, Rozeff (1982) hypothesised that the relationship between anticipated investment opportunities and the dividend payments is negative because companies prefer to avoid transaction costs related to external financing. Evidence from various studies supports the narrative that companies distribute lower dividends when they are experiencing higher growth opportunities because this growth seemingly involves higher investment expenditures (Ding & Murinde, 2010). Furthermore, the pecking-order theory, proposed by Myers (1984) and Myers and Majluf (1984), states that companies finance their investment activities according to a hierarchy: first with internal funds, second with debt financing and third with equity issuance. In this context, companies with high growth opportunities tend to have high leverage (given that investment requires more than internally generated funds) and these companies should pay out low dividends. Hence, the pecking-order theory also predicts a negative relationship between investment opportunities and dividend payments.

It is worth pointing out that the negative relationship between the dividend payments and investment opportunities is partially supported by the overinvestment hypothesis developed by Lang and Litzenberger (1989). According to the overinvestment hypothesis, a dividend payment increases/decreases by a value maximising ($Q>1$). However, a substantial increase in dividends by an overinvestment ($Q<1$) is a good indicator because it means a smaller amount of cash is spent on suboptimal investments. By contrast, a mirror argument applies to substantial dividend decreases. In this respect, companies' investment opportunities negatively correlate with dividend payments.

However, La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000) state that the relationship between the dividend payment and investment opportunities may significantly differ in countries with poor shareholder protections. They propose the substitute model of dividend pay-out, arguing that in countries with poor shareholder protection, companies have greater incentives to establish a reputation of good treatment of minority shareholders because they come to the external capital markets for funds, at least occasionally. Consequently, the need for companies paying to establish a reputation is the greatest in such countries, which reduces what is left for expropriation. Accordingly, companies in countries with weaker protection and better investment opportunity prospects also have stronger incentives to establish such a reputation. In fact, they have a much greater potential need for external finance. Therefore, companies with good investment opportunities should choose higher dividend payments than those with poor investment and growth opportunities. Indeed, some researchers reported a significant positive relationship between investment opportunities and dividend payments (Aivazian *et al*., 2003; Al-Najjar,2009; Kirkulak & Kurt,2010; Al-Malkawi, 2007; Foroghi, Karimi and Momeni, 2011; Al-Shubiri,2011; Imran,2011; Baker *et al.,*2019) whereas other researchers evidenced a significant negative correlation between investment opportunities and dividend payments (Chang & Rhee,1990; Ahmed & Javid,2009; Al-Kuwari, 2010; Subramaniam & Devi,2011; Kisman, 2016; Yusof & Ismail, 2016). Combining the ideas from the transaction cost theory, pecking-order theory, overinvestment hypothesis and the substituted model of dividends that contradicts prior explanations and, due to the mixed evidence reported in different markets by a number of studies, the following two competing hypotheses are formulated:

Hypothesis 11A: There is a negative relationship between investment opportunities and the dividend payment decisions of JSE-listed companies

Hypothesis 12A: There is a positive relationship between investment opportunities and the dividend payment decisions of JSE-listed companies

4.15.2.8 Non-debt tax shields

Chang and Rhee (1990) state that the greater the non-debt tax shields, the higher the dividend payments. This argument is supported by the narrative that the depreciation cost is a non-cash expense (does not involve any outflow of cash). Therefore, the research hypothesis is as follows:

Hypothesis 13A: There is a positive relationship between the non-debt tax shield and the dividend payments

4.15.2.9 Market volatility

During a period of high market volatility, the cost of bankruptcy increases, and companies are faced with the possibility of financial distress. In this situation, it is better for companies not to pay dividends because companies cannot with certainty predict their future earnings (Crutchley & Hansen, 1989). Therefore, the research hypothesis is as follows:

Hypothesis 14A: There is a negative relationship between market volatility and dividend payments

4.15.3 Hypothesis of joint determinants with capital structure

4.15.3.1 Profitability and capital structure

In the spirit of the pecking-order theory, companies will follow a financing pattern that ranks different sources of finance in a particular order (Myers & Majluf, 1984). Companies will prefer internal financing sources over the external sources but will issue debt if such low-cost alternatives are exhausted (Al-Najjar, 2011). Such companies tend to use covenants to minimise the information premium of the company. The last option for the company is to issue new equity. Most studies show that profitability is negatively associated with debt ratio, because profitable companies are supposed to have more available internal capital based on the pecking-order theory (Acaravci, 2015; Al-Najjar, 2011; Chadha & Sharma, 2015; Dang, Kim & Shin, 2014; De Jong *et al*., 2011; Handoo & Sharma, 2014; Hirota, 1999; Hovakimian *et al.*, 2001; Hussain, 1997; Kieschnick & Moussawi, 2018; Mouton & Smith, 2016; Öztekin & Flannery, 2012; Ranjan & Zingales, 1995; Reyna, 2017; Shen, 2014; Titman & Wessels, 1988; Vo, 2017; Wiwattanakantang, 1999). However, according to Modigliani and Miller (1963), companies probably favour debt over equity, since a more profitable company tends to make use of higher debt to gain more tax shield benefits. Dacosta (2017) found a positive and significant correlation between profitability and the capital structure. Therefore, the research hypothesis is as follows:

Hypothesis 15A: There is a negative relationship between profitability of the company and the capital structure.

4.15.3.2 Asset tangibility and capital structure

The trade-off theory states that tangibility is positively related to debt levels for two main reasons, namely security and financial distress. First, tangible assets normally provide high collateral value relative to intangible assets, which implies that these assets can support more debt . Second, tangible assets often reduce the cost of financial distress because they tend to have higher liquidation value. In addition, the agency theory provides another two reasons for a positive association between asset tangibility and the company's debt levels. The first of these reasons relates to the ease by which the variance of the cash flows generated from the asset can be increased. As a result, it is usually more difficult to alter the variance of cash flow generated from tangible rather than from intangible assets. Thus, asset tangibility reduces the scope for risk shifting and companies with tangible assets will support more debt. Second, Harris and Raviv (1990) developed the idea of the role of debt in disciplining management and providing information for this purpose arguing that tangible assets have higher value on liquidation, which means that liquidation is often the best strategy when the company is financially distressed. However, it is when liquidation may be the best course of action that managers will be most reluctant to provide useful information than can lead to such an outcome due to self-interest considerations. Under these circumstances, debt can ensure that information is available because the default on debt obligations triggers investigation into the company's affairs. Consequently, companies with tangible assets whose managers tend to conceal information in order to avoid liquidation, will have more debt due to its role in disciplining managers and providing information. The positive relationship is reported by some researchers (Al-Najjar, 2011; Chadha & Sharma, 2015; Dacosta, 2017; Dang *et al*., 2014; Hall, Hutchinson & Michaelas, 2004; Handoo & Sharma 2014; Hirota, 1999; Hovakimian *et al.,* 2001; Jordan, Lowe & Taylor ,1998; Kieschnick & Moussawi, 2018; Mouton & Smith 2016; Öztekin & Flannery, 2012; Rajan & Zingales,1995; Vo 2017). However, Titman and Wessels (1988) provide an agency-based argument for a negative relationship between the tangibility of the company's assets and leverage. Acaravci (2015) and Reyna (2017) found a negative but significant relationship between asset tangibility and leverage. Thus, on the basis of the trade-off and agency theories, the research hypothesis is as follows:

Hypothesis 16A: There is a positive relationship between asset tangibility and the capital structure.

4.15.3.3 Growth opportunities and capital structure

Agency problems are more severe for growing companies because these companies are more flexible in their selection of future investments. Thus, the expected growth rate should be negatively related to long-term leverage (Titman and Wessels, 1988). Based on the existing works of literature, some studies reported the negative relationship between growth and the debt ratio (Bonaimé *et al.,* 2014; Chadha & Sharma, 2015; Dacosta, 2017; De Jong *et al.,* 2011; Deesomsak, Paudyal & Pescetto, 2004; Hovakimian *et al*., 2001; Huang & Song, 2006, Rajan & Zingales, 1995; Shen, 2014), while Mouton and Smith (2016) found no evidence of the statistical relationship between growth and the capital structure. In addition, Myers (1977) argues that companies with higher growth rates tend to use less long-term debt and more short-term debt in their capital structure in order to reduce such agency costs. By contrast, some authors found a positive and significant correlation between growth and the capital structure (Acaravci, 2015; Al-Najjar, 2011; Bhaduri,2002; Cooper & Lambertides, 2018; Dang *et al.*, 2014; Öztekin & Flannery, 2012; Vo, 2017), whereas others found an insignificant relationship (Handoo & Sharma, 2014; Kieschnick & Moussawi; 2018). Therefore, the research hypothesis is as follows:

Hypothesis 17A: There is a negative statistical relationship between growth opportunities and leverage ratio.

4.15.3.4 Liquidity and capital structure

Harris and Raviv (1990) state that the increase in liquidity ratio results in a fall in the cost of financial distress and investors are more in favour of debt to obtain information regarding the profitability of the company. To the contrary, the pecking-order theory indicates a negative statistical relationship of the company liquidity on the financing decisions based on the narrative that companies with greater liquidity are reluctant to borrow. Further, companies with highly liquid assets can use such assets to finance their investments when there are growth opportunities. Therefore, a company's liquid position should have a negative impact on its leverage ratio. Similarly, Myers and Rajan (1998) argue that when agency costs of liquidity are high, outside creditors limit the amount of debt financing available to the company. Handoo and Sharma (2014) and Chadha and Sharma (2015) found an insignificant relationship between the company liquidity and the capital structure. Therefore, the research hypothesis is as follows:

Hypothesis 18A: There is a negative relationship between asset liquidity and leverage ratio.

4.15.3.5 Business risk, market volatility and capital structure

According to Frank and Goyal (2004), there is no significant relationship between volatility in operating income and the company's leverage. The pecking-order theory states that risk or market volatility should be negatively associated with leverage due to the trade-off considerations (riskier companies bearing high risk to financial distress reduce the availability of cash with high leverage). Particularly, the probability of being unable to meet financial obligations increases with the level of risk or market volatility. As the present value of the costs of financial distress increases with the probability of being financially distressed, risky companies prefer less debt. Furthermore, the agency cost theory of debt also predicts a negative association between debt and risk. Specifically, because equity holders are aware that high risk implies that there may be insufficient funds to pay them, they become prone to risk shifting or underinvestment activities. These theoretical predictions are consistent with some of the empirical results (Bradley, Jarrell & Kim,1984; Hirota,1999; Mouton & Smith, 2016) but not with others (Jordan, Lowe & Taylor, 1998; Harris & Raviv; 1991; Ross,1977; Chadha & Sharma, 2015). Therefore, the research hypothesis is as follows:

Hypothesis 19A There is a negative relationship between business risk and the capital structure*.*

4.15.3.6 Company size and capital structure

Generally, larger companies tend to be more diversified, and hence less risky and less prone to bankruptcy. Therefore, these companies have higher debt capacity and in line with the trade-off theory, a positive relationship is expected between size and leverage. This is consistent with the general results found by some authors (Acaravci, 2015; Al-Najjar, 2011; Bhaduri, 2002; Dacosta, 2017; Dang *et al.,* 2014; Hall *et al.,* 2004; Hirota,1999; Hovakimian *et al.,* 2001; Hussain,1997; Kieschnick & Moussawi, 2018; Öztekin & Flannery, 2012; San Martin & Saona, 2017; Rajan & Zingales, 1995; Wiwattanakantang,1999). In addition, if maintaining control is important, then it is likely that companies achieve larger size through debt rather than equity financing. Thus, control considerations also support a positive correlation between the company size and debt. However, it could also be argued that size serves as proxy for the availability of information that outsiders have about the company. From a pecking-order point of view, less information asymmetry makes equity issuance more appealing to the company, thus a negative association can be expected between size and leverage. This view is consistent with some of the empirical results reported by some authors (Titman & Wessels,1988; Rajan & Zingales,1995; Bonaimé *et al.,* 2014; Handoo & Sharma, 2014). The theoretical relationship between size and the leverage is thus undetermined but can distinguish between the order and between the trade-off and control considerations. Specifically, a positive correlation is in line with the trade-off theory, while a negative correlation is supportive of symmetric information and the pecking-order considerations. Therefore, the research hypotheses are as follows:

Hypothesis 20A: There is a positive relationship between the company size and the capital structure.

Hypothesis 21A: There is a negative relationship between the company size and the capital structure.

4.15.3.7 Non-debt tax shields and capital structure

In the context of the trade-off theory, non-debt tax shields provide alternative measures to interest tax shields. Therefore, companies with high non-debt tax shields, such as accelerated depreciation and investment tax credits relative to their expected cash flows, should use less debt. This leads to the prediction of a negative correlation between non-debt tax shields and debt, which is consistent with the results reported by some researchers (Acaravci, 2015; Handoo & Sharma, 2014; Hirota,1999; Reyna, 2017; Wiwattanakantang,1999). By contrast, Chadha and Sharma (2015) state that the non-debt tax shield positively correlates with the capital structure. Therefore, the research hypothesis is as follows:

Hypothesis 22A: There is a negative relationship between non-debt tax shields and the capital structure.

4.15.3.8 Cash flow

The signalling theory and the pecking-order theory suggest contradictory relationships between a company's leverage and its cash flow. The signalling theory implies a positive relationship, in which companies with higher cash flow signal their performance with higher leverage. By contrast, the pecking-order theory suggests a negative relationship, in which companies' higher internally generated cash flow require companies to be less leveraged. Both the pecking-order theory and the signalling theory have broad support in different bodies of empirical literature (Shenoy & Koch, 1996). According to Harris and Raviv (1991), the comparative statistics of the signalling models suggest that higher leverage is associated with higher cash flow in the same period. However, most cross-sectional empirical studies of the capital structure found that the cash flow negatively correlated with the capital structure (Bhaduri, 2002; Cooper & Lambertides, 2018). By contrast, Bonaimé *et al.,* (2014) found an insignificant relationship between the cash flow and different measures of the capital structure. Therefore, the research hypothesis is as follows:

Hypothesis 23A: There is a negative relationship between cash flow and the capital structure.

The hypotheses on financing and pay-out decisions as discussed by prior research are summarised in table 4.6 below.

Table 4. 6: Hypothesis for the joint determinants

	Dividend payments	Share repurchases	Distribution strategies	Capital structure
Variables	Expected sign	Expected sign	Expected sign	Expected sign
Investment opportunities (INVEST)	(-)/(+)	(-)/(+)	(-)/(+)	(+)
Profitability (RA)	(+)	(+)	(+)	(-)
Non-debt tax shields (NDT)	(-)	(-)	(-)	(+)
Company size (SIZE)	(+)	(+)	(+)	(+)
Asset tangibility (TAN)	(-)	(-)	(-)	(-)
Free cash flow (CF)	(+)	(+)	(+)	(-)
Market volatility (VO)	(-)	(-)	(-)	(-)
Degree of operating leverage (DOL)	(-)	(-)	(-)	(+)
Liquidity	(+)	(+)	(+)	(-)
Growth opportunities	(-)	(-)	(-)	(-)

4.15.4 Hypothesis for the threshold effect and model of choice

4.15.4.1 Hypothesis for the threshold effect

According to Fischer, Heinkel and Zeckner (1989), the limitation of a single-period capital structure model is that it ignores the company's optimal restructuring choices in response to fluctuations. Further, in the absence of transaction cost, companies could carry large amounts of debts and by the appropriate repurchase strategy, the company can capture large tax shields while keeping the debt essentially riskless. Companies allow their financial structure to change over time due to costs of recapitalising and any ratio lying within a set of boundaries being optimal, and as a result, similar companies could have different leverage ratios at any point in time. According to the boundary conditions, when the value-to-debt ratio increases, the leverage ratio drops and when the value-to-debt ratio decreases over time, the leverage ratio increases. Therefore, the research hypotheses are as follows:

Hypothesis 1B: There is a positive threshold effect of the capital structure on the payment of dividend over the periods 1990 to 2017 and 1999 to 2017.

Hypothesis 2B: There is a positive threshold effect of the capital structure on share repurchases over the period 1999 to 2017.

4.15.4.2 Model of choice hypothesis for the distribution strategies

In this section, the study argues that the nature of the capital structure and company-specific variables are predictors of choice between the payments of dividends, the repurchase of shares, the engagements in both (dividend and share repurchases) and the engagements in neither the dividend payments nor the share repurchases.

Capital structure

Wesson *et al.,* (2018) found that the level of debt in the result per sector was statistically significant, whereas in the total sample, this variable was not found to be statistically significant. This is an indication that decisions made in financing issues may have strong implication for the choice between the dividend payment and share repurchases. The authors argue that the level of debt (based on debt variable) and the choice of open-market share repurchase were reported. Their findings do not support the international empirical evidence (for example, Caudill *et al.,* 2006), which postulates that lower debt levels are associated with the choice for open-market share repurchases, mainly because share repurchases are usually financed through debt, hence resulting in increased financial leverage for companies with below-target leverage levels. Furthermore, in the South African regulatory environment, the reported results may therefore indicate that open-market share repurchases are not financed through debt, as is globally the case (for example, Caudill *et al.,* 2006), but rather financed by utilising cash reserved. It is worth noting that Wesson *et al.* (2018) did not use the different levels of leverage including the target leverage. A study by

Renneboog and Trojanowski (2011) found that lowly geared companies were more likely to repurchase shares relative to non-distribution and dividend payment. Therefore, the research hypotheses are as follows:

Hypothesis 3B: The different alternative measures of the capital structure (DE, DA, and LF) affect the choice between distribution strategies differently.

Hypothesis 4B: Companies that are lowly geared are more likely to repurchase shares.

Company profitability

Profitability is one of the predictors of choice that affect a company's decision to pay dividends, to repurchase shares, to engage in both the dividend payments and share repurchase or to engage in neither the dividend payments nor the share repurchases. Therefore, the research hypotheses are as follows:

Hypothesis 5.1B: Companies that are profitable are more likely to choose dividend payments relative to share repurchases.

Hypothesis 5.2B: Companies that are profitable are more likely to engage in both dividend payments and share repurchases relative to share repurchases.

Hypothesis 5.3B: Companies that are profitable are less likely to engage in neither dividend payments nor share repurchases relative to share repurchases.

Company size

According to Fenn and Liang (2001), companies that are larger have smaller information asymmetries and lower financing costs than smaller companies. As a result, lower financing costs enable companies to distribute more cash to shareholders, because if they need to raise funds in future, the funds will be relatively inexpensive (Kahle, 2002). Furthermore, large companies are less likely to be undervalued (Vermaelen, 1981). Thus, companies conducting a repurchase as a signal to the market are undervalued and smaller in size. Therefore, the research expects the coefficient of the company size to be positively correlated with the decision to pay dividends relative to share repurchases, positively correlated with the decision to engage in both (the dividend payments and share repurchases) relative to share repurchases, positively correlated with the decision to neither engage in share repurchases nor the dividend payments relative to share repurchases. Moon, Lee and Dattilo (2015) found that companies that were large in size were more likely to pay dividend than to not pay dividends. Therefore, the research hypotheses are as follows:

Hypothesis 6.1B: Large companies are more likely to pay dividend relative to share repurchases

Hypothesis 6.2B: Large companies are more likely to engage in both the dividend payments and share repurchases relative to share repurchases.

Hypothesis 6.3B: Large companies are less likely to engage in neither the dividend payments nor the share repurchases relative to share repurchases.

Cash flow of a company

According to Lamba and Miranda (2010:350), companies with high levels of free cash flows are able to reduce agency costs and avoid the risk of overinvesting by distributing cash to the shareholders. Although other methods of distributing cash, such as the payments of dividend, also alleviate agency problems, the repurchase of shares is tax advantageous to shareholders and does not imply future commitments to returning cash to shareholders, which is commonly associated with dividend increase. Therefore, the research expects the coefficient of the cash flow to be negatively correlated with the decision to pay dividend relative to share repurchases, negatively correlated with the decision to neither choose the dividend payments nor the share repurchases and a positive relationship is expected between cash flows and share repurchases relative to the dividend payments. Some authors found a positive correlation between cash flow and share repurchases (Grullon & Michaely, 2004;

Jensen,1986; Nohel & Tarhan, 1998). Therefore, the research hypotheses are as follows:

Hypothesis 7.1B: Companies with more cash flow are less likely to choose the dividend payments relative to share repurchases.

Hypothesis 7.2B: Companies with more cash flow are more likely to engage in both the dividend payments and share repurchases relative to share repurchases.

Hypothesis 7.3B: Companies with more cash flow are less likely to engage in neither the dividend payments nor the share repurchases relative to share repurchases.

Growth opportunities of a company

According to Kahle (2002), the decision to repurchase shares should depend on the marginal investment opportunities of the company. Further, companies with good investment opportunities are able to enhance their value by using cash flows to finance those investments as opposed to distributing them to shareholders and *vice versa* (Jensen, 1986). Therefore, the coefficient of the growth opportunities should be negatively correlated with the decision to pay dividends, to repurchase shares, to engage in both the dividend payments and the repurchase of shares but positively correlated with the decision to engage in neither the dividend payments nor the share repurchases. Some authors found a negative correlation between growth opportunities and share repurchases (Brown, Handley & O'Day,2015; Grullon *et al.,* 2002; Grullon & Michaely, 2004). Therefore, the study hypotheses are as follows:

Hypothesis 8.1B: Companies with growth opportunities are less likely to pay dividend relative to share repurchases.

Hypothesis 8.2B: Companies with growth opportunities are less likely to engage both the dividend payments and share repurchases relative to share repurchases.

Hypothesis 8.3B: Companies with growth opportunities are more likely to engage in neither the dividend payments nor the repurchase of shares relative to share repurchases.

Market volatility

During a period of high market volatility in the market, companies are expected to reduce the amount paid in dividend or not pay dividend at all. The coefficient of the market volatility is expected to be negatively correlated with the decision to pay dividend, to engage in both the dividend payments and the repurchase of shares but positively correlated with the decision to neither pay dividend nor the share repurchases. Therefore, the research hypotheses are as follows:

Hypothesis 8.1B: During a period of high market volatility, companies are less likely to choose the dividend payments relative to share repurchases.

Hypothesis 8.2B: During a period of high market volatility, companies are less likely to engage in both the dividend payments and the repurchase relative to share repurchases.

Hypothesis 8.3B: During a period of high market volatility, companies are more likely to engage in neither the dividend payments nor the repurchase of shares relative to share repurchases.

Working capital

Higher levels of working capital show that the company is able to meet its obligations when they are due. Further, higher levels of working capital imply higher levels of liquidity, which means the availability of cash to pay dividends or repurchase shares. Therefore, the research hypotheses are as follows:

Hypothesis 10.1B: Companies with a higher working capital are more likely to pay dividend relative to share repurchases

Hypothesis 10.2B: Companies with a higher working capital are more likely to engage in both the dividend payments and share repurchases relative to share repurchases

Hypothesis 10.3B: Companies with a higher working capital are less likely to engage in neither the dividend payment nor the repurchase of shares relative to share repurchases.

Table 4. 7: Hypotheses for the predictors of choice between distribution strategies

Table 4.7 presents the summary of the hypotheses for the predictors of choice between the distribution strategies (pay, both and none) relative to the reference category of share repurchases.

	Choices		
	PR relative to SRP	**BOTH relative to SRP**	**NONE relative to SRP**
Predictors			
Profitability (RA)	Pay dividend	Engage in both	Repurchase shares
Company size (SIZE)	Repurchase shares	Engage in both	Repurchase shares
Cash flow (CF)	Repurchase shares	Engage in both	Repurchase shares
Growth opportunities (GW)	Repurchase shares	Repurchase shares	Engage in none
Market volatility	Repurchase shares	Repurchase shares	Engage in none
Liquidity	Pay dividends	Engage in both	Repurchase shares
Working capital (WK)	Pay dividends	Engage in both	Repurchase shares
Quick ratio (QR)	Pay dividend	Engage in both	Repurchase shares
Highly leveraged capital	Pay dividend	Engage in both	Engage in none
Lowly leveraged capital	Repurchase shares	Repurchase shares	Repurchase shares

4.16 CHAPTER SUMMARY

This chapter presented the methodology used to conduct the research. Firstly, the research used static (fixed- and random effects) and dynamic (GMM owing to the dynamic nature of the capital structure and distribution strategies) panel data techniques as individual equation approach. This approach has been widely used by prior research while investigating financing decisions and distribution policies as one issue at a time. Secondly, the research used a simultaneous decision-making approach (3SLS approach full information) as a system equation to account for the interdependence between the capital structure and distribution strategies (the dividend payments and share repurchases). Thirdly, the research used advanced threshold regression technique to capture the threshold effects of the different alternative measures of the capital structure on the dividend payments, share repurchases and distribution strategies (the sum of the actual dividend paid, and share repurchases). Fourthly, the research used a multinomial logistic regression to investigate the capital structure and company-specific variables as predictors of choice between the distribution strategies. Furthermore, hypotheses for the dependent (endogenous variables) and joint determinant variables were also presented in this chapter.

The next chapter presents the individual and simultaneous decision-making analysis and interpretation of the different alternative measures of the capital structure (the debt-to-equity ratio, the debt-to-asset ratio and the leverage factor) and distribution policies (the dividend payments and share repurchases) for the full sample over the periods 1990 to 2017 and 1999 to 2017.

CHAPTER 5: ANALYSIS OF INDIVIDUAL AND SIMULTANEOUS EQUATIONS AND INTERPRETATION OF CAPITAL STRUCTURE AND DISTRIBUTION STRATEGIES

5.1 INTRODUCTION

This chapter focuses on the first objective of the study, namely, to investigate the interplay between the capital structure and distribution strategies. In simultaneously estimating the equations for the South African market, this chapter provides empirical evidence to test the four hypotheses on the interdependence between the capital structure and the distribution strategies of South African-listed companies. The empirical findings provided by this chapter contribute to the understanding of a two-way causal effect between alternative measures of the capital and distribution strategy attributes in South Africa as an emerging economy.

Although the purpose of this study was to investigate the simultaneity among the capital structure and the distribution strategies, it is desirable to first apply the single-equation estimation technique to the two policies separately. The single-equation estimation results presented in this section are comparable with those provided by previous studies that ignored the interdependence of the decision-making processes, which the researcher aimed to investigate. Furthermore, it allowed the researcher to compare the individual equation approach with the simultaneous decision-making approach.

The remainder of the chapter proceeds as follows: Section 5.2 presents the model specification for the individual equation approach, Section 5.3 presents the specification for the strategic simultaneous decision-making approach, Section 5.4 presents the preliminary data analysis for the full sample, Section 5.5 presents the Granger causality test results and interpretation, Section 5.6 presents the individual equation analysis and interpretation for the capital structure and the distribution policy using the fixed-effects model, random effects model and the generalised method of moments, Section 5.7 presents the simultaneous equation analysis and interpretation, Section 5.8 presents the analysis and interpretation of the simultaneous decision-making framework for the pre-financial crisis, in-financial crisis and post-financial crisis. Section 5.9 summarises the chapter.

5.2 MODEL SPECIFICATION FOR THE INDIVIDUAL EQUATION APPROACH

Companies' distribution strategies are modelled based on the signalling hypothesis of the information asymmetry and undervaluation hypothesis. Control variables are included for a robustness check. Some macroeconomic variables are also included to capture the aggregate economic effects.

In order to compare the results with prior research, a single-equation approach (fixed-effects model, random effects model and the generalised method of moments) is used for distribution strategies and financing equations for the full sample and the four main sectors of the JSE. Therefore, the research uses the following equations for the period 1990 to 2017:

Model 1

$$\begin{aligned} CD_{i,t} &= \beta_0 + \beta_1 GW_{i,t} + \beta_2 RA_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 TAN_{i,t} + \beta_5 CF_{i,t} + \beta_6 VO_{i,t} \\ &\quad + \beta_7 DOL_{i,t} + \beta_8 LIQ_{i,t} + \beta_9 NDT_{i,t} + \beta_{10} CS_{i,t} + u_{i,t} \end{aligned} \tag{5.1}$$

Model 2

$$\begin{aligned} CS_{i,t} &= \beta_0 + \beta_1 GW_{i,t} + \beta_2 RA_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 TAN_{i,t} + \beta_5 CF_{i,t} + \beta_6 VO_{i,t} \\ &\quad + \beta_7 DOL_{i,t} + \beta_8 LIQ_{i,t} + \beta_9 NDT_{i,t} + \beta_{10} CD_{i,t} + u_{i,t} \end{aligned} \tag{5.2}$$

where

$CS_{i,t}$ =represents the three alternatives measures of the capital structure, namely the debt-to-equity ratio (DE), the debt-to-asset ratio (DA) and the leverage factor (LF)

$CD_{i,t}$ = the actual dividend paid for a company i in period.

$RA_{i,t}$ =the return on assets of company i in period t

$NDT_{i,t}$ =the non-debt tax shield of a company i in period t

$SIZE_{i,t}$ =is the size of a company i in period t

$TAN_{i,t}$ =the asset tangibility of a company i in period t

$CF_{i,t}$:=the cash flow of a company i in period t

$VO_{i,t}$ =the market volatility of a company i in period t

$DOL_{i,t}$ =the degree of operating leverage of a company i in period t

$LIQ_{i,t}$ =the liquidity of a company i in period t

$GW_{i,t}$ =the growth of a company i in period t

$u_{i,t} = \mu + v_{i,t}$ = the error term, which is the sum of an (unobservable) individual specific effect (time invariant) and well-behaved (remainder) disturbance

Employing the generalised method of moments, the research uses the following equation:

Model 3

$$CS_{i,t} = \beta_0 + \lambda CS_{i,(t-1)} + \beta_1 CD_{i,t} + \beta_2 RA_{i,t} + \beta_3 NDT_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 TAN_{i,t} + \beta_6 CF_{i,t} + \beta_7 VO_{i,t} + \beta_8 DOL_{i,t} + \beta_9 LIQ_{i,t} + \beta_{10} GW_{i,t} + \upsilon_{i,t} \quad (5.3)$$

Model 4

$$CD_{i,t} = \beta_0 + \lambda CD_{i,(t-1)} + \beta_1 CS_{i,t} + \beta_2 RA_{i,t} + \beta_3 NDT_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 TAN_{i,t} + \beta_6 CF_{i,t} + \beta_7 VO_{i,t} + \beta_8 DOL_{i,t} + \beta_9 LIQ_{i,t} + \beta_{10} GW_{i,t} + \upsilon_{i,t} \quad (5.4)$$

where $CS_{i,(t-1)}$ and $CD_{i,t-1}$ represent the lagged capital structure and the lagged actual dividend paid. λ, represents $1-\delta$ and δ, and is the adjustment speed coefficient.

5.3 MODEL SPECIFICATION FOR THE SIMULTANEOUS EQUATIONS

In this section, a simultaneous equation system is developed, which explicitly accounts for the interactions among the capital structure, the dividend payments and share repurchase decisions, with each of the variables being treated as endogenous variable and exogenous variable. Therefore, the analysis of simultaneous equations overcomes the single-equation techniques presented in the existing literature and provide new insights into the interdependencies among JSE-listed companies' decisions in an imperfect market.

Therefore, to determine the interrelationship between the dividend payments and the three alternative measures of the capital structure for the period 1990 to 2017 within a simultaneous framework using a panel data three-stage least squares equation system (3SLS full information), the research uses the following system equation specification:

System Equation 1

CD=f(C(1)+C(2)*CS+C(3)*RA+C(4)*GW+C(5)*TAN)

CS=f(C(6)+C(7)*CD+C(8)*RA+C(9)*GW+C(10)*TAN+C(11)*CR)

(5.5)

where

CD=the endogenous actual dividend paid

CS=the endogenous capital structure representing the three alternative measures of the capital structure, namely the debt-to-equity ratio, the debt-to-asset ratio and the leverage factor

GW=growth opportunities

RA=the return on assets used as proxy for the company profitability

TAN=Asset tangibility

CR=current ratio

To determine the interdependence between share repurchases and two alternative measures of the capital structure, namely the debt-to-equity ratio and the debt-to-asset ratio within a simultaneous framework for the period 1999 to 2017, the research uses the following system equation specification:

System Equation 2

SRP=f(C(1)+C(2)*INVEST+C(3)*CF+C(4)*LIQ+C(5)*VO+C(6)*CS)

$$CS=f(C(7)+C(8)*SRP+C(9)*INVEST+C(10)*CF+C(11)*TAN+C(12)*NDT) \quad (5.6)$$

where

SRP: is the share repurchases

CS: is the capital structure representing the two alternative measures of the capital structure, namely the debt-to-equity ratio and the debt-to-asset ratio. The other variables are defined as before.

To determine the interdependence between distribution strategies (the sum of cash dividend paid and share repurchases) and two alternative measures of the capital structure, namely the debt-to-equity ratio and the debt-to-asset ratio within a simultaneous framework for the period 1999 to 2017, the research uses the following system equation specification:

System Equation 3

$$\begin{aligned} DS&=f(C(1)+C(2)*INVEST+C(3)*CF+C(4)*LIQ+C(5)*VO+C(6)*CS) \\ CS&=f(C(7)+C(8)*DS+C(9)*INVEST+C(10)*CF+C(11)*TAN+C(12)*NDT) \end{aligned} \quad (5.7)$$

where

CS: represents the two alternative measures of the capital structure, namely the debt to-equity ratio and the debt-to-asset ratio

DS: is the sum of the dividend payments and share repurchases

To investigate the pecking-order theory within a simultaneous framework still accounting for the interrelationship between financing decisions and distribution strategies, the research uses the following 3SLS specification models:

System Equation 4

$$\begin{aligned} \Delta DE&=f(C(1)+C(2)*CD+C(3)*CE+C(4)*\Delta WC+C(5)*CF) \\ CD&=f(C(6)+C(7)*\Delta DE+C(8)*CE+C(9)*RA+C(10)*VO) \end{aligned} \quad (5.8)$$

System Equation 5

$$\Delta DE=f(C(1)+C(2)*SRP+C(3)*CE+C(4)*\Delta WC+C(5)*CF)$$

$$SRP=f(C(6)+C(7)^* \Delta DE+C(8)^*CE+C(9)^*RA+C(10)^*VO) \quad (5.9)$$

System Equation 6

$$\Delta DE=f(C(1)+C(2)^*DS+C(3)^*CE+C(4)^*\Delta WC+C(5)^*CF)$$
$$DS=f(C(6)+C(7)^* \Delta DE+C(8)^*CE+C(9)^*RA+C(10)^*VO) \quad (5.10)$$

where

ΔDE= the change in the debt-to-equity ratio

CE=the capital expenditure

ΔWC=the net change in working capital

SRP=the share repurchases

DS=the distribution strategies, which are the sum of the actual dividend paid and the share repurchases. The other variables are the same as for equation 5.5 (System Equation 1).

5.4 PRELIMINARY DATA ANALYSIS FOR THE FULL SAMPLE

Table 4.1 indicates that the panel data set for the South African market includes 68 cross-sections (companies), which had relatively full information on key financing and distribution strategy variables, covering a 28-year period from 1990 to 2017 and an 18-year period from 1999 to 2017. The study uses multiple regression analysis to investigate the relationship between capital structure and distribution strategies. Before conducting the regression analysis, various preliminary tests are conducted. The following section discusses the assumptions of the OLS to determine which estimation technique is appropriate for the study. These assumptions include normality, linearity, homoscedasticity, multicollinearity, autocorrelation and the presence of outliers.

To make full use of the data, a company-year observation is included in the sample for the single-equation analysis as long as it has records on the relevant variables in determining the interdependence between capital structure and distribution strategies.

However, for the simultaneous equation analysis a company-year observation can be utilised only if it has complete records on all the relevant variables in determining the distribution strategies and the capital structure.

To check for the presence of outliers, the next section discusses the descriptive statistics with and without winsorisation.

5.4.1 Descriptive statistics tests for the full sample

Table 5.1 presents the descriptive statistics for the main variables from the raw data and Table 5.2 shows the summary of descriptive statistics for the variables used in the estimation of the determinants of dividend payments and capital structure without winsorisation and with winsorisation over the period 1990 to 2017

Table 5.1 shows that extreme values appear in almost all the variables, especially those that are constructed as ratios. The research winsorises all the variables used in the analysis at the top and bottom fifth percentile of their respective distributions. Specifically, the winsorisation transformation will set all observations below the fifth percentile equal to the fifth percentile and observation above the 95^{th} percentile equal to the 95^{th} percentile. Such a transformation not only reduces the potential impact of outliers but also allows the full use of observations. Table 5.2 reports descriptive statistics after such a transformation is undertaken. It shows that the maximum values of, for instance, pay-out ratio, debt-to-equity ratio and leverage factor, reduced from 65.87500, 61.72270 and 675.5474 to 0.987248, 3.841140 and 4.481730 respectively. The standard of deviation for each of these variables reduced from 1.804300, 2.488234 and 22.31992 to 0.259161, 1.019568 and 1.036906 respectively, and more importantly, their distributions are closer to normality after the transformation, as suggested by the skewness and the kurtosis statistics. Because the winsorisation estimators are expected to be more robust, the empirical results presented hereafter are obtained by using the winsorised variables. It is worth pointing out that the same procedure will be carried out for the four main sectors of JSE to find out if they treat financing and distribution strategies differently.

Table 5. 1: Descriptive statistics tests for the full sample without winsorisation:1990-2017

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs.
CD	0.042401	0.022293	5.356504	-0.000142	0.198605	21.79702	521.9506	1865
PR	0.482883	0.337553	65.87500	-1.844961	1.804300	27.38815	941.6908	1865
DE	1.373455	0.875500	61.72270	-12.21760	2.488234	13.18645	270.2069	1865
DA	0.450725	0.445300	1.928800	0.000400	0.218586	0.357680	3.546211	1865
LF	2.521614	1.215600	675.5474	-199.2182	22.31992	19.94636	533.1631	1865
LTM	0.015995	0.000568	1.000000	0.000000	0.110632	8.320275	72.37518	1865
LTB	0.516871	0.518505	2.074688	0.000000	0.215599	0.537131	5.629829	1865
LLM	0.003824	0.000133	0.998104	0.000000	0.039076	19.03133	430.3930	1865
LLB	0.159964	0.120180	1.879202	0.000000	0.157479	2.382090	15.57968	1865
INVEST	0.093421	0.063365	10.60768	0.000000	0.407643	22.80212	549.2721	1865
RA	12.07224	10.89860	1763.004	-120.3551	43.19849	35.79779	1449.806	1865
NDT	0.033565	0.032358	0.153062	0.000000	0.020699	0.782972	4.715553	1865
SIZE	6.716744	6.820109	12.83263	0.000000	0.974152	-.883141	9.753789	1865
TAN	0.291264	0.259099	0.999372	0.000000	0.220155	0.743345	2.956870	1865
CF	0.132138	0.100515	16.88254	-1.350724	0.668311	21.28182	488.3685	1865
VO	40.88749	34.41540	365.3421	0.000000	30.62377	3.821218	28.38440	1865
DOL	-18.91719	0.987431	9423.128	-39953.59	960.6399	-38.09360	1608.291	1865
LIQ	2.560423	1.926449	36.56858	0.000000	2.401560	7.333635	83.03129	1865
GW	27.68242	10.70120	8689.383	-99.99980	262.6518	25.85687	755.6101	1865
PE	12.42954	11.51800	3269.000	-11890.24	300.3741	-32.15414	1334.948	1865
QR	1.206275	0.977600	29.57580	0.053000	1.086779	11.95536	274.5415	1865
WK	0.172728	0.149970	0.966189	-1.305615	0.197027	0.024130	6.389052	1865
TDC	4.393349	3.374300	412.1726	-420.0244	16.94271	-0.688279	398.3251	1865

CD is the actual dividend paid, **PR** is the dividend pay-out ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio, **LF** is the leverage factor, **LTM** is the total debt ratio based on the market value, **LTB** is the total debt ratio based on the book value, **LLM** is the long-term debt based on the market value, **LLB** is the long-term debt based on the book value, **INVEST** is the actual investment in assets, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **SIZE** is the company size, **TAN** is the asset tangibility, **CF** is the cash flow, **VO** is the market volatility, **DOL** is the degree of operating leverage used as proxy for the business risk, **LIQ** is the liquidity position of the company, **GW** is the growth in sales used as proxy for growth opportunities, **PE** is the price-earnings, **QR** is the quick ratio, **WK** is the net working capital, **TDC** is the total debt to cash flow.

Table 5. 2: Descriptive statistics tests for the full sample with winsorisation:1990-2017

Panel A2 Descriptive statistics of variables winsorised at the top and bottom 5th percentiles								
	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs.
CD	0.029058	0.022293	0.099557	0.000000	0.027785	1.104088	3.458043	1865
PR	0.348619	0.337553	0.987248	0.000000	0.259161	0.640365	3.198126	1865
DE	1.213532	0.875500	3.841140	0.143840	1.019568	1.174971	3.514926	1865
DA	0.447343	0.445300	0.790220	0.118240	0.203930	0.024083	1.852078	1865
LF	1.507106	1.215600	4.481730	-0.176950	1.036906	1.309024	4.758124	1865
LTM	0.001453	0.000568	0.009229	9.01E-05	0.002257	2.532806	8.537063	1865
LTB	0.512753	0.518505	0.834071	0.169720	0.193074	-0.010054	1.979102	1865
LLM	0.000393	0.000133	0.002696	8.72E-07	0.000660	2.553907	8.719735	1865
LLB	0.152469	0.120180	0.462632	0.001103	0.130463	0.948074	3.024103	1865
INVEST	0.070512	0.063365	0.185263	0.000561	0.049423	0.695040	2.830782	1865
RA	11.40951	10.89860	28.39192	-4.755420	8.312312	0.137184	2.674948	1865
NDT	0.032717	0.032358	0.067367	0.000697	0.018379	0.084198	2.252096	1865
SIZE	6.721178	6.820109	8.043106	4.991276	0.823536	-0.360917	2.332330	1865
TAN	0.287588	0.259099	0.746282	0.001882	0.211097	0.580138	2.487249	1865
CF	0.102424	0.100515	0.257482	-0.040684	0.078086	0.132778	2.406150	1865
VO	38.33953	34.41540	85.43271	0.000000	19.98760	0.581170	3.268607	1865
DOL	1.149140	0.987431	25.44688	-24.11664	9.835510	-0.049537	5.099880	1865
LIQ	2.361560	1.926449	5.731675	1.191178	1.222257	1.496965	4.419960	1865
GW	12.71651	10.70120	60.00968	-20.54368	18.98995	0.665533	3.491246	1865
PE	12.78110	11.51800	35.97165	-2.622500	9.123046	0.773737	3.524858	1865
QR	1.144808	0.977600	2.721200	0.367935	0.625069	1.112520	3.493729	1865
WK	0.174437	0.149970	0.555069	-0.097079	0.170189	0.559223	2.722714	1865
TDC	4.209189	3.374300	13.64809	-0.901110	3.559973	1.101403	3.777037	1865

CD is the actual dividend paid, **PR** is the dividend pay-out ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio, **LF** is the leverage factor, **LTM** is the total debt ratio based on the market value, **LTB** is the total debt ratio based on the book value, **LLM** is the long-term debt based on the market value, **LLB** is the long-term debt based on the book value, **INVEST** is the actual investment in assets, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **SIZE** is the company size, **TAN** is the asset tangibility, **CF** is the cash flow, **VO** is the market volatility, **DOL** is the degree of operating leverage used as proxy for the business risk, **LIQ** is the liquidity position of the company, **GW** is the growth in sales used as proxy for growth opportunities, **PE** is the price-earnings, **QR** is the quick ratio, **WK** is the net working capital, **TDC** is the total debt to cash flow. Descriptive statistics tests for the period 1999-2017 with winsorisation are presented in appendix 1.

Note:

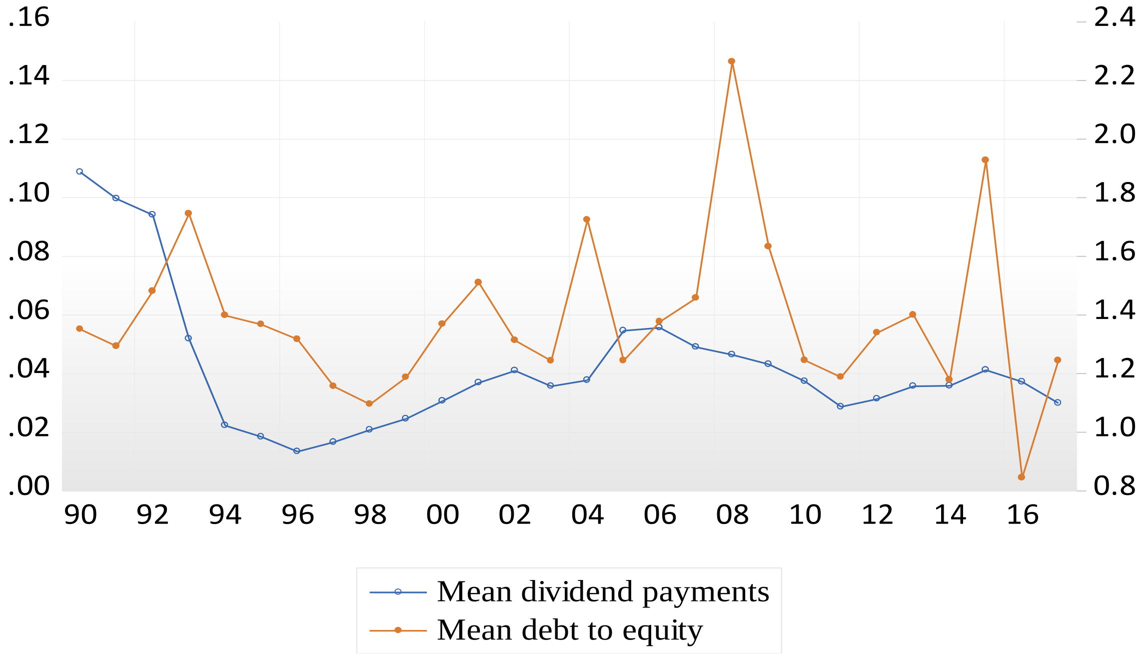
- The sample contains South African company-year data observed within the period 1990 to 2017.
- Winsorisation is the transformation of extreme values in the statistical data.
- The transformed data are identical to the original data except that, in this case, all data below the fifth percentile are set to the fifth percentile and all data above the 95^{th} percentile are set to the 95^{th} percentile.

5.4.2 Variations in the dividend payment and the capital structure full sample for the period 1990 to 2017

Figure 5.1 depicts the variations in the actual dividend paid (CD) and the variation in the debt-to-equity ratio (DE). The actual dividend graph shows that South African companies paid higher dividends between 1990 and 1992. Between the period 1992 and 1994, there was a huge decline in dividend payments, which slightly picked up between 1996 and 2006 but did not reach the level of pay-outs in 1990 and 1992. Between 2006 and 2012, the graph shows a decline in dividend payment because of the 2008 financial crisis. The graph shows again an increasing trend in dividend paid between 2012 and 2016 without reaching the level of pay-out between 2004 and 2006.

The capital structure graph shows that South African companies increased the level of debt (showing a demand for debt) between 1990 and 1994. Approximately over the same period JSE-listed companies decreased the amount of the actual dividend paid. Between the period 1994 and 1998, the graph shows a decline in the debt-to-equity ratio, which picked up between 1998 and 2004 (It is worth pointing out that over this period, there was a lot of volatility in the debt-to-equity ratio). Between 2004 and 2008, the graph indicates that South African companies became highly leveraged and reached levels in debt never reached between 1990 and 2004. This period of high leverage (between 2004 and 2008) coincides with the pre-financial crisis period. Between 2008 and 2012, South African companies deleveraged because of the financial crisis due to the economic crunch. Between 2012 and 2016, the graph shows that the debt-to-equity ratio became again volatile and reached its lowest levels in 2016. Taken together, Figure 5.1 shows that both the distribution policy and the capital structure seemed to be affected by economic shocks; the changes in the capital structure seemed to affect the actual dividend paid.

Figure 5. 1: Mean actual dividend paid (CD) and mean debt-to-equity ratio: full sample for the period 1990 to 2017



The left-hand axis is the mean actual dividend paid of the consumer goods sector and the right-hand axis is the mean debt-to-equity ratio of the consumer goods sector.

5.4.3 Correlation coefficient matrix of variables

The pair-wise correlation among the main variables is presented in Table 5.3. The table shows that the distribution policies (actual dividend paid and the pay-out ratio) and the five alternative measures, namely the debt-to-equity ratio (DE), the long-term debt based on the market value (LLM), the long-term debt based on the book value (LLB) , the total debt based on the book value LTB, and the total debt based on the market value LTM negatively correlated with one another at the 1% level. The leverage factor and the distribution policies (CD and PR) negatively correlated with one another at the 10% level. This result is consistent with the findings of Jensen *et al.,* (1992), Aggarwal and Kyaw (2010), who argue that companies carrying higher debt ratios pay out lower dividends. It is also evident that the volatility (VC) significantly and negatively correlated with the two natures of the dividend payments, and significantly and positively correlated with the different natures of the capital structure. Finally, the correlations between the pay policy, financing decisions and other variables are also informative. According to Table 5.3, the different alternative measures of the capital structure significantly and negatively correlated with profitability (RA) and liquidity, but positively correlated with asset tangibility (TAN), non-debt tax shield (NDT) and size (SIZE). The dividend payment positively correlated with profitability (RA); non-debt tax shield (NDT) and size (SIZE), but negatively correlated with market volatility (VO). The correlation between risk (DOL) and the dividend payments and the different natures of the capital structure was rather weak. In addition, there is evidence of the near multicollinearity presented in the correlation coefficient matrix.

Table 5. 3: Correlation matrix for the full sample

	CD	PR	DA	DE	LF	LLB	LTB	LTM	RA	NDT	SIZE	TAN	CF	VO	DOL	LIQ	GW	LLM
CD	1,00																	
PR	-0,54***	1,00																
DA	-0,10***	-0,07***	1,00															
DE	-0,13***	-0,07***	0,86***	1,00														
LF	-0,03*	-0,03*	0,36***	0,49***	1,00													
LLB	-0,04*	0,02*	0,18***	0,16***	0,00	1,00												
LTM	-0,34***	-0,19***	0,19***	0,26***	0,05***	0,06***	0,27***	1,00										
RA	0,52***	0,27***	-0,11***	-0,16***	-0,18***	-0,08***	-0,09***	-0,17***	1,00									
NDT	0,03*	0,02*	0,09***	0,12***	0,06***	0,18***	0,13***	-0,05**	-0,06***	1,00								
SIZE	0,15***	0,13***	0,05**	0,05**	0,09***	0,31***	0,16***	-0,13***	0,04*	0,07***	1,00							
TAN	0,03***	0,03*	0,01*	0,02*	0,07***	0,30***	0,03*	0,04*	0,09***	0,36***	0,03*	1,00						
CF	0,53***	0,28***	-0,06***	-0,07***	-0,04*	-0,06**	-0,07***	-0,34***	0,50***	0,18***	0,17***	0,07***	1,00					
VO	-0,22***	-0,22***	-0,01*	0,02*	0,03*	0,06***	0,04*	0,14***	-0,27***	0,02*	-0,03*	-0,10***	-0,18***	1,00				
DOL	0,00	0,05**	0,02*	0,03*	0,01*	0,03*	0,00	0,01*	0,05**	0,03*	0,04*	0,03*	0,02*	0,02*	1,00			
LIQ	0,05**	0,05**	-0,82***	-0,64***	-0,23***	-0,38***	-0,90***	-0,2***	-0,02*	-0,16***	-0,20***	-0,06***	0,01*	-0,02*	0,00	1,00		
GW	0,05**	0,05**	0,11***	0,06***	0,04*	-0,05**	0,09***	0,00	0,14***	-0,09***	-0,04*	-0,03*	0,10***	-0,08***	0,02*	0,10***	1,00	
LLM	-0,31***	0,20***	0,10***	0,15***	-0,03*	0,42***	0,24***	0,81***	-0,12***	0,00	0,01*	0,18***	-0,32***	0,11***	-0,01*	-0,22***	-0,01*	1,00

0.01(*), 0.05(**) and 0.1 (***) respectively**.** **CD** is the actual dividend paid, **PR** is the dividend pay-out ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio, **LF** is the leverage factor, **LTM** is the total debt ratio based on the market value, **LTB** is the total debt ratio based on the book value, **LLM** is the long-term debt based on the market value, **LLB** is the long-term debt based on the book value, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **SIZE** is the company size, **TAN** is the asset tangibility, **CF** is the cash flow, **VO** is the market volatility, **DOL** is the degree of operating leverage used as proxy for the business risk, **LIQ** is the liquidity position of the company and **GW** is the growth in sales used as proxy for growth opportunities.

5.5 Granger causality tests

In this section, a dynamic Granger causality test is used to examine the direction of causality between distribution policies and financing decisions because the policies are also dynamic in nature (they change over time). Furthermore, apart from being dynamic in nature, the test is chosen because of its favourable response to both large and small samples. It is also worth pointing out that this research uses different techniques to better understand the interactions between the two policies. The conventional Granger causality test in this research involves testing the null hypothesis that the alternative measures of the capital structure do not cause the distribution policy, and vice versa by simply running the following two equations (Gujarati, 2004):

$$\Delta CS_{it} = \lambda_0 + \sum_{i}^{m} \lambda_{1i} \Delta CS_{t-i} + \sum_{i}^{n} \lambda_{2i} \Delta DP_{it\text{-}i} + \mu_{it} \quad (5.11)$$

$$\Delta DP_{it} = \varphi_0 + \sum_{i}^{m} \varphi_{1i} \Delta DP_{it-i} + \sum_{i}^{n} \varphi_{2i} \Delta CS_{it\text{-}i} + \varepsilon_{it} \quad (5.12)$$

where

CS represents alternative measures of the capital structure (long-term debt based on the book value, long-term debt based on the market value, total debt based on the book value, total debt based on the market value, the debt-to-equity ratio and the debt-to-asset ratio), DP is the distribution policy representing the actual dividend paid and the dividend pay-out ratio; m and n represent the number of lagged variables; and u_{it} and ε_{it} represent the white noise error processes. The null hypothesis of DP does not Granger-cause CS is rejected if the λ_{2i} is jointly significant in equation 5.11. Similarly, in equation 5.12, the null hypothesis of CS does not Granger-cause DP is rejected if the φ_{21} is jointly significant.

Table 5.4 presents the pairwise Granger causality tests, Lags-5 between the dividend payments and the alternative measures of the capital structure. Overall, the empirical evidence presented in Table 5.4 clearly demonstrates that the long-term debt based on book value **(LLB)** Granger-causes the actual dividend **(CD)**; debt-to-assets ratio **(DA)** Granger-causes the pay-out ratio **(PR)**; the total debt ratio based on market value

(LTM) Granger-causes the pay-out ratio **(PR)**; the total debt based on the market value **(LTM)** Granger-causes **CD,** the long-term debt based on the market value Granger-causes **CD,** the total debt based on the book value **(LTB)** Granger-causes the pay-out ratio **(PR)** and there is a bidirectional causality between the long-term debt based on market value **(LLM**) and the pay-out ratio **(PR)**.Therefore, it is likely that the two policies are interrelated.

Table 5. 4: Pairwise Granger causality between distribution strategies and different alternative measures of the capital structure

Null Hypothesis:	Obs.	F-Statistic	P-value	Causal relation
DE does not Granger-Cause CD	1533	1.09097	0.3634	
CD does not Granger-Cause DE		0.52578	0.7569	
DA does not Granger-Cause CD	1533	2.04503	0.0697	
CD does not Granger-Cause DA		0.56948	0.7235	
LLB does not Granger-Cause CD	1522	2.50904*	0.0285	LLB→CD
CD does not Granger-Cause LLB		1.92637	0.0870	
LLM does not Granger-Cause CD	1533	5.67981***	3.E-05	LLM→CD
CD does not Granger-Cause LLM		1.50717	0.1845	
LTB does not Granger-Cause CD	1528	2.08165	0.0651	
CD does not Granger-Cause LTB		0.92769	0.4619	
LTM does not Granger-Cause CD	1533	6.28900***	9.E-06	LTM→CD
CD does not Granger-Cause LTM		1.41036	0.2175	
DE does not Granger-Cause PR	1564	1.07066	0.3748	
PR does not Granger-Cause DE		1.10152	0.3576	
DA does not Granger-Cause PR	1564	2.19203*	0.0527	DA→PR
PR does not Granger-Cause DA		1.41607	0.2154	
LLB does not Granger-Cause PR	1528	1.25823	0.2795	
PR does not Granger-Cause LLB		1.63283	0.1481	
LLM does not Granger-Cause PR	1561	4.96590***	0.0002	LLM↔PR
PR does not Granger-Cause LLM		2.34495*	0.0393	
LTB does not Granger-Cause PR	1534	2.63264*	0.0223	LTB→PR
PR does not Granger-Cause LTB		1.15399	0.3298	
LTM does not Granger-Cause PR	1561	2.77294*	0.0168	LTM→PR
PR does not Granger Cause LTM		1.44956	0.2035	

(*)/ [***] indicates the rejection of the null hypothesis at (5%)/[1%] level of significance
DE is the debt-to-equity ratio, **DA** is the debt-to-asset ratio, **LLB** is the long-term debt based on the book value, **LLM** is the long term debt based on the market value, **LTM** is the total debt ratio based on the market value, **LTB** is the total debt ratio based on the book value, **CD** is the actual dividend paid and **PR** is the pay-out ratio.
Lags-5 is the number of lags included in the test to determine the simultaneous strategic decision-making framework between the capital structure and distribution strategies.

5.6 SINGLE-EQUATION ANALYSES

Although the purpose of the study was to investigate the simultaneity among corporate capital structure and distribution strategies, it is desirable to first apply the single-equation estimation technique to the corporate equations separately. The single-equation estimation results presented in this section are comparable with those provided by the previous studies, which ignored the interdependence of the decision-making processes that are investigated in this research.

Given the endogeneity of the corporate decision variables and the dynamic structures of the corporate behaviour models, equations are estimated separately using the fixed-effects model, the random effects model and the system-generalised method of moments (system-GMM) estimators. This approach is an efficient extension of the difference generalised method of moments (difference-GMM) estimators developed by Arellano and Bond (1991). It combines an equation in differences of the variables with an equation in levels of variables to form a system in which lagged levels are used as instruments for the differenced equation and lagged differences are used as instruments for the level equation (Arellano & Bover, 1995; Blundell and Bond, 1998). The use of instruments in such a way is considered a possible solution to the endogeneity problems as well as the weak instrument problems.

In the implementation of system GMM estimators, there is a choice of using one-step or two-step estimation. The one-step estimation assumes homoscedastic errors, whereas the two-step estimators generate heteroscedasticity consistent standard errors. Thus, the two-step estimators are expected to be asymptotically more efficient than their one-step counterparts. However, as the reported standard errors in two-step estimation tend to be downward biased, it is important to use the finite sampling correction to the standard errors computed in two-step estimation (Roodman, 2009). Therefore, the two-step system GMM estimators with finite sampling correction are used to estimate the structural equations for the capital structure and distribution strategies. The single-equation results are obtained using EViews 11.

Given the fact that the reliability of the system GMM method crucially depends on the validity of instrument and serial correlation of the error terms, they are checked with

Hansen's J-statistic of overidentifying restrictions and Arellano-Bond's tests of serial correlation respectively. The results of the fixed- and random effects are presented in Table 5.5 and the results of the generalised method of moments are presented in Table 5.6.

5.6.1 Individual equation of the dividend payments: FE, RE and GMM approach (1990-2017)

Table 5.5 presents the effect of the three alternative measures of the capital on the dividend payments for the period 1990 to 2017 using a fixed and a random effect single-equation approach. The results are computed using EViews 11.

(a) Fixed-effects and random effects models

The fixed effects and the random effects models of the dividend payment equation are presented in Table 5.5. The fixed-effects model acknowledges cross-section heterogeneity and assumes a different intercept for each company included in the sample. It achieves this by including a matrix of dummies in the estimation in the case of the LSDV estimator. In the case of the within estimator, cross-section effects are wiped out, essentially estimating the same coefficients but running the regression through the origin. The presence of these effects is apparent since the F-test for the fixed effects clearly rejects the null hypothesis of homogeneous cross-sections (Baltagi, 2008). These fixed effects may represent differences in financing decisions or distribution strategy decisions that are not explicitly included in the specification, but which are accounted for when estimation is done, ultimately leading to more representative estimates. This is evident from the fact that this model has the highest adjusted R^2 value in Model Variants 1, 2 and 3 (0.590606, 0.591432 and 0.581180 respectively). The random effects model also acknowledges the cross-section heterogeneity but differs from the fixed-effects model in that it assumes that the fixed effects are generated by a specific distribution. Therefore, this model assumes cross-section differences but does not explicitly model each effect. The loss in degrees of freedom, as is the case in the fixed-effects model, is subsequently avoided. However, the Hausman test in Table 5.4 confirms the validity of specific fixed effects rather than random effects since the null hypothesis (the individual specific effects are random) is rejected making the estimates of the fixed-effects model consistent. Consequently, the interpretation of the results of the dividend equation as explained by the three alternative measures of the capital structure is based on the fixed-effects model.

1) The three alternative measures of the capital structure (DE, DA AND LF)

The three alternative measures of the capital structure are directly related to the actual cash dividend paid. The coefficients on the debt-to-equity ratio and the debt-to-asset ratio are negative and highly significant, while the coefficient of the leverage factor is positive and highly significant. A one-unit change in the debt-to-equity ratio and the debt-to-asset ratio is associated with a 0.002340 and 0.013672 decrease in the actual dividend paid at the 1% significance level. A one-unit change in the leverage factor is associated with a 0.001034 increase in the actual dividend paid at the 5% significance level.

The negative relationship between the dividend payments and the two alternative measures validates the arguments that companies that have higher debt distribute lower dividend since earnings are paid for debt servicing (Al-Shuburi, 2011 & Kaźmierska-Jóźwiak, 2015). Stated differently, when companies borrow capital from debt finance, they commit themselves to the payment of fixed-interest charges, which include interest and a principal amount, and failure to meet these obligations may result in the companies facing the risk of liquidation and bankruptcy.

Furthermore, Rozeff (1982) argues that high leverage increases the transaction costs and the risk of the company. Companies with high leverage ratio have high fixed payments for using external financing. Therefore, the higher the leverage ratio, the lower the chance for dividend and consequently leverage is negatively related to dividend. This result is supported by the agency cost theory of dividend policy. This finding is also consistent with the empirical results reported by prior research (Arko *et* *al.,* 2014; Banerjee & De 2015; Benavides *et al.,* 2016; Ben Amar *et al*., 2018; Crutchley *et al*.,1999; Ding & Murinde, 2010; Frank & Goyal, 2009; Labhane, 2018; Moon *et al*., 2015; Yusof & Ismail 2016).

2) Profitability (RA)

The coefficient of the profitability positively and significantly correlates with the actual cash dividend paid. A one-unit change in the company profitability is associated with a 0.000888 increase in the actual dividend paid at the 1% significance level. Therefore, Hypothesis H5A is accepted. The positive relationship confirms the rational of the signalling hypothesis suggesting that signals with cash-based variables cannot be replicated by unprofitable companies because such companies do not have the ability to generate future cash and maintain the announced dividend payments. Furthermore, companies that are profitable tend to increase dividend rather than to increase the balance of retained earnings in order to avoid free cash flow problems as asserted by Jensen (1986). This finding is consistent with prior empirical results (Al-Najjar, 2011; Aivazian *et al*., 2003; Baker *et al*., 2019; Chang & Rhee, 1990; Ho, 2003; Yusof & Ismail, 2016)

3) Company size

The coefficient of the company size is positive and highly significant. A one-unit change in the company size is associated with a 0.005402 increase in the actual dividend paid at the 1% significance level. Consequently, Hypothesis 10A is accepted. The positive relationship indicates that large companies tend to be more diversified than smaller companies, therefore they are less prone to the risk of bankruptcy (Rajan & Zingales, 1995). The findings are in line with the trade-off theory. Prior research found similar results (Hashemi & Zadeh, 2012; Ramli, 2010; Rajan & Zingales, 1995; Yusof & Ismael, 2016). To the contrary, other authors found no evidence of the effect of the company size on the dividend payments (Al-Najjar, 2011; Chen & Dhiensiri, 2009; & Sim, 2011). Huda and Farah (2011) found a negative but significant relationship between the company size and the dividend payments.

4) Liquidity (LIQ)

The coefficient of liquidity positively and significantly correlates with the actual dividend paid. A one-unit change in the company's liquidity is associated with a 0.002570 increase in the actual dividend paid at the 1% significance level. The positive sign is supported by the narrative that companies with higher cash availability are more likely to pay dividends than companies with an insufficient level of cash. Therefore, the likelihood of a company paying a cash dividend is positively related to liquidity. The findings are supported by the signalling theory of dividend policy (Ho, 2003). Therefore, Hypothesis 8A is accepted.

5) Market volatility (VO)

The coefficient of market volatility (VO) is negative and highly significant. A one-unit change in market volatility is associated with a 7.50E-05 decrease in the actual dividend paid at the 1% significance level. This indicates that during a period of high uncertainty and increased risk, companies decrease the actual amount of dividend paid. As a result, Hypothesis 15A is accepted

6) Degree of operating leverage (DOL)

The coefficient of the degree of the operating leverage is negative and highly significant. A one-unit change in the operating leverage is associated with a 9.14E-05 decrease in the actual dividend paid. This finding validates the narrative that companies with high business risk are more likely to be bankrupted (Al-Najjar, 2011). Because debt involves a commitment of period payments to the lender, highly leveraged companies are prone to financial distress costs. Thus, companies with volatile returns are expected to use less debt in their capital structure than those with stable returns (Bhaduri, 2002). In addition, such companies are less likely to pay dividends. Therefore, Hypothesis 6A is accepted. This finding is similar to the findings by Ramli (2010) and Al-Shubiri (2011) but contradicts the finding by Al Shabibi and Ramesh (2011).

7) Growth opportunities (GW)

The coefficient of growth opportunities negatively and significantly correlates with the actual dividend paid. A one-unit change in the growth opportunities is associated with a 0.000100 decrease in the actual dividend paid at the 1% significance level. The negative sign shows that companies tend to retain and keep the profit gained because they will be used as funds for further financing enlargements and growth. Stated differently, growing companies are less likely to pay dividends. Therefore, Hypothesis 13HA is accepted. This finding contradicts the finding by Yusof and Ismael (2016) but is in line with the findings by Al-Shubiri (2011) and Imran (2011).

8) Cash flow (CF)

The coefficient of the cash flow positively correlates with the actual dividend paid. Therefore, Hypothesis 7A is accepted. A one-unit change in the cash flow is associated with a 0.046458 increase in the actual dividend at the 1% significance level. The positive sign indicates that if the available cash flow of the company increases, then there is a surplus of cash after the company's obligations have been met, thus this money can be used for the payment of the dividends to the shareholders. The significance of the cash flow also supports the free cash flow hypothesis (Jensen, 1986). Thus, companies with higher cash flow are more likely to distribute dividends because this helps to control management's tendency to use the free cash flow to pursue unprofitable investments. Consequently, an agency cost that may arise from holding free cash is prevented.

9) Asset tangibility and non-debt tax shields

The coefficients of the asset tangibility and non-debt tax shield are positive and statistically insignificant. The findings of the research using the fixed-effects and random effects models suggest that the asset tangibility and the non-debt tax shields do not explain the distribution policy of JSE-listed companies.

Table 5. 5: Estimation results of the actual dividend with the different natures of the capital structure (fixed- and random effects models):1990-2017

	Dependent variable: actual cash dividend paid (CD)					
	Fixed-effects model			**Random effects model**		
	CD and DE	**CD and DA**	**CD and LF**	**CD and DE**	CD and DA	CD and LF
	Coefficient t-statistic	Coefficient t-statistic	Coefficient t-statistic	Coefficient t-statistic	Coefficient t-statistic	Coefficient t-statistic
Constant	-0.020087* -2.490786	-0.014798 -1.853205	-0.027826*** -3.501102	-0.017411** -2.683070	-0.018784* -2.444216	-0.024451*** -3.941128
RA	0.000888*** 10.94782	0.000897*** 11.30413	0.000946*** 11.38522	0.001078*** 14.71347	0.001088*** 14.77651	0.001128*** 15.37790
NDT	0.026852 0.611009	0.015397 0.348057	0.028735 0.638930	-0.014664 -0.418914	-0.016380 -0.464285	-0.013246 -0.378933
SIZE	0.005402*** 5.837767	0.005313*** 5.851882	0.005336*** 5.677863	0.004479*** 5.527448	0.004499*** 5.532651	0.004492*** 5.556903
TAN	0.003693 0.802467	0.003983 0.869500	0.002620 0.562208	-0.001531 -0.440745	-0.001674 -0.481938	-0.001452 -0.418748
CF	0.046458*** 7.279067	0.046707*** 7.384017	0.048505*** 7.557458	0.089296*** 11.74477	0.089895*** 11.82491	0.089556*** 11.80441
VO	-7.50E-05*** -5.074471	-7.37E-05*** -5.174730	-6.97E-05*** -4.350309	-6.96E-05** -2.706628	-6.90E-05** -2.683962	-6.69E-05** -2.608700
DOL	-9.14E-05* -2.102631	-9.51E-05* -2.149421	-9.79E-05* -2.135701	-5.43E-05 -1.176672	-5.73E-05 -1.241146	-5.71E-05 -1.241290
LIQ	0.001253* 2.424030	0.000701 1.237943	0.002570*** 5.425688	0.000854 1.336290	0.001156 1.389387	0.001757** 3.233734
GW	-8.93E-05*** -4.474981	-8.90E-05*** -4.399272	-0.000100*** -5.180336	-0.000142*** -5.680792	-0.000143*** -5.712655	-0.000146*** -5.850995
DE	-0.002340*** -5.372423			-0.001336 -1.841254		
DA		-0.013672*** -4.177629			-0.002646 -0.521784	
LF			0.001034** 3.139636			0.001648*** 3.338415
Regression statistics						
Number of observations	1865	1865	1865	1865	1865	1865
Adjusted R^2	0.583897	0.585060	0.574734	0.288567	0.288024	0.291344
F-statistics test	14.839067***	14.020915***	13.801756***			
Hausman test				59.545983***	62.354302***	57.725691***

*/(**)/[***] indicates the significance of the coefficient or the rejection of the null hypothesis at 10%/(5%)/[1%] level of significance. The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. **RA** is the return on assets used as proxy for profitability, **NDT** is the non-debt tax shields, **SIZE** is the company size, **TAN** is the asset tangibility, **CF** is the cash flow, **VO** is the market volatility, **DOL** is the degree of operating leverage used as a proxy for business risk, **LIQ** is the company liquidity, **GW** is the growth in sales used as a proxy for growth opportunities, DE is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor.

(b) <u>Generalised method of moments (GMM)</u>

Table 5.6 presents the effect of the three alternative measures of the capital structure on the dividend payments for the period 1990 to 2017 using a single-equation GMM approach. The results are computed using EViews 11.

Given the endogeneity of the company decision variables and the dynamic structures of financing decisions and distribution strategy decisions, the dividend equation is estimated using the generalised method of moments (system GMM) estimators for robustness check. The approach combines an equation in differences of the variables with an equation in levels of variables to form a system in which lagged levels are used as instruments for the differenced equation and lagged differences are used as instruments for the level equation (Arellano & Bover, 1995; Blundell & Bond, 1998). The use of instruments in such a way is considered a possible solution to the endogeneity problems as well as the weak instrument problems. The research uses the two-step estimators and the results of the models are obtained using EViews 11.

1) Three alternatives measures of the capital structure

The coefficients of the debt-to-equity ratio and the debt-to-asset ratio are negative and significant at the 10% level, while the coefficient of the leverage factor is positive and insignificant. The findings indicate that in the short run, a one-unit change in the debt-to-equity ratio and the debt-to-asset ratio is associated with a 0.009023 and 0.035877 decrease in the dividend payments respectively. The results are in line with the fixed-effects model.

2) Growth opportunities

The coefficient of the company's growth is negative and statistically significant. The finding suggests that a one-unit change in growth opportunities is associated with a 0.000160 decrease in the companies' actual dividend paid in the short run at the 5% level, on average *ceteris paribus.* This finding is in line with the fixed-effects model and contradicts the finding by Baker *et al*., (2019). The finding is in line with the fixed-effects model.

3) Profitability (RA)

The coefficient of the company's profitability is surprisingly negative and significant at the 10% level. The finding suggests that in the short run, a one-unit change in the company's profitability is associated with a 0.000591 decrease in the actual dividend paid at the 10% significance level, on average *ceteris paribus*. The finding is not in line with the fixed-effects model and Hypothesis 5A is rejected.

4) Non-debt tax shield (NDT)

The coefficient of the non-debt tax shield is positive and statistically significant. The finding indicates that a one-unit change in the non-debt tax shield is associated with a 0.966638 increase in the actual dividend paid in the short run, at the 10% significance level, on average *ceteris paribus*. Therefore, Hypothesis 14A is accepted.

5) Company size

The company size coefficient is positive and statistically significant. The results show that a one-unit change in the company size is associated with a 0.014081 increase in the actual dividend paid in the short run, at the 10% significance level, on average *ceteris paribus*. The finding is in line with the fixed-effects model. Therefore, Hypothesis 10A is accepted.

6) Cash flow (CF)

The coefficient of the company's cash flow is positive and statistically significant. A one-unit change in the cash flow is associated with 0.169726 increase in the actual dividend paid in the short run, at the 5% significance level, on average *ceteris paribus*. The finding is in line with the fixed-effects model.

7) Lagged dividend paid

The coefficient of the lagged dividend paid is positive and statistically significant. The finding suggests that the dividend payment is dynamic in nature and the current level in actual dividend paid is determined by its past levels at the 10% significance level in the short run, on average *ceteris paribus.* This finding is consistent with the findings by Baker *et al.* (2019).

Table 5.6: System GMM for the dividend payment and the different natures of capital structure for the full sample: 1990-2017

Dependent variable: the actual dividend paid (CD)			
	Model Variant (1) **CD and DE**	Model Variant (2) **CD and DA**	Model Variant (3) **CD and LF**
	Cash dividend	Cash dividend	Cash dividend
Ind. variable	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic
Lagged cash dividend (CD(-1))	0.161152* 1.914464	0.162645* 1.932323	0.171450* 1.902841
Growth opportunities (GW)	-0.000160** -2.685906	-0.000175** -2.963923	-0.000176** -2.763100
Profitability (RA)	-0.000591* -2.063457	-0.000615* -2.108143	-0.000696* -2.014466
Non-debt tax shield (NDT)	0.966638* 2.574132	0.914175* 2.490008	0.762594* 2.033300
Company size (size)	0.014081* 2.209379	0.013672* 2.160398	0.007112 1.077677
Cash flow (CF)	0.096598* 2.522075	0.082747* 2.223054	0.169726** 2.729390
Market volatility (VO)	-0.000667 -1.635025	-0.000731 -1.751235	-0.000725 -1.544042
Debt-to-equity ratio (DE)	-0.009023* -2.314363		
Debt-to-asset ratio (DA)		-0.035877* -2.303538	
Leverage factor			0.000649 0.539547
Model summary			
No. observation	1451	1451	1451
No. group	68	68	68
Year dummies	Included	Included	Included
Industry dummies	Not included	Not included	Not included
AB-AR (1) **P-value**	-6.409223*** 0.0000	-6.400259*** 0.0000	-6.199430*** 0.0000
AB-AR (2) **P-value**	-0.955856 0.3391	-0.774754 0.4385	0.093988 0.9251
Hansen test (J-statistic) **p-value**	17.23636 0.140920	17.24973 0.140442	13.87866 0.308524

t-statistics reported in parentheses.
*/ (**)/ [***] indicates the significance of the coefficient or the rejection of the null hypothesis at 10%/ (5%)/ [1%] level of significance. Arellano-Bond test for first serial correlation: Reject null of no first-order serial correlation. AB test for second-order serial correlation: Fail to reject the null of second-order serial correlation (at 5% level significance). Hansen J test for overidentifying restrictions (test is robust to heteroscedasticity and autocorrelation): Fail to reject the null that overidentifying restrictions are valid.

5.6.2 Individual equation of financing decisions: FE, RE and GMM (1990-2017)

(a) Fixed-effects and random effects models

Table 5.7 presents the effect of the actual dividend paid on the three different ways of measuring the capital structure (debt-to-equity ratio, debt-to-asset ratio and the leverage factor) for the period 1990 to 2017 using a fixed-effects and a random effects single-equation approach. For the fixed-effects model, the research uses Panel EGLS (white cross-section standard errors & covariance). The results are computed using EViews 11. The Hausman test suggests that the null hypothesis in the random effects model of the debt-to-equity ratio and the debt-to-asset ratio is rejected. As a result, the coefficients in the fixed-effects model of the financing equation (DE and DA) are consistent excluding the leverage factor equation where the null hypothesis of the specific individual random effects model is not rejected making the coefficient in the model efficient.

1) Actual dividend paid (CD)

The coefficient of the actual cash dividend paid is negative and significant in the debt-to-equity ratio equation and positive and significant in the leverage factor equation. A one-unit change in the actual dividend paid is associated with a 0.682193 decrease in the debt-to-equity ratio and a 2.417394 increase in the leverage factor at the 10% and 5% significance levels respectively. With regard to the negative relationship, the finding is consistent with the trade-off theory and the pecking-order theory. According to the trade-off theory, companies will only increase dividends if they want to replace internal equity with debt to increase the company's interest debt shield, which directly adds to the company's overall value (Barclay & Smith, 1999). The pecking-order theory argues that an increase in actual dividend paid increases the company's internal funds deficit (Shyam-Sunder & Myers, 1999:224). This deficit can only be financed in pecking-order way, with equity being the first choice, and hence an increase in dividends is directly proportional to an increase in debt-to-equity ratio. The correlation in the debt-to-equity ratio equation is similar to that of Ali Ahmed and Hisham (2009).

2) Profitability (RA)

The coefficient of profitability is inversely and significantly related to the three alternative measures of the capital structure at the 10% level for the debt-to-equity ratio and at the 1% level for the debt-to-asset ratio and the leverage factor equation. A one-unit change in the company profitability is associated with a 0.003467 decrease in the debt-to-equity ratio, with a 0.001353 decrease in the debt-to-asset ratio and with a 0.013053 decrease in the leverage factor. This is consistent with findings in the literature (Al-Najjar, 2011; Booth *et al.,* 2001; Bhaduri, 2002; Frank & Goyal, 2009; Huang & Song, 2006; Kayhan & Titman, 2007 ; Ranjan & Zingales 1995). Therefore, Hypothesis 15A is accepted.

3) Liquidity (LIQ)

The liquidity position of the company is regarded as a measure of the ability of companies to meet their financial obligations and their capacity to pay their creditors using their available assets. The research results reveal that the coefficient of liquidity is negative and statistically significant in all three alternative measures of the capital structure equation (debt-to-equity ratio, debt-to-asset ratio and the leverage factor). A one-unit change in the liquidity position of the company is associated with a 0.346378 decrease in the debt-to-equity ratio, with a 0.119127 decrease in the debt-to-asset ratio and with a 0.121669 decrease in the leverage factor. This finding is consistent with the prediction of the pecking-order theory (POT). The companies with more liquid assets have a lower level of external capital, which shows that companies with greater liquidities prefer to use internally generated earnings for future investments. This finding is consistent with some studies (Deesomsak, Paudyal, & Pescetto, 2004; Mazur, 2007). Furthermore, based on the narrative that the costs of equity are lower with increased liquidity, making equity finance more attractive, South African companies listed on the JSE will rather choose internal capital as priority over external finance due to market volatility, higher risk and the cost imposed on external finance options. To the contrary, Al-Najjar (2011) found a statistically positive relationship between the liquidity and the debt-to-asset ratio. Therefore, Hypothesis 18A is accepted.

4) Asset tangibility (TAN)

The coefficient of asset tangibility is positive and highly significant in the debt-to-equity ratio and the debt-to-asset ratio. A one-unit change in the asset tangibility is associated with a 0.223722 increase in the debt-to-equity ratio and with a 0.060720 increase in the debt-to-asset ratio. The positive sign indicates that the company's debt levels increase with increasing asset tangibility. This finding is consistent with the trade-off theory, which predicts a positive relationship between asset tangibility and the capital structure. The finding is also consistent with some empirical results (Al-Najjar, 2011; Bhaduri, 2002; Booth *et al.,* 2001; Huang & Song, 2006; Jensen & Meckling,1976; Rajan & Zingales,1995; Titman & Wessels,1988). Therefore, Hypothesis 16A is accepted.

5) Company size (SIZE)

The coefficient of the company size is negative and highly significant in the debt-to-equity ratio and the debt-to-asset ratio in the fixed-effects model. A one-unit change in the company size is associated with a 0.084371 decrease in the debt-to-equity ratio and with a 0.015529 decrease in the debt-to-asset ratio. The negative sign suggests that large South African companies listed on the JSE are more likely to be susceptible to financial distress. The research results contradict previous findings of some authors (Al-Najjar, 2011; Bhaduri, 2002; Booth *et al.*, 2001; Rajan & Zingales, 1995). Therefore, Hypothesis 20A is accepted.

6) Cash flow (CF)

The coefficient of the cash flow is negative and significant in the debt-to-equity ratio and the debt-to-asset ratio. A one-unit change in the cash flow is associated with a 0.387843 decrease in the debt-to-equity ratio at the 5% significance level and with a 0.052908 decrease in the debt-to-asset ratio at the 10% significance level. The negative sign suggests that if the company's cash flow can be treated as an indicator of a company's financial soundness and credit worthiness, then companies tend to depend more on debt to finance operating activities. Therefore, Hypothesis 22A is accepted.

7) Company growth (GW)

In the results of all three debt ratios, the coefficient of the growth opportunity is positive and statistically significant. A one-unit change in the company's growth opportunity is associated with a 0.001426 increase in the debt-to-equity ratio at the 5% significance level, with a 0.000250 increase in the debt-to-asset ratio at the 1% significance level and with a 0.001879 increase in the leverage factor at the 1% significance level. Theoretically, based on the pecking-order theory (POT), the findings support the narrative that if the internal capital is not enough and significant external finance is required for future development, the growth opportunity should be positively related to the capital structure because an asymmetric information problem exists between the company investors and managers. In addition, the companies with greater potential tend to find it easier to obtain external funding. On the contrary, greater growth opportunity such as one of intangible asset also could result in higher financial distress costs in the long run, because it cannot be collateralised. Growth opportunities add value to the company and increase its debt capacity. These results contradict the findings of Frank and Goyal (2009:26), who found a negative correlation between growth rate and the capital structure. This finding is similar to the findings reported in Bhaduri (2002); Booth *et al.* (2001); Voulgaris, Asteriou and Agiomirgianakis (2004) and Al-Najjar (2011). Therefore, South African JSE-listed companies with high growth opportunities tend to face different financing alternatives, and they prefer debt financing as a source of financing their investment opportunities. According to Al-Najjar (2011), such companies have a low profitability of bankruptcy and hence have more access to debt financing than low-growth companies. Therefore, Hypothesis 17A is rejected.

8) Non-debt tax shields (NDT)

The coefficient of the non-debt tax shield is negative and significant in the debt-to-equity ratio at the 10% level and in the debt-to-asset ratio at the 1% level. A one-unit change in the non-debt tax shield is associated with a 1.779334 decrease in the debt-to-equity ratio and with a 0.945544 decrease in the debt-to-asset ratio. The negative sign indicates that the company's debt-to-equity ratio and the debt-to-asset ratio decrease with an increase in their non-debt tax shields. These results confirm the trade-off hypothesis. Ali Ahmed and Hisham (2009:63) and Kayhan and Titman (2007:28) validated similar results. According to De Angelo and Masulis (1980:27), non-debt tax shields are perfect substitutes for debt interest tax shields. As a result, companies with higher non-debt tax shields would have less of an appetite for debt, because the benefit of debt finance would already be captured by the non-debt tax shields. Therefore, such companies would issue less debt and rely more on equity finance; hence there is an inverse relationship between non-debt tax shields and the two alternative measures of the capital structure. Therefore, Hypothesis 21A is accepted.

Table 5.7: Estimation of financing equations with the dividend payments: 1990-2017 (fixed- and random effects models)

Dependent variable: Debt ratios						
	Fixed-effects model			**Random effects model**		
	DE	**DA**	**LF**	**DE**	**DA**	**LF**
	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic
constant	2.657748*** 15.46855	0.861813*** 37.08504	1.663343*** 6.974903	2.621513*** 12.59493	0.862653*** 29.78930	2.006375*** 6.771832
CD	-0.682193* -2.267719	-0.069235 -0.939197	2.417394** 3.236667	-1.480655* -2.097689	-0.117234 -1.190000	3.544303** 3.303372
RA	-0.003467* -2.295070	-0.001353*** -5.427017	-0.013053*** -3.818735	-0.007288** -3.076396	-0.001708*** -5.164989	-0.024209*** -6.719151
NDT	-1.779334* -2.545963	-0.945544*** -5.679410	-1.096301 -1.125555	-0.779125 -0.696016	-1.004158*** -6.433025	-0.636928 -0.383586
SIZE	-0.084371*** -3.538292	-0.015529*** -4.572531	0.044496 1.328693	-0.035565 -1.308719	-0.014048*** -3.710990	0.023130 0.589858
TAN	0.223722*** 4.158118	0.060720*** 4.764510	-0.263070* -2.232359	0.339814** 2.873849	0.084860*** 5.155381	-0.187454 -1.115998
CF	-0.387843** -3.193954	-0.052908* -2.013667	-0.011386 -0.044933	-0.444055 -1.846836	-0.061402 -1.829318	-0.211791 -0.575999
VO	0.000389 0.878477	0.000112 1.052644	1.20E-05 0.013263	-0.000859 -1.081598	-0.000131 -1.177190	-0.000523 -0.433389
DOL	0.000684 1.111603	8.14E-05 0.504341	-0.000828 -0.486142	0.002464 1.765835	0.000240 1.230621	-0.000459 -0.214054
LIQ	-0.346378*** -31.09162	-0.119127*** -50.31979	-0.121669*** -6.782639	-0.444078*** -24.97103	-0.119229*** -48.11695	-0.166653*** -6.449997
GW	0.001426** 3.023145	0.000250*** 3.413848	0.001879** 2.632876	0.000932 1.214521	0.000250* 2.338221	0.002067 1.756677
Regression statistics						
No of obs.	1865	1865	1865	1865	1865	1865
Adjusted R^2	0.755170	0.904923	0.328708	0.281009	0.567061	0.047252
F-statistic test	31.966459***	40.296296***	9.730364***			
Hausman test				41.879597***	85.718347***	12.749191

*/ (**)/ [***] indicates the significance of the coefficient or the rejection of the null hypothesis at 10%/ (5%)/ [1%] level of significance. The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. **RA** is the return on assets used as proxy for profitability, **NDT** is the non-debt tax shields, **SIZE** is the company size, **TAN** is the asset tangibility, **CF** is the cash flow, **VO** is the market volatility, **DOL** is the degree of operating leverage used as a proxy for business risk, **LIQ** is the company liquidity, **GW** is the growth in sales used as a proxy for growth opportunities, DE is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor.

(b) Generalised method of moments

Table 5.8 presents the effect of the dividend payments on the three different natures of the capital structure using a single-equation system GMM approach for the period 1990 to 2017.

1) Actual dividend paid (CD)

Focusing on the results in Table 5.8 for the individual financing equations using the GMM approach, the coefficient of the actual dividend paid is positive and insignificant in all debt ratio (debt-to-equity, debt-to-asset and the leverage factor) equations.

2) Lagged debt ratios (DE_{t-1}, DA_{t-1} and LF_{t-1})

The trade-off theory suggests that companies have a target capital structure and they will adjust their optimal capital structure to meet this. The speed of adjustment towards optimal capital structure usually relates to the effects of lagged debt ratios at the previous periods on the current debt ratios in the current year. Further, the speed of adjustment towards target is also related to the cost of adjustment and the cost of being off target (Hovakimian, Opler and Titman, 2001). If the coefficient is positive and below the unity coefficient, this suggests that the companies have their target capital structure and that they are adjusting their capital structure well. Conversely, if a coefficient is greater than one, this implies that companies do not have any optimal debt ratios.

The research results reveal that there is a significant and positive correlation of lagged debt ratios on capital structure decisions across two debt ratios (debt-to-equity and debt-to-asset ratios) for the full sample. The coefficients are between 0 and 1 across the two debt ratios, which indicates that there is a dynamic capital structure for these selected JSE-listed companies and that they are adjusting their capital structure to the desired level over time. In the estimation of the debt-to-equity ratio, as the regression result reveals, the coefficient is greater than zero (0.411599). Therefore, it can be concluded that there is some inertia in the adjustment of capital structure, mostly likely due to the cost of raising debt and lack of funds to be always on the target value .

Furthermore, the *speed of adjustment* is defined as one minus the value of the estimated coefficient of the lagged debt variable in the dynamic capital structure model. As can be seen in Table 5.8, the coefficient of the lagged debt-to-equity ratio is small (1-0.411599=0.588401). This provides evidence that the speed of adjustment on the overall debt-to-equity ratio is higher for JSE-listed companies. In terms of the debt-to-asset ratio, it can be seen that the coefficient is still greater than zero (0.420794), implying that there is optimal capital structure in the debt-to-asset ratio financing pattern. However, comparing this with the debt-to-equity ratio, the magnitude of its adjustment is approximately the same, with only 0.579206 (1-0.420794=.0.579206). Comparatively, with regard to the leverage factor, the result is surprising as the lagged leverage ratio is negative and insignificant. The empirical findings reveal the presence of a dynamic capital structure decision for JSE-listed companies and the fact that the speed of adjustment is a trade-off of between the cost of adjustment and the cost of being off target.

3) Profitability (RA)

The coefficient of the company profitability is negative and highly statistically significant in all three debt ratio equations. A one-unit change in the company's profitability in the short run is associated with a 0.013833 decrease in the debt-to-equity ratio, with a 0.002471 decrease in the debt-to-asset ratio and with a 0.001200 decrease in the leverage factor at the 1% significance level, on average *ceteris paribus*. Further, the research finding that companies with greater profitability tend to have a lower debt level is consistent with the prediction of the pecking-order theory (POT), namely that companies prefer to use internal capital rather than external capital. Moreover, it also indicates that external capital is costly and that companies make corporate financing decisions from the consideration of cost and risk. The negative correlation also indicates that for South African companies listed on the JSE, the problem of information asymmetry (imbalanced information) is a persistent and driving force in influencing companies. The findings are similar to the fixed-effects model.

4) Non-debt tax shield (NDT)

The coefficient of the non-debt tax shield is negative and statistically significant in the debt-to-asset ratio equation. A one-unit change in the non-debt tax shields is associated with a 3.338726 decrease in debt-to-asset ratio in the short run at the 1% significance level, on average *ceteris paribus*. The finding is similar to the fixed-effects model.

5) Asset tangibility (TAN)

The asset coefficient is positive and statistically significant in the debt-to-asset ratio at the 10% significance level. A one-unit change in the asset tangibility is associated with a 0.122508 increase in the debt-to-asset ratio. The finding is similar to the fixed-effects model.

6) Cash flow (CF)

The coefficient of the cash flow is negative and statistically significant in the leverage factor equation. A one-unit change in the cash flow is associated with a 0.051597 decrease in the leverage factor in the short run at the 10% significance level, on average *ceteris paribus*. The finding is similar to the fixed-effects model.

7) Market volatility (VO)

The coefficient of market volatility is negative and statistically significant in the debt-to-equity ratio. A one-unit change in the market volatility is associated with a 0.006138 decrease in the debt-to-equity ratio in the short run at the 10% significance level, on average *ceteris paribus*. The finding suggests that during a period of high market volatility, JSE-listed companies decrease the amount of debt issued. Therefore, Hypothesis 23A is accepted.

8) Degree of operating leverage (DOL)

The coefficient of the degree of operating leverage is positive and statistically significant. A one-unit change in the degree of operating leverage is associated with a

0.013732 increase in the debt-to-equity ratio in the short run at the 10% significance level. The finding suggests that the company's risk increases with an increase in the debt-to-equity ratio. Therefore, Hypothesis 19A is rejected.

9) Liquidity (LIQ)

The coefficient of the company's liquidity is negative and statistically significant in all three debt ratios (debt-to-equity ratio, debt-to-asset ratio and the leverage factor). A one-unit change in the liquidity ratio is associated with a 0.561248 decrease in the debt-to-equity ratio, with a 0.164880 decrease in the debt-to-asset ratio and with a 0.125657 decrease in the leverage factor in the short run at the 1% significance level, on average *ceteris paribus*. The findings are similar to the fixed-effects model.

10) Growth opportunities (GW)

The coefficient of the growth opportunities is positive and statistically significant in all three debt ratios. A one-unit change in the growth opportunity is associated with a 0.001956 increase in the debt-to-equity ratio at the 10% significance level, with a 0.000290 increase in the debt-to-asset ratio at the 10% significance level and with a 0.000209 in the leverage factor at the 1% significance level in the short run, on average *ceteris paribus*. The finding is similar to the fixed-effects model.

Table 5.8: System GMM for financing equation and the dividend payments

Dependent variable: debt ratios			
	Debt-to-equity ratios	**Debt-to-asset ratios**	**Leverage factor**
Variables	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic
Lagged debt ratios	0.411599*** 3.609812	0.420794*** 5.952956	-0.231403 -1.284887
Cash dividend **(CD)**	0.170633 0.153948	0.261476 1.487108	-0.773067 -0.145242
Profitability **(RA)**	-0.013833*** -3.644607	-0.002471*** -4.404503	-0.013448 -0.515257
Non-debt tax shields **(NDT)**	-6.832106 -1.149045	-3.338726*** -3.486954	-37.10701 -1.661715
Company size **(SIZE)**	0.057768 0.328042	-0.033086 -1.185793	-1.654952 -1.135374
Asset tangibility **(TAN)**	0.339954 1.047930	0.122508* 2.364936	6.130841 1.454274
Cash flow **(CF)**	0.105653 0.436322	0.045955 1.181310	-2.235530 -1.549890
Market volatility **(VO)**	-0.006138* -2.303123	-0.000360 -0.861133	-0.009896 -0.411999
Degree of operating leverage **(DOL)**	0.013732* 1.889547	0.001665 1.495866	0.024492 1.260695
Liquidity **(LIQ)**	-0.561248*** -7.429942	-0.164880*** -13.11014	0.118054 0.236725
Growth opportunities **(GW)**	0.001956* 2.219200	0.000290* 2.147190	0.020227* 2.204182
Model summary			
Year dummy	Included	Included	Included
Industry dummies	Not included	Not included	Not included
AB-AR1 P-value	-3.915402*** 0.0001	-5.474041*** 0.0000	-2.091773* 0.0365
AB-AR2 P-value	-0.322080 0.7474	-1.377620 0.1683	-0.846312 0.3974
Hansen test P-value	15.44312 0.800079	34.35917 0.033156	20.19558 0.445757
Observation	1086	1086	1086
R-squared	-	-	-
Number of cross-sections	68	68	68

*/ (**)/ [***] indicates the significance of the coefficient or the rejection of the null hypothesis at 10%/ (5%)/ [1%] level of significance. Arellano-Bond test for first serial correlation: Reject null of no first-order serial correlation. AB test for second-order serial correlation: Fail to reject the null of second-order serial correlation (at 5% level significance). Hensen J-test for overidentifying restrictions (test is robust to heteroscedasticity and autocorrelation): Fail to reject the null that overidentifying restrictions are valid.

5.7 SIMULTANEOUS EQUATION ANALYSES

5.7.1 Simultaneous equation for the dividend payments and capital structure: 1990-2017

The fixed-effects model and the system GMM analysis reported in Table 5.8 indicate that the different natures of the capital structure and the dividend payments are likely to be endogenous. All the coefficients of the endogenous variable bear the expected signs. To provide further evidence and more insight into the joint determination of the dividend payment and the capital structure, the researcher carries out a simultaneous equation system using the three-stage least squares (3SLS) full information method, which explicitly allows for the interdependence of the set of corporate decisions (endogenous variables). The structure of the two-corporate behaviour suggests that the necessary condition (the order condition) for identification is satisfied, and thus the system can be identified.
To apply the 2SLS to the system of structural equations, the reduced form equations are estimated by the ordinary least squares method to obtain the fitted values for the endogenous variables in the first stage. The structural equations, in which the fitted values are used in place of the right-hand side endogenous variable, are then estimated in the second stage. Additionally, the 3SLS method provides a third step in the estimation procedure that allows for non-zero covariances between the error terms across equations.

(a) Actual dividend paid and the three alternative measures of the capital structure (DE, DA and LF)

The results of the simultaneous equation for the dividend payment and the capital structure (the three alternative measures of the capital structure, DE, DA and LF) for the full sample over the period 1990 to 2017 are reported in Table 5.9.

Looking at the dividend payment specifications for equation 5.5, the finding suggests that the coefficient of the debt-to-equity ratio (DE), the debt-to-assets and the leverage factor are negative and statistically significant at the 1% level. The findings suggest the importance of the capital structure choices in the dividend payment decision-making process. Looking at the different alternative measures of the capital structure equation, the actual dividend paid (CD) negatively and significantly correlates with two alternative measures of the capital structure (debt-to-equity ratio and the debt-to-asset ratio) and positively corelates with the leverage factor at the 10% level. This finding suggests a simultaneous decision-making framework between the capital structure and the dividend payments. The results indicate that the payment of dividend made by JSE-listed companies is likely to be constrained by the availability of internal funds as well as access to external financing. With regard to the simultaneous decision-making framework between the capital structure and the dividend payments, the research findings validate the findings of previous research (Aggarwal & Kyaw, 2010; Chen & Steiner,1999:132; Crutchley *et al.*,1999:191; Ding & Murinde, 2010:54; Ghasemi *et al*., 2018; Jensen *et al.*, 1992:256; Noronha *et al*.,1995:450). However, in terms of the direction of the statistical relationship, the research findings contradict the findings by Chen and Steiner (1999) and are in line with the findings of some authors (Aggarwal & Kyaw, 2010; Ding & Murinde, 2010; Jensen *et al.,*1992; Noronha *et al*.,1995:450), who found a negative correlation but significant between the capital structure and the dividend payments, in both specifications. Furthermore, the findings of the inter-play between the actual dividend paid and the leverage factor is consistent with findings by Ghasemi *et al*. (2018).

More importantly, the significant and negative relationship between the alternative measures of the capital structure and the actual dividend paid detected in the pair-wise correlation, the fixed-effects model, random effects model and the GMM single-equation approach is also validated. The negative relationship between growth opportunities and the actual dividends paid suggests that within a simultaneous framework, managers of the JSE-listed companies have to trade-off between investment outlays and the dividend payments in order to allocate scarce funds rationally. This finding is consistent with the finding by Jensen *et al*., (1992:256) and Ding and Murinde (2010:54). Turning to the financing equation, the findings of the research suggest the coefficients of asset tangibility, profitability and current ratio are negative and statistically significant. This finding is consistent with the finding by Ghasemi *et al*. (2018). The coefficient on growth opportunity is positive and statistically significant in the leverage factor specification.

Table 5.9: 3SLS estimation results for the dividend payments and the different alternative measures of the capital structure: 1990-2017

	System CD and DE		System CD and DA		System CD and LF	
	CD equation	**DE equation**	**CD equation**	**DA equation**	**CD equation**	**LF equation**
	Coefficient t-Statistic	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**
Constant	0.022660*** 14.00186	2.851956*** 39.67015	0.033115*** 17.40381	0.816140*** 58.46332	0.028343*** 6.487863	2.465323*** 31.35134
CD		-12.05600*** -5.448885		-2.678167*** -6.003613		6.167215* 2.538122
RA	0.001630*** 23.03333	0.006948 1.467808	0.001665*** 23.49332	0.003363 3.584361	0.001592*** 17.62123	-0.030773*** -5.922688
GW	-0.000140*** -4.624105	-0.000958 -0.808796	-0.000118*** -3.809982	-4.74E-05 -0.209406	-0.000148*** -4.488201	0.002771* 2.133069
TAN	-0.001095 -0.408648	-0.452491*** -4.477432	-0.001363 -0.498359	-0.123622*** -6.434717	-0.005032 -1.727241	-0.569632*** -5.141175
CR		-0.700444*** -26.49841		-0.168071*** -32.29163		-0.372980*** -12.91346
DE	-0.008443*** -10.77456					
DA			-0.047683*** -15.24371			
LF					-0.009457*** -4.100118	
Regression statistics						
Balanced observations	3774		3774		3774	
Adjusted R-squared	0.219940	0.225957	0.185812	0.297806	0.119685	0.107196

*/(**)/[***] indicates the significance of the coefficients at a 10%/(5%)/[1%] level of significance **CD** is the actual dividend paid, **GW** is the company growth opportunities, **RA** is the return on assets used as a proxy for profitability, **TAN** is the asset tangibility, **CR** is the current ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor. The results for the 2SLS are presented in appendix 2.

CD= 0.022660-0.008443*DE+0.001630*PROF-0.000140*GW-0.001095
*TAN

DE=2.851956-12.05600*CD+0.006948*PROF-0.000958*GW-0.452491*TAN-0.700444*CR

CD= 0.033115-0.047683*DA+0.001665*PROF--0.000118*GW-0.001363*TAN

DA=0.816140-2.678167*CD+0.003363*PROF-4.74E-05
*GW-0.123622*TAN-0.168071*CR

CD= 0.028343-0.009457*LF+0.001592*PROF-0.000148*GW-0.005032*TAN

LF=2.465323+6.167215*CD-0.030773*PROF+0.002771*GW-0.569632*TAN-0.372980*CR

5.7.2 Simultaneous equation approach (SRP, DS, DE and DA): 1999-2017

Table 5.10 presents the interrelationship between share repurchases and two alternative measures of the capital structure on the one hand and the interrelationship between distribution strategies (the sum of cash dividend and share repurchases and the two alternative measures of the capital structure on the other hand (endogenous variables)) within a simultaneous framework using a 3SLS approach for the period 1999 to 2017.

The results for the simultaneous equation between share repurchases and the debt-to-equity ratio (System Equation 4); share repurchases and the debt-to-asset ratio (System Equation 5); distribution strategies and the debt-to-equity ratio (System Equation 6) and distribution strategies and the debt-to-asset ratio (System Equation 7) are presented in Table 5.10.

<u>Variants 4 and 5 of equation 5.6 (System Equation 2)</u>

Looking at the share repurchases specification in Variants 4 and 5 of equation 5.6, the endogenous variables (the debt-to-equity ratio and the debt-to-asset ratio) are positive and highly significant. The results suggest that an increase in debt leads to an increase in share repurchases for JSE-listed companies. However, the coefficient of the endogenous share repurchases is insignificant in the debt-to-equity ratio and the debt-to-asset ratio specifications in Variants 4 and 5 of equation 5.6. This finding suggests that there is no simultaneous decision-making between the capital structure and share repurchases. The coefficient of investment is negative and significant at the 1% level. The results indicate that an increase in investment opportunities leads to a decrease in share repurchases. The results validate the notion that companies with investment opportunities will be less likely to repurchase shares. Liquidity and market volatility are negative and insignificant.

Turning to the financing equation, investment is positive and significant at the 1% level in the debt-to-equity ratio equation and positive and significant at the 5% level in the debt-to-asset ratio equation. The coefficient of the cash flow is negative and significant in the debt-to-equity ratio and the debt-to-asset ratio at the 1% and 5% levels respectively (in Variants 4 and 5 of System Equation 5.6). The finding is similar to the finding by Kim *et al*. (2007).

Variants 6 and 7 of equation 5.7 (System Equation 3)

Focusing on the distribution strategies (sum of the cash dividend and share repurchases) in Variants 6 and 7 of System Equation 5.7, the results reveal that the coefficients of the endogenous variables (the debt-to-equity ratio and the debt-to-asset ratio) are both positive and highly significant, while the sum of the dividend payments and share repurchases is positive and statistically significant in the debt-to-asset ratio specification and insignificant in the debt-to-equity ratio specification. The finding suggests that there is a simultaneous decision-making framework between the capital structure and the sum of the dividend payments and share repurchases. The coefficient of investment is negative and significant at the 1% and 10% levels in Variants 6 and 7, respectively. The coefficient of cash flow is positive and highly significant in both variants (6 and 7) for the distribution strategy specifications.

For the financing equation in Variants 6 and 7, the coefficient of investments is positive and significant at the 1% and 10% levels in Variants 6 and 7 respectively. The coefficient of cash flow is negative and significant at the 10% and 1% levels in the debt-to-equity ratio and the debt-to-asset ratio specification respectively (Variants 6 and 7 of System Equation 5.7).

Table 5.10: 3SLS estimation results for the share repurchases, distribution strategies and the different natures of the capital structure: 1999-2017

	System Equation 5.6				**System Equation 5.7**			
	Variant 4		Variant 5		Variant 6		Variant 7	
	SRP equation	DE equation	SRP equation	DA equation	DS equation	DE equation	DS equation	DA equation
	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic
Constant	-1.219857*** -4.190469	1.248605*** 10.42220	-0.507542*** -4.811616	0.486552*** 20.51166	-1.246942*** -6.870085	1.248336*** 10.21364	-0.483714*** -16.42982	0.483615*** 19.86240
SRP		-0.973192 -0.052736		4.802149 0.503023				
INVEST	-8.816365*** -3.940318	8.786148*** 3.916762	-1.037575* -2.532826	1.090191* 2.570558	-9.081230*** -3.877447	9.079572*** 3.801439	-1.310587** -2.929613	1.310671** 2.926746
CF	5.927251*** 5.955963	-5.874685*** -4.473324	1.101139*** 5.126749	-1.243943* -2.394598	6.431120*** 6.660069	-6.456853* -2.545562	1.511067*** 8.261031	-1.511466*** -7.227751
LIQ	-0.000255 -0.006841		-0.001008 -0.061484		0.001445 0.028336		8.38E-06 0.003395	
VO	-0.000644 -0.120112		0.000807 0.427416		-0.000146 -0.050919		1.11E-06 0.007812	
TAN		-0.005930 -0.121987		0.005715 0.314486		-0.003809 -0.088642		-3.50E-05 -0.019006
NDT		0.055428 0.114577		-0.058096 -0.295614		0.039827 0.038849		0.000495 0.011225
DE	1.003274*** 18.54842				1.002268*** 12.90611			
DA			0.965476*** 6.891898				1.000049*** 65.43059	
DS						1.037565 0.215599		1.001110*** 4.578700
Regression statistics								
No of obs.	2582	2582	2582	2582	2582	2582	2582	2582
Adjusted R^2	_	_	_	_	_	_	_	_
SRP is share repurchases, **INVEST** is the actual investment in asset, **CF** is the cash flow, **LIQ** is the company liquidity position, **VO** is the market volatility **TAN** is the asset tangibility, **NDT** is the non-debt tax shields, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **DS** is the sum of the dividend payment share repurchases. The results for the 2SLS are presented in appendix 3.								

5.7.3 Simultaneous decision-making framework for ΔDE, CD, SRP and DS: testing the pecking-order theory

Table 5.11 presents the independence between the change in capital structure (ΔDE) and the three alternative measures of distribution strategies (the dividend payments, share repurchases, and the sum of share repurchases and the dividend payments) within a strategic simultaneous decision-making framework using a 3SLS full information approach for the period 1999 to 2017.

In the spirit of the literature on the financing hierarchy with asymmetric information, the financing equation is specified based on the pecking-order theory within a simultaneous equation framework. The pecking-order theory implies that there is no target or optimal leverage ratio, and that asymmetric information is the main determinant of companies' leverage ratios. The company will use internal source of funds followed by debt and equity financing respectively. Shyam-Sunder and Myers (1999) developed a model in which the company's debt level correlates with internal financial deficit. They argue that if internal funds are not sufficient, and the pecking-order theory holds, the company's debt level will respond to fluctuations of the financial deficit that the company faces.

Following Frank and Goyal (2003), the research disaggregates the financial deficit term within the simultaneous equation system. It is worth pointing out that among other variables, the change in leverage is a function of cash dividend, share repurchases, and the sum of dividend payments and share repurchases as pay-out policies (DS).

Equation 5.8 (System Equation 4)

Looking at the changes in the financing equation specification (equation 5.8), the coefficient of the endogenous variable (actual dividend paid) is positive and significant at the 5% level, while the coefficient of the change in the debt-to-equity ratio in the actual dividend specification is positive and statistically significant. The finding suggests that there is a simultaneous decision-making framework between the change in capital structure (ΔDE) and the actual dividend paid. The coefficient of the capital expenditure is positive and significant at the10% level and the coefficients of the changes in working capital and cash flow are negative and significant at the 1% and 5% levels respectively. These results are in line with the pecking-order theory.

For the cash dividend paid equation (System Equation 5.8), the coefficients of capital expenditure and market volatility are negative and significant at the 5% and 1% levels respectively. The negative and significant sign on the profitability coefficient is reversed to be positive and highly significant. over the period 1999 to 2017. This finding is consistent with the finding of Aggarwal and Kyaw (2010) and Jensen *et al*., (1992:256).

Equation 5.9 (System Equation 5)

Looking at the changes in financing equation (equation 5.9), the coefficient of the endogenous (share repurchases) is positive and significant at the 1% level, while the coefficient of the change in the capital structure (ΔDE) is positive and statistically significant. The finding suggests a simultaneous decision-making between share repurchases and the change in the capital structure. The coefficient of the capital expenditure is positive and significant at the 10% level and the coefficient of the changes in working capital and cash flow are negative and significant at the 10% and 1% levels respectively. These results are in line with the pecking-order theory.

For the share repurchases, the coefficients of capital expenditure are negative and significant at the 10% level. The coefficient of profitability is positive and statistically significant at the 1% level. This finding suggests that a one-unit change in profitability is associated with a 0.000197 increase in share repurchases. The coefficient of market volatility is negative and significant at the 5% level. The finding suggests that during a period of uncertainty in the market and high volatility in the market, South African companies are more likely to reduce the amount paid in share repurchases.

System equation 5.10 (System Equation 6)

Regarding the changes in the debt-to-equity ratio (ΔDE) equation (equation 5.10), the endogenous variable DS (the sum of cash dividend and share repurchases) is positive and statistically significant at the 1% level, while the coefficient of the debt-to-equity ratio in the DS equation is positive and statistically significant. The finding suggests a simultaneous decision-making framework between the capital structure and the sum of the dividend payments and share repurchases. The coefficient of capital expenditure is positive and significant at the 5% level. The coefficients of changes in working capital and cash flow are negative and significant at the 1% and 5% levels respectively. In combination with earlier results, one can also infer that high distributions are associated with companies with low debt levels and high equity levels (hence the negative coefficients for CD to explain DE and DA in table 5.9) but that the payment of high dividends effectively increase DE and DA (thus positive coefficients for CD explaining delta DE).

Focusing on the distribution strategies equation, the coefficient of profitability is positive and highly significant at the 1% level, while the coefficients of market volatility and capital expenditure are negative and significant at the 1% and 5% levels respectively

Table 5.11: 3SLS estimation for distribution strategies and changes in capital structure (pecking-order theory): 1999-2017

	System Equation 5.8		System Equation 5.9		System Equation 5.10	
	∆DE and CD		∆DE and SR		∆DE and DS	
	Financing ∆DE	Distribution CD	Financing ∆DE	Distribution SRP	Financing ∆DE	Distribution CD
	Coefficient (t-Statistic)	Coefficient (t-Statistic)	Coefficient (t-Statistic)	Coefficient (t-Statistic)	Coefficient (t-Statistic)	Coefficient (t-Statistic)
Constant	0.018401 0.491159	0.043074*** 6.795781	-0.029277 -0.482692	0.005281*** 4.136035	0.018482 0.492703	0.049854*** 7.340865
∆DE		0.024085*** 5.805773		0.010408*** 16.37140		0.038566*** 8.565343
CD	3.445884* 2.031087					
SRP			81.74736*** 6.960690			
DS					4.112007** 2.607596	
CE	0.769285** 2.824468	-0.035385* -2.417131	1.360056* 2.245571	-0.015373* -2.249398	0.856161** 3.118525	-0.052616** -3.100413
∆WC	-2.156747*** -7.388164		-1.101603* -2.197975		-1.931961*** -6.678388	
CF	-1.562760* - 2.172907		-3.244780*** -4.257944		-1.947866** -2.634538	
RA		0.001085*** 5.876178		0.000197*** 5.888470		0.001349*** 6.602216
VO		-0.000511*** -4.015212		-6.88E-05** -2.609763		-0.000631*** -4.647254
Regression statistics						
No of balanced obs	2548		2548		2548	
Adj.R^2	0.044551	0.134537	-	-	0.029239	-

∆DE is the change in the debt-to-equity ratio, **CD** is the actual dividend paid, **SR** is the share repurchase, **DS** is the sum of the dividend payments and share repurchases, CE is the capital expenditure, ∆**WC** is the net change in working capital, is the return on assets used as a proxy for profitability and **VO** is the market volatility

$\Delta DE = -0.029 + 81.747*SREPS + 1.360*CE - 1.102*\Delta WK - 3.245*CF$

$SRP = 0.005 + 0.010*\Delta DE - 0.0154*CE + 0.000*RA - 6.8753237432e-05*VO$

$\Delta DE = 0.018 + 3.446*CD + 0.769*CE - 2.157*\Delta WK - 1.563*CF$

$CD = 0.043 + 0.024*\Delta DE - 0.035*CE + 0.001*RA - 0.001*VO$

$\Delta DE = 0.018 + 4.112*DS + 0.856*CE - 1.932*\Delta WK - 1.948*CF$

$DS = 0.050 + 0.039*\Delta DE - 0.053*CE + 0.001*RA - 0.001*VO$

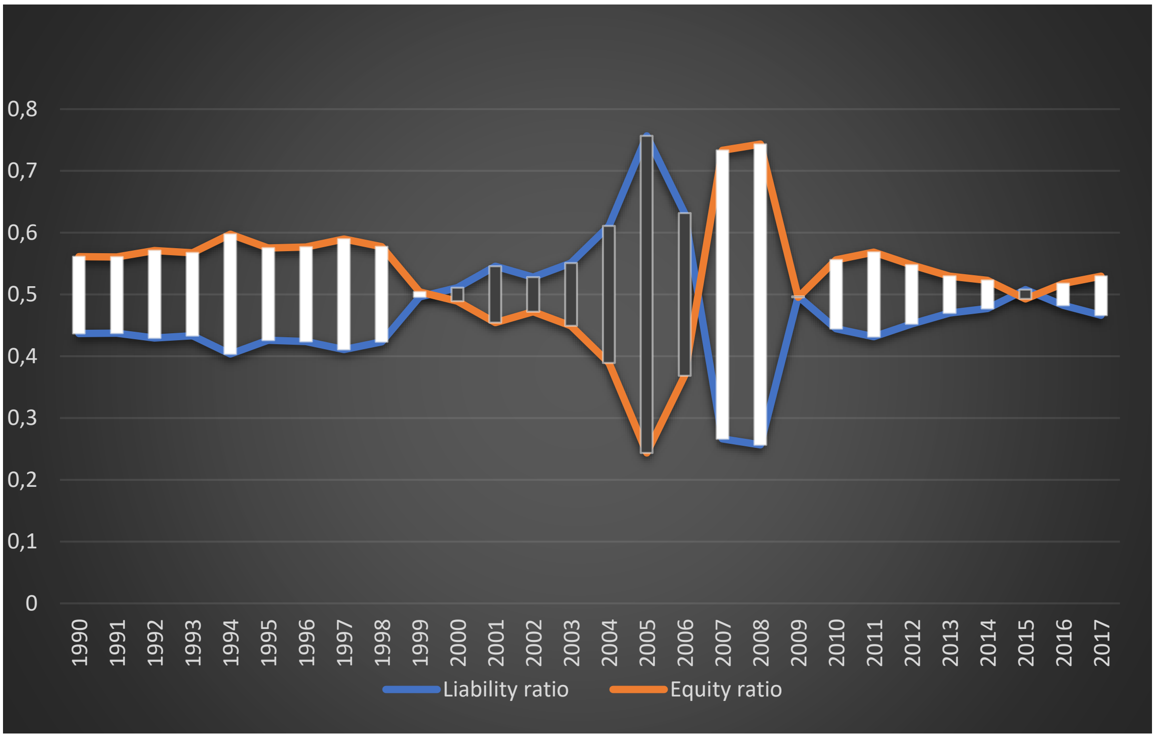
5.8 INTERRELATIONSHIP BETWEEN FINANCING AND DISTRIBUTION POLICIES BEFORE THE FINANCIAL CRISIS, DURING THE FINANCIAL CRISIS AND AFTER THE FINANCIAL CRISIS

Lim (2016) argues that during a period of financial recession, the real rate of return, inflation and risk premium will be low, whereas the liquidity and maturity risk premium will be higher (for example, the stock market experienced a 77% decline in the market value, the housing market went into a prolonged slump, the US unemployment rate increased to 12% and the US and worldwide economic outputs declined by 25%). The unprecedented economic crisis caused by subprime mortgages forcefully changed the distribution policies and the capital structure of most companies. Hence it could further change the interplay between financing decisions and pay-out decisions. As a result, it is interesting to examine whether the inter-relationship between the capital structure and the dividend payments change as an increase of overall risk, and the cost of external capital, in crisis periods.

Interestingly, in terms of the interplay, it is noticeable that South African companies in the sample increased the level of debt over the period 1995 to 2005, followed by a decline in leverage in the period between 2005 and 2007 (the period before the financial crisis, and companies deleveraged over this period). Over the period 2008 to 2010 (during the financial crisis, and companies deleveraged to issue more equity) companies in the sample appeared to be more equity financed than debt financed and this trend continued over the period 2011 to 2015, which is the period after the financial crisis (see Figure 5.2). This trend is validated by the findings by Lim (2016), who found that most companies deleveraged and reduced the amount of the dividends paid to survive in response to the worldwide economic downturn. In addition, Dang *et al.* (2014) assert that during a decline in collateral values in a weak state of the economy, debt capacity will decline and therefore a financially constrained company will find it difficult to take up further debt financing. Consequently, this influences the capital structure proportions when refinancing is needed to accommodate the economic crunch. This narrative is validated by the research findings.

This crisis provides an excellent window to investigate how an economic shock affects the inter-statistical relationship between distribution policies and the capital structure in a simultaneous decision-making framework. It is worth pointing out that Lim (2016) used an individual equation approach and noted that due to the known endogeneity between the dividend payments and the leverages, the interpretation of the statistical relationship between the two policies had to be carefully looked at. This study overcomes this problem by determining the statistical relationship in a strategic simultaneous decision-making framework.

Figure 5. 2: Variations in liability and debt-to-equity ratio over the period 1990-2017



5.8.1 Simultaneous decision-making before, during and after the financial crisis

5.8.1.1 Before the financial crisis (2005-2007)

Table 5.12 presents the independence between the dividend payments and the capital structure before the financial crisis (2005-2007), during the financial crisis (2008-2010) and after the financial crisis (2011-2015).

The results show that before the financial crisis (2005-2007), the coefficient of the actual dividend is negatively correlated with the capital structure (the debt-to-equity ratio) at the 1% significance level, while the coefficient of the debt-to-equity ratio is negatively and significantly correlated with the actual dividend.. This finding suggests that over the period before the financial crisis, there was simultaneous decision-making framework between the capital structure and the dividend payments because of the statistical significance of the two coefficients (endogenous variables). The researcher argues that the existence of a simultaneous decision-making framework over this period might be caused by the decrease in the amount of debt by South African companies, which had an impact on the magnitude of the dividend paid (see Figure 5.2). In addition, the most significant company-specific variables are the profitability (in the dividend equation) and the current ratio, profitability. (in the capital structure equation). This finding supports the argument that over the period before the recession, companies with more cash flow or free cash and profitable will continue to pay dividend and decrease the amount of debt.

CD= 0.029077-0.012079*DE+0.001752*PROF-1.17E-05*GW+5.76E-05*TAN

DE=2.815154-28.52352*CD+0.032463*PROF+0.004248*GW-0.148715*TAN-0.513999*CR

5.8.1.2 During the financial crisis (2008-2010)

The results in Table 5.12 show that, during the financial crisis (2008-2010), the coefficient of the actual dividend is negatively and insignificantly correlated with the capital structure (the debt-to-equity ratio) , while the coefficient of the debt-to-equity ratio is also negatively and insignificantly correlated with the actual dividend in the dividend equation. This finding suggests that over the financial crisis, the interdependence between the capital structure and the dividend payments was non-existent (there is no simultaneous decision-making framework because the debt-to-equity ratio and the actual dividends are insignificant) and South African companies issued more equity than debt finance. This finding is consistent with the finding by Lim (2016), namely that over this period, companies deleveraged and decreased the amount paid in dividends. The most significant company-specific variables in the simultaneous decision-making framework over this period are profitability (in the dividend equation) and the current ratio (in the capital structure equation). Again, this finding suggests that companies that experienced higher levels of profitability and higher levels of liquidity paid dividends and reduced the amount of debt issued (as depicted in Figure 5.2).

CD=0.017308-0.004554*DE+0.001752*PROF--0.004554*GW+0.004988*TAN

DE=3.076910-4.542801*CD-0.002593*PROF-0.000407*GW-0.365267*TAN-0.785684*CR

5.8.1.3 After the financial crisis (2011 to 2015)

The results in Table 5.12 show that after the financial crisis (2011-2015), the coefficient of the actual dividend paid negatively correlates with the capital structure (the debt-to-equity ratio) at the 5% significance level, while the coefficient of the debt-to-equity ratio negatively correlates with the actual dividend paid at the 10% significance level. This finding suggests that over the period after the financial crisis, the interdependence between the capital structure and the dividend payments (there is a simultaneous decision-making framework because of the statistical significance of both endogenous variables) becomes strong. In addition, the most significant company-specific variables in the SMS are the profitability (in the dividend equation) and profitability, asset tangibility and the current ratio (in the capital structure equation). The existence of the inter-relationship between the two policies suggests an improvement in economic activities over this period.

Taken together, the finding suggests that within a strategic simultaneous decision-making framework, the marginal effect of the actual dividend paid on shareholders' wealth decreases with an increase in debt (more debt finance than equity finance) and increases with a decrease in debt (more equity finance than debt finance) for South African companies listed on the JSE before the financial crisis and after the financial crisis (because the coefficient of the actual dividend increased over the three periods from -28.52352 to -19.00100). Furthermore, the stability in credit crunch after the financial crisis improves the determination of the strategic simultaneous decision-making framework between the capital structure and the distribution policy:

CD= 0.013642-0.003763*DE+0.002158*PROF-0.000127*GW+0.004743*TAN

DE=2.576274-19.00100*CD+0.035797*PROF+0.000837*GW-0.566059*TAN--0.688367*CR

Table 5.13 presents the summary of the results generated from the fixed effect model, the random effect model, the generalised method of moments, the two stage least squares and the three stage least squares. The table also presents the differences in the results based on the different models used in the research.

Table 5. 12: Simultaneous equation between the actual dividend paid and the debt-to-equity ratio before the financial crisis (2005-2007), during the financial crisis (2008-2010) and after the financial crisis (2011-2015)

	CD and DE pre-crisis (2005-2007)		**CD and DE during crisis (2008-2010)**		**CD and DE post crisis (2011-2015)**	
	CD equation	**DE equation**	**CD equation**	**DE equation**	**CD equation**	**DE equation**
	Coefficient t-Statistic	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**
Constant	0.029077*** 5.261515	2.815154*** 12.61920	0.017308** 2.923204	3.076910*** 14.89180	0.013642*** 4.671855	2.576274*** 13.83033
CD		-28.52352*** -4.372573		-4.542801 -0.764091		-19.00100** -2.772443
RA	0.001899*** 8.177260	0.032463 1.821588	0.001752*** -0.978074	-0.002593 -0.191057	0.002158*** 13.03675	0.035797* 2.117178
GW	-1.17E-05 -0.122757	0.004248 1.086764	-0.004554 -0.978074	-0.000407 -0.121741	-0.000127 -1.452164	0.000837 0.219012
TAN	5.76E-05 0.006793	-0.148715 -0.422130	0.004988 0.494680	-0.365267 -1.104117	0.004743 0.729483	0.566059* 2.133695
CR		-0.513999*** -5.794746		-0.785684*** -10.62737		-0.688367*** -11.41554
DE	-0.012079*** -5.104440		-0.004554 -1.637630		-0.003763* -2.119798	
Regression statistics						
Balanced observations	398		406		340	
Adjusted R-squared	0.384084	0.127178	0.216677	0.338925	0.345951	0.208102

*/(**)/[***] indicates the significance of the coefficients at a 10%/(5%)/[1%] level of significance **CD** is the actual dividend paid, **GW** is the company growth opportunities, **RA** is the return on assets used as a proxy for profitability, **TAN** is the asset tangibility, **CR** is the current ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor.

Table 5. 13: Difference between FE, RE, GMM, 2SLS and 3SLS (1990-2017 and 1999-2017)

Debt eq.	**DR**	**CD**	**RA**	**GW/IN**	**VO**	**DOL**	**∆DE**	**LIQ/CR**	**NDT**	**TAN**	**SIZE**	**CF**	**∆WK**	**CAPEX**	**SR**	**DS**
Exp. sign.		(-/+)	-	+	+	-		-	+	+	+	-	+	+	+	?
FE		(-)*	(-)***	(+)***	(+)	(+)		(-)***	(-)***	(+)***	(-)**					
RE		(-)*	(-)*	(+)*	(-)	(+)		(-)***	(-)***	(+)***	(-)***					
GMM		(+)	(-)***	(+)*	(-)*	(+)*		(-)***	(-)***	(+)*						
2SLS				(+)**					(+/-)	(+/-)					(+/-)	(+)
3SLS		(-)***	(-)***	(+)*				(-)***	(-)***	(-)***	(-)***	(-)			(+/-)	(+)***
CD eq.																
Exp. sign	(-/+)		+	-	-	-	+	+	+	+	+	+	+	-		
FE	(-)***		(+)***	(-)***	(-)***	(-)*		(+)***	(+)	(+)	(+)***	(+)***				
RE	(-)***		(+)***	(-)***	(-)***	(-)		(+)**	(-)	(-)	(+)***	(+)***				
GMM	(-)*		(-)*		(-)				(+)*		(+)*	(+)**				
2SLS							(+)***									
3SLS	(-)***		(+)***	(-)***	(-)***		(+)***			(-)		(+)***		(-)*		
SR eq																
Exp sign			+	-	+	+	+	+	-	+	+	+	+	-		
2SLS	(+)*			(-)**	(-/+)		(+)***	(-)				(+)***				
3SLS	(+)***			(-)****			(+)***					(+)****				
DS eq.							(+)***									
Exp. sign.	+			-	-			+				+				
2SLS	(+)*			(-)*	(+/-)		(+)***	(+)				(+)***		(-)***		
3SLS	(+)***			(-)***			(+)***	(+)				(+)***		(-)**		
∆DE eq.																
Exp. sign.		-	-	+	+	-		-	+	+	+	-	+	+	+	?
2SLS		(+)										(-)*	(-)***	(+)*	(+)	(+)
3SLS		(+)*										(-)*	(-)***	(+)**	(+)***	(+)**

DR is the debt ratios representing the capital structure (debt-to-equity ratio, the debt-to-asset ratio and the leverage factor), **CD** is the actual dividend paid, **RA** is the return on assets used as a proxy for profitability, **GW** is the growth in sales used as a proxy for growth opportunities, **VO** is the market volatility, **DOL** is the degree of operating leverage used as proxy for business risk, **LIQ** is the company liquidity position, **NDT** is the non-debt tax shields, **TAN** is the asset tangibility, **SIZE** is the company size, **CF** is the cash flow, WK is the net working capital, **CAPEX** is the capital expenditure **SRP** is the share repurchase. **GMM** is the generalised method of moments, **2SLS** is a two-stage least squares and **3SLS** is a three-stage least squares, which is a combination of SUR and **2SLS** (seemingly unrelated regression and two-stage least squares).

5.9 CHAPTER SUMMARY

An individual equation approach was used to compare the research results to prior research that ignored the simultaneity between financing decisions and pay-out decisions. However, there is still scant empirical evidence from emerging economies using simultaneous equations compared with studies examining the developed economies. The aim of this chapter was to extend the empirical literature by providing new evidence on the interrelationship between financing decisions and distribution strategy decisions from South African markets. This chapter used static panel data techniques (fixed-effects and random effects models), dynamic panel data techniques (generalised method of moments) and simultaneous equation (3 SLS full information) to determine the inter-statistical relationship between the capital structure and distribution policies directly and through joint determinants over the periods 1990 to 2017 and 1999 to 2017.

The results suggested that the financing decisions and distribution strategies made by JSE listed companies on the JSE were linked and jointly determined directly and through some joint determinants. Furthermore, the simultaneity among them was robust with respect to different methods of estimation. The empirical results in this chapter indicated that South African companies were likely to be financially constrained by the availability of internal funds as well as by access to external finance (in the simultaneous equation, the capital structure and the change in capital structure increased with dividend, suggesting that debt might be used to pay dividend). Therefore, South African managers have to consider their financing and distribution strategies concurrently. The results indicated that over the period 1990 to 2017, the actual dividend negatively correlated with the capital structure (debt-to-equity ratio, debt-to-asset ratio and the leverage factor) and the capital structure (debt-to-equity ratio and the debt-to-asset ratio) positively correlated with the actual dividend. Over the period 1999 to 2017, the findings revealed that the capital structure (debt-to-equity ratio and the debt-to-asset ratio) positively correlated with share repurchases and the correlation between share repurchases and the capital structure was insignificant. Furthermore, the results indicated that over the same period (1999-2017), the capital structure positively correlated with the sum of share repurchases and the dividend payments (DS) and the DS (the sum of share repurchases and the dividend payment) positively correlated with the capital structure (debt-to-asset ratio only).

Investigating whether the economic shock caused by the 2008 financial crisis changed the strategic simultaneous decision-making framework between the capital structure and the distribution policies, the findings of this research indicated that South African companies adjusted their financing decisions and distribution policies in response to the extreme credit crunch caused by the financial crisis. Consequently, the empirical evidence of this research showed the existence of a simultaneous decision-making framework between the capital structure and the distribution policies only over the period after the financial crisis (there was no simultaneous decision-making framework before and during the financial crisis).

The research findings also showed that for the impact of the joint determinants for the financing and distribution strategy decisions using the individual equation approach (fixed-effects and random effects), the most significant predictors were profitability, size, cash flow and growth opportunities. The results showed that company profitability positively correlated with dividend payment and negatively correlated with capital structure. The larger the company profit, the higher the dividend and the lower the debt ratios. The company size and cash flow positively correlated with the dividend payments and negatively correlated with the capital structure. This finding indicated that larger companies with free cash flow would be willing to pay higher dividend while reducing the amount of debt issued. The growth opportunity negatively correlated with the dividend payment and positively correlated with the debt ratios. This finding showed that JSE-listed companies with growth opportunities were willing to reduce the actual amount paid in dividends and issue debt in support of the narrative that if the internal capital was not enough and significant, external finance was required for future development and growth

Further, the results revealed the existence of a dynamic model in capital structure and the dividend payments decision in South Africa. With regard to the capital structure, in general, the findings showed that the capital structure was not static, and it changed over the years with fluctuations of cost of capital. The speed of adjustment was a trade-off between the cost of adjustment and the cost of being off target. Moreover, the speed of adjustments for the debt-to-equity and the debt-to-asset ratio was much quicker than the leverage factor, which showed that the costs of being off target on the debt-to-equity ratio and the debt-to-asset ratio were high compared with the cost of adjustment. The most significant joint determinants in the individual equation GMM approach were profitability, non-debt tax shield and cash flow. However, taken together, the results of the research demonstrated that the 3SLS approach was superior to the fixed-effects, random effects and the GMM approach.

The next chapter investigates the threshold effect of the capital structure (the debt-to-equity ratio and the long-term debt based on the book value) on the distribution strategies and the determinants of choice between the decision to pay dividend, repurchase shares, engage in both (the dividend payments and share repurchases), and finally, engage in neither.

CHAPTER 6: THRESHOLD CAPITAL STRUCTURE AND PREDICTORS OF CHOICE BETWEEN THE DISTRIBUTION STRATEGIES

6.1 INTRODUCTION

This Chapter focuses on the second objective of the study, namely, to determine how risk and return associated with a threshold capital structure affected the distribution policies of JSE-listed companies separately and jointly. Further, conventional literature on corporate finance has overlooked the effects of risk and return on the choice between distribution strategies. As a result, this chapter also investigates the predictors of choice (the nature of capital, alternative measures of the capital structure and company-specific variables) between the payments of dividends, the repurchase of shares, the engagement in both the dividend payments and share repurchases (both) and the engagement in neither the dividend payments nor the share repurchases (none).

According to the trade-off theory of capital structure, when the debt ratio increases, the interest tax shield increases; however, leverage-related costs increase to offset the positive effects of the debt ratio on the company value and subsequently on the distribution strategies because they increase the value of shareholders. The threshold regression distinguishes between the characteristics of companies' dynamic capital structure that collectively define mean leverage ratios, because it separates companies' lower and upper refinancing thresholds and target leverage ratios, as proposed by fundamental contributors to the dynamic trade-off theory (Fischer *et al.,* 1989).

When a company has excess capital resources, it faces two alternatives, either invest the funds to advance business goals or return the cash to claim holders through dividends, debt repayments or share repurchases. Miller and Modigliani (1961) state that when markets are incomplete, companies can convey information about the future cash flows through changes in distribution policy.

The chapter is structured as follows: Section 6.2 presents the threshold specification model, Section 6.2.1 presents the descriptive statistics of the variables, Section 6.2.2 presents the results and the interpretation of the threshold capital structure for the distribution strategies over the periods 1990 to 2017 and 1999 to 2017, Section 6.3.1 presents the model specification for the multinomial logistic regression, Section 6.3.2 presents the results and the interpretation of the results for the determinants of choice between the decision to pay dividends, repurchase shares, engage in both and engage in neither and Section 6.4 summarises the chapter.

6.2 PART A THRESHOLD CAPITAL STRUCTURE: TESTING THE TRADE-OFF THEORY

The research examines whether there is a threshold effect between the capital structure and distribution strategies of JSE-listed companies assuming that there is an optimal debt-to-equity ratio. To capture the threshold effects (optimal debt), the research uses the following single set-up threshold model for the periods 1990 to 2017 and 1999 to 2017:

$$ds_{i,t} = \begin{cases} \mu_i + \varphi' h_{i,t} + \omega_1 de_{i,t} + \varepsilon_{i,t} & \text{if } de_{i,t} \leq \gamma \\ \mu_i + \varphi' h_{i,t} + \omega_2 de_{i,t} + \varepsilon_{i,t} & \text{if } de_{i,t} > \gamma \end{cases} \qquad (6.1)$$

$$\varphi = (\varphi_1, \varphi_2, \varphi_3, \varphi_4, \varphi_5)^t$$

$$h_{i,t} = (size_{i,t}, ra_{i,t}, cf_{i,t}, vol_{i,t})$$

where

$ds_{i,t}$ =represents the distribution strategies (cash dividend paid, or share repurchases) of a company i in period t

$de_{i,t}$ =represents the debt-to-equity ratio and is also a threshold value.

γ =represents the specific estimated threshold value

$h_{i,t}$ =represents the five control variables, namely size, profitability (ra), free cash flow (cf), and market volatility (vol) of a company i in period t

$\mu_{i,t}$ = represents the fixed effects, which represent the heterogeneity of companies under different operating conditions

$\varepsilon_{i,t}$: = error terms, assuming that they are independent and identically distributed $(i.i.d)$, with mean zero. The finite variance is $\sigma^2(\varepsilon_{i,t} \sim i.i.d.\ (0,\sigma^2)$.

For the sake of simplicity, equation (6.1) can be written as:

$$ds_{i,t} = \mu_{i,t} + \varphi' h_{i,t} + \omega_1 de_{i,t} I(de_{i,t} \leq \gamma) + \omega_2 de_{i,t} I(de_{i,t} > \gamma) + \varepsilon_{i,t}$$

(6.2)

where $I(\bullet)$ represents an indicator function and $ds_{it} = \mu_{i,t} + \varphi' h_{i,t} + \omega' de_{i,t}(\gamma) + \varepsilon_{i,t}$ can be written as:

$$ds_{i,t} = \mu_i + [\varphi', \omega'] \begin{bmatrix} h_{i,t} \\ de_{it}(\gamma) \end{bmatrix} + \varepsilon_{i,t}$$

(6.3)

$$ds_{i,t} = \mu_i + \beta' x_{i,t}(\gamma) + \varepsilon_{i,t}$$

(6.4)

$$de_{i,t}(\gamma) = \begin{bmatrix} de_{i,t} I(d_{i,t} \leq \gamma) \\ de_{i,t} I(de_{i,t} > \gamma \end{bmatrix}$$

(6.5)

where $\omega = (\omega_1, \omega_2)'$, $\beta = (\varphi', \omega')$ and $x_{i,t} = (h'_{i,t}, d'_{i,t}(\gamma))'$

It is worth pointing out that the observations are divided into two regimes depending on whether the threshold variable de_{it} is smaller or larger than the threshold value (γ). The regimes are distinguished on the basis of the different regression slopes ω_1 and ω_2. The known $ds_{i,t}$ and $de_{i,t}$ are used to estimate the parameters $(\gamma, \omega, \varphi$ and $\sigma^2)$.

6.2.1 Descriptive statistics for the threshold regression period: 1990-2017

Table 6. 1: Descriptive statistics for the threshold regression

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.028779	0.021987	0.099557	0.000000	0.027783	1.114564	3.482446	1883
∆DE	9.17E-05	0.000000	3.697300	-3.697300	0.546672	-0.065337	17.76136	1883
∆LTB	0.000541	0.000000	0.652694	-0.596708	0.094504	0.305050	13.32962	1883
SIZE	6.708634	6.812465	8.043106	4.991276	0.830427	-0.356606	2.310798	1883
RA	11.35141	10.85330	28.39192	-4.755420	8.329104	0.141167	2.672605	1883
CF	0.101436	0.099542	0.257482	-0.040684	0.078427	0.134418	2.389632	1883
INVEST	0.070579	0.063163	0.185263	0.000561	0.049770	0.687539	2.797525	1883
VO	38.37514	34.41540	85.43271	0.000000	20.03220	0.577668	3.260890	1883

The data was winsorised, and consequently all data below the fifth percentile are set to the fifth percentile and all data above the 95th percentile are set to the 95th percentile. **CD** is the actual dividend paid, **∆DE** is the change in the debt-to-equity ratio, **∆LTB** is the change in total debt based on the book value, **SIZE** is the company size, **RA** is the return on assets, **CF** is the cash flow, INVEST is the investment and **VO** is the market volatility**.**

6.2.2 Threshold effects of DE and LTB on CD: 1990-2017

Table 6.2 presents the threshold effect of two alternative measures of the capital structure (debt-to-equity ratio and the total debt based on book value) on the dividend payments to test the validity of the trade-off theory for the period 1990 to 2017. The model specification and tests are presented in Appendices 11 and 12. The results are computed using EViews 11.

The results of the threshold effects of the two alternative measures of the capital structure (debt-to-equity ratio and total debt based on the book value) on the dividend payments for the period 1990-2017 are provided in table 6.2 and the results of the threshold debt-to-equity ratio on share repurchases, the dividend payments and the distribution strategies (the sum of cash dividend and share repurchases) for the period 1999-2017 are provided in Table 6.3. The threshold specifications and tests are provided in Appendices 6.

The results in Table 6.2 show that there is a single threshold effect for the debt-to equity ratio and double threshold effect for the total debt based on the book value. The regimes are distinguished by the different slopes $\hat{\omega}_1$ and $\hat{\omega}_2$, and the findings suggest that there is a level debt beyond which the relation between financing and pay-out decision becomes unclear.

(a) Threshold coefficient for the debt-to-equity ratio on the dividend payments

In the first regime, where the debt-to-equity ratio is less than 1.6654999 (debt-to-equity ratio<1.6654999), the estimated coefficient of the upper bound $(\hat{\omega} = 0.005195)$ ω=0.005195 is positive and significant at 5%. The results indicate that a one-unit change in the debt-to-equity ratio is associated with a 0.005195 increase in the actual dividend paid. In the second regime where the debt-to-equity ratio is greater or equal to 1.6654999 (1.6654999 ≤DE), the estimated coefficient is positive and insignificant. The results indicate that when the debt-to-equity ratio of the JSE-listed companies is greater than 1.665499, the relationship between financing decisions and the dividend payment decisions becomes unclear. Two classes of companies shown by the point estimates are those with low debt-to-equity ratio (debt-to-equity ratio<1.6654999) and those with high debt-to-equity ratio (1.6654999 ≤DE). If the two regimes are compared, companies that are not at risk or lowly geared are likely to distribute dividend and companies that are at risk or highly leveraged will not pay dividend. In addition, the finding suggests that below the threshold, the return is higher and above the target, the risk is higher. Therefore, Hypothesis 1B is supported.

(b) Threshold coefficient for the total debt (LTB) on dividend payments

To validate the above results, the research uses a different measure of the capital structure (total debt based on the book value). The results reveal that there is a double threshold effect of the long term debt based on the book value. In the first regime where the total debt based of the book value is strictly less than 0.5585192 (LTB<0.5585192), the upper bound coefficient is positive and significant at the 5% level. In the second regime where the total debt based on the book value is between

0.5585192 and 0.8331859 (0.5585192 ≤LTB < 0.8331859), the estimated coefficient of the upper bound is positive and significant at the 10% level. In the third regime where LTB is greater or equal 0.8331859 (0.8331859 ≤LTB), the coefficients are both positive and insignificant. The research concludes that there is an increasing trend in the threshold effect between long-term debt based on the book value and the dividend payments for the period 1990 to 2017. Therefore, Hypothesis 1B is accepted.

(c) Non-threshold coefficients and the dividend payments

1) Company size

The coefficient of the lagged company size is positive and statistically significant. A one-unit change in the lagged size is associated with a 0.002392 increase in the actual dividend paid (when the DE is used as a threshold) and with 0.002989 increase in the actual dividend (when the LTB is used as a threshold) at the 5% and 1% levels respectively. The finding is similar to that of the fixed-effects model (full sample).

2) Company profitability

The coefficient of the lagged company profitability is positive and statistically significant. A one-unit change in the lagged profitability is associated with a 0.000932 increase in the actual dividend paid (when the DE is used as a threshold) and with 0.000980 increase in the actual dividend (when the LTB is used as a threshold) at the 1% significance level. The finding is similar to that of the fixed-effects model (full sample).

3) Company's cash flow

The coefficient of the lagged company's cash flow is positive and statistically significant. A one-unit change in the lagged cash flow is associated with a 0.139429 increase in the actual dividend paid (when the DE is used as a threshold) and with a 0.135828 increase in the actual dividend (when the LTB is used as a threshold) at the 1% significance level. The finding is similar to that of the fixed-effects model (full sample).

4) Market volatility

The coefficient of the lagged market volatility is negative and statistically significant. A one-unit change in the lagged volatility is associated with a 9.71E-05 decrease in the actual dividend paid (when the DE is used as a threshold) and with a 0.000100 decrease in the actual dividend (when the LTB is used as a threshold) at the 5% significance level. The finding is similar to that of the fixed-effects model (full sample).

The estimated models of the threshold debt-to-equity ratio and the long-term debt based on the book value from the empirical results of the research are as follows:

$$\begin{aligned} cd_{i,t} = {} & \mu_i + 0.0023 * size_{i,(t-1)} + 0.0009 * ra_{i,(t-1)} + 0.1394 * cf_{i,(t-1)} - 0.0251 * invest_{i,(t-1)} \\ & - 9.71E\text{-}05 * vo_{i,(t-1)} + 0.0051 * \Delta de_{i,(t-1)} I(de_{i,t} < 1.6655) \\ & + 0.0005 * \Delta de_{i,(t-1)} I(de_{i,t} \geq 1.6655) + \varepsilon_{i,t} \end{aligned}$$

$$\begin{aligned} cd_{i,t} = {} & \mu_i + 0.0029 * size_{i,(t-1)} + 0.0009 * ra_{i,(t-1)} + 0.1358 * cf_{i,(t-1)} \\ & - 0.0297 * invest_{i,(t-1)} - 0.0001 * vo_{i,t} + 0.237 * \Delta ltb_{i,(t-1)} I(ltb_{i,t} < 0.5585) \\ & + 0.0213 * \Delta ltb_{i,(t-1)} I(0.5585 \leq ltb < 0.8331) + 0.0346 * ltb_{i,(t-1)} I(0.8331 \leq ltb) \\ & + \varepsilon_{i,t} \end{aligned}$$

Table 6.2: Threshold regressions approach for the dividend payments and the capital structure (trade-off theory): 1990-2017

	CD and threshold DE		**CD and threshold LTB**
Variables	Coefficient (t-Statistic)	Variables	Coefficient (t-Statistic)
Threshold variables		Threshold variables	
	DE < 1.6654999	LTB< 0.5585192	
Constant	-0.004854 -0.814305	Constant	-0.007403 -1.262647
∆DE(-1)	0.005195** 3.206685	∆LTB(-1)	0.023794** 2.622795
∆DE(-2)	-0.000105 -0.055836	∆LTB(-2)	0.003055 0.386242
1.6654999 ≤DE		0.5585192 ≤LTB < 0.8331859	
Constant	-0.011139* -1.890787	Constant	-0.015286** -2.583113
∆DE(-1)	0.000527 0.415914	∆LTB(-1)	0.021319* 2.540218
∆DE(-2)	0.001200 1.239113	∆LTB(-2)	0.009074 1.151361
	-	0.8331859 ≤LTB_TRM	
	-	Constant	-0.007564 -1.101762
	-	∆LTB(-1)	0.034620 1.136971
	-	∆LTB(-2)	0.111407*** 3.487889
Non-threshold variables		**Non-threshold variables**	
SIZE(-1)	0.002392** 2.751864	SIZE(-1)	0.002989*** 3.496072
RA(-1)	0.000932*** 6.478423	RA(-1)	0.000980*** 7.251997
CF(-1)	0.139429*** 10.04970	CF(-1)	0.135828*** 10.37085
INVEST(-1)	-0.025092 -1.576643	INVEST(-1)	-0.029664* -1.913929
VO(-1)	-9.71E-05** -3.135061	VO(-1)	-0.000100** -3.285907
	Regression statistics	**Regression statistics**	
Adjusted R-squared	0.392646	Adjusted R-squared	0.410662
F-statistic	122.5392	F-statistic	100.9669
Prob(F-statistic)	0.000000	Prob(F-statistic)	0.000000

CD is the actual dividend paid, **∆DE** is the change in the debt-to-equity ratio, **∆LTB** is the change in total debt based on the book value, **SIZE** is the company size, **RA** is the return on assets used as proxy for the profitability, **CF** is the cash flow, **INVEST** is the actual investments fixed assets and **VO** is the market volatility**. DE(-1), DE(-2), LTB(-1)** and **LTB(-2)** are time lags included in the model to allow for the computation of ω_1 (DE**(-1)**) and **ω_2 (DE(-2))** when the debt-to-equity is used as threshold variable or **ω_1 (LTB(-1))** and **ω_2 (LTB(-2))** when the total debt based on the book value is chosen as the threshold variable under the two regimes given the existence of a threshold. Threshold variables mean varying variables according to different regimes and non-threshold variables means non-varying variables according the different given the existence of a threshold. The threshold test is presented in appendix 6.

6.2.3 Threshold effects of the DE on SRP, CD and DS: 1999-2017

Table 6.3 presents the threshold effects of the capital structure (the debt-to-equity ratio) on share repurchases, the dividend payments and the distribution strategies (the sum of CD and SRP) for the period 1999 to 2017. The results are computed using EViews 11. The model specification and tests are presented in Appendices 7, 8 and 9.

(a) Threshold effects of the debt equity ratio on share repurchases

In the first regime over the period 1999 to 2017, where the debt-to-equity ratio is less than 0.5619999 $\left(de_{i,t} < 0.56019999\right)$, the estimated coefficients of the upper bound and the lower bound are both negative and statistically insignificant $\left(\Delta de_{i,(t-1)} = -862E-05,\ \Delta de_{i,(t-2)} = -0.001020\right)$. The results indicate that there is a threshold effect of the debt-to-equity ratio on share repurchases. However, this effect is insignificant since share repurchases are not of a big magnitude. Likewise, in the second regime where the debt-to-equity ratio is greater or equal to 0.56019999 $\left(de_{i,t} \geq 0.56019999\right)$, the estimated coefficients of the debt-to-equity ratio are insignificant $\left(\Delta de_{i,(t-1)} = -0{,}000990, \Delta de_{i,(t-2)} = 0.000175\right)$. The existence of the threshold of the debt-to-equity ratio does not have any effects on share repurchases of smaller magnitude. The size, the profitability (RA) and the free cash flow are positive and significant at the 5%, 10% and 1% levels respectively. Investment and market volatility are negative and insignificant. The cash flow appears to be the biggest non-threshold determinant of share repurchases.

The introduction of share repurchases in 1999 did not deter JSE-listed companies from paying dividends. Over this period (1999-2017), the results show that in the first regime where the debt-to-equity ratio is strictly less than 1.4144999 $\left(de_{i,t} < 1.4144999\right)$ the estimated coefficients of the debt-to-equity ratio are both positive and significant at the 1% and 5% levels respectively $\left(de_{i,(t-1)} = 0.006364, de_{i,(t-2)} = 0.003641\right)$. The results indicate that, a one-unit change in the debt-to-equity ratio is associated with a

0.006364 increase in the actual dividend paid at the 1% significance level when the upper bound is considered and with a 0.003641 increase when the lower bound is considered. In the second regime where the debt-to-equity ratio is greater or equal to 1.4144999, the estimate coefficient of the lower bound of the debt-to-equity ratio is positive and significant at the 5% level. The results indicate that there is an existing significant threshold effect of the capital structure on the dividend payments even after the introduction of share repurchases. The estimated coefficients of profitability and cash flow are positive and highly significant. The coefficient of market volatility is negative and highly significant. The coefficients of size and investment are negative and insignificant.

Extending the threshold effects to the distribution strategies (the sum of share repurchases and the actual dividend paid), the results show that in the first regime where the debt-to-equity ratio is strictly less than $\gamma = 1.113899$, the estimated coefficient of the debt-to-equity ratio $(de_{i,(t-1)} = 0.004230)$ is positive and significant at the 5% level. In the second regime where the debt-to-equity ratio is greater or equal to $\gamma = 1.113899$, the estimated coefficients are positive and insignificant. Therefore, Hypothesis 1B is accepted.

(b) Non-threshold variables

Company size

The coefficient of the size of the company is positive and statistically significant at the 10% level in the share repurchases equation. The coefficient is insignificant in the dividend payment equations and the distribution strategy equation (the sum of the dividend payments and share repurchases). The finding shows that a unit change in the lagged company size is associated with a 0.000856 increase in share repurchases.

Company profitability

The coefficient of the company is positive and highly significant in the share repurchases, the dividend payment and the distribution strategy equation at the 5%, 1% and 1% levels respectively. A one-unit change in the company's profitability is associated with a 0.000134 increase in share repurchases, a 0.001162 increase in the actual dividend paid and a 0.001316 increase in the sum of the actual dividend paid and share repurchases. The finding is similar to the fixed-effects model with regard to the dividend payments.

Company investments

The coefficient of investment is negative and statistically insignificant. This finding shows no evidence of the lagged fixed assets acquired in terms of investments on the payments of dividend, share repurchases and the distribution strategies. The finding suggests that past investment decisions do not affect current distribution policy decisions.

Market volatility

The results show that the coefficient of market volatility is negative and highly significant in the dividend payment equation and distribution strategy equation, whereas it is insignificant in the share repurchase equations. Similar to the fixed-effects and random effects models, the results support the argument that during a period of uncertainty in the market, South African managers reduce the amount paid in dividend to shareholders. Further, South African managers seem to be unconcerned to repurchase shares during a period of high volatility because the shares are of small magnitude.

Table 6.3: Threshold regressions approach for share repurchases, distribution strategies and the capital structure (trade-off theory): 1999-2017

	SRP and threshold DE		CD and threshold DE		DS and threshold DE
Variables	Coefficient (t-Statistic)	Variables	Coefficient (t-Statistic)	Variables	Coefficient (t-Statistic)
Threshold variables		Threshold variables		Threshold variables	
DE(-1) < 0.56019999		DE< 1.4144999		DE(-4) < 1.113899	
Constant	-0.005802 -1.820988	Constant	0.019870 1.742551	Constant	0.013355 1.103261
ΔDE(-1)	-8.62E-05 -0.173409	ΔDE(-1)	0.006394*** 3.467950	ΔDE(-1)	0.004230* 2.006780
ΔDE(-2)	-0.001020 -1.312175	ΔDE(-2)	0.003641* 2.213993	ΔDE(-2)	0.001773 0.918997
0.56019999 <= DE(-1)		1.4144999 <= DE		1.113899 <= DE(-4)	
Constant	-0.003060 -0.961627	Constant	0.011260 0.983528	Constant	0.005910 0.483453
ΔDE(-1)	-0.000990 -1.763036	ΔDE(-1)	0.002508 1.430880	ΔDE(-1)	0.000399 0.289421
ΔDE(-2)	0.000175 0.329638	ΔDE(-2)	0.002493* 2.009723	ΔDE(-2)	0.000518 0.367823
Non-threshold variables		Non-Threshold Variables		Non-Threshold Variables	
SIZE(-1)	0.000856* 1.920259	SIZE(-1)	-0.000280 -0.185468	SIZE(-1)	0.001060 0.652887
RA(-1)	0.000134** 3.065530	RA(-1)	0.001162*** 5.834972	RA(-1)	0.001316*** 6.265055
CF(-1)	0.020926*** 4.135311	CF(-1)	0.154228*** 7.691859	CF(-1)	0.172547*** 7.826571
INVEST(-1)	-0.006754 -0.831847	INVEST(-1)	-0.040384 -1.721852	INVEST(-1)	-0.048181 -1.881862
VO(-1)	-2.04E-05 -1.291196	VO(-1)	-0.000210*** -4.223871	VO(-1)	-0.000256*** -4.937439
Regression statistics					
Adjusted R-squared	0.069904	Adjusted R-squared	0.423603	Adjusted R-squared	0.428434
F-statistic	10.67286	F-statistic	95.51004	F-statistic	97.32099
Prob(F-statistic)	0.000000	Prob(F-statistic)	0.000000	Prob(F-statistic)	0.000000

CD is the actual dividend paid, Δ**DE** is the change in the debt-to-equity ratio, Δ**LTB** is the change in total debt based on the book value, **SIZE** is the company size, **RA** is the return on assets used as proxy for the profitability, **CF** is the cash flow, **INVEST** is the actual investments fixed assets and **VO** is the market volatility. **ΔDE(-1)** and **ΔDE(-2)** are time lags included in the model to allow for the computation of ω_1 **(DE(-1)**) and ω_2 **(D(-2))** under the two regimes given the existence of a threshold. Threshold variables mean varying variables according to different regimes and non-threshold variables means non-varying variables according the different given the existence of a threshold. The threshold tests for each specification are presented in appendix 7, 8 and 9.

6.3 PART B: PREDICTORS OF CHOICE BETWEEN DISTRIBUTION STRATEGIES

6.3.1 Distribution strategies: model of choice specification

To determine how JSE-listed companies in the four main sectors of the JSE choose between the dividend payments, the share repurchases, the engagement in both share repurchases and the dividend payments and the engagement in neither the share repurchases nor the dividend payments using the natures of the capital structure and company-specific variables, the research uses multinomial logistic regression. Multinomial logistic regressions are a straightforward extension of logistic models. Supposing that a dependent variable has J categories, one value (typically the first, the last or the value with the highest frequency) of the dependent is designed as the reference category. The probability of membership in other categories is compared with the probability of membership in the reference category (for example, the dividend payments relative to share repurchases).

For a dependent variable with J categories (the dividend payments, engaging in both, repurchasing shares and engaging in none), this requires the calculation of J-1 equations, one for each category relative to the reference category, to describe the relationship between the dependent variable (distribution strategies) and the independent variables (the capital structure and the company-specific variables).
Hence, if the first category is the reference category, then for j=2, … , J, the probability that the y takes j can be written as:

$$\Pr(y=j)=\frac{e^{\beta_j x_i}}{1+\sum_{k=1}^{j-1} e^{\beta'_k x_i}} \quad \text{, for j=1, 2,…, J-1} \qquad (6.6)$$

$$\Pr(y=J)=\frac{1}{1+\sum_{k=1}^{J-1} e^{\beta'_k x_i}} \qquad (6.7)$$

where there are J categories and J is the reference category (share repurchases for the purpose of this study), each β_j is a vector of dimension equal to the number of independent variables, which can be estimated by maximum likelihood. These estimates are conveniently expressed in terms of the log odds of any two outcomes, which equal $\ln\left[\frac{P_{ij}}{P_{ik}}\right] = x_i'(\beta_j - \beta_k)$. The coefficient of each independent variable in this equation equals the difference between the βs for two different outcomes. The p-value on such a coefficient provides a test of the hypothesis that the independent variable affects the probability of each outcome in the same manner. The marginal effects on the particular outcomes are:

$$\frac{\partial P_j}{\partial x_i} = P_j\left[\beta_j - \sum_{k=1}^{J} P_k \beta_k\right]$$

6.3.2 Predictors of choice between distribution strategies

The data set for this model of choice contains 68 companies covering the period 1999 to 2017. Given the nature of the data set, some companies pay and/or repurchase shares yearly, or do not do any of the above in some years (not paying dividend or repurchasing shares during some periods is a distribution strategy for certain companies in the sample). Consequently, the research looks at four different pay-out categories in the data set; companies that only pay dividends, only repurchase shares, engage in both, and finally engage in neither. The multinomial logistic regression used in this section has nine independent variables (company-specific variables): profitability **(RA)**, growth **(GW)**, company size **(SIZE)**, cash flow **(CF)**, working capital **(WK)**, liquidity ratio **(LIQ)**, quick ratio **(QR)**, market volatility **(VO)**, three alternative measures of the capital structure (debt-to-asset ratio **(DA)**, debt-to-equity ratio **(DE)** and the leverage factor **(LF)**) and one dependent variable, distribution strategies, that represent four different outcomes of distribution policies.

The results on the debt-to-asset ratio and company-specific variables as predictors of choice between distribution strategies are presented in Table 6.4, while the results of the nature of the capital structure and the company-specific variables as predictors of choice between distribution strategies are presented in Table 6.5.

6.3.2.1 DA and company-specific variables as predictors of choice between DS

Table 6.4 presents the multinomial logistic regression parameter estimates of the choices between distribution strategies and the debt-to-asset ratio effects.

Dividend payments relative to share repurchases

The first set of coefficients is a comparison between the decision to pay dividend and the decision to repurchase shares. Only profitability and the company size are the significant coefficients in the model.

1) **Company profitability**

Companies that are more profitable are more likely to pay dividend and less likely to repurchase shares. The odd ratio of 1.024 indicates that for every one-unit increase on profitability, the odds of a company paying dividend change by factor of 1.024 (in other words, the odds increase). This finding is similar to the finding by Renneboog and Trojanowsk (2011).

2) **Company size**

The company size is a negative significant predictor, indicating that large companies are less likely to pay dividends. The odd ratios of 0.433 indicate that for every unit increase on the company size, the odds of a company paying dividend change by a factor of 0.433 (stated differently, the odds decrease for every increase in the size of the company). This finding contradicts the finding by Renneboog and Trojanowsk (2011), who found that in the United Kingdom, large companies were more likely to pay dividends, but is similar to the findings by Dittmar (2000) and Liu and Mehran (2016). Dittmar (2000) argues that if size and information available positively correlate, then large companies are less likely to be mis valued. Thus, the conjunction of these two results illustrates that large companies may also be mis valued and use share repurchases to take advantage of possible undervaluation.

<u>Both relative to share repurchases</u>

The second set of coefficients represents the comparison between companies that engage in both (the dividend payment and the repurchase of shares) and those that repurchase shares only. The only significant coefficients are profitability, cash flow and market volatility.

1) **Profitability**

Companies that are profitable are more like to engage in both the dividend payments and share repurchases. The odds ratio of 1.028 indicates that for every one-unit increase in the company profitability, the odds of a company choosing to engage in both the dividend payments and share repurchase change by a factor of 1.028 (in other words, the odds increase). Renneboog and Trojanowsk (2011) found a similar result.

2) **Cash flow**

Companies with more cash flow are likely to engage in both (the dividend payments and share repurchases). The odd ratio of 28.744 indicates that for every one-unit increase in the company's cash flow, the odds of a company to engage in both the dividend payments and share repurchase change by a factor of 28.744 (stated differently, the odds increase). The finding suggests that South African companies with more cash flow engage in both the dividend payments and share repurchases.

3) **Market volatility**

Companies faced with high uncertainty in the market are less likely to engage in both the dividend payments and share repurchases. The odds ratio of 0.980 indicate that for every one-unit increase in the market volatility, the odds of a company to engage in both change by factor of 0.980 (stated differently, the odds decrease with increasing market volatility). The finding suggests South African companies faced with higher market volatility will not engage in both the dividend payments and share repurchases.

<u>None (no dividend payments and no share repurchase) relative to share repurchases</u>

The final set of coefficients represents a comparison between companies choosing not to engage in the dividend payments and share repurchase and companies choosing to repurchase shares. The only significant coefficients are size, cash flow, growth, market volatility and working capital.

1) **Company size**

Company size is a significant negative predictor, indicating that large companies are less likely to engage in none and more likely to repurchase shares. The odds ratio of 0.319 indicates that for every one-unit increase in the company size, the odds to engage neither the dividend payments nor share repurchases change by a factor of 0.319.

2) **Company cash flow**

Cash is a significant negative predictor, indicating that companies with free cash are less likely to choose to engage in none but more likely to repurchase shares. The odds ratio of 0.037 indicates that for every one-unit increase in the cash flow, the odds to engage in neither the dividend payments nor share repurchases change by a factor of 0.037 (in other words, the odds decrease). The finding is consistent with the finding by Liu and Mehran (2016).

3) **Company growth opportunity**

Companies that have growth opportunities are more likely to choose to engage in none but less likely to choose to repurchase shares. The odds ratio of 1.011 indicates that for every one-unit increase in growth opportunities, the odds to engage in neither the dividend payments nor share repurchases change by a factor of 1.011 (in other words, the odds increase). The finding suggests that South African companies with growth opportunities will not pay dividend and repurchase shares. This finding is similar to the findings by Lui and Mehran (2016), Brown, Handley and O'Day (2015), who argue that companies with growth opportunities are less likely to repurchase shares.

4) Market volatility

Companies faced with higher market volatility are more likely to choose to engage in none and less likely to repurchase shares. The odds ratio of 1.018 indicates that for every one-unit increase in the market volatility, the odds to engage in neither the dividend payments nor share repurchases change by a factor of 1.018 (in other words, the odds increase).

5) Working capital

Working capital is a negative significant predictor, indicating that companies with higher working capital are less likely to engage in none. The odds ratio of 0.017 indicates that for every one-unit increase in working capital, the odds to engage in none (dividend payments and share repurchases) change by a factor of 0.017 (in other words, the odds decrease).

Table 6.4: Capital structure and company-specific variables as predictors of choice between distribution strategies

Parameter Estimates									
Distribution strategies[a]		B	Std. error	Wald	d f	Sig.	Exp(B)	95% CI for Exp(B) LB	UB
Dividend payments	Intercept	9.114	2.100	18.839***	1	.000			
	Profitability	.023	.011	4.477**	1	.034	1.024	1.002	1.046
	Size	-.837	.218	14.737***	1	.000	.433	.282	.664
	Cash Flow	.891	1.619	.302	1	.582	2.437	.102	58.250
	Growth	.000	.006	.001	1	.979	1.000	.989	1.012
	Volatility	-.006	.008	.624	1	.430	.994	.978	1.010
	Liquidity	.117	.199	.345	1	.557	1.124	.761	1.660
	Working Capital	-1.675	1.130	2.198	1	.138	.187	.020	1.715
	Quick Ratio	-.103	.249	.171	1	.679	.902	.554	1.469
	Debt-to-asset ratio	-.714	1.098	.423	1	.515	.489	.057	4.211
Both (dividend payments and share repurchases)	Intercept	2.812	2.186	1.654	1	.198			
	Profitability	.027	.012	5.412**	1	.020	1.028	1.004	1.051
	Size	-.099	.226	.191	1	.662	.906	.581	1.411
	Cash Flow	3.360	1.673	4.032**	1	.045	28.780	1.083	764.472
	Growth	-.006	.006	.936	1	.333	.994	.982	1.006
	Volatility	-.020	.009	5.010**	1	.025	.981	.964	.998
	Liquidity	-.008	.215	.002	1	.969	.992	.651	1.511
	Working Capital	-.028	1.184	.001	1	.981	.973	.096	9.895
	Quick Ratio	-.146	.266	.301	1	.583	.864	.513	1.455
	Debt-to-asset ratio	.269	1.155	.054	1	.816	1.309	.136	12.586
None (neither the dividend payments nor share repurchases)	Intercept	9.625	2.193	19.268***	1	.000			
	Profitability	.010	.011	.850	1	.356	1.010	.988	1.033
	Size	-1.141	.231	24.408***	1	.000	.319	.203	.502
	Cash Flow	-3.311	1.709	3.753*	1	.053	.036	.001	1.040
	Growth	.011	.006	3.690*	1	.055	1.012	1.000	1.023
	Volatility	.018	.008	4.486*	1	.034	1.018	1.001	1.035
	Liquidity	.110	.205	.289	1	.591	1.116	.748	1.667
	Working Capital	-4.041	1.217	11.031***	1	.001	.018	.002	.191
	Quick Ratio	-.078	.276	.079	1	.779	.925	.538	1.591
	Debt-to-asset ratio	-1.193	1.172	1.037	1	.309	.303	.031	3.014
	Number of obs.	1288							
	Pseudo R-Square	.304							
	Chi-Square	403.497***							

a. **The reference category is: Share repurchases**

Note: *p<0.1; **p<0.05; ***p<0.01. The full summary statistics of the model are provided in appendix 10. **Df** is the degree of freedom, **CI** is the confidence interval, **LB** is the lower bound, **UB** is the upper bound and **Exp(**B) is the exponentiation of the **B** coefficient which is an odds ratio.

6.3.2.2 The nature of the capital structure and company-specific variables as predictors of choice between DS

The results in Table 6.4 reveal no evidence of the debt-to-asset ratio as a predictor of choice between the payments of dividends, the repurchase of shares, the engagement in both and the engagement in neither one of them. Consequently, an attempt is made to find out what happens to the choices when companies are above the mean debt-to-equity ratio or below the mean debt-to-equity ratio in the sample.

1) Natures of capital structure

The results in Table 6.5 show that companies with a decrease in the debt-to-equity ratio are more likely to pay dividends relative to share repurchases and at the same time are more likely to engage in none (neither the dividend payments nor share repurchases) relative to share repurchases. This validates the findings of the threshold regression approach suggesting that the payment of dividend is conditioned by the specific threshold in the debt-to-equity ratio. Furthermore, it contradicts the notion that companies that are not highly leveraged are more likely to repurchase shares.

2) Company-specific variables

Dividend payments relative to share repurchases

The results in Table 6.5 reveal that companies that are profitable are more likely to pay dividend relative to share repurchases and larger companies are less likely to pay dividend. This finding is similar to the finding in Table 6.4.

Both (dividend payments and share repurchase) relative to share repurchases

The results reveal that profitable companies are more likely to engage in both the dividend payments and share repurchases relative to share repurchases. Companies with free cash are more likely to engage in both the dividend payments and share repurchases relative to share repurchases. JSE-listed companies faced with higher market volatility are less likely to engage in both the repurchase of shares and the dividend payments relative to share repurchases.

Neither the dividend payments nor the share repurchases

The findings show that large companies are less likely to engage in neither the repurchase of shares nor the dividend payments relative to share repurchases. Companies with growth opportunities are more likely to engage in neither the repurchase of shares nor the payment of dividend relative to the repurchase of shares.

This finding validates the narrative that growth opportunities deter companies from paying dividends and repurchasing shares.

Companies faced with higher market volatility are less likely to engage in neither the repurchase of shares nor the dividend payments relative to share repurchases. The findings support the notion that during a period of market volatility, South African companies are more likely to repurchase shares. Companies with higher levels of working capital are less likely to engage in neither the repurchase of shares nor the payment of dividends relative to share repurchases. Companies with a higher level of cash-flow are less likely to engage in neither the dividend payments nor the share repurchases (they will choose share repurchases over none). The results of the leverage factor, the debt-to-equity ratio and company-specific variables as predictors of choice between the distribution strategies are reported in the list of appendices. Table 6.6 presents the summary results of predictors of choice between the decision to pay dividend, engage in both and engage in none relative to the reference category share repurchases

Table 6.5 Nature of DE and company-specific variables as predictors of choice between distribution strategies

Parameter Estimates									
Distribution Strategies[a]		B	Std. Error	Wald	df	**Sig.**	**Exp(B)**	95% **CI** for Exp(B) **LB**	**UB**
Dividend payments	Intercept	8.865	1.762	25.310	1	.000			
	Profitability	.024	.011	4.483**	1	.034	1.024	1.002	1.047
	Size	-.891	.220	16.476***	1	.000	.410	.267	.631
	Cash Flow	.834	1.689	.243	1	.622	2.301	.084	63.089
	Growth opportunities	.001	.006	.007	1	.931	1.001	.989	1.012
	Volatility	-.006	.008	.549	1	.459	.994	.978	1.010
	Working Capital	-2.078	.986	4.440**	1	.035	.125	.018	.865
	Decrease in DE	.789	.339	5.408*	1	.020	2.201	1.132	4.278
	Increase in DE	0[b]	.	.	0	.	.	.	.
Both (Dividend payments and share repurchases)	Intercept	2.916	1.820	2.567	1	.109			
	Profitability	.026	.012	4.826**	1	.028	1.026	1.003	1.051
	Size	-.111	.227	.238	1	.626	.895	.574	1.396
	Cash Flow	3.338	1.749	3.643*	1	.056	28.171	.914	868.285
	Growth opportunities	-.005	.006	.774	1	.379	.995	.983	1.006
	Volatility	-.020	.009	5.178**	1	.023	.980	.964	.997
	Working Capital	-.677	1.023	.438	1	.508	.508	.068	3.775
	Decrease in DE	.088	.351	.062	1	.803	1.092	.549	2.172
	Increase in DE	0[b]	.	.	0	.	.	.	.
None (Neither the dividend payments nor share repurchases)	Intercept	9.073	1.848	24.118***	1	.000			
	Profitability	.011	.011	.949	1	.330	1.011	.989	1.034
	Size	-1.192	.232	26.329***	1	.000	.304	.193	.479
	Cash Flow	-3.298	1.774	3.455*	1	.063	.037	.001	1.196
	Growth opportunities	.012	.006	3.899**	1	.048	1.012	1.000	1.023
	Volatility	.018	.008	4.873**	1	.027	1.019	1.002	1.035
	Working Capital	-4.231	1.066	15.749***	1	.000	.015	.002	.117
	Decrease in DE	.838	.374	5.019**	1	.025	2.312	1.111	4.813
	Increase in DE	0[b]	.	.	0	.	.	.	.
	Number of obs.	1286							
	Pseudo-R-squared	.301							
	Chi-squared	399.003***							

a. The reference category is: Share repurchase. *p<0.1; **p<0.05; ***p<0.01

b. This parameter is set to zero because it is redundant. Summary statistics of the model are in appendix 11. **LB** is the lower bound, **UB** is the upper bound, **CI** is the confidence interval.

Table 6.6: Summary of predictors of choice between distribution strategies

Choices made relative to share repurchases			
	PR relative to SRP	**BOTH relative to SRP**	**NONE relative to SRP**
Predictors			
Profitability (RA)	Pay dividend	Engage in both	
Company size (SIZE)	Repurchase shares		Repurchase shares
Cash flow (CF)		Engage in both	Repurchase shares
Growth opportunities (GW)			Engage in none
Market volatility		Repurchase shares	Engage in none
Liquidity			
Working capital (WK)			Repurchase shares
Quick ratio (QR)			
Debt-to-asset ratio (DA)			
Debt-to-equity ratio (DE)			
Leverage factor (LF)			
Decrease in DE	Pay dividends	-	Engage in none
Increase in DE	-	-	

6.4 CHAPTER SUMMARY

The capital structure as a determinant of the distribution strategies among other variables was investigated. However, in developing economies, there is still a dearth of empirical evidence of an optimal capital structure for the distribution strategies and the empirical evidence of the different alternative measures of the capital structure as predictors of choice between the decision to pay dividend, repurchase shares, engage in both and engage in neither the dividend payments nor share repurchases. The aim of this chapter was to extend the empirical literature by providing new evidence from South African markets.

First, the chapter used an advanced threshold regression approach to capture the threshold effects of two alternatives measures of the capital structure (debt-to-equity ratio and the total debt based on book value) on the dividend payments, share repurchases and the distribution strategies (total pay-out). The result revealed the existence of a dynamic capital structure for the payments of dividends to South African shareholders. Surprisingly, the threshold effect on share repurchases appeared to be insignificant over the period 1999 to 2017. The non-existence of the threshold effects on share repurchases could be explained by the narrative that South African companies did not use share repurchases as the main distribution policy.

Second, the model of choice results revealed that the choice between dividends, repurchase shares, engage in both (dividend payments and share repurchase) and engage in neither one (dividend payments and share repurchases) relative to share repurchases was driven by profitability, company size, cash flow, working capital and market volatility. The results suggested that for every one-unit increase in profitability as a predictor of choice, JSE-listed companies were more likely to choose to pay dividend only or pay dividend and repurchase shares at the same time. During a period of high market volatility, the results showed that South African managers would choose not to engage in dividends and repurchase shares at all. Large companies were less likely to pay dividend and less likely to engage in none. Finally, the results suggested that companies that with a decrease in the debt-to-equity ratios in the sample were more likely to choose the payment of dividends and were also more likely to engage in none (neither the dividend payments nor the share repurchases) relative to share repurchases.

The next chapter examines the sectoral effect on the distribution and financing decisions and the interaction among them.

CHAPTER 7: SECTORAL ANALYSIS OF FINANCING DECISIONS AND DISTRIBUTION STRATEGIES

7.1 INTRODUCTION

This chapter focuses on the third objective of the research, namely investigating the sectoral effect on the interrelationship between financing decisions and distribution strategies. Companies operating in the same sector in South Africa should have similar characteristics. These characteristics will affect the nature of the sector (for example, profitability and risks) and follow common business policies and norms. Sectors are also subject to different challenges in terms of operating risk, technology requirements and environmental regulation. The literature indicates that companies' financing and distribution decisions not only rely on companies' specific characteristics, but the nature of the industry could also determine these decisions. However, information on the sectoral effect on the interplay between distribution policies and the capital structure is scarce when it comes to developing countries like South Africa. Over the last two decades, the South African markets has featured periods of high economic growth and low economic growth, massive capital inflows (during booming periods) and outflows (during periods of uncertainty in the market) and significant changes in the structure of capital and distribution strategies. The phenomenal variation in the economy of South Africa is reflected in the per capita income and the growth relative to the whole population. This generates a gradual transferring from traditional primary sectors (industrial and basic materials) to secondary or tertiary sectors (services) in order to serve the need of the growing population. As a result, this chapter investigates how the sector within which a company operates influences the interrelationship between financing and distribution strategy decisions. Furthermore, some industries are still highly controlled by the South African government (for example, the industrial sector), which could lead to a different style of agency problems and consequently result in different approaches to companies' capital structure and distribution policies. Therefore, it is important to understand how cross-sector differences (the sector activities and the nature of the sector, market volatility and government policies) affect the interdependence between financing and distribution decisions within sectors in South Africa.

This chapter aims to answer the following question: Is the interdependence between the capital structure and the dividend payment different within sectors because of cross-sector differences?

In order to answer this question, the research uses four sectors having data over the periods 1990 to 2017 and 1999 to 2017. The research applies panel data techniques (pooled, fixed-effects and random effects) to the four sectors of the JSE. To correct for heteroscedasticity in the fixed-effects model, the research uses a white cross-section weight. The GMM approach is not used at sectoral level because it works better with a larger N and small T. However, for the strategic simultaneous decision-making approach between the capital structure and the distribution policies, the research uses a three-stage least squares estimation (which is a combination of a seemingly unrelated regression and two-stage least squares).

The structure of this chapter is as follows: Section 7.2 presents the results of the basic materials sector, Section 7.3 presents the results of the industrial sector, Section 7.4 presents the results of the consumer services sector and Section 7.5 presents the results of the consumer goods sector. The conclusion follows at the end of the chapter. The names of companies included in each sector are provided in the list of appendices.

7.2 SUMMARY OF SECTORAL FACTORS

Table 7.1 shows four sectors of the JSE, subsectors, the nature of cyclicality, the number of companies in each sector and the proportion of each sector in the full sample. In general, the industrial and the basic materials sectors are the two largest groups. They occupy 33 and 31 % in the full sample respectively. The total number of companies in these two sectors groups is 64% in the research sample. The consumer services and the consumer goods sectors only occupy 23 and 13 % respectively.

Table 7.1: Economic activities classification of companies by sector

	Table 7.1 shows the research unbalanced panel data set by sectoral factor. It shows four sectors, subsectors (major activities in each sector as per JSE), the number of companies in each sector group and the percentage of each sector in the entire sample set.				
Number of sectors	**Sectors**	**Subsectors**	**The nature of cyclicality**	**No. of companies selected in each sector**	**Percentage of sample (%)**
1)	Basic material	Chemicals and basic resources	Cyclical	23	33
2)	Consumer goods	Automobiles & parts; food & beverage; personal & household goods	Both cyclical and non-cyclical	09	13
3)	Consumer service	Retail; media, travel; and leisure	Cyclical	16	23
4)	Industrial	Construction & materials and industrial goods & services	Cyclical	21	31
	Final selected sample			68	100
	Source: The JSE Market data 2017				
Note: the sector cyclicality is defined as whether the sector would be affected by economic changes in terms of its revenues, share price, market volatility and economic shocks. In other words, the cyclicality of a sector refers to those sectors that have relatively higher volatility with the change of economic climate, such as economic boom or economic downturn periods. In addition, the demands of goods or services products in a sector tend to be easily affected by the change in general economic conditions or seasonal conditions. By contrast, the non-cyclical sector does not react to shocks in its business cycles. Their demands of products or services usually stay at a relatively stable level and do not present a significant fluctuation such as the general economy or seasonal factors. The cyclical sectors usually comprise those sectors that produce and deliver durable services, which would perform better when the economy is favourable. Consequently, the researcher expects financing and distribution decisions to change in response to changes in the general economy for the four sectors in the research sample.					

7.3 PRELIMINARY DATA ANALYSIS ACROSS SECTORS

7.3.1 Descriptive statistics across sectors

Tables 7.2, 7.3, 7.4 and 7.5 present descriptive statistics of the variables used in the basic material, industrial, consumer service and consumer goods sectors respectively. The variables are winsorised at the top and bottom fifth percentiles. In terms of the debt-to-equity ratio, the tables reveal that the industrial sector is the most indebted and the consumer goods sector the least, being approximately 1.820287 and 0.732398 respectively. The consumer services sector follows the industrial sector at around 1.469208. There is little difference in the average of the debt-to-asset ratio between the basic materials and the consumer goods sectors. In the industrial sector, the debt-to-asset ratio stands at 0.574816 followed by the consumer services sector at 0.473075. With regard to the leverage factor, the industrial sector stands at 1.812100 followed by the consumer services sector at 1.492556. The leverage factor of the basic materials and the consumer goods sectors stands at 1.472623 and 1.178810 respectively.

In terms of the dividend payments, there is little difference in the average actual dividend paid across sectors. The consumer goods sector stands at 0.036419, followed by the consumer services sector at 0.032230. In the basic materials and the industrial sectors, the average dividend paid stands at around 0.027698 and 0.024593 respectively. The results also reveal that the industrial sector could be highly leveraged, but it paid lower dividend as compared with the consumer goods and consumer services sectors.

Table 7.2: Descriptive statistics tests for the BCM sample with winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.027698	0.017198	0.138566	0.000000	0.035426	1.819978	5.896954	641
DA	0.341330	0.319700	0.685780	0.094340	0.174103	0.384898	2.095571	641
DE	0.747696	0.548900	2.351160	0.086380	0.621107	1.189261	3.588348	641
LF	1.472623	1.142500	6.280300	0.874680	1.506674	1.990086	7.204837	641
INVEST	0.074453	0.067322	0.205909	0.000000	0.054479	0.713764	3.021006	641
SIZE	6.741837	6.915975	8.199213	4.423395	1.037237	-0.656610	2.638431	641
RA	8.866054	8.562000	32.74704	-18.44098	12.27923	-0.201737	3.035139	641
NDT	0.034286	0.033751	0.083593	0.000000	0.023557	0.260646	2.406164	641
VO	45.10908	38.20140	122.0366	0.000000	27.34406	1.158296	4.476887	641
TAN	0.262902	0.245699	0.699393	0.000000	0.237743	0.373556	1.752552	641
CF	0.090341	0.083244	0.290269	-0.104799	0.094627	0.108012	2.888426	641

CD is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the actual investment in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, NDT is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow.

Note: when considering the data without winsorisation in Appendix 2, it is evident that extreme values appear in almost all the variables. The research winsorises all the variables used in the basic materials sector at the top and bottom 5th percentiles of their respective distributions. Specifically, the winsorisation transformation as alluded to for the full sample sets all observations below the 5th percentile equal to the 5th percentile, and observation above the 95th percentile equal to the 95th percentile. Such a transformation not only reduces the potential impact of outliers but also allows the full use of observations for the companies selected in the BCM. For Table 7.1, in comparison with Appendix 2, the transformation reveals that the maximum values of the debt-to-equity ratio, leverage factor, return on assets, market volatility and cash flow reduce from 183.4810; 397.9333; 283.3691; 579.5674 and 16.63255 to 2.351160; 6.280300; 32.74704; 122.0366 and 0.290269 respectively. The standard of deviation for each of these variables reduces from 7.403388; 23.77318; 2416474; 49.22389 and 0.930120 to 0.621107; 1.506674; 12.27923; 27.34406 and 0.094627 respectively, and more importantly, their distributions are closer to normality after the transformation, as suggested by the skewness and the kurtosis statistics. Because the winsorisation estimators are expected to be more robust, the empirical evidence presented for the basic materials sector is obtained by using the winsorised variables. The same procedure is followed for the other sectors.

Table 7.3: Descriptive statistics tests for the IND sample with winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.024593	0.018897	0.089409	0.000000	0.024275	1.206800	3.837209	587
DA	0.574816	0.599600	0.827890	0.220960	0.162436	-0.520155	2.540265	587
DE	1.820287	1.523900	4.945850	0.312840	1.215684	1.060498	3.538319	587
LF	1.812100	1.454300	5.560180	-0.313990	1.323032	1.177932	4.488721	587
VO	40.24057	34.08650	100.6786	0.000000	23.85712	0.911386	3.641501	587
TAN	0.268646	0.251260	0.662778	0.037890	0.174343	0.698534	2.751572	587
SIZE	6.692565	6.837014	7.942315	4.917392	0.856792	-0.516816	2.356489	587
RA	11.04389	10.27270	26.21536	-3.370980	7.284316	0.231688	2.753911	587
NDT	0.031953	0.031490	0.065405	0.000692	0.019251	0.079852	1.901065	587
CF	0.089104	0.091936	0.242979	-0.059164	0.077981	0.061675	2.425087	587
INVEST	0.069511	0.054843	0.212143	0.000628	0.059662	0.921897	2.963769	587

CD is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the actual investment in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow.

Table 7.4: Descriptive statistics tests for the CNS sample with winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.032230	0.026040	0.095287	0.000000	0.027456	0.823314	2.726412	447
DA	0.473075	0.476800	0.825870	0.140890	0.225575	-0.012444	1.674461	447
DE	1.469208	0.979100	4.693430	0.171890	1.316183	1.112151	3.171904	447
LF	1.492556	1.252100	3.933610	-0.650050	1.034604	0.529812	3.580911	447
VO	34.42044	32.73630	72.81232	0.000000	17.51489	0.186216	3.162775	447
TAN	0.312937	0.252335	0.824351	0.030014	0.227768	1.020498	3.115103	447
SIZE	6.473939	6.562257	7.638585	5.174142	0.708771	-0.092404	1.888486	447
RA	12.58256	12.52370	27.74606	-1.073380	7.552481	0.189305	2.521537	447
NDT	0.033076	0.032659	0.062799	0.005246	0.015707	0.124718	2.256397	447
CF	0.119657	0.123775	0.264198	-0.024862	0.079732	-0.05528	2.177090	447
INVEST	0.073354	0.066131	0.171274	0.004780	0.043952	0.581743	2.704332	447

CD is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the actual investment in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow

Table 7.5: Descriptive statistics tests for the CNG sample with winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.036419	0.029076	0.102172	0.000146	0.027548	0.916431	3.130668	251
DA	0.377470	0.367800	0.660620	0.081740	0.151351	0.016159	2.455012	251
DE	0.732398	0.595400	1.764620	0.103810	0.468162	0.842761	2.680088	251
LF	1.178810	1.107200	2.131040	0.592010	0.374595	0.926320	3.646048	251
INVEST	0.059204	0.056777	0.128257	0.005488	0.033053	0.421620	2.482387	251
SIZE	6.736071	6.891535	7.730118	5.369240	0.663854	-0.473910	2.286048	251
RA	13.27701	12.63040	25.19167	3.328890	5.974970	0.304843	2.368303	251
NDT	0.029177	0.028853	0.051716	0.009311	0.011221	0.148092	2.358831	251
VO	33.33085	30.25140	63.19679	11.03128	13.23785	0.628422	2.789911	251
TAN	0.334133	0.307982	0.774759	0.057178	0.194054	0.699835	2.763945	251
CF	0.106820	0.104976	0.223028	-0.000704	0.060297	0.158178	2.462584	251

CD is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor**, INVEST** is the actual investment in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow.

7.3.2 Correlation coefficient of variables across sectors

The pair-wise correlations among the main variables for the four sectors are presented in Table 7.6 (basic materials), Table 7.7 (industrial sector), Table 7.8 (consumer services sector) and Table 7.9 (consumer goods sector). The tables indicate that the three alternative measures of the capital structure and the dividend payments negatively significantly correlate with each other in the basic materials sector, the industrial sector and the consumer services sector. This result is consistent with the findings of the full sample and supports the narrative that within the sectors of the JSE, companies carrying higher debt ratios pay out lower dividends. However, in the consumer goods sector, the correlation between the three alternative measures of the capital structure and the actual dividend paid is positive. The finding in the consumer goods sector is in line with the argument that the dividend payments represents a signal of improved financial health, and hence of more debt issuing capacity (Al-Najjar, 2011; Bhaduri, 2002). However, the finding contradicts the agency cost theory which suggests a negative correlation between the capital structure and the distribution policy.

The predetermined cash flow, investment, profitability, non-debt tax shields and size significantly and positively correlate with the actual dividend paid in all four sectors. Asset tangibility significantly and negatively correlate with the actual dividend paid in the basic materials sector and consumer goods sector, but positively correlate with the actual dividend in the industrial and consumer services sector. The market volatility significantly and negatively correlates with the actual dividend paid in all four sectors. Company size significantly and negatively correlates with all three alternative measures of the capital structure in the basic materials sector. The correlation between size and measures of the capital structure is positive and significant with the debt-to-asset ratio and negative and significant with the debt-to-equity ratio in the industrial sector. Size positively and significantly correlates with all measures of the capital structure in the consumer goods and consumer services sector.

Company profitability negatively and significantly correlates with all three alternative measures of the capital structure in the basic materials sector, industrial sector, consumer services sector, but positively and significantly correlates with all three alternative measures of the capital structure in the consumer goods sector. The negative correlation between profitability and the alternative measures of the capital structure is in line with the argument that profitable companies are supposed to have more available internal capital based on the pecking-order theory. The non-debt tax shields in the basic materials sector and consumer goods sector positively and significantly correlate with the debt-to-equity ratio, the debt-to-asset ratio and negatively correlate with the leverage factor (in the basic materials sector), while in the industrial sector, it positively and significantly correlate with all three measures of the capital structure. In the consumer services sector, the non-debt tax shields negatively and significantly correlate with the debt-to-equity ratio and the debt-to-asset ratio, but positively and significantly correlate with the leverage factor.

Asset tangibility negatively and significantly correlates with the three alternative measures of capital structure in the consumer goods and consumer services sector, while in the basic materials sector, it positively and significantly correlates with the debt-to-equity ratio and the debt-to-asset ratio, but negatively and significantly correlates with the leverage factor.

The cash flow negatively and significantly correlates with the three alternative measures of the capital structure in the basic materials sector, while in the consumer services sector, it significantly and negatively correlates with the debt-to-equity ratio, debt-to-asset ratio and positively and significantly correlates with the leverage factor. In the industrial sector, it negatively correlates with the debt-to-equity ratio and the debt-to-asset ratio. In the consumer goods sector, it positively and significantly correlates with debt-to-equity ratio and the debt-to-asset ratio, but negatively and significantly correlates with the leverage factor.

Investment positively and significantly correlates with all three alternative measures of the capital structure in the industrial sector, while in the consumer services sector and consumer goods sector it negatively and significantly correlates with the debt-to-equity ratio and the debt-to-asset ratio, but positively and significantly correlates with the leverage factor.

The market volatility negatively and significantly correlates with all three alternative measures of the capital structure in the consumer goods, while it positively and significantly correlates with all three measures of the capital structure in the industrial sector. In the consumer services sector, it negatively and significantly correlates with the debt-to-equity ratio and debt-to-asset ratio, but positively and significantly correlates with the leverage factor. In the basic materials sector, investment negatively and significantly correlates with the debt-to-asset ratio, but positively and significantly correlates with the debt-to-equity ratio and the leverage factor.

Table 7. 6: Correlation matrix for the basic materials sector (BCM)

	CD	DA	DE	LF	INVEST	SIZE	RA	NDT	VO	TAN	CF
CD	1										
DA	-0.13***	1									
DE	-0.17***	0.88***	1								
LF	-0.09***	0.20***	0.35***	1							
INVEST	0.30***	0.03	0.00	-0.09***	1						
SIZE	0.10***	-0.13***	-0.05**	-0.04**	0.14***	1					
RA	0.53***	-0.06***	-0.09***	-0.21***	0.28***	0.20***	1				
NDT	-0.07***	0.23***	0.22***	-0.08***	0.13***	0.13***	-0.05**	1			
VO	-0.21***	-0.02*	0.04*	0.16***	-0.13***	-0.18***	-0.33***	-0.03*	1		
TAN	-0.13***	0.32***	0.24***	-0.07***	0.04*	0.05**	0.05**	0.23***	-0.14***	1	
CF	0.55***	-0.14***	-0.18***	-0.22***	0.36***	0.29***	0.66***	0.14***	-0.31***	-0.04*	1

0.01(*), 0.05(**) and 0.1 (***) respectively.CD is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the actual investment in fixed assets, **SIZE** is the company size, RA is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow.

Table 7. 7: Correlation matrix for the industrial sector (IND)

	CD	DA	DE	LF	VO	TAN	SIZE	RA	NDT	CF	INVEST
CD	1										
DA	-0.10***	1									
DE	-0.18***	0.75***	1								
LF	-0.05**	0.40***	0.57***	1							
VO	-0.24***	0.17***	0.16***	0.07***	1						
TAN	0.02*	-0.10***	0.09***	-0.04*	0.02*	1					
SIZE	0.14***	0.02*	-0.06***	-0.00	-0.24***	0.16***	1				
RA	0.35***	-0.41***	-0.36***	-0.27***	-0.21***	0.10***	0.01*	1			
NDT	0.06***	0.15***	0.21***	0.14***	0.09***	0.57***	0.07***	-0.17***	1		
CF	0.46***	-0.06***	-0.08***	-0.00	-0.18***	0.07***	0.17***	0.31***	0.24***	1	
INVEST	0.06***	0.15***	0.11***	0.02*	-0.06***	0.48***	0.11***	-0.06***	0.49***	0.21***	1

0.01(*), 0.05(**) and 0.1 (***) respectively.CD is the actual dividend paid, DA is the debt-to-asset ratio, DE is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the actual investment in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow.

Table 7. 8: Correlation matrix for the consumer services sector (CNS)

	CD	DA	DE	LF	VO	TAN	SIZE	RA	NDT	CF	INVEST
CD	1										
DA	-0.11***	1									
DE	-0.09***	0.87***	1								
LF	0.15***	0.45***	0.50***	1							
VO	-0.20***	0.10***	0.08***	-0.05**	1						
TAN	0.36***	-0.11***	-0.10***	-0.04*	-0.13***	1					
SIZE	0.42***	0.34***	0.26***	0.39***	0.09***	0.15***	1				
RA	0.56***	-0.12***	-0.20***	-0.01*	-0.29***	0.33***	0.16***	1			
NDT	0.23***	-0.11***	-0.02*	0.17***	-0.21***	0.37***	0.31***	0.16***	1		
CF	0.52***	-0.05**	-0.01*	0.11***	-0.10***	0.35***	0.31***	0.48***	0.29***	1	
INVEST	0.28***	-0.02*	-0.03*	0.09***	-0.21***	0.45***	0.23***	0.26***	0.43***	0.33***	1

0.01(*), 0.05(**) and 0.1 (***) respectively. **CD** is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the actual investment in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow

Table 7. 9: Correlation matrix for the consumer goods sector (CNG)

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	CD	DA	DE	LF	VO	TAN	SIZE	RA	NDT	CF	INVEST
CD	1										
DA	0.10***	1									
DE	0.04*	0.90***	1								
LF	0.06***	0.18***	0.31***	1							
VO	-0.13***	-0.11***	-0.16***	-0.03*	1						
TAN	-0.16***	-0.38***	-0.29***	-0.03**	-0.01*	1					
SIZE	0.25***	0.31***	0.22***	0.13***	-0.07***	-0.30***	1				
RA	0.58***	0.13***	0.11***	0.08***	-0.22***	-0.26***	0.05**	1			
NDT	0.22***	0.03*	0.05**	0.00	-0.02*	0.34***	-0.15***	0.24***	1		
CF	0.59***	0.11***	0.02*	-0.01*	-0.13***	-0.17***	0.32***	0.57	0.30***	1	
INVEST	0.17***	-0.16***	-0.14***	0.03*	-0.09***	0.43***	-0.21***	0.18***	0.45***	0.22***	1

0.01(*), 0.05(**) and 0.1 (***) respectively. **CD** is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the actual investment in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, **TAN** is the asset tangibility and **CF** is the cash flow.

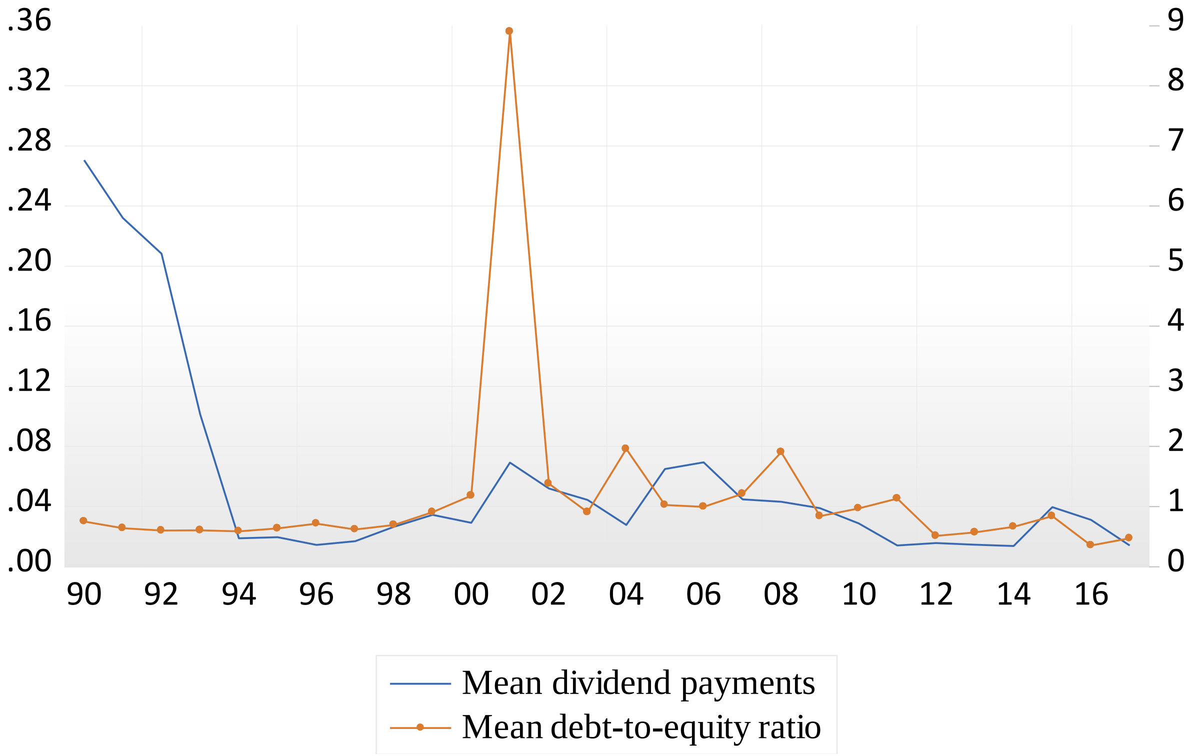
7.3.3 Variations in the dividend payment and the capital structure across sectors

Figure 7.1 to Figure 7.2 show the variations in the dividend payments and the debt-to-equity ratio over the period 1990 to 2017. First, the tables indicate that over the period 1990 to 1994, there was a downward trend in the mean actual dividend paid in the basic materials sector and the industrial sector. However, in the consumer services sector, the mean average dividend increased between 1990 and 1992 and showed a decreasing trend in the period 1992 to 1996. In the consumer goods sector over the same period, the mean actual dividend paid fluctuated. For the period 1996 to 2006, the actual dividend paid in the basic materials sector fluctuated and stayed at its lowest since 1994. Meanwhile, in the industrial sector, consumer services sector and consumer goods sector, the mean actual dividend paid showed an upward fluctuating trend over the period 1996 to 2006. However, over the period 2007 to 2010, the consumer services sector and the consumer goods sector showed a decline in mean actual dividend paid because of the financial crisis and started showing an increasing trend between 2010 and 2014. In the industrial sector, the actual mean dividend decreased from its highest in 2004.

With regard to financing decisions, the figures indicated that the debt-to-equity ratio was volatile across sectors especially in the industrial sector as compared with the actual dividend paid. More importantly, the large variation in the debt-to-equity ratio across the four sectors could also suggest that the difficulty of accessing external capital was diverse across sectors due to various types of business natures, degree of business risk, external financing requirement for future growth, financial traditions and institutional aspects. Despite the fact that the financing decision varied across sectors, there were some similarities in the pattern of the debt-to-equity ratio. For instance, both the basic materials sector and the industrial sector showed an increasing trend in financing decisions over the period 1998 to 2001 and after this period, there was a decline in financing decision between the period 2002 and 2003. Over the period 2004 to 2016, the debt-to-equity ratio fluctuated almost in a similar way even if the magnitude was much higher in the industrial sector because of high requirements in this sector.

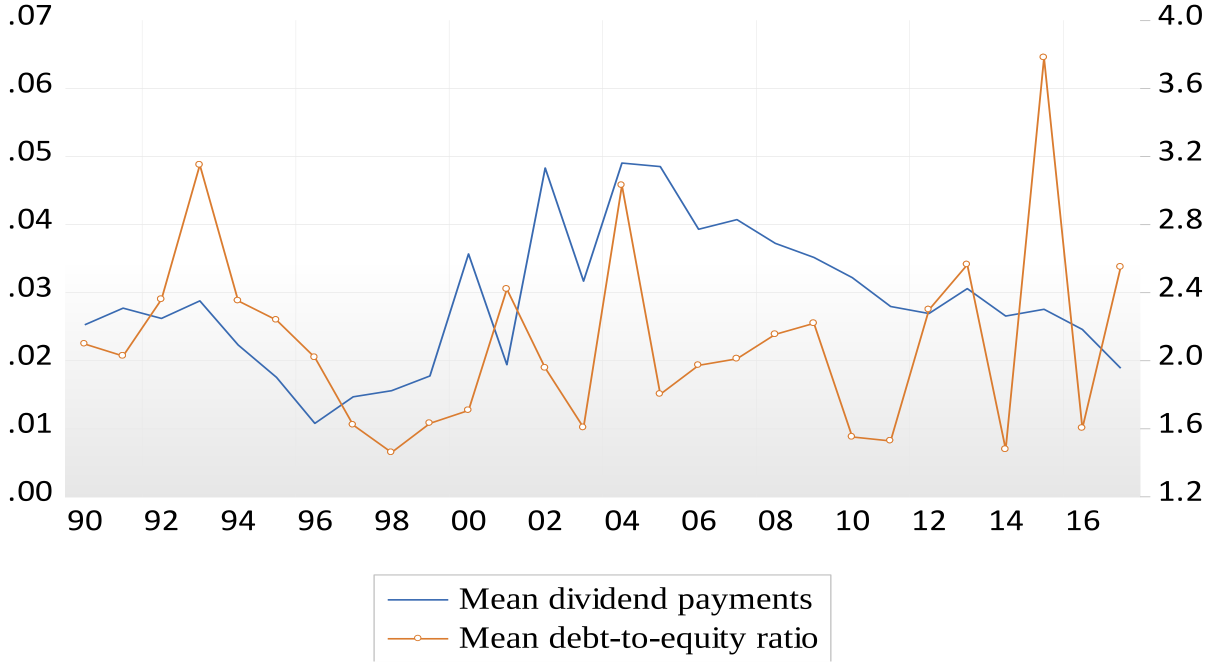
The findings in terms of the variations mainly provided three interpretations of financing and distribution decision preferences across sectors, which could answer the question of how each sector treated financing and distribution decisions and the interdependence between them. First, the variations in the general degree of indebtedness had big differences across sectors. Second, the difficulty of accessing a capital market was diverse across sectors implying constraints of government-directed lending policy in South Africa. Third, the volatility in the financing decisions seemed to be higher compared with the actual dividend paid.

Figure 7.1: Variation in the CD and DE of the BCM sector of the JSE



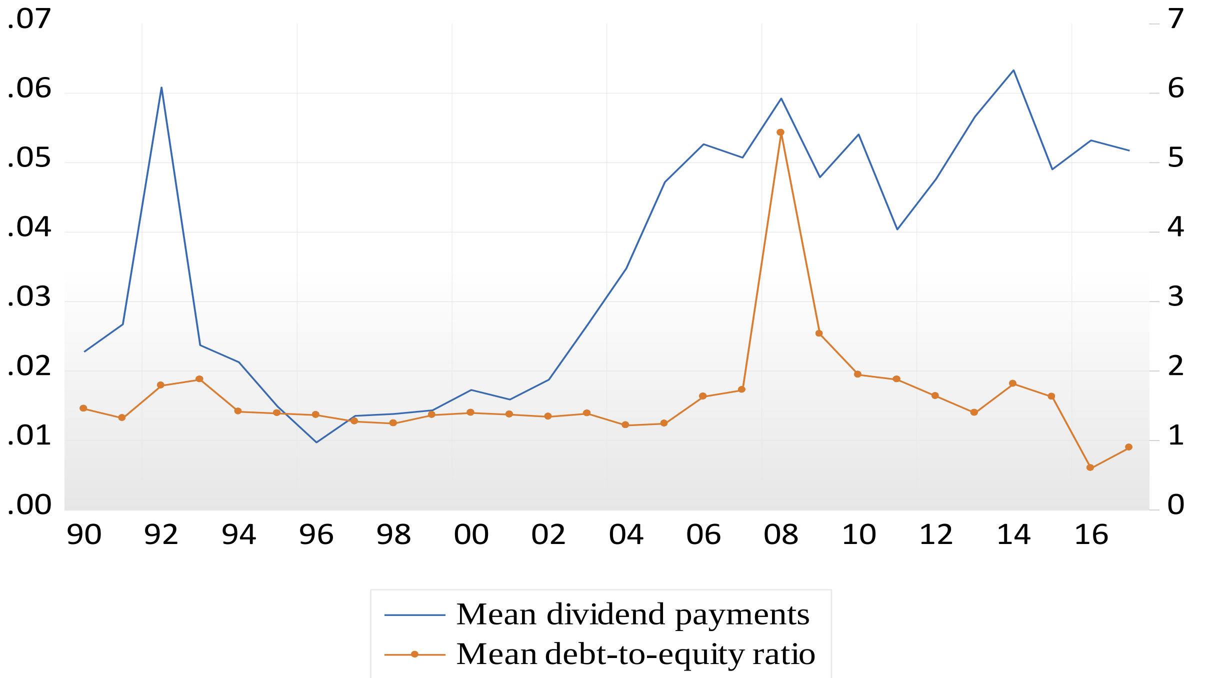
Note: The left-hand axis is the mean dividend payments of the basic materials sector and the right-hand axis is the mean debt-to-equity ratio of the basic materials sector.

Figure 7.2: Variation in the dividend payments and the capital structure of the IND sector of the JSE



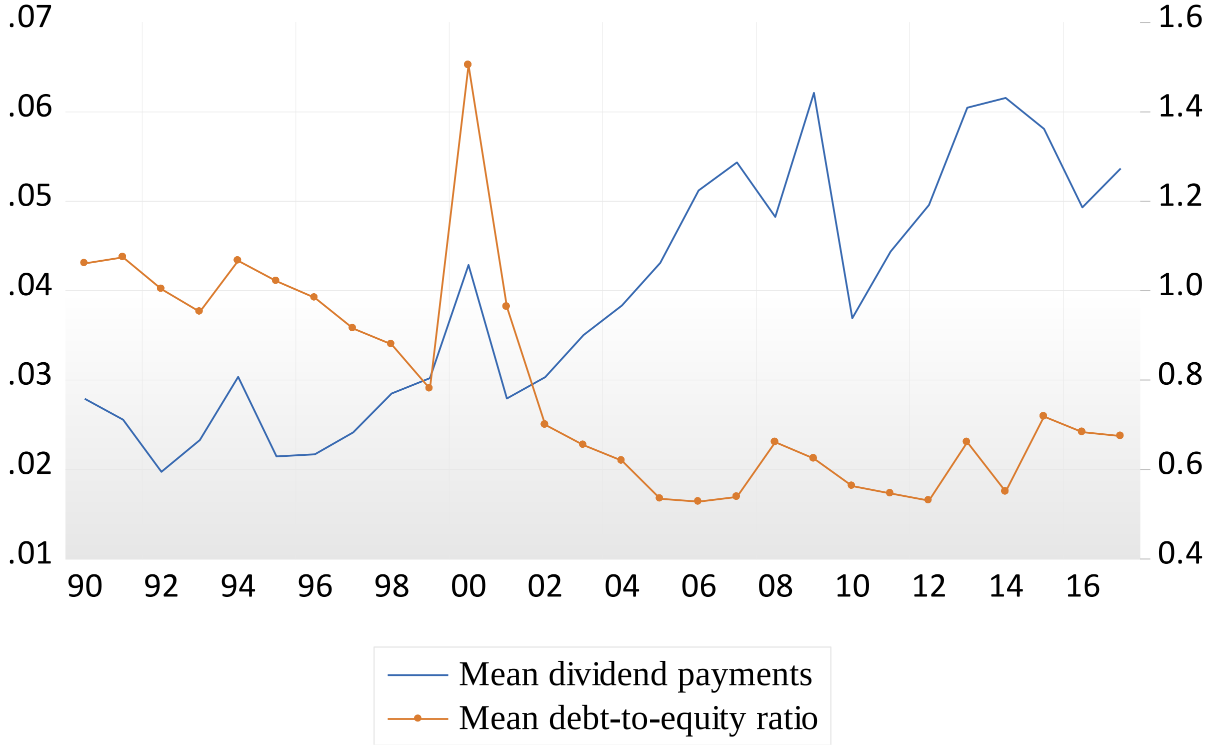
The left-hand axis is the mean of the industrial sector and the right-hand axis is the mean debt-to-equity ratio of the industrial sector.

Figure 7.3: Variation in the dividend payments and the capital structure of the CNS sector of the JSE



The left-hand axis is the mean of the consumer services sector and the right-hand axis is the mean debt-to-equity ratio of the consumer services sector.

Figure 7.4: Variation in the dividend payments and the capital structure of the CNG sector of the JSE



The left-hand axis is the mean actual dividend paid of the consumer goods sector and the right-hand axis is the mean debt-to-equity ratio of the consumer goods sector.

7.4 MODEL SPECIFICATION AND REGRESSION RESULTS ACROSS SECTORS

7.4.1 Model specification

This section aims to present and compare the interdependence between the capital structure and the dividend payments within four sectors of the JSE (basic materials, industrial, consumer services and consumer goods) by applying the pooled, fixed-effects and random effects (one-way error component regression) estimation methods:

$$CD_{i,t} = \alpha_0 + \beta_1 INVEST_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 RA_{i,t} + \beta_4 NDT_{i,t} + \beta_5 VO_{i,t} + \beta_6 TAN_{i,t} + \beta_7 CF_{i,t} + \beta_8 CS_{i,t} + u_{i,t} \quad (7.1)$$

$$CS_{i,t} = \alpha_0 + \beta_1 CD_{i,t} + \beta_2 INVEST_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 RA_{i,t} + \beta_5 NDT_{i,t} + \beta_6 TAN_{i,t} + \beta_7 VO_{i,t} + \beta_8 CF_{i,t} + u_{i,t} \quad (7.2)$$

where

$CS_{i,t}$ =the three alternative measures of the capital structure, namely the debt-to-equity ratio (DE), the debt-to-asset ratio (DA) and the leverage factor (LF).

$CD_{i,t}$ =the actual dividend paid for a company i in period t.

Because the interdependence between the capital structure and the distribution strategies can also be investigated through joint determinants, the research includes seven joint determinants in the estimation of the individual equations:

$INVEST_{i,t}$=the investment of a company i in period t

$RA_{i,t}$=the return assets of a company i in period t

$NDT_{i,t}$=the non-debt tax shield of a company i in period t

$SIZE_{i,t}$=the size of a company i in period t

$TAN_{i,t}$=the asset tangibility of a company i in period t

$CF_{i,t}$=the cash flow of a company i in period t

$VO_{i,t}$=the market volatility of a company i in period t

$u_{i,t} = \mu_i + \nu_{i,t}$ =the error term, which is the sum of an (unobservable) individual specific effect (time invariant) and a well-behaved (remainder) disturbance.

For the simultaneous decision-making across the four sectors the research uses the following structural system equation:

System equation

CD=f(C(1)+C(2)*GW+C(3)*RA+C(4)*TAN+C(5)*CS)

CS=f(C(6)+C(7)*CD+C(8)*GW+C(9)*RA+C(10)*TAN+C(11)*CR) (7.3) where

CD=The endogenous actual dividend paid

CS=the endogenous capital structure, representing the three alternative measures of the capital structure (debt-to-equity ratio, debt-to-asset ratio and the leverage factor)

CR=the current ratio

GW=growth opportunities

The research results provided strong evidence that the sectoral factor did matter to companies' financing and distribution decisions and the interdependence among them. Most explanatory variables were not only consistent with the empirical findings in Chapter 5, but they also showed some differences across sectors (because of, for example, the nature of the business, distinction of tax benefits and business risks, different degrees of governmental support and capital-intensive requirements of growth potential), which could result in various financing and pay-out patterns, which consequently could lead to a different interplay between the dividend payment and the capital structure across the sectors. The next section presents the individual regressions result for the financing and dividend pay-out decisions and their joint determinant analysis using a one-way error component model and simultaneous decision-making approach for each of the four sectors.

7.4.2 Discussion and analysis of empirical results between sectors: fixed-effects and random effects models

This section discusses and analyses the interplay between financing decisions and distribution strategies across sectors using an individual equation approach (fixed-effects and random effects approach).

7.4.2.1 CD and CS equations in the basic material sector

Table 7.10 presents the effect of the three alternative measures of the capital structure on the dividend payments in the basic materials sector for the period 1990 to 2017 using the pooled, fixed-effects and the random effects single-equation approach, while Table 7.11 presents the effect of the dividend payment on the three alternative measures of the capital structure for the same period also using the pooled, fixed-effects and the random effects single-equation approach.

The nature of basic materials is highly cyclical, and this sector is a primary production industry in the South African economy, its major activities comprise the discovery, development and processing of raw materials. The products in this sector usually are durable (such as basic metal, chemical and forestry products). Hence, the sector is sensitive to changes of business cycle and demand fluctuation due to a largely driven price on supply and raw materials. Acknowledging cross-section heterogeneity and assuming a different intercept for each company in the basic materials sector sample, the results in Table 7.10 indicate that the debt-to-equity ratio and the debt-to-asset ratio are negative and significant at the 10% level, while the leverage factor is positive and significant at the 10% level. The presence of fixed effects is apparent because the F-test for the fixed effects, according to Baltagi (2013), clearly rejects the null hypothesis of homogeneous cross-sections. These effects may represent differences in financing policies and distribution policies, which are not explicitly included in the specification, but which are accounted for when estimation is done, ultimately leading to more representative estimates. This is evident from the fact that this model has the highest R^2 value of 0.52 in all three fixed-effects models. However, in the financing equation, the results in Table 7.11 indicate that the actual dividend paid did not have an effect on all three alternative measures of the capital structure. Stated differently, pay-out decisions did not affect how financing decisions were made in the basic materials sector. Furthermore, the literature review indicated that if the financing and distribution decisions are interdependent through joint determinants, all joint determinant variables in the model must be significant. Some of the selected joint determinant variables work well to explain the financing equation and the dividend payment of the basic materials sector. Table 7.10 and Table 7.11 show the following results with regard to the joint determinants:

Company investment positively and significantly correlates with dividend payment decisions and correlates positively and significantly with the three alternative measures of the capital structure in the financing equations, suggesting that in the basic materials sector, companies with investment opportunities paid more dividend and raised more debt. Company size negatively and significantly correlates with the dividend payment, while in the financing equation, it is statistically insignificant, suggesting that large companies in the basic materials sector paid lower dividend. This finding is consistent with finding by Ahmed and Javid (2009) and Huda and Farah (2011). Profitability positively and significantly correlates with the dividend payment at the 1% level and negatively and significantly with the leverage factor at the 10% level, suggesting that the profitable companies in the basic materials sector paid more dividends and used more internal funds than external funds. The non-debt tax shield is insignificant in the dividend equation but significantly and positively correlates with the debt-to-equity and the debt-to-asset ratio, suggesting that companies in the basic materials sector raised more debt while taking advantage of the non-debt tax shield. The market volatility is insignificant in the dividend payment equation, while it significantly and negatively correlates with the leverage factor at the 10% level. Asset tangibility negatively and significantly correlates with the dividend payments at the 1% level, while it is insignificant in the financing equation. The cash flow positively and significantly correlates with the dividend payment, and negatively and significantly correlates with all three measures of the capital structure.

Table 7. 10: Dividend payments and the different alternative measures of capital structure in the BCM sector

Dependent variable: actual dividend paid									
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Radom effects**	**Pooled**	**Fixed effects**	**Random effects**
	Coefficient t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic
Constant	0.027781*** 3.745461	0.071173*** 8.300440	0.055064*** 4.829437	0.029876*** 3.492803	0.075401*** 8.703366	0.056908*** 4.855460	0.025196** 3.161860	0.072962*** 8.312548	0.051138*** 4.579468
INVEST	0.081366*** 3.745461	0.082310*** 5.195574	0.087473*** 3.948081	0.080534*** 3.696067	0.082426*** 5.134284	0.086010*** 3.868956	0.079874*** 3.682008	0.078397*** 4.629694	0.084320*** 3.863378
SIZE	-0.001961 -1.767209	-0.007745*** -6.022470	-0.006483*** -4.010153	-0.002146* -1.900722	-0.008020*** -6.150785	-0.017095*** -4.069770	-0.001993 -1.794981	-0.008537*** -6.540942	-0.006385*** -4.032029
RA	0.000837*** -1.938378	0.000657*** 5.065927	0.000863*** -2.039433	0.000832*** 6.684117	0.000653*** 5.018670	0.000861*** 7.426737	0.000840*** 6.751463	0.000669*** 5.291223	0.000878*** 7.602095
NDT	-0.107926* -2.102221	0.078493 1.689277	0.025650 0.432592	-0.113143* -2.199486	0.080184 1.690818	0.026018 0.434787	-0.118419* -2.358989	0.065499 1.447374	0.020537* -0.356247
VO	-3.26E-05 -0.756864	-2.88E-05 -0.881788	1.15E-06 0.027392	-3.85E-05 -0.882647	-3.57E-05 -1.051219	-6.51E-06 -0.151306	-3.87E-05 -0.893856	-3.18E-05 -0.971922	-9.55E-06* -0.227919
TAN	-0.016310** -3.308685	-0.030419*** -6.218415	-0.024844*** -3.713080	-0.016389** -3.250011	-0.030044*** -6.135118	-0.024835*** -3.696538	-0.017159*** -3.532743	-0.029834*** -6.324449	-0.024055*** -3.657966
CF	0.120364*** 7.056407	0.063543*** 4.170532	0.097433*** 35.57040	0.121853*** 7.161480	0.064069*** 4.184348	0.097804*** 6.148147	0.126258*** 7.504547	0.071972*** 5.235792	0.102936*** 6.558000
DE	-0.002398 -1.269390	-0.003281* -2.048568	-0.001463 -0.726695						
DA				-0.006331 -0.912630	-0.013462* -1.924400	-0.005274 -0.673054			
LF							0.000969 1.288354	0.000650* 2.007507	0.001515* 2.180216
Regression statistics									
Adj. R^2	**0.387193**	0.523810	0.320039	0.385695	0.524064	0.320222	0.387239	0.521029	0.325230
Fixed effect		**F=**8.693520***			**F=**8.952317***			**F=**8.941303***	
Random effect			**H=**18.783644*			**H=**18.881065*			**H=**23.298155**

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance.

. The null of no individual effects is rejected because the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. **CD** is the actual dividend paid, **INVEST** is the actual investments in the fixed assets, **NDT** is the non-debt tax shields, **RA** is the return on assets, **SIZE** is the company size, TAN is the asset tangibility, **VO** is the market volatility and **CF** is the cash flow.

Table 7. 11: Different measures of the capital structure and the cash dividend in the BCM sector

Dependent variable: debt ratios									
	Debt-to-equity ratio			**Debt-to-assets**			**Leverage factor**		
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effect**
	Coefficient t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic	**Coefficient** t-Statistic
Constant	0.030763 0.311691	0.710413*** 4.379612	0.280953 1.127439	0.420791*** 9.035764	0.413192*** 5.682452	0.323699*** 4.854789	1.176803** 2.794190	1.963432*** 4.713874	1.083579* 2.025003
CD	-1.057129 -1.269390	-1.222839*** -4.106529	-0.486573 -0.633876	-0.207894 -0.912630	-0.391801*** -3.541869	-0.117020 -0.599991	2.696137 1.288354	1.942974 1.172582	4.067733 1.863821
INVEST	0.686826 1.492079	1.198352*** 4.981998	1.593905*** 3.676811	0.202179 1.605261	0.408728*** 4.749919	0.391902*** 3.548249	-0.167250 -0.144590	0.082079 0.127430	0.133315 0.108754
SIZE	-0.016625 -0.712250	-0.043288 -1.632540	0.034187 0.990611	-0.023855*** -3.715822	-0.024830* -2.219129	-0.007316 -0.809961	0.074695 1.273492	-0.033796 -0.605589	0.087579 1.153236
RA	0.004760 1.767709	0.002341 1.419159	0.002560 1.096573	0.001103 1.497505	0.000635 1.084017	0.000248 0.418652	-0.014989* -2.394183	-0.002591 -0.554386	-0.016370* -2.403752
NDT	5.751731*** 5.440286	5.547060*** 8.074983	5.764310*** 4.996133	1.563741*** 5.405373	1.947969*** 9.430943	1.803914*** 6.118776	-3.398434 -1.279169	-3.244358 -1.257797	-4.616875 -1.512339
TAN	0.438173*** 4.257123	-0.027198 -0.464959	-0.116907 -0.836428	0.183678*** 6.511616	-0.023520 -0.977792	0.044247 0.049957	-0.207512 -0.802307	-0.608524** -3.195075	-0.143880 -0.441475
VO	0.000424 0.468370	0.001784*** 4.020873	0.001159 1.414552	-0.000212 -0.848986	0.000306* 2.088791	-4.76E-05 -0.223443	0.005198* 2.284896	0.001151 0.694700	0.004990* 2.130094
CF	-1.542871*** -4.205775	-0.131551 -0.616149	-1.228703*** -3.925381	-0.332516** -3.308066	-0.045373 -0.660749	-0.228016** -2.872228	-2.275426* -2.468340	-0.956654 -1.769909	-2.355422* -2.558998
Regression statistics									
Adjusted R^2	0.122596	0.611916	0.074624	0.164765	0.741860	0.080709	0.057931	0.073969	0.046667
Fixed effects		**F=**29.74***			**F=**49.79***			**F=**3.24***	
Random effect			**H=**11.98			**H=**10.64			**H=**5.43

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance. Since the null of individual specific effects is random, it is not rejected based on the Hausman test, both the fixed effects and random effect are consistent, but only the random effect is efficient. Consequently, the random effect estimator is favoured. **CD** is the actual dividend paid, **INVEST** is the actual investments in the fixed assets, **NDT** is the non-debt tax shields, **RA** is the return on assets, **SIZE** is the company size, TAN is the asset tangibility, **VO** is the market volatility and **CF** is the cash-flow.

7.4.2.2 CD and CS equations in the industrial sector

Table 7.12 presents the effect of the three alternative measures of the capital structure on the dividend payments in the industrial sector for the period 1990 to 2017 using the pooled, fixed-effects and the random effects single-equation approach, while Table 7.13 presents the effect of the dividend payment on the three alternative measures of the capital structure in the industrial sector for the period 1999 to 2017 using similar techniques.

The industrial sector mainly refers to manufacturing companies as a secondary sector in the economy. Their major activities mainly cover construction, manufacturing and subsections. According to their sector feature, the manufacturing companies have relatively high cyclicality that is affected by the overall economic volatility. The results in Tables 7.12 and 7.13 indicate that the three alternative measures of the capital structure correlate with the dividend payments. The debt-to-equity ratio and the debt-to-asset ratio negatively and significantly correlate with the dividend payment at the 10% and 5% levels respectively, while the dividend payments negatively and significantly correlate with the debt-to-equity and the debt-to-asset ratio at the 10% and 5% levels, suggesting that there is an interplay between the capital structure and the dividend payments in the industrial sector.

Investigating the independence through joint determinants, Tables 7.12 and 7.13 reveal the following: there is no evidence of investment affecting both financing and pay-out decisions in the industrial sector. The non-debt tax shield positively and significantly correlates with the dividend payments at the 10% level (when the leverage factor is used as a determinant of the actual dividend paid). In the financing equation, the non-debt tax shield positively and significantly correlates with the leverage factor at the 10% level. The company's profitability positively and significantly correlates with the actual dividend paid, while it negatively and significantly correlates with the financing equation in the debt-to-equity and the leverage factor at the 10% and 5% levels respectively. The company size positively and significantly correlates with the dividend payment and the debt-to-asset ratio at the 1% and 1% levels respectively, suggesting that large companies in the industrial sector paid more dividends and raised more debt. Asset tangibility is insignificant in the dividend payment equation, while it positively and significantly correlates with the debt-to-equity ratio and the debt-to-asset ratio at the 1% and 1% levels respectively. The market volatility negatively and significantly correlates with the dividend payments, while it is insignificant in the financing equation. This finding suggests that volatility is a major issue in this sector because it is highly cyclical and easily affected by the overall economic volatility. The cash flow positively and significantly correlates with the dividend payment and insignificantly correlates with the financing equation.

Table 7. 12: Dividend payments and the different alternative measures of capital structure in the industrial sector

Dependent variable: actual dividend paid									
	Dividend payments and debt-to-equity ratio			**Dividend payments and debt-to-asset ratio**			**Dividend payments and leverage factor**		
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Radom effects**
	Coefficient **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**
Constant	0.002889 0.358711	-0.024053** -2.666765	-0.013519 -1.656595	-0.001806 -0.213344	-0.022893* -2.526766	-0.013601 -1.641216	-0.000600 -0.075220	-0.028102** -3.108752	-0.017724* -2.183163
INVEST	-0.010536 -0.601327	-0.004601 -0.297366	-0.006948 -0.460323	-0.012408 -0.696272	-0.001653 -0.106620	-0.004791 -0.315679	-0.010731 -0.610786	-0.005444 -0.350010	-0.007936*** -0.523704
NDT	0.096418 1.550875	0.173858 2.523137	0.148890* 2.399458	0.084333 1.352872	0.165301* 2.399134	0.145205* 2.344993	0.085321 1.365217	0.167990* 2.417059	0.137116* 2.195276
RA	0.000705*** 4.938925	0.000641*** 4.878181	0.000652*** 5.159630	0.000796*** 5.538705	0.000660*** 5.058734	0.000676*** 5.380978	0.000782*** 5.577330	0.000695*** 5.267192	0.000721*** 5.718714
SIZE	0.001630 1.536267	0.006208*** 4.940025	0.004531*** 4.096025	0.001697 1.595477	0.006982*** 5.446463	0.004910*** 4.409204	0.001734 1.633110	0.006304*** 4.995812	0.004651*** 4.202548
TAN	-0.007281 -1.093399	-0.004148 -0.497339	-0.005965 -0.832785	-0.007102 -1.044653	-0.005283 -0.645268	-0.008494 1.204575	-0.007636 -1.142207	-0.009486 -1.173021	-0.008608** -1.216978
VO	-0.000118** -3.058114	-0.000112** -3.025529	-0.000109** -3.135116	-0.000124** -3.207924	-0.000104** -2.806662	-0.000105** -3.011716	-0.000122** -3.172220	-0.000111** -2.980776	-0.000111*** -3.189339
CF	0.108003*** 8.437451	0.042966*** 3.698272	0.059903*** 5.315043	0.107873*** 8.409776	0.040438*** 3.469167	0.059141*** 5.243018	0.107755*** 8.391373	0.043187*** 3.700880	0.060483 5.346179
DE	-0.001251 -1.628913	-0.001880* -2.385938	-0.001674* -2.298031						
DA				0.003000 0.500225	-0.016865** -2.638956	-0.009050 -1.584655			
LF							0.000185 0.271739	0.000553 0.882715	0.000435 0.719490
Regression statistics									
Adjusted R^2	**0.272399**	**0.522444**	**0.194528**	**0.269376**	**0.546286**	**0.191143**	**0.279130**	**0.541264**	**0.189198**
Fixed effects		**F=16.131814*** **			**F=16.414529*** **			**F=15.942772*** **	
Random effects			**H=69.798587*** **			**H=74.351356*** **			**H=70.895284*** **

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance.
The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. Consequently, the fixed-effects model is favoured since the estimates are consistent. **CD** is the actual dividend paid, **INVEST** is the actual investments in the fixed assets, **NDT** is the non-debt tax shields, **RA** is the return on assets, **SIZE** is the company size, TAN is the asset tangibility, **VO** is the market volatility and **CF** is the cash-flow.

Table 7. 13: Different measures of the capital structure and the cash dividend in the industrial sector

Dependent variable: debt ratios									
	Debt-to-equity ratio			Debt-to-asset ratio			Leverage factor		
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**
	Coefficient **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**
Constant	2.479580*** 5.864103	1.474947** 3.064906	1.725783*** 3.626289	0.530619*** 9.756538	0.229626*** 3.879331	0.315127*** 5.573536	2.085754*** 4.349680	1.882856** 3.081421	2.026887*** 3.642902
CD	-3.652318 -1.628913	-5.372573* -2.385938	-5.185831* -2.361202	0.144260 0.500225	-0.730905** -2.638956	-0.561021* -2.101288	0.690959 0.271739	2.523774 0.882715	1.958838 0.725913
INVEST	0.235874 0.249090	0.113761 0.137523	0.225055 0.274614	0.510467*** 4.191154	0.186839 1.836305	0.255914* 2.549715	-0.807564 -0.807564	1.062063 1.011175	0.751987 0.731384
NDT	7.582492* 2.262626	1.053903 0.284493	2.568327 0.722650	0.986571*** 2.288859	-0.366998 -0.805432	0.088137 0.205431	10.80872*** 2.844108	9.769389* 2.076974	10.40860* 2.428243
RA	-0.051768*** -6.832298	-0.017361* -2.432532	-0.021927** -3.127887	-0.007411*** -7.604820	-0.000726 -0.826880	-0.002094* -2.448319	-0.045530** -5.298730	-0.028118** -3.102757	-0.032482*** 3.734861
SIZE	-0.077029 -1.342962	-0.009361 -0.136386	-0.034070 -0.523664	0.012069 1.635961	0.045704*** 5.413878	0.035516*** 4.545226	0.003329 0.051172	-0.042633 -0.489213	-0.040707 -0.525909
TAN	0.364719 1.013634	2.716858*** 6.305432	2.245083*** 5.478755	-0.222229*** -4.801902	0.234272*** 4.420409	0.107168* 2.175419	-0.731523 -1.792758	0.271104 0.495538	-0.169968 -0.347921
VO	0.002962 1.416301	-0.001028 -0.515381	-0.000265 -0.136267	0.000864** 3.212577	0.000342 1.393475	0.000512* 2.164273	0.000751 0.316600	-0.000373 -0.147167	0.000175 0.073101
CF	0.470471 0.642115	0.019886 0.031632	0.035658 0.057168	-0.003961 -0.042033	-0.141931 3.879331	-0.122342 -1.600442	0.751655 0.904626	0.215596 0.270091	0.266651 0.340104
Regression statistics									
Adjusted R^2	**0.153098**	**0.455754**	**0.116730**	**0.215252**	**0.538806**	**0.111624**	**0.092967**	**0.259186**	**0.047225**
Fixed effects		**F=17.071384*** **			**F=21.275055*** **			**7.974106*** **	
Random effects			**H=23.898622** **			**H=71.621629*** **			**H=21.686992*** **

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance. The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogenous. Consequently, the fixed-effects model is favoured since the estimates are consistent. **CD** is the actual dividend paid, **INVEST** is the actual investments in the fixed assets, **NDT** is the non-debt tax shields, **RA** is the return on assets, **SIZE** is the company size, TAN is the asset tangibility, **VO** is the market volatility and **CF** is the cash flow.

7.4.2.3 CD and CS equations in the consumer service sector

Table 7.14 presents the effect of the three alternative measures of the capital structure on the dividend payments in the consumer service sector for the period 1990 to 2017 using the pooled, fixed-effects and the random effects single-equation approach, while Table 7.15 presents the effect of the dividend payments on the three alternative measures of the capital structure in the consumer service sector for the period 1999 to 2017 using the pooled, fixed-effects and the random effects single-equation approach.

The consumer service sector is defined as a cyclical sector. Table 7.14 and 7.15 indicate that the adjusted R-squared for the dividend payments equation stands at around 60% and the adjusted-square for the financing equation stands at around 61% for the debt-to-equity ratio, at 72 % for the debt to asset ratio and 30% for the leverage factor equation.

The results show that two alternative measures of the capital structure namely the debt-to-equity ratio and the debt-to-asset ratio are negatively and significantly correlated with the actual dividend paid while the actual dividend is negatively and significantly correlated with the debt-to-equity ratio and the debt to asset ratio. This finding suggests that in consumer service sector the two policies are inter-related. The finding validates the findings of the correlation matrix and suggests that companies in the consumer services sector are likely to be financially constrained. Furthermore, the empirical evidence suggests that the agency cost theory provide a better explanation for the inter-relationship between financing and pay-out decisions in the consumer services sector. Examining the interplay through joint determinants, the following is shown: the coefficient of investment is insignificant in both the dividend equation and the capital structure equation. The non-debt tax shield positively and significantly correlates with the debt-to-equity ratio, while the correlation is insignificant in the dividend equation. Profitability positively and significantly correlates with the dividend payments, while the correlation is insignificant in the capital structure equation. Size positively and significantly correlated with the dividend payments, and at the same time, positively and significantly correlates with the debt-to-equity and the leverage factor at the 10% level. The finding suggests that large companies in the consumer service sector paid more dividends and at the same time, increased the amount of debt. Asset tangibility positively and significantly correlates with the debt-to-asset ratio at the 1% level and at the same time, the correlation is insignificant in the dividend equation. The cash flow positively and significantly correlates with the dividend payments at the 10% level and at the same time, the correlation is insignificant in the capital structure equations. The market volatility negatively and significantly correlated with the payments at the 5% level and at the same time, negatively and significantly correlates with debt-to-equity ratio and the debt-to-asset ratio. The finding suggests that during period of high market volatility companies in the consumer services sector reduced the amount paid in dividends and at the same time reduced the amount of debt.

Table 7. 14: Dividend payments and the different alternative measures of capital structure in the consumer services sector

Dependent variable: actual dividend paid									
	Dividend payment and the debt-to-equity ratio			**Dividend payment and the debt to asset ratio**			**Dividend payments and the leverage factor**		
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**
	Coefficient **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**	**Coefficient** **t-statistic**
constant	-0.067419*** -7.597581	-0.153805*** -11.41506	-0.089555*** -9.371991	-0.070198*** -8.046679	-0.143025*** 10.25186	-0.096576*** -9.492667	-0.063280*** -6.988321	-0.155000*** -11.44020	-0.094205 -9.263885
INVEST	-0.009756 -0.380627	0.012435 0.524866	-0.006136 -0.266778	-8.046679 -0.152283	0.013421 0.570324	0.000776 0.033740	-0.009486 -0.367672	0.016299 0.685149	-0.002358 -0.101612
NDT	-0.100308 -1.417425	-0.111925 -1.353472	-0.146322* -2.122855	-0.151896* -2.149961	-0.138268 -1.697357	-0.186296*** -2.624605	-0.091599 -1.285877	-0.138870 -1.685181	-0.163195* -2.294413
RA	0.001158*** 7.565696	0.001301*** 7.802253	0.001163*** 7.863191	0.001157*** 7.833749	0.001269*** 7.615784	0.001169*** 7.772950	0.001250*** 8.279626	0.001335*** 7.972130	0.001238*** 8.221310
SIZE	0.012853*** 8.430006	0.028122*** 12.54724	0.016943*** 10.56163	0.014739*** 9.416036	0.027439*** 12.33127	0.019809*** 11.52440	0.011345*** 7.212808	0.027640*** 12.16390	0.017002*** 9.911840
TAN	0.016375*** 3.360853	-0.010823 -1.185433	0.014400** 2.613968	0.015632** 3.264467	-0.003910 -0.421614	0.013683* 2.285841	0.017393** 3.525144	-0.009797 -1.067544	0.014423* 2.436898
VO	-0.000166** -2.869602	-0.000175** -3.147913	-0.000162** -3.053350	-0.000166** -2.915981	-0.000183** -3.297094	-0.000169** -3.175131	-0.000157*** -2.666875	-0.000162** -2.901218	-0.000150*** -2.791363
CF	0.077584*** 5.398237	0.026762* 1.919072	0.060866*** 4.624281	0.072533*** 5.135907	0.026046 1.877820	0.049829* -5.081567	0.075555 5.223115	0.026060 1.858065	0.055882 4.185231
DE	-0.001884* -2.472554	-0.002315* -2.269429	-0.002367** -2.985604						
DA				-0.021345*** -4.716199	-0.021920** -3.094161	-0.026386*** -5.081567			
LF							0.000650 0.648029	0.000269 0.274888	0.000207 0.220443
Regression statistics									
Adjust.R^2	0.486898	0.599793		0.513760	0.603886	0.459139	0.480234	0.594993	0.431882
Fixed effects		F=9.24***			F=8.298360***			F=9.273780***	
Random effects			H=77.79***			H=48.88***			H=68.41***

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance.
C. The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. Consequently, the fixed-effects model is favoured since the estimates are consistent.

Table 7. 15: Different measures of the capital structure and the cash dividend in the consumer services sector

Dependent variable: debt ratios									
	Debt-to-equity and dividend payments			**Debt-to-asset ratio and dividend payments**			**Leverage factor and dividend payments**		
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**
	Coefficient t-statistic	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**
Constant	-2.013089***	-0.238695	-0.584353	-0.412350***	0.395083***	0.257374*	-1.802238***	-0.335628	-1.101012
	-3.471803	-0.326958	-0.867387	-4.376316	3.797601	2.542869	-4.040871	-0.436551	-1.793333
CD	-7.304816*	-5.196630*	-5.837096**	-2.264148***	-1.009660**	-1.235294***	1.472609	0.662876	0.330711
	-2.472554	-2.269429	-2.613333	-4.716199	-3.094161	-3.844805	0.648029	0.274888	0.144927
INVEST	-0.313888	-1.500414	-1.402006	0.234496	-0.106062	-0.055028	0.310256	-0.742220	-0.345523
	-0.196666	-1.338976	-1.261339	0.904150	-0.664194	-0.346379	0.252724	-0.628960	-0.297868
NDT	-6.981782	10.63074**	8.944635*	-3.176382***	-0.142834	-0.138956	5.097956	2.595102	4.325485
	-1.585510	2.731120	2.394208	-4.439010	-0.257503	-0.256921	1.505114	0.633083	1.160525
RA	-0.034907***	-0.006550	-0.008390	-0.001095	-0.001549	-0.001093	-0.016290*	-0.010084	-0.010061
	-3.493994	-0.775600	-1.022180	-0.674413	-1.287323	-0.923505	-2.119819	-1.133801	-1.213433
SIZE	0.687696***	0.312913*	0.380013***	0.168039***	0.014696	0.039841*	0.557146***	0.319620*	0.445337***
	7.095474	2.534492	3.425621	10.66953	0.835298	2.419320	7.473505	2.458274	4.366315
TAN	-0.209288	-0.467951	-0.476255	-0.025765	0.261381***	0.188664**	-0.622468**	-0.220358	-0.489215
	-0.681539	-1.081484	-1.255662	-0.516322	4.239027	3.319957	-2.635328	-0.483590	-1.442378
VO	-0.004180	-0.006253*	-0.006077*	-0.000611	-0.001088**	-0.001115**	-0.006286*	-0.002874	-0.004161
	-1.148095	-2.362910	-2.320143	-1.032476	-2.884544	-2.974784	-2.244748	-1.031116	-1.530385
CF	1.405394	0.435785	0.436846	0.010443	0.025379	-0.003494	0.544543	0.008184	0.041208
	1.524856	0.657035	0.436846	0.069726	0.268510	-0.037197	0.768128	0.011718	0.060396
Regression statistics									
Adjusted R^2	**0.134481**	**0.609030**	**0.038275**	**0.221916**	**0.729698**	**0.062318**	**0.171259**	**0.298271**	**0.048459**
Fixed effects		**F=36.442244*** **			**F=55.854388*** **			**F=6.285187*** **	
Random effects			**H=38.471355**** **			**H=45.678015*** **			**H=15.418916* **

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance. The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. Consequently, the fixed-effects model is favoured since the estimates are consistent.

7.4.2.4 CD and CS equations in the consumer goods sector

Table 7.16 presents the effect of the three alternative measures of the capital structure on the dividend payments in the consumer goods sector for the period 1990 to 2017 using the pooled, fixed-effects and the random effects single-equation approach, while Table 7.17 presents the effect of the dividend payments on the three alternative measures of the capital structure in the consumer goods sector for the period 1999 to 2017 using the pooled, fixed-effects and the random effects single-equation approach.

The consumer goods sector is defined as both a cyclical and non-cyclical sector. Compared with products in the basic materials sector, consumer goods usually are related to items purchased by individuals over manufacturers and industries. The main tasks or goals of this types of companies are to reduce production costs and stocks, enhance product quality, improve operations and establish better communication within departments. Tables 7.16 and 7.17 indicate that the adjusted R-squared for the dividend payment equation stands at around 58% and the adjusted R-squared for the financing equation stands at around 37% in the debt-to-equity ratio, at 52% in the debt-to-asset ratio and at 11% in the leverage equation.

The results reveal that the three alternative measures of the capital structure are insignificant in the dividend payment equation and the dividend payment is insignificant in the financing equation, suggesting the dividend payments and the capital structure are not interrelated in the consumer goods sector. Examining the interplay through joint determinants shows the following: the coefficient of investment is insignificant in both the dividend equation and the capital structure equation. The non-debt tax shield negatively and significantly correlates with the debt-to-asset ratio, while the correlation is insignificant in the dividend equation. Profitability positively and significantly correlates with the dividend payments, while the correlation is insignificant in the capital structure equation. Size positively and significantly correlates with the dividend payments, and at the same time, negatively and significantly correlates with the debt-to-equity and the debt-to-asset ratio at the 5% and 1% levels respectively. The finding suggests that large companies in the consumer goods sector paid more dividends and at the same time, decreased the amount of debt. Asset tangibility positively and significantly correlates with the dividend payments (when the debt-to-equity and the leverage factor are used as determinants of the dividend payments) and at the same time, the correlation is insignificant in the financing equation. The cash flow positively and significantly correlates with the dividend payment at the 10% level and at the same time, negatively and significantly correlates with the three alternative measures of the capital structure at the 5%, 10% and 10% levels respectively.

Table 7. 16: Dividend payments and the different alternative measures of capital structure in the consumer goods sector

Dependent variable: actual dividend paid									
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**
	Coefficient t-statistic	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**
Constant	-0.054153** -3.075786	-0.101413** -2.964859	-0.054153*** -3.560597	-0.054126** -3.068949	-0.107069** -3.005525	-0.054126*** -3.540809	-0.054553** -3.087350	-0.119896*** -3.615280	-0.054553*** -3.557692
INVEST	0.039234 0.798010	0.043290 0.956376	0.039234 0.923794	0.040670 0.826768	0.045041 0.988744	0.040670 0.953886	0.040794 0.827285	0.042113 0.918935	0.040794 0.953318
NDT	0.132680 0.910270	-0.202218 -1.101356	0.132680 1.053749	0.118053 0.808147	-0.227083 -1.215708	0.118053 0.932402	0.102998 0.724090	-0.202533 -1.094847	0.102998 0.834401
RA	0.001854*** 6.337670	0.001668*** 6.254671	0.001854*** 7.336627	0.001844*** 6.301908	0.001666*** 6.219225	0.001844*** 7.270845	0.001838*** 6.234362	0.001669*** 6.191948	0.001838*** 7.184134
SIZE	0.007189** 3.110456	0.014894*** 3.487013	0.007189*** 3.600733	0.007059** 3.006999	0.015595*** 3.595037	0.007059*** 3.469334	0.006745** 2.919414	0.016679*** 3.989455	0.006745*** 3.364171
TAN	-0.001115 -0.124766	0.038291** 2.707357	-0.001115 -0.144432	-0.000311 -0.034053	0.039741 2.798296	-0.000311 -0.039289	0.001016 0.117738	0.041187** 2.913822	0.001016 0.135675
VO	1.02E-05 0.098064	9.56E-05 0.998126	1.02E-05 0.113522	2.10E-05 0.203623	0.000102 1 .061753	2.10E-05*** 0.234931	2.65E-05 0.258369	9.95E-05 1.028244	2.65E-05 0.297730
CF	0.125360*** 4.133088	0.061964* 2.207862	0.125360*** 4.784554	0.128347*** 4.258419	0.067822* 2.424899	0.128347 4.913164	0.130373*** 4.306519	0.072228* 2.580980	0.130373*** 4.962594
DE	-0.002753 -0.893566	-0.005319 -1.709394	-0.002753 -1.034412						
DA				-0.004353 -0.440204	-0.009678 -0.868820	-0.004353 -0.507887			
LF							0.000477 0.133930	0.000365 0.110124	0.000477 0.154334
Regression statistics									
Adjusted R^2	0.440472	0.582470	0.440472	0.439075	0.578615	0.439075	0.438668	0.577278	
Fixed effects		F=11.287688***			F=11.017164***			F=10.918931***	
Random effects			H=90.301504***			H=88.137315***			H=87.351446***

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance.
The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. Consequently, the fixed-effects model is favoured since the estimates are consistent. **CD** is the actual dividend paid, **INVEST** is the actual investments in the fixed assets, **NDT** is the non-debt tax shields, **RA** is the return on assets, **SIZE** is the company size, TAN is the asset tangibility, **VO** is the market volatility and **CF** is the cash flow, DE is the debt-to-equity ratio, DA is the debt-to-asset ratio and LF is the leverage factor.

Table 7. 17: Different measures of the capital structure and the cash dividend in the consumer goods sector

Dependent variable: debt ratios									
	Debt-to-equity			**Debt-to-asset**			**Leverage factor**		
	Pooled	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**	**Pooled**	**Fixed effects**	**Random effects**
	Coefficient t-statistic	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**	**Coefficient t-statistic**
Constant	0.024462 0.065428	3.091809*** 4.424079	0.024462 0.075567	0.052600 0.450449	1.227187*** 6.229184	0.052600 0.576420	0.331360 1.022287	1.570700* 2.364637	0.331360 1.076978
CD	-1.194652 -0.893566	-2.318858 -1.709394	-1.194652 -1.032040	-0.183815 -0.440204	-0.332240 -0.868820	-0.183815 -0.563310	0.155237 0.133930	0.141988 0.110124	0.155237 0.141095
INVEST	-0.683015 -0.666599	0.215003 0.227064	-0.683015 -0.769900	-0.125557 -0.392341	0.258824 0.969656	-0.125557 -0.502061	0.949445 1.068811	1.529643 1.699631	0.949445 1.125991
NDT	10.80067*** 3.647166	-0.603766 -0.157088	10.80067*** 4.212359	3.411170 3.688037	-2.711089* -2.502228	3.411170*** 4.719418	0.592197 0.230658	2.881595 0.788800	0.592197 0.242998
RA	0.006055 0.921923	0.003101 0.515979	0.006055 1.064791	0.000564 0.274843	-0.103331 -0.009621	0.000564 0.351705	0.009687 1.701428	0.007621 1.334035	0.009687 1.792452
SIZE	0.149423** 3.102993	-0.291382** -3.256933	0.149423*** 3.583856	0.060664 4.033492	-0.103331*** -4.097188	0.060664*** 5.161482	0.114256** 2.736782	-0.086114 -1.012696	0.114256** 2.883197
TAN	-0.772828*** -4.305336	-0.442203 -1.481370	-0.772828*** -4.972523	-0.304561 -5.432323	-0.131999 -1.568631	-0.304561*** -6.951504	-0.001858 -0.011941	-0.104741 -0.369162	-0.001858 -0.012580
VO	-0.005887** -2.763425	-0.000659 -0.328722	-0.005887** -3.191667	-0.001254 -1.884241	0.000220 0.388802	-0.001254* -2.411180	3.26E-05 0.017673	0.002500 1.312338	3.26E-05 0.018618
CF	-1.457818* -2.253087	-1.673521** -2.876054	-1.457818* -2.602243	-0.309883 -1.533411	-0.381940* -2.328471	-0.309883* -1.962239	-1.220915* -2.176490	-1.321490* -2.389410	-1.220915* -2.292929
Regression statistics									
Adj. R^2	0.159228	0.369713	0.159228	0.215259	0.520775	0.215259	0.012917	0.110624	0.012917
Fixed effects		F=11.10***			F=20.28***			F=4.323255***	
Random effects			H=88.82***			H=162.28***			H=34.59***

*/ (**)/ [***] indicates the significance of the coefficients or rejection of the null hypothesis at a 10%/ (5%)/ [1%] level of significance. The null of no individual effects is rejected since the F-statistic is higher than the critical value at 5% significance level. Therefore, there are differences in the cross-sections and the companies in the sample are heterogeneous. Consequently, the fixed-effects model is favoured since the estimates are consistent. **CD** is the actual dividend paid, **INVEST** is the actual investments in the fixed assets, **NDT** is the non-debt tax shields, **RA** is the return on assets, **SIZE** is the company size, TAN is the asset tangibility, **VO** is the market volatility and **CF** is the cash flow.

7.4.3 Discussion and analysis of empirical results for the simultaneous decision-making framework across sectors

This section discusses and analyses the inter-statistical relation between the capital structure and the distribution policies within a strategic simultaneous decision-making process using a three-stage least squares approach, which is a combination of seemingly unrelated regression and a two-stage least squares approach. This approach overcomes the endogeneity problem as asserted before.

7.4.3.1 Simultaneous decision-making framework in the basic materials sector

Table 7.18 indicates that the results in System Equations 1 suggests the existence of a simultaneous decision-making framework between the capital structure and the dividend payments. In System Equation 1, the debt-to-equity ratio negatively and significantly correlate with the actual dividend paid, while the actual dividend also negatively and significantly correlates with the debt-to-equity ratio. This finding is consistent with the empirical evidence reported by some authors (Crutchley *et al*.,1999:191; Ding & Murinde, 2010:54; Noronha *et al.,*1995:450; Jensen *et al.,*1992:256) and the results of the full sample. In system equation 2 and 3 the debt-to-asset ratio and the leverage factor negatively and significantly correlates with the actual dividend, while the actual dividend is negative and insignificant in debt-to-asset ratio and the leverage factor specifications. The coefficient of profitability positively and significantly correlates with actual dividend and at the same time correlates negatively and significantly with the leverage factor. The coefficient of asset tangibility negatively and significantly correlates with actual dividend and at the same positively and significantly correlates with the debt-to-equity ratio and the debt-to asset ratio.

Table 7. 18: Simultaneous decision-making framework in the basic materials sector

	System 1		System 2		System 3	
Dependent variables	**CD**	**DE**	**CD**	**DA**	**CD**	**LF**
	Coefficient t-Statistic	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**
Cons_CD	0.041499*** 14.72095	–	0.034630*** 9.982441	–	0.098757*** 9.289829	
GW	-4.05E-05 -0.819302	–	-8.53E-05* -1.960840	–	4.81E-05 0.452764	
RA	0.001409*** 12.67223	–	0.001538*** 15.75457	–	–	
TAN	-0.003988 -0.668012	–	-0.013304* -2.417297	–	-0.019582** -2.725295	
DE	-0.033228*** -11.48364	–				
DA		–	-0.046789*** -4.664941	–		
LF					-0.045387*** -6.975147	
Cons_CS		1.370290*** 19.23815		0.515092*** 27.36539		1.964101 13.11247
CD		-6.917121** -3.049361		-0.444382 -0.741677		-1.009613 -0.199219
Growth		0.000650 0.765228		0.000211 0.973963		0.002998 1.381808
RA		0.007674* 1.931879		0.000309 0.296871		-0.031183*** -3.466895
TAN		0.311198** 3.060966		0.162002*** 6.174578		
CR		-0.355462*** -9.882771		-0.125841*** -13.39127		-0.138439 -1.739772
Regression statistics						
No of balanced observations	1286		1282		1286	
Adjusted R^2	0.078408	0.161522	0.286460	0.307542	_	0.052650

*/(**)/[***] indicates the significance of the coefficients at a 10%/(5%)/[1%] level of significance **CD** is the actual dividend paid, **GW** is the company growth opportunities, **RA** is the return on assets used as a proxy for profitability, **TAN** is the asset tangibility, **CR** is the current ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor.

7.4.3.2 Simultaneous decision-making framework in the industrial sector

The results in Table 7.19 indicates the existence of a strategic simultaneous decision-making framework in the industrial sector. The results in System Equations 5 and 6 reveal that the debt-to-asset ratio and the leverage factor correlate negatively and significantly with the actual dividend, while the actual dividend correlates negatively and significantly with the leverage factor and correlates positively and significantly with the debt-to-asset ratio. The asset tangibility correlates positively and significantly with the debt-to-equity in System Equations 4. This finding is similar to the finding by Jensen *et al*., (1992:256). The coefficient of profitability negatively and significantly correlates with two measures of the capital structure (the debt-to-equity ratio and the debt-to-asset ratio) and at the same time correlates positively and significantly with the actual dividend. The coefficient of growth negatively and significantly correlates with actual dividend and positively and significantly correlates with the debt-to-asset ratio. The coefficient of liquidity negatively and significantly correlates with the debt-to-equity ratio and the debt-to-asset ratio.

Table 7. 19: Simultaneous decision-making framework in the industrial sector

	System 4		**System 5**		**System 6**	
Dependent variables	**CD**	**DE**	**CD**	**DA**	**CD**	**LF**
	Coefficient t-Statistic	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**
Cons_CD	0.024805*** 6.404478	_	0.027321*** 4.472520	_	0.100868*** 16.41359	
GW	-0.006976* -1.953665	_	-0.006219 -1.727887	_	0.003126 0.344558	
RA	0.000898*** 5.611996	_	0.001036*** 6.764392	_	_	
TAN	0.002018 0.352002	_	-0.004110 -0.739745	_	-0.002740 -0.920196	
DE	-0.005306*** -3.694088	_				
DA		_	-0.020990* -2.498610	_		
LF					-0.042121*** -13.90390	
Cons_CS		4.516350*** 29.21286		1.059292*** 48.30708		2.290260*** 14.03018
CD		-0.185083 -0.053361		5.040318*** 11.57174		-20.29048*** -3.688467
GW		0.010059 0.072905		0.083226*** 4.258415		0.111112 0.517546
RA		-0.026975*** -4.114590		-0.008530*** -9.555751		-0.003890 -0.885582
TAN		0.999138*** 4.719798		-0.024520 -0.814911		
LIQ		-1.616725*** -17.16536		-0.313757*** -23.39274		0.019844 0.537676
Regression statistics						
No of balanced observations	1170		1170		1170	
Adjusted R^2	0.090356	0.447609	0.095163	0.393210	_	_

*/(**)/[***] indicates the significance of the coefficients at a 10%/(5%)/[1%] level of significance **CD** is the actual dividend paid, **GW** is the company growth opportunities, **RA** is the return on assets used as a proxy for profitability, **TAN** is the asset tangibility, **CR** is the current ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor.

7.4.3.3 Simultaneous decision-making framework in the consumer services sector

The results in Table 7.20 suggest the non-existence of a simultaneous decision-making framework in the consumer services sector because of the statistical insignificance of the three alternative measures of the capital structure in all actual dividend paid specifications in System Equations 7, 8 and 9. However, the actual dividend paid positively correlates with all three measures of the capital structure (the debt-to-equity ratio, the debt-to-asset ratio and the leverage factor). Profitability positively and significantly correlates with the actual dividend paid. Profitability negatively and significantly correlates with the debt-to-equity ratio, debt-to-asset ratio and the leverage factor. This finding is similar to the finding by Crutchley *et al*., (1999:191). The coefficient growth opportunities negatively and significantly correlate with the actual dividend paid and negatively . Crutchley *et al.*, (1999:191) found a positive correlation between growth opportunities and the actual dividend paid. The coefficient of asset tangibility positively and significantly correlate with the actual dividend and negatively but significantly correlates with all three alternative measures of the capital structure. The coefficient of current ratio negatively and significantly correlates with all three alternative measures of the capital structure. This finding is consistent with the finding by Kim *et al.* (2007).

Table 7. 20: Simultaneous decision-making framework in the consumer services sector

	System 1		System 2		System 3	
Dependent variables	**CD**	**DE**	**CD**	**DA**	**CD**	**LF**
	Coefficient t-Statistic	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**
Cons_CD	0.003970 1.243401	_	0.001186 0.333201	_	0.000241 0.049789	
GW	-0.000226* -2.367870	_	-0.000249* -2.566088	_	-0.000245* -2.575148	
RA	0.001927*** 12.20778	_	0.001956*** 12.69665	_	0.001936*** 12.97542	
TAN	0.022034*** 4.522797	_	0.022281*** 4.558405	_	0.022509*** 4.681363	
DE	-5.26E-05 -0.044993	_				
DA		_	0.005362 1.007080	_		
LF					0.002416 0.851643	
Cons_CS		3.880785*** 24.96191		0.910418*** 41.76883		2.098879*** 12.39275
CD		16.28299*** 3.509500		2.658250*** 4.259819		38.39906*** 7.732793
Growth		-0.003368 -0.718498		0.000996 1.513374		0.009649 1.874922
RA		-0.061273*** -5.340238		-0.008358*** -5.318674		-0.074261*** -5.984233
TAN		-1.908468*** -7.329628		-0.392462*** -10.79410		-1.504244*** -5.240514
CR		-0.774889*** -18.93725		-0.155451*** -27.16425		-0.280684*** -6.316052
Regression statistics						
No of balanced observations	888		888		888	
Adjusted R^2	0.356180	0.370875	0.353691	0.575638	0.378770	_

*/(**)/[***] indicates the significance of the coefficients at a 10%/(5%)/[1%] level of significance **CD** is the actual dividend paid, **GW** is the company growth opportunities, **RA** is the return on assets used as a proxy for profitability, **TAN** is the asset tangibility, **CR** is the current ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor.

7.4.3.4 Simultaneous decision-making in the consumer goods sector

Table 7.21 indicates the existence of a simultaneous decision-making framework between the leverage factor and the actual dividend paid in system equation 6. The finding indicates that the leverage factor positively and significantly correlate with the actual dividend and the actual dividend positively and significantly correlates with the leverage factor. This finding is similar to the finding by Aggarwal and Kyaw (2010), Kim *et al.* (2007). However, the coefficient of the debt-to-equity ratio and the debt-to-asset ratio are insignificant in system equation 4 and 5. Profitability positively correlates with the actual dividend paid. This finding is similar to the finding by Jensen *et al*., (1992:256) and Aggarwal and Kyaw (2010). The coefficient of growth opportunities negatively but significantly correlates with the actual dividend. This finding is the same as the findings reported by some authors (by Crutchley *et al*., 1999:191; Noronha *et al.,*1995:450; Ding & Murinde, 2010:54; Aggarwal & Kyaw 2010). The coefficient of the asset tangibility negatively but significantly correlates with the debt-to-equity ratio and the debt-to-asset ratio.

Table 7. 21: Simultaneous decision-making framework in the consumer goods sector

	System 4		System 5		System 6	
Dependent variables	**CD**	**DE**	**CD**	**DA**	**CD**	**LF**
	Coefficient t-Statistic	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**
Cons_CD	0.007046 1.209527	_	0.009430 1.393283	_	-1.119201*** -14.24520	
GW	-0.000374*** -3.499617	_	-0.000375*** -3.522236	_	0.000579 0.358009	
RA	0.002749*** 11.48761	_	0.002749*** 11.43539	_	-0.002063 -0.560427	
TAN	-0.003139 -0.403086	_	-0.004318 -0.541430	_	0.018128 0.160284	
DE	-0.002617 -0.687244	_				
DA		_	-0.010340 -0.980000	_		
LF					0.992962*** 41.97259	
Cons_CS		2.422116*** 17.47791		1.004392*** 27.80304		1.118516*** 13.39429
CD		-11.00917*** -4.109895		-2.255096** -3.071110		1.207057* 2.363323
GW		0.000419 0.205409		0.000192 0.360644		-0.000502 -0.282028
RA		0.022724** 2.808136		0.003233 1.478748		0.001580 0.371940
TAN		-1.548423*** -11.30550		-0.598213*** -16.98476		-0.013621 -0.109605
CR		-0.544497*** -14.01611		-0.197006*** -19.32772		0.002777 0.381915
Regression statistics						
No of balanced observations						
Adjusted R^2	0.363691	0.392612	0.357326	0.620166	_	_

*/(**)/[***] indicates the significance of the coefficients at a 10%/(5%)/[1%] level of significance **CD** is the actual dividend paid, **GW** is the company growth opportunities, **RA** is the return on assets used as a proxy for profitability, **TAN** is the asset tangibility, **CR** is the current ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor**.**

7.4.4 Summary of financing and distribution equations across sectors

In the basic materials sector, the individual equation shows a negative and insignificant coefficient of the actual dividend paid in the debt-to-equity ratio and the debt-to-asset ratio (suggesting that financing decisions and distribution policies might not be related directly). However, the simultaneous decision-making framework suggests that the actual dividend paid negatively and significantly correlates with the debt-to-equity ratio and the debt-to-equity ratio negatively and significantly correlates with the actual dividend.

In the industrial sector, the results of the individual equation seem to suggest that the actual dividend negatively correlates with the two alternative measures of the capital structure and the two alternative measures of the capital structure negatively correlate with the actual dividend. The simultaneous decision-making approach suggests that the actual dividend positively correlates with the debt-to-asset ratio and the debt-to-asset ratio negatively correlates with the actual dividend while the leverage factor negatively correlates with actual dividend and the actual dividend negatively correlates with the leverage factor.

In the consumer services sector, the results of the individual equation approach suggest that the two alternative measures of the capital structure negatively correlate with the actual dividend and that the actual dividend negatively correlates with the two alternative measures of the capital structure. However, the simultaneous decision-making approach suggests that there is no interdependence between the capital structure and the distribution policy because of the insignificant coefficient of the three alternative measures of the capital structure. In addition, the findings suggest that the actual dividend positively and significantly correlates with all three measures of the capital structure.

In the consumer goods sector, the results of the individual equation approach suggest that the capital structure and the distribution policy are not interrelated. The strategic simultaneous decision-making approach suggests the existence of the interplay between both policies in this sector. The results suggest that the actual dividend paid positively and significantly correlates with the leverage and that the leverage factor positively and significantly correlates with the actual dividend paid.

Table 7. 22: Summary of results across sectors for the dividend equation

Table 7.17 presents the summary of the effect of the three alternative measures of capital structure and their joint determinants on the actual dividend paid across the four sectors of the JSE.					
Dividend equation					
Sectors		Basic materials	Industrial	Consumer services	Consumer goods
Joint determinant variables	Expected sign	Sign and significance	Sign and significance	Sign and significance	Sign and significance
Investment	**(-)/(+)**	(+) and significant	(-) and insignificant	(-) and insignificant	(+) and significant
Non-debt tax shield	**(+)**	(+) and insignificant	(+) and significant	(-) and insignificant	(-) and insignificant
Return on assets	**(+)**	(+) and significant	(+) and significant	(+) and significant	(+) and significant
Size	**(+)**	(-) and significant	(+) and significant	(+) and significant	(+) and significant
Asset tangibility	**(+)**	(-) and significant	(-) and insignificant	(-) and insignificant	(+) and significant
Market volatility	**(-)**	(-) and insignificant	(-) and significant	(-) and significant	(+) and insignificant
Cash flow	**(+)**	(+) and significant	(+) and significant	(+) and significant	(+) and significant
Alternative measures of capital structure					
Debt-to-equity ratio	**(-)**	(-) and significant	(-) and significant	(-) and significant	(-) and insignificant
Debt-to-asset ratio	**(-)**	(-) and significant	(-) and significant	(-) and significant	(-) and insignificant
Leverage factor	**(-)**	(+) and significant	(+) and insignificant	(+) and insignificant	(+) and insignificant

Table 7. 23: Summary of results across sectors for the capital structure equation

Financing equation	Expected sign	Basic materials sector			Industrial sector			Consumer services sector			Consumer goods sector		
Sectors		**DE**	**DA**	**LF**	**DE**	**DA**	**LF**	**DE**	**DA**	**LF**	**DE**	**DA**	**LF**
Actual dividend paid	(-)	(-)	(-)	(+)	(-)	(-)	(+)	(-)	(-)	(+)	(-)	(-)	(+)
Joint determinants													
Investment	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(-)	(-)	(+)	(+)	(+)
Non-debt tax shields	(+)	(+)	(+)	(-)	(+)	(-)	(+)	(+)	(-)	(+)	(-)	(-)	(+)
Return on assets	(-)	(+)	(+)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(-)	(+)
Size	(+)	(+)	(-)	(+)	(-)	(+)	(-)	(+)	(+)	(+)	(-)	(-)	(-)
Asset tangibility	(+)	(-)	(+)	(-)	(+)	(+)	(+)	(-)	(+)	(-)	(-)	(-)	(-)
Market volatility	(-)	(+)	(-)	(+)	(-)	(+)	(-)	(-)	(-)	(-)	(-)	(+)	(+)
Cash flow	(-)	(-)	(-)	(-)	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(-)	(-)

	Positively significant
	Negatively significant
	Insignificant

Table 7. 24: Summary of results across sectors for the simultaneous decision-making framework

	System equation DE and CD	**System equation DA and CD**	**System equation LF and CD**	Expected sign
Sectors				
Basic materials	-(***) and –(**)	-(***) and -	- (***) and -	(-/+) and (-/+)
Industrial	-(***) and -	-(*) and +(***)	-(***) and -(***)	(-/+) and (-/+)
Consumer services	- and +(*)	+ and +(***)	+ and +(***)	(-/+) and (-/+)
Consumer goods	- and –(***)	- and –(***)	+(***) and +(*)	(-/+) and (-/+)
CD is the actual dividend paid, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio, and **LF** is the leverage factor.				

7.5 CHAPTER SUMMARY

The findings of this chapter showed that sectoral factors played an important role in explaining the interplay between financing and distribution decisions in South Africa. The degree of indebtedness varied across the sectors and this changed the way in which the policies were interrelated. The interdependence between the capital structure and the dividend payments appeared to be present in the basic materials sector, the industrial sector and the consumer goods sector when the two policies were tested using the strategic simultaneous decision-making approach. Profitability, size, cash flow and market volatility were the strongest in explaining the effects of joint determinant variables on the dividend payment decisions across sectors, whereas investment, non-debt tax shield and cash flow were the strongest in the financing equation of the basic material BCM sector; return on assets, size and asset tangibility were the strongest in the financing equation of the industrial sector; non-debt tax shield, size and market volatility were the strongest in the financing equation of the consumer services sector; non-debt tax shield, size and cash flow were the strongest in the financing equations of the consumer goods sector. The results also indicated the interdependence between the capital structure and the dividend through joint determination. For example, in the basic material sector, investment and cash flow were both significant in the financing and pay-out equation, in the industrial sector, profitability and size were significant in both the financing and distribution equation, size and market volatility were both significant in the financing and distribution equation, and in the consumer goods sector, cash flow and size were both significant in the financing and distribution equation. Furthermore, the results provided the evidence of joint determinants affecting the sectors in a significant and different way.

For instance, an increase in the company size increased the amount paid in the actual dividend in the industrial, consumer services and consumer goods sectors, while in the basic materials sector, the company size decreased the amount paid in dividend. An increase in the asset in tangibility decreased the amount paid in the actual dividend paid, while in the consumer goods sector, it increased the amount paid in dividends. In the financing equation, the results showed that an increase in the no-debt tax shield increased the amount raised in debt in the basic materials, industrial and consumer services sectors, while there was evidence of an inverse relationship in the consumer goods sector. An increase in the company size increased the amount raised in debt in the industrial and consumer services sector, while in the consumer goods sector, there was evidence of a significant inverse relationship. Therefore, the empirical results in this chapter provided evidence of the sectoral effect on the dividend payments and capital structure equations and the interplay among them. These sectoral effects arose as a result of cross-sector differences (the sector activities and the nature of the sector, market volatility and government policies), which affected the interdependence between financing and distribution decisions within sectors in South Africa.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1 AIM

The aim of this chapter is to summarise the key findings of the study and to offer some possible research ideas for future work. The first task is thus to briefly restate the purpose and approach of each chapter, emphasising the main results and conclusions. This is followed by a concluding section, which highlights some promising research ideas.

8.2 SUMMARY

This thesis empirically investigated the interdependence of companies' capital structure and distribution strategies, with reference to the four main sectors of the JSE observed within the periods 1990 to 2017 and 1999 to 2017, in an attempt to improve the current knowledge of the interplay and simultaneity of the execution of companies' decisions. It represents one of the first studies in South Africa to explicitly and systematically examine the influence of the different natures of capital structure on distribution strategies and the influence of distribution strategies on the different natures of the capital structure within a simultaneous framework. It also represents one of the first studies to investigate how the different natures of the capital structure and financial distress influence the choice between the dividend payments and share repurchases.

8.3 KEY EMPIRICAL FINDINGS AND CONCLUSION

8.3.1 Simultaneous determination of financing and distribution policies

The comprehensive review of literature showed that, although much effort has gone into investigating financing and distribution strategies, the capital structure, the dividend payment and share repurchases have typically been treated separately and examined in isolation rather than together, and hence there has been little analysis of the interplay among them within a simultaneous framework. Prior research, however, provided both reasons and evidence that companies' capital structure and distribution strategies were likely to be interdependent on one another and jointly determined by management. Several mechanisms through which the set of companies' decisions might be related to one another were explored, such as the trade-off theory, the pecking-order theory, the agency approach, the flow-of-funds approach, the institutional approach, the information approach and the tax approach. An important implication is that financing decisions and distribution strategies are potentially interrelated in several important ways, thus should be better analysed within a simultaneous model framework. However, previous studies on the simultaneous determination of companies' decisions were not sufficiently comprehensive, in the sense that they neither provided enough insight into the theoretical mechanism through which the capital structure and distribution strategies were likely to be simultaneously determined, nor offered solid empirical evidence which could verify the potential interactions suggested by the theoretical arguments. Nonetheless, previous studies provided guidance in modelling companies' behaviours to avoid the danger of drawing spurious conclusions.

To resolve the dearth of knowledge in the literature (Chapter 2 and 3), Chapter 5 investigated the interrelationship among capital structure and distribution strategies with reference to JSE-listed companies. Firstly, the policies were modelled using the single-equation fixed-effects model, random effects model and GMM approach. Secondly the policies were modelled within a simultaneous equation system where they were treated as endogenous.

8.3.1.1 Individual equation (FE, RE and GMM) for financing and distribution policies

Using an individual equation approach, the results indicated that the capital structure and the distribution strategies were interrelated directly and through joint determinant variables (company-specific variables). For the dividend payment equation, the findings revealed that over the period 1990 to 2017, two alternative measures of the capital structure (the debt-to-equity ratio and the debt-to-asset ratio) negatively correlated with the dividend payments at the 1% significance level in the fixed-effects model and at the 10% significance level in the generalised method of moments, while the leverage factor positively correlated with the dividend payments. Further, the findings revealed that over the same period, 1990 to 2017, the dividend payments negatively correlated with the debt-to-equity ratio at the 10% significance level and positively correlated with the leverage factor at the 5% significance level in the fixed-effects model. In the generalised method of moments, the dividend payments appeared to be statistically insignificant.

The most significant joint determinants using the individual equation approach were profitability, size, liquidity and the non-debt tax shields. It is worth pointing out that using the individual equation approach, the results appeared to be mixed and in certain instances, the actual dividend paid was statistically insignificant in explaining financing decisions (for instance, the generalised method of moments). Consequently, this warranted the need for a more robust approach.

8.3.1.2 Simultaneous equation systems (3SLS)

The results from a three-stage least squares estimation showed that over the period 1990 to 2017, the dividend payments negatively correlated with two alternative measures of the capital structure (the debt-to-equity ratio and the debt-to-asset ratio) while all three alternative measures of the capital structure (the debt-to-equity ratio, the debt-to-asset ratio and the leverage factor) negatively correlated with the dividend payments. The dividend payments was positive and statistically significant in the leverage specification.

Over the period 1999 to 2017, within a simultaneous framework, the finding indicated that share repurchases were statistically insignificant in the debt-to-equity ratio and the debt-to-asset ratio equation, while the debt-to-equity ratio and the debt-to-asset ratio positively correlated with the share repurchases at the 1% significance level. In addition, over the same period, the results indicated that the two alternative measures of the capital structure (the debt-to-equity ratio and the debt-to-asset ratio) positively correlated with the distribution strategies (the sum of the dividend payments and share repurchases), while the distribution strategies positively correlated with the debt-to-asset ratio.

The findings using a 3SLS approach indicated that South African companies listed on the Johannesburg Stock Exchange were more likely to be financially constrained not only by the availability of internal funds but also by the access to external finance, and as a result, managers in South Africa had to consider their financing choices alongside with their distribution policies.

8.3.1.3 Simultaneous equation between CD and DE before the financial crisis, during the financial crisis (2008-2010) and after the financial crisis (2011-2015)

Lim (2016) argues that during a period of financial recession, the real rate of return, inflation and risk premium were low, whereas the liquidity and maturity risk premiums were higher. The financial recession changed the macroeconomic environment. Consequently, it further changed the interplay between financing decisions and pay-out decisions. The research investigated the interrelationship between the capital structure and the actual dividend paid over three periods, before the financial crisis, during the financial crisis and after the financial crisis. The findings revealed that during the financial crisis, the actual dividend paid and the capital structure were not interrelated (the actual dividend paid was insignificant in the debt-to-equity ratio specification and the debt-to-equity ratio was insignificant in the actual dividend paid specification). Over this period, South African companies listed on the JSE appeared to decrease the amount of debt issued to become more equity financed, which had an impact on the interplay between financing and payout (the interplay between financing decisions and pay-out decisions was insignificant/not clear).

Over the period before and after the financial crisis (2005-2007 and 2011-2015), the two policies were interrelated. Before and after the financial crisis the coefficient of the actual dividend paid correlated significantly negative with the capital structure (the debt-to-equity ratio), while the coefficient of the debt-to-equity ratio correlated significantly negative with the actual dividend paid. This finding indicated that over the period before and after the financial crisis, the interdependence between the capital structure and the dividend payments was stronger (there was a two-way causal relationship). In addition, the marginal effect of the actual dividend paid after the financial crisis was better than the effect for the period before the financial crisis and during the financial crisis.

8.3.2 Threshold regressions and model of choice

8.3.2.1 Threshold regression

In the threshold regression section, the research investigated whether there is an optimal leverage at which point companies are able to maximise distribution strategies using a panel of 68 JSE-listed companies in the four main sectors during the periods 1990 to 2017 and 1999 to 2017 to account for the incorporation of the share repurchases. The research employed an advanced panel threshold regression model to test whether there was a threshold debt-to-equity ratio and a threshold long-term debt based on the book value which might have threshold effects and asymmetrical relationships between capital structure and distribution strategies. This shift in financing sources propelled the nonlinear relation that was uncovered in this section and shed fresh light on existing capital structure theories. The results substantiated that there was a double threshold effect between the two alternative measures of the capital structure and the dividend payments over the period 1990 to 2017 and the estimated coefficients were positive and significant for both the debt-to-equity ratio and the long-term debt based on the book value. The finding suggested that it is possible to identify the level beyond which a further increase in debt financing does not improve distribution strategies. Over the period 1999 to 2017, a threshold effect of the debt-to-equity ratio was found on share repurchases; however, the estimated coefficients were negative and insignificant because of share repurchases not being reported comprehensively and of smaller magnitude. Furthermore, over the same period (1999-2017), the findings of the research revealed that even after the introduction of share repurchases, JSE-listed companies' capital structure had a threshold effect on the dividend payments and the estimated coefficients were still positive and significant. The threshold effects of the debt-to-equity ratio on DS (the sum of the cash dividend paid, and share repurchases) seemed to be unclear although the estimated coefficients were positive and significant at the 5% level. This result indicated that the threshold effect on the distribution strategies was stronger when the dividend payments and shares were analysed separately. Stated differently, the variations in financing decisions were taken by JSE-listed companies' managers when looking at single distribution but not as a combination of the two. Among the non-threshold variables, the cash flow appeared to have the biggest effect on share repurchases. Nevertheless, profitability, cash flow and the size of the company had a positive effect on the cash dividend. The market volatility was negative and significant. This result again validated the narrative that during a period of uncertainty, JSE-listed companies reduced the amount of cash paid in dividend.

8.3.2.2 Model of choice between PR, SRP, BOTH AND NONE

The review of the literature also showed that the capital structure, company-specific variables and financial distress seemed to be critical factors in choosing between the dividend payments and share repurchases. However, prior research largely ignored the importance of the different alternative measures of the leverage and financial distress in the choice between the dividend payments and share repurchases. Furthermore, prior research also ignored the decision by companies to engage in both (the dividend payments and share repurchases) and the decision to engage in neither.

To fill this gap in the literature, Chapter 6 investigated the different alternative measures of capital structure and company-specific factors as predictors of choice between the decision to pay dividend, to engage in both (dividend and share repurchases), to repurchase shares and to engage in neither.

The results revealed that the choice between paying dividend, engaging in both (dividend payments and share repurchases) and engaging in neither (dividend payments and share repurchases) relative to share repurchases was driven by profitability, company size, cash flow, working capital and market volatility. The research findings showed that for every one-unit increase in profitability as a predictor of choice, JSE-listed companies were more likely to choose to pay dividend only or pay dividend and repurchase shares at the same time relative to share repurchases. The results showed that during a period of high market volatility, South African managers would choose not to engage in dividend payments and repurchase shares at all. Large companies were less likely to pay dividend and less likely to engage in neither the dividend payments nor the share repurchases, relative to share repurchases. Finally, the results indicated that companies that experienced a decrease in the debt-to-equity ratios in the sample were more likely to choose the payment of dividends and were also more likely to engage in none (neither the dividend payments nor the share repurchases) relative to share repurchases.

8.3.3 Sectoral effect on financing decisions and distribution policies

To ascertain whether companies in the four main sectors of the JSE treated their financing and distribution policies differently because companies operating in the same sector in South Africa should have similar characteristics and these characteristics should affect the nature of the sector (for example, profitability and risks), the research investigated the sectoral effect on the interplay between the capital structure and the dividend payments in the basic materials, industrial, consumer goods and consumer services sectors. The findings showed that sectoral factors played an important role in explaining the interplay between financing and distribution decisions in South Africa. The degree of indebtedness varied across the sectors. The interdependence between the capital structure and the dividend payments appeared to be present in the basic material, industrial and the consumer services sector. Profitability, size, cash flow and market volatility were the strongest in explaining the effects of joint determinant variables for the dividend payment decisions across sectors, whereas investment, non-debt tax shield and cash flow were the strongest in the financing equation of the basic material sector; return on assets, size and asset tangibility were the strongest in the financing equation of the industrial sector; non-debt tax shield, size and market volatility were the strongest in the financing equation of the consumer services sector; non-debt tax shield, size and cash flow were the strongest in the financing equations of the consumer goods sector.

The results also gave an indication of the interdependence between the capital structure and the dividend payment through joint determination. For example, in the basic material sector, investment and cash flow were both significant in financing and pay-out equation; in the industrial sector, profitability and size were significant in both financing and distribution equation; size and market volatility were both significant in the financing and distribution equation; and in the consumer goods sector, cash flow and size were both significant in the financing and distribution equation. Furthermore, the results showed that some of the joint determinants affected the sectors differently. For instance, an increase in the company size was associated with an increase in the amount paid in the actual dividend in the industrial, consumer services and consumer goods sectors, while in the basic materials sector, an increase in the company size was associated with a decrease in the amount paid in the actual dividend. An increase in the asset tangibility was associated with a decrease in the amount paid in the actual dividend, while in the consumer goods sector, it was associated with an increase in the amount paid in dividends. In the financing equation, the results showed that an increase in the no-debt tax shield increased the amount raised in debt in the basic materials, industrial and consumer services sectors, while there was evidence of an inverse relationship in the consumer goods sector. An increase in the company size increased the amount raised in debt in the industrial and consumer services sector, while in the consumer goods sector, there was evidence of a significant inverse relationship. Therefore, the empirical results of the chapter provided evidence of the sectoral effect on the dividend payments and capital structure equations and the interplay among them. These sectoral effects arose as a result of cross-sector differences (the sector activities and the nature of the sector, market volatility and government policies), which affected the interdependence between financing and distribution decisions within sectors in South Africa.

8.4 MAIN CONTRIBUTIONS TO THE LITERATURE

This thesis aimed to fill the critical lacunae identified in the existing finance literature by investigating the capital structure, share repurchases and dividend payments simultaneously, with reference to the companies listed in the four main sectors of the JSE. Based on the trade-off theory, pecking-order theory and agency cost theory, a simultaneous equations system was developed, which explicitly accounted for the interrelationship among the two companies' decisions, with each of the decisions being treated as endogenous over the periods 1990 to 2017 and 1999 to 2017. Furthermore, the simultaneous equations system was also used as a platform for empirically investigating the influences of a company's specific variables (for example, profitability, asset tangibility, growth opportunities, current ratio, non-debt tax shield, risk and market volatility) on the set of jointly determined companies' decisions. This study made a number of important contributions to the existing literature, which would enhance the understanding of the complex corporate decision-making process in the real world in South Africa.

Specifically, the main contributions of this thesis are threefold. First, unlike previous studies that focused only on one aspect of company behaviour, this research treated the capital structure, the dividend payments and share repurchases endogenously, and modelled them simultaneously within a system as implied by the agency cost theory, the pecking-order theory, the flow of fund theory and the trade-off theory. By utilising panel data econometric models for the simultaneity analysis to account for the interrelationship between the set of companies' decisions, this research overcame the shortcomings of the single-equation techniques adopted in the literature and provided new insight into the interdependence among the companies' decisions in theory and practice. The interrelationships among the companies' decisions were empirically verified in Chapter 5 and based on the evidence obtained using JSE-listed companies in the four main sectors, the research contributed to the current knowledge of the complex interplay between the capital structure and distribution policies.

Second, the research investigated whether JSE-listed companies optimised the capital structure for the dividend payments over the period 1990 to 2017 and for share repurchases over the period 1999 to 2017. The findings in Chapter 6 explained how target capital structure was important in the payments of dividends and repurchase of shares for the JSE-listed companies. Further, the research explicitly explored the possible channels through which the decision to pay dividend, the decision to engage in both (the dividend payments and share repurchases) and the decision to engage in none (neither the dividend payments nor the repurchase of shares) relative to share repurchases depended on the different alternative measures of the capital structure (the debt-to-equity ratio, the debt-to-asset ratio and the leverage factor) and company-specific variables. The findings in Chapter 6 also explained how companies listed on the JSE chose between distribution strategies based on the different alternative measures of capital structure and company-specific variables (profitability, working capital, liquidity, size, growth and market volatility) as the predictors of choice used in this research.

Third, the sectoral analysis demonstrated that the level of indebtedness and pay-out policies varied across sectors and this influenced the interdependence between the capital structure and the dividend payments across sectors. The findings helped to explain how and why for example companies in the basic materials sector and industrial sector would take a different stance on the interdependence between capital structure and dividend payments.

8.5 PRACTICAL IMPLICATIONS OF THE FINDINGS

The findings and conclusions presented in this thesis not only contribute to the existing academic literature, but also have broader implications, especially for companies' managers, public policy-makers and shareholders.

8.5.1 Implications for companies' managers

Because the investigation focused on understanding the inter-relationship between the capital structure and distribution strategies within a simultaneous framework as well as the influences of the joint determinants on the set of jointly determined variables of the JSE-listed companies, the practical implications for companies' managers are considered first.

First, the interrelationship among the capital structure, share repurchases, and the dividend payments evidenced in this study has distinct implications for companies and their managements. In making key company decisions, managers must be aware of the inherent interdependencies which exist among them, in order to avoid undesirable side effects which may stem from a given decision. As a result, companies' managers should consider the set of companies' decisions simultaneously in an attempt to prevent losses and bankruptcy, while at the same time, keeping the overall cost of capital as low as possible, such that the company's value and shareholders' value is maximised.

Second, the empirical evidence of the threshold capital structure for the dividend payments and share repurchases and the model of choice uncovered in this study have profound implications for companies' decision-makers. Consequently, South African managers of companies listed on the JSE should bear in mind that there is a positive threshold capital structure for the dividend payment and above this threshold capital structure, the relationship between the capital structure and the dividend payments becomes unclear. If the managers of the JSE-listed companies want to create value for the shareholders, they must always consider the target capital structure of the payment of the dividend. Furthermore, when deciding to pay dividends, to engage in both (the dividend payments and share repurchases), to engage in none (neither the dividend payments nor share repurchases) relative to share repurchases, they must also consider company-specific variables.

8.5.2 Implications for public policy-makers

In spite of the fact that this study primarily focused on aspects of company behaviour, the empirical findings and conclusions drawn from this thesis may also have implications for public policy-makers.

First, it was found that managerial confidence and economic sentiment played a key role in the formation of companies' expectations of future returns and risks associated with the optimisation of the capital structure, and therefore, also in the determination of distribution strategies. High levels of confidence and sentiment encourage companies to take more debt, which, in turn, enables them to invest more in capital assets. Therefore, the extent to which a policy stimulus contributes to an improvement in managerial confidence and economic sentiment is likely to be highly important. For example, the findings of the research showed that during a period of high market volatility, South African managers were more likely to reduce the amount paid in dividend or not pay dividend at all. Furthermore, an increase in market volatility decreases the amount of debt.

8.5.3 Implications for shareholders

In addition to the implication for companies' managers and public policy-makers, the empirical evidence in this thesis also has implications for shareholders in general. The simultaneous analysis demonstrated that the payment of dividends and the repurchase of share were not completely independent but taken with reference to capital structure. In practice, South African shareholders seemed to have a strong preference for high dividend payment ratios as they considered it as a way of mitigating agency cost problems. However, shareholders possibly did not think about the interrelationship that existed between distribution policies and capital structure. For South African companies, the magnitude in the dividend payments decreased with any additional debt that the company issued. Stated differently, the size of dividend payments to the shareholders was directly affected by debt financing.

8.6 LIMITATIONS OF THE RESEARCH

It is worth pointing out that the thesis reported several limitations of the research. First, the research relied mainly on the empirical approach to test the theoretical predictions. The findings and conclusions of this thesis were largely drawn from the accumulation of the evidence collected from data. As a result, the first main limitation of this thesis was that the validity of the conclusions may, to some extent, be sensitive to the selection of the sample, the measurement of the variables, the specification of models, the choice of estimation techniques and the interpretation of the results. Given the fact that a large amount of financial and accounting information was used to produce empirical evidence, the results presented in this thesis may also be subject to the managerial manipulation of the reported accounting data. Further, although the researcher tried to systemically and simultaneously investigate the interdependence between the capital structure and distribution policies, it was found that the South African financial data source used for this research (Iress BFA) did not record comprehensive share repurchase data on a consistent basis for the period 1999 to 2017 (the second period covered for this research). The information was only available for certain periods. Share repurchases that were announced on the Security Exchange News Service (SENS) of the JSE also did not represent the full extent of share repurchases owing to the JSE listing requirements (JSE, 2007), which did not require all general (or open-market) share repurchases to be announced via SENS. As a result, only when a 3% limit was reached, an announcement was required.

Despite the above shortcomings, this research reveals new insights into the complex company decision-making processes. Some of the limitations of the research are expected to be resolved in future research.

8.7 PROMISING IDEAS FOR FUTURE RESEARCH

Finally, a number of promising ideas for future research can be drawn from the literature review and the empirical findings presented in this study. The researcher concludes this thesis by proposing a number of promising research ideas for further extension of this study.

This study investigated a key set of company decisions (the capital structure and distribution policies) within a simultaneous equations system (to account for the interdependence among them), as implied by the pecking-order theory, the trade-off theory and the agency cost theory. However, the size of share repurchases used in this research appeared to be smaller because of the 3% requirement. As a result, the research could not find strong evidence of an optimal capital structure of the share repurchases. Therefore, further research may increase the size of repurchases in order to explore the threshold effect of alternative measures of the capital structure on the share repurchases.

Apart from the company-specific variables used in this research as predictors of choice to pay dividend, to engage in both and to engage in none (neither the dividend payments nor share repurchases) relative to share repurchases, future research can extend the list of predictors of choice and increase the sample size.

Given the changes in the capital structure in the periods before, during and after the financial crisis, the research findings showed the marginal effect to pay dividend improved when the proportion of equity in terms of capital was greater than debt.

Future research can focus on companies which are highly equity financed and companies which are highly debt financed to find out how company-specific variables affect the two different natures of capital structure.

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APPENDICES

Appendix 1: Descriptive statistic for the period 1999-2017

Table A.1.1: Descriptive statistics tests for the full sample with winsorisation:1999-2017

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Obs
ΔDE	-0.007354	-0.003400	3.732210	-3.732210	0.522177	-0.563022	20.84780	1223
DE	1.216157	0.822500	3.883950	0.151740	1.060005	1.193748	3.468795	1223
DA	0.447818	0.440900	0.801780	0.119750	0.212310	0.058538	1.777352	1223
ΔWK	0.001774	0.000000	0.544008	-0.652340	0.084963	-0.187061	10.65446	1223
CD	0.033610	0.025153	0.126531	0.000000	0.033573	1.306178	4.125945	1223
SRP	0.004614	0.000000	0.041267	0.000000	0.011070	2.525940	8.048249	1223
CE	0.058889	0.051349	0.188559	-0.031426	0.053329	0.703672	3.215766	1223
INVEST	0.068956	0.062932	0.173640	0.001352	0.046536	0.569848	2.613007	1223
LIQ	2.249530	1.871217	5.055640	1.160415	1.076870	1.266190	3.719396	1223
VO	41.42924	35.99810	88.17998	20.68329	17.61991	1.171085	3.662217	1223
RA	11.37823	10.59640	29.21484	-5.413560	8.824592	0.208941	2.632758	1223
CF	0.109082	0.105255	0.263636	-0.035843	0.079366	0.124752	2.363211	1223
TAN	0.279013	0.258186	0.748309	0.001930	0.209824	0.586672	2.567235	1223
NDT	0.033473	0.033144	0.068717	0.001603	0.018644	0.123516	2.215220	1223

ΔDE is the change in the debt-to-equity ratio, **SRP** is the share repurchase, **ΔWK** is the change in working capital, **CE** is the capital expenditure

Appendix 2: 2SLS estimation results for the dividend payments and the three alternative measures of the capital structure: 1990-2017

Table A2. 1: 2SLS estimation results for the dividend payments and the three measures of the capital structure:1990-2017

	System CD and DE		System CD and DA		System CD and LF	
	CD equation	**DE equation**	**CD equation**	**DA equation**	**CD equation**	**LF equation**
	Coefficient t-Statistic	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**	**Coefficient t-Statistic**
Constant	0.000163 0.096370	3.193336*** 37.64104	0.026207*** 13.59802	0.892756*** 55.00198	-0.324719*** -11.75780	2.523490*** 28.18389
CD		-14.44849*** -4.580049		-3.023473*** -4.992496		2.037809 0.600240
RA	0.001985*** 27.14755	0.012768* 2.036286	0.001711*** 24.97414	0.004333*** 3.599738	0.006093*** 9.681898	-0.023243** -3.468287
GW	-0.000225*** -7.186016	-0.002281* -1.760938	-0.000139*** -4.627186	-0.000315 -1.268319	-0.000868*** -3.617049	0.001982 1.454290
TAN	-0.003726 -1.348199	-0.592332*** -5.560217	-0.001700 -0.644116	-0.155459*** -7.606880	0.048672* 2.294214	-0.584673*** -5.215282
CR		-0.861927*** -25.91027		-0.205418*** -32.34667		-0.379011*** -10.44635
DE	0.008193*** 9.842545					
DA			-0.032623*** -9.953932			
LF					0.185790*** 12.96039	
Regression statistics						
Balanced observations	3774		3774		3774	
Adjusted R-squared	0.172323	0.160471	0.243900	0.221071	-	0.110684

*/(**)/[***] indicates the significance of the coefficients at a 10%/(5%)/[1%] level of significance **CD** is the actual dividend paid, **GW** is the company growth opportunities, **RA** is the return on assets used as a proxy for profitability, **TAN** is the asset tangibility, **CR** is the current ratio, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **LF** is the leverage factor.

Appendix 3: 2SLS estimation results for the share repurchases, distribution strategies and the different alternative measures of the capital structure (DE and DA) for the period 1999-2017

Table A3.1: 2SLS estimation results for the share repurchases, distribution strategies and the different natures of the capital structure for the period 1999-2017

	System Equation 5.6				System Equation 5.7			
	Variant 4		Variant 5		Variant 6		Variant 7	
	SRP equation	DE equation	SRP equation	DA equation	DS equation	DE equation	DS equation	DA equation
	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic	Coefficient t-Statistic
Constant	-1.023003 -0.881391	1.241895*** 11.33564	-0.525615 -1.451646	0.488080*** 21.00855	-1.192546 -0.785642	1.248328 8.441349	-0.512331 -1.297926	0.484322*** 19.02592
SRP		-14.01902 -0.151291		7.801005 0.389490				
INVEST	-8.883257** -2.896687	8.653118** 2.761431	-1.033913* -2.294069	1.127958* 2.160915	-9.430706* -1.969422	9.366161 1.321359	-1.323990** -2.782228	1.347529* 1.991007
CF	5.612114*** 3.367040	-5.211539 -1.048506	1.145182** 3.294872	-1.400362 -1.345778	6.186248** 2.836640	-7.258406 -0.275202	1.551466*** 3.869925	-1.664069 -0.634524
LIQ	-0.001941 -0.005573		-0.001799 -0.027707		0.059029 0.109537		0.002417 0.035546	
VO	-0.004900 -0.298143		0.001444 0.567301		-0.005878 -0.284494		0.000317 0.131822	
TAN		-0.042527 -0.211486		0.011503 0.301608		-0.074525 -0.197598		0.002844 0.062441
NDT		0.396790 0.162491		-0.116235 -0.233822		0.862265 0.077639		0.018492 0.014189
DE	1.024923* 2.304467				1.092643 1.342069			
DA			0.938275* 1.993857				1.014222* 2.390860	
DS						2.624601 0.048222		1.319363 0.240261
No of obs.	2582	2582	2582	2582	2582	2582	2582	2582
Industry dummies	Not included	Not included	Not included	Not included	Not included	Not included	Not included	Not included
Year dummies	Not included	Not included	Not included	Not included	Not included	Not included	Not included	Not included

SRP is share repurchases, **INVES**T is the actual investment in asset, **CF** is the cash flow, **LIQ** is the company liquidity position, **VO** is the market volatility **TAN** is the asset tangibility, **NDT** is the non-debt tax shields, **DE** is the debt-to-equity ratio, **DA** is the debt-to-asset ratio and **DS** is the sum of the dividend payments and share repurchases.

Appendix 4: 2SLS estimation for distribution strategies and changes in capital structure (the pecking-order theory) :1999-2017

Table A4.1: 2SLS estimation for distribution strategies and changes in capital structure (the pecking-order theory) :1999-2017

	System equation ∆DE and CD		**System equation ∆DE and SRP**		**System equation ∆DE and DS**	
	∆DE	CD	∆DE	SR	∆DE	DS
	Fin. Eq.	Dist. Eq.	Fin. Eq.	Dist. Eq.	Fin. Eq.	Dist. Eq.
Constant	0.096525* 1.915845	0.001876 0.129384	0.047353 0.703637	-0.105725*** -8.866516	0.093957 1.856027	0.016372 1.220054
∆DE		0.068593*** 7.906827		0.034830*** 5.284926		0.067817*** 8.447757
CD	0.951315 0.397339					
SRP			21.87831 1.291707			
DS					2.522664 1.085208	
CE	0.684213* 2.366526	-0.158709*** -5.372495	0.883377* 1.946356	-0.035110 -0.035110	0.764871* 2.571485	-0.146267*** -5.352524
∆WCA	-2.752177*** -7.491333		-3.330738*** -4.727757		-2.660927*** -6.961164	
CF	-1.500831 -1.804749		-1.618698 -1.509459		-2.067467* -2.276488	
RA		0.006230*** 17.90273		0.003282*** 12.53526		0.005537*** 17.28601
VO		-0.000740* -2.571548		0.001780*** 7.421918		-0.000827 -3.108231
Regression statistics						
Number of balanced obs	2548		2548		2548	
Adj-R^2	0.025977		-	-	0.004976	-

Appendix 5: Descriptive statistics tests for the sectors without winsorisation

Table A5. 1: Descriptive statistics tests for the BCM sample without winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.057360	0.017198	5.356504	-0.000142	0.333066	13.31447	189.9636	641
DA	0.357031	0.319700	2.908600	0.000000	0.255106	3.761288	30.48540	641
DE	1.165819	0.548900	183.4810	-4.072000	7.403388	23.45464	575.8460	641
LF	3.415213	1.142500	397.9333	-105.5680	23.77318	11.38226	165.2235	641
INVEST	0.133376	0.067322	10.60768	0.000000	0.690732	13.51409	191.2357	641
SIZE	6.720989	6.915975	12.83263	0.000000	1.318266	-1.290881	9.046685	641
RA	7.805532	8.562000	283.3691	-196.0680	24.16474	-0.071653	42.18488	641
NDT	0.035380	0.033751	0.216824	0.000000	0.026821	1.172926	6.899851	641
VO	49.74931	38.20140	579.5674	0.000000	49.22389	5.087003	41.61005	641
TAN	0.268784	0.245699	0.999372	0.000000	0.250713	0.582720	2.361154	641
CF	0.138783	0.083244	16.63255	-2.996803	0.930120	13.76538	214.7152	641

CD is the actual dividend paid, DA is the debt-to-asset ratio, DE is the debt-to-equity ratio, LF is the leverage factor, INVEST is the company investments in fixed assets, SIZE is the company size, RA is the return on assets used as a proxy for profitability, NDT is the non-debt tax shields, VO is the market volatility, TAN is the asset tangibility and CF is the cash flow.

Table A5. 2: Descriptive statistics tests for the IND sample without winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.028870	0.018897	0.505733	0.000000	0.044668	5.132836	40.87523	587
DA	0.574981	0.599600	1.239600	0.000000	0.182464	-0.461962	3.776134	587
DE	2.117530	1.523900	47.85560	-3.839100	3.142537	8.193194	97.39568	587
LF	3.923427	1.454300	675.5474	-78.66220	31.76041	17.73879	354.7159	587
VO	43.13815	34.08650	344.1663	0.000000	35.66442	3.508911	22.31151	587
TAN	0.271390	0.251260	0.864417	0.000000	0.184666	0.883451	3.413804	587
SIZE	6.659018	6.837014	10.96056	0.000000	1.080272	-2.065997	13.82199	587
RA	13.71189	10.27270	1763.004	-86.07900	73.25152	23.25145	555.9499	587
NDT	0.032816	0.031490	0.141901	0.000000	0.021519	0.724088	4.277308	587
CF	0.120947	0.091936	16.88254	-0.516696	0.705339	22.94576	545.2065	587
INVEST	0.077890	0.054843	1.193433	0.000000	0.100321	5.212012	46.17528	587

CD is the actual dividend paid, **DA** is the debt-to-asset ratio, **DE** is the debt-to-equity ratio, **LF** is the leverage factor, **INVEST** is the company investments in fixed assets, **SIZE** is the company size, **RA** is the return on assets used as a proxy for profitability, **NDT** is the non-debt tax shields, **VO** is the market volatility, TAN is the asset tangibility and **CF** is the cash flow.

Table A5. 3: Descriptive statistics tests for the CNS sample without winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.036052	0.026040	0.540681	0.000000	0.044125	4.761022	44.21577	447
DA	0.474647	0.476800	1.418500	0.000000	0.235613	0.122203	2.261196	447
DE	1.626309	0.979100	61.72270	-12.21760	3.339596	13.10518	236.9493	447
LF	1.475918	1.252100	114.2468	-199.2182	11.98661	-7.989864	198.3461	447
INVEST	0.078540	0.066131	1.405800	0.000000	0.081932	9.927333	156.0494	447
SIZE	6.370207	6.562257	8.288625	0.000000	1.178426	-3.098637	17.71668	447
RA	12.85675	12.52370	108.2972	-25.42060	10.11983	2.156286	21.25603	447
NDT	0.033127	0.032659	0.083316	0.000000	0.016556	0.168161	2.618321	447
VO	36.12083	32.73630	255.0696	0.000000	24.14422	2.965838	22.35142	447
TAN	0.313727	0.252335	0.930153	0.000000	0.232198	1.041976	3.217044	447
CF	0.118576	0.123775	0.450851	-0.634681	0.098249	-0.969001	10.73749	447

CD is the actual dividend paid, DA is the debt-to-asset ratio, DE is the debt-to-equity ratio, LF is the leverage factor, INVEST is the company investments in fixed assets, SIZE is the company size, RA is the return on assets used as a proxy for profitability, NDT is the non-debt tax shields, VO is the market volatility, TAN is the asset tangibility and CF is the cash flow.

Table A5. 4: Descriptive statistics tests for the CNG sample without winsorisation

	Mean	Median	Maximum	Minimum	Std. dev.	Skewness	Kurtosis	Obs
CD	0.039210	0.029076	0.237346	0.000000	0.037168	2.424791	11.23938	251
DA	0.383667	0.367800	1.046100	0.049500	0.171133	0.611363	4.242648	251
DE	0.783051	0.595400	9.167500	0.053800	0.764710	6.016145	61.26791	251
LF	1.244169	1.107200	20.60650	-9.102400	1.526613	7.129560	113.0016	251
INVEST	0.060683	0.056777	0.245196	0.000000	0.037902	1.129468	5.448620	251
SIZE	6.752685	6.891535	8.689653	4.732804	0.750937	-0.228149	3.115647	251
RA	13.30745	12.63040	49.78370	-17.83220	7.359064	0.470684	6.532316	251
NDT	0.029511	0.028853	0.082763	0.000000	0.013024	0.627269	4.328585	251
VO	34.71166	30.25140	270.0737	0.000000	22.83557	4.945503	47.68763	251
TAN	0.336285	0.307982	0.881073	0.017740	0.203692	0.813966	3.186811	251
CF	0.105879	0.104976	0.362791	-0.158289	0.072057	-0.056081	4.658136	251

CD is the actual dividend paid, DA is the debt-to-asset ratio, DE is the debt-to-equity ratio, LF is the leverage factor, INVEST is the company investments in fixed assets, SIZE is the company size, RA is the return on assets used as a proxy for profitability, NDT is the non-debt tax shields, VO is the market volatility, TAN is the asset tangibility and CF is the cash flow.

Appendix 6: Target capital structure specification, Residual, actual and fitted values for DE, LTB and CD:1990-2017

Table A6. 1: Threshold specification for CD and DE: 1990-2017

Discrete Threshold Specification			
Description of the threshold specification used in estimation			
Equation: EQ01			
Date: 09/28/19 Time: 08:06			
Summary			
Threshold variable: Debt-to-equiy ratio			
Estimated number of thresholds: 1			
Method: Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Maximum number of thresholds: 5			
Threshold data value: 1.6655			
Adjacent data value: 1.6628			
Threshold value used: 1.6654999			
Current threshold calculations:			
Multiple threshold tests			
Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Date: 09/28/19 Time: 08:06			
Sample: 4 1904			
Included observations: 1881			
Threshold variable: Debt-to-equity ratio			
Threshold-varying variables: C DELTA_DE(-1) DELTA_DE(			
-2)			
Threshold-non-varying variables: SIZE_TRM(-1) RA_TRM(			
-1) CF_TRM(-1) INVEST_TRM(-1) VO_TRM(-1)			
Threshold test options: Trimming 0.05, Max. thresholds 5,			
Sig. level 0.05			
Test statistics employ HAC covariances (Bartlett kernel,			
Newey-West fixed bandwidth)			
Sequential F-statistic determined thresholds:			1
Significant F-statistic largest thresholds:			1
		Scaled	Critical
Threshold Test	F-statistic	F-statistic	Value**
0 vs. 1 *	8.724572	26.17372	15.37
1 vs. 2	2.498677	7.496030	17.15
2 vs. 3	2.165290	6.495871	17.97
3 vs. 4	4.415047	13.24514	18.72
4 vs. 5	4.528657	13.58597	19.23
* Significant at the 0.05 level			
** Bai-Perron (Econometric Journal, 2003) critical values.			
Estimated threshold values:			
1: 1.6654999			
2: 1.6654999, 3.5469999			
3: 0.46259999, 0.53449999, 1.6654999			
4: 0.46259999, 0.53449999, 1.6620999, 3.5672999			
5: 0.46259999, 0.53449999, 0.90589999, 1.6654999,			
3.5672999			

Figure A6. 1:Residual, actual and fitted values for CD and threshold DE for the period 1999-2017

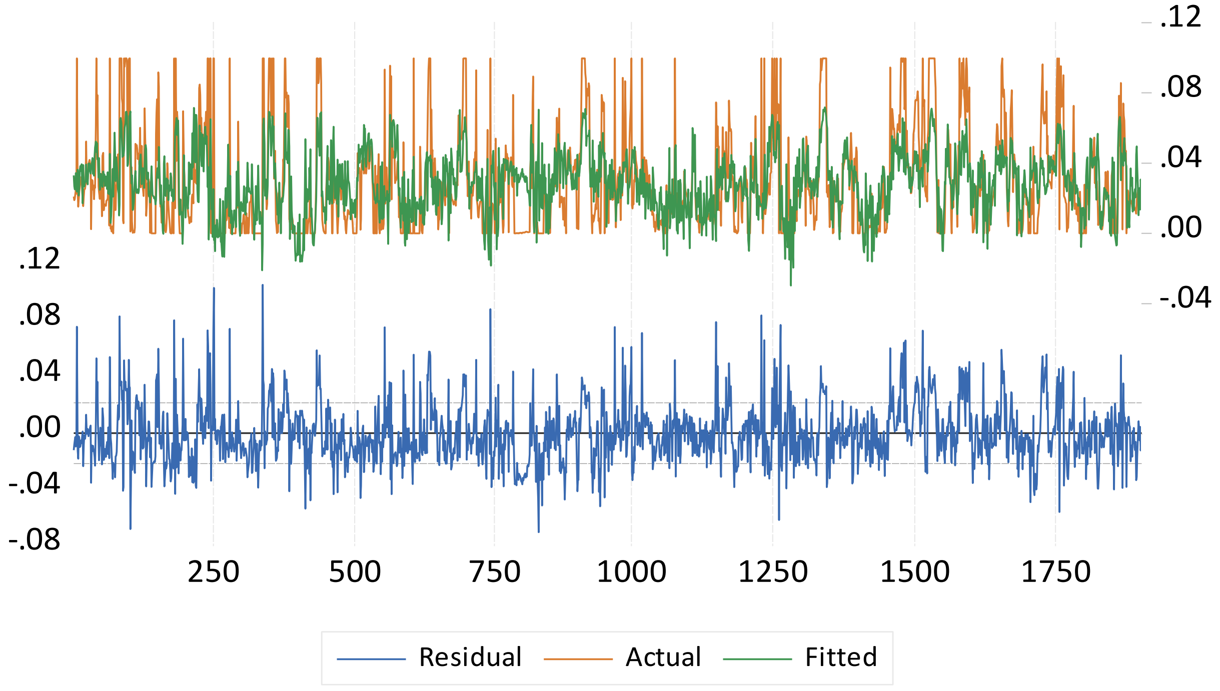
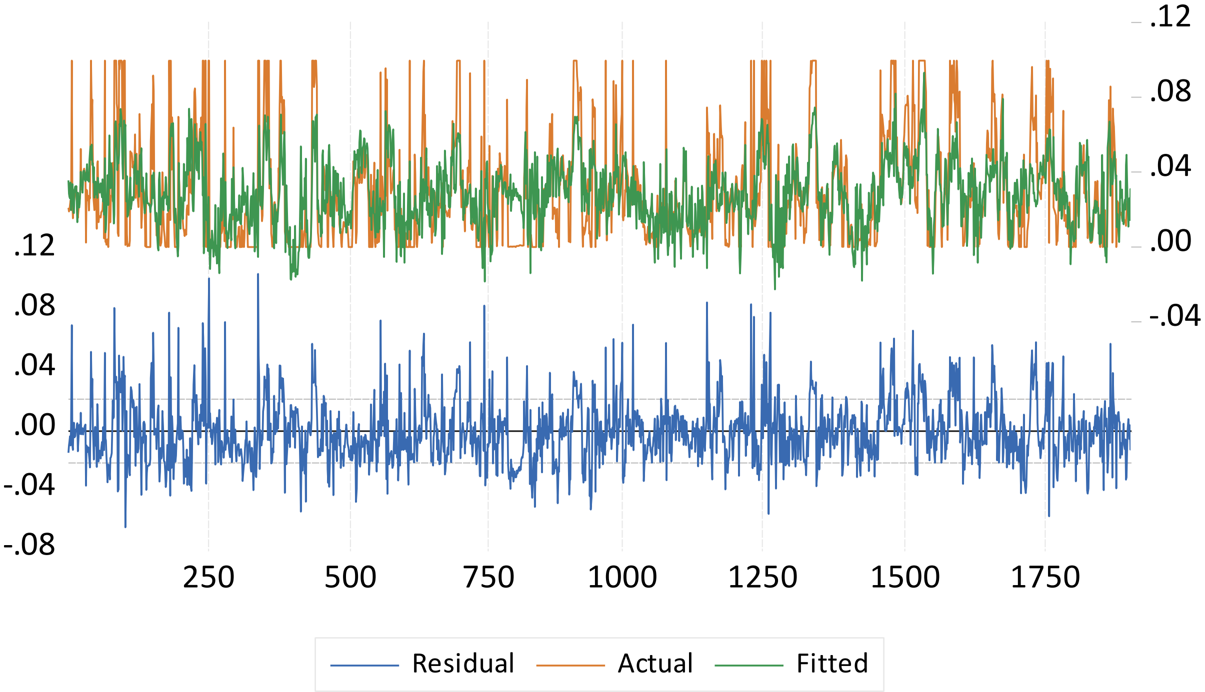


Table A6. 2: Threshold specification for CD AND LTB for the period 1990-2017

Discrete Threshold Specification			
Description of the threshold specification used in estimation			
Equation: EQ01			
Date: 09/28/19 Time: 08:06			
Summary			
Threshold variable: Long term debt based on book value			
Estimated number of thresholds: 2			
Method: Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Maximum number of thresholds: 5			
Threshold data values: 0.558519257136,			
0.833185916601			
Adjacent data values: 0.558442851276, 0.830675093183			
Thresholds values used: 0.5585192, 0.8331859			
Current threshold calculations:			
Multiple threshold tests			
Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Date: 07/20/20 Time: 00:26			
Sample: 4 1904			
Included observations: 1866			
Threshold variable: LTB (total debt based on the book value)			
Threshold varying variables: C DELTA_LTB(-1)			
DELTA_LTB(-2)			
Threshold non-varying variables: SIZE_TRM(-1) RA_TRM(			
-1) CF_TRM(-1) INVEST_TRM(-1) VO_TRM(-1)			
Threshold test options: Trimming 0.05, Max. thresholds 5,			
Sig. level 0.05			
Test statistics employ HAC covariances (Bartlett kernel,			
Newey-West fixed bandwidth)			
Sequential F-statistic determined thresholds:			2
Significant F-statistic largest thresholds:			2
		Scaled	Critical
Threshold Test	F-statistic	F-statistic	Value**
0 vs. 1 *	9.443659	28.33098	15.37
1 vs. 2 *	7.759588	23.27876	17.15
2 vs. 3	1.931655	5.794965	17.97
3 vs. 4	2.808721	8.426163	18.72
4 vs. 5	2.059555	6.178665	19.23
* Significant at the 0.05 level			
** Bai-Perron (Econometric Journal, 2003) critical values.			
Estimated threshold values:			
1: 0.5659653			
2: 0.5585192, 0.8331859			
3: 0.5762129, 0.6269862, 0.8331859			
4: 0.3370681, 0.3872586, 0.5585192, 0.8331859			
5: 0.3370681, 0.3872586, 0.4171588, 0.5659653,			
0.8331859			

Figure A6. 2:Residual, actual and fitted values for CD and threshold LTB for the period 1990-2017

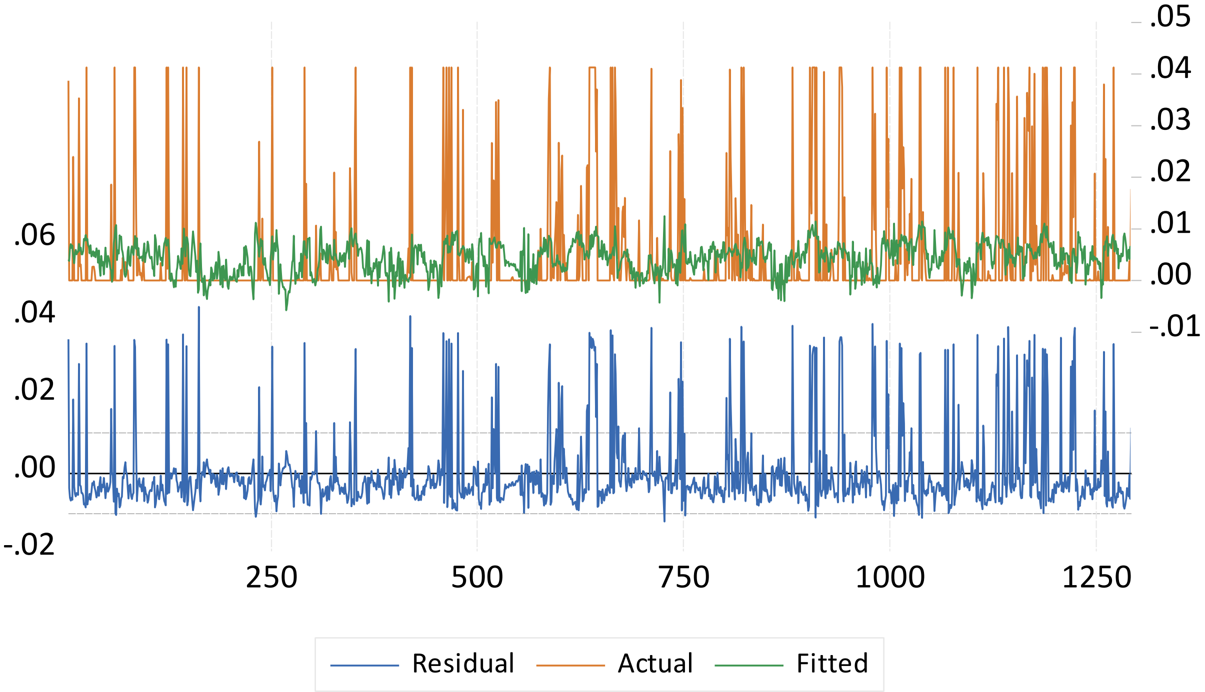


Appendix 7:Target capital structure specification, Residual, actual and fitted values for SRP and DE:1999-2017

Table A7. 3: Threshold specification for SRP and DE: 1999-2017

Discrete Threshold Specification			
Description of the threshold specification used in estimation			
Equation: EQ01			
Date: 09/28/19 Time: 08:06			
Summary			
Threshold variable: Debt-to-equity ratio (-1)			
Estimated number of thresholds: 1			
Method: Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Maximum number of thresholds: 5			
Threshold data value: 0.5602			
Adjacent data value: 0.5601			
Threshold value used: 0.56019999			
Current threshold calculations:			
Multiple threshold tests			
Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Date: 07/19/20 Time: 23:07			
Sample: 4 1292			
Included observations: 1288			
Threshold variable: DE_TRM(-1)			
Threshold varying variables: C DELTA_DE(-1) DELTA_DE(			
-2)			
Threshold non-varying variables: RA_TRM(-1) CF_TRM(-1)			
SIZE_TRM(-1) INVEST_TRM(-1) VO_TRM(-1)			
Threshold test options: Trimming 0.05, Max. thresholds 5,			
Sig. level 0.05			
Test statistics employ HAC covariances (Bartlett kernel,			
Newey-West fixed bandwidth)			
Sequential F-statistic determined thresholds:			1
Significant F-statistic largest thresholds:			1
		Scaled	Critical
Threshold Test	F-statistic	F-statistic	Value**
0 vs. 1 *	5.590152	16.77046	15.37
1 vs. 2	4.399365	13.19809	17.15
2 vs. 3	2.778395	8.335186	17.97
3 vs. 4	3.450333	10.35100	18.72
4 vs. 5	3.447789	10.34337	19.23
* Significant at the 0.05 level			
** Bai-Perron (Econometric Journal, 2003) critical values.			
Estimated threshold values:			
1: 0.56019999			
2: 0.59029999, 0.84559999			
3: 0.56009999, 0.73299999, 0.84559999			
4: 0.56009999, 0.73299999, 0.84559999, 1.4380999			
5: 0.56009999, 0.73299999, 0.84559999, 1.8617999,			
2.4837999			

Figure A7.1:Residual, actual and fitted values for SRP and threshold DE:1999-2017

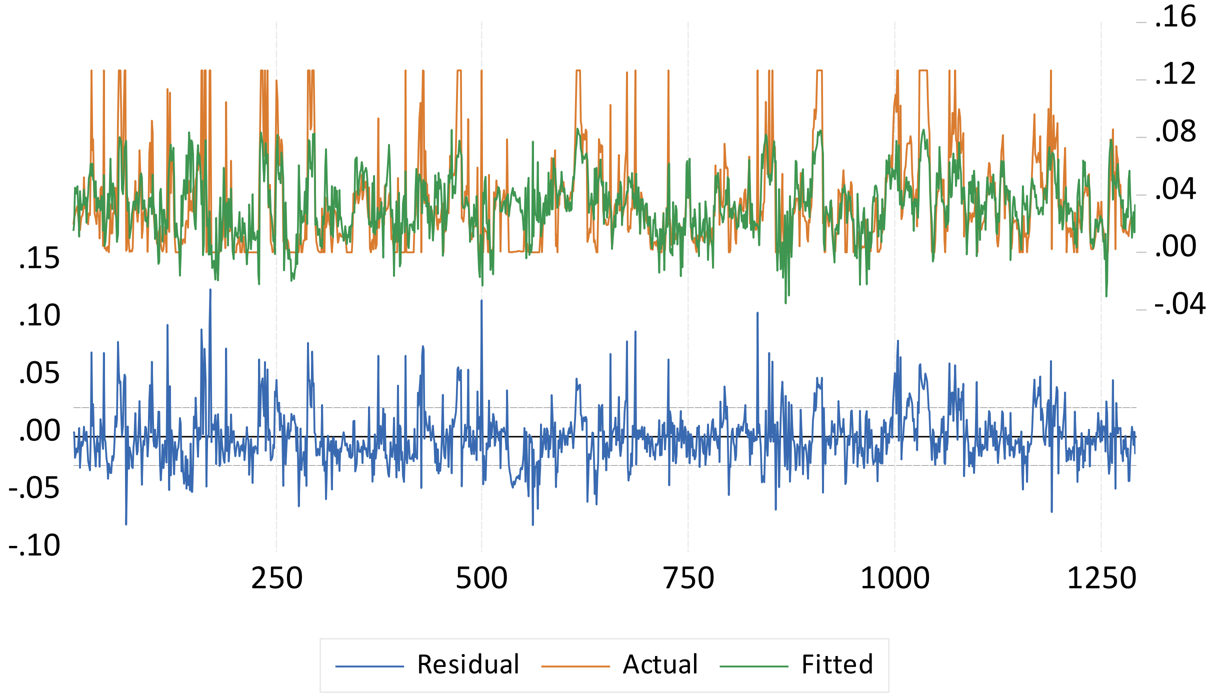


Appendix 8: Target capital structure specification, Residual, actual and fitted values for CD and DE:1999-2017

Table A8. 4: Threshold specification for CD and DE: 1999-2017

Discrete Threshold Specification			
Description of the threshold specification used in estimation			
Equation: EQ01			
Date: 09/28/19 Time: 08:06			
Summary			
Threshold variable: Debt-to-equity ratio			
Estimated number of thresholds: 1			
Method: Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Maximum number of thresholds: 5			
Threshold data value: 1.4145			
Adjacent data value: 1.4116			
Threshold value used: 1.4144999			
Current threshold calculations:			
Multiple threshold tests			
Bai-Perron tests of L+1 vs. L globally determined			
thresholds			
Date: 07/19/20 Time: 22:56			
Sample: 4 1292			
Included observations: 1287			
Threshold variable: DE_TRM			
Threshold varying variables: C DELTA_DE(-1) DELTA_DE(			
-2)			
Threshold non-varying variables: RA_TRM(-1) CF_TRM(-1)			
SIZE_TRM(-1) INVEST_TRM(-1) VO_TRM(-1)			
Threshold test options: Trimming 0.05, Max. thresholds 5,			
Sig. level 0.05			
Test statistics employ HAC covariances (Bartlett kernel,			
Newey-West fixed bandwidth)			
Sequential F-statistic determined thresholds:			1
Significant F-statistic largest thresholds:			1
		Scaled	Critical
Threshold Test	F-statistic	F-statistic	Value**
0 vs. 1 *	7.319844	21.95953	15.37
1 vs. 2	2.756306	8.268918	17.15
2 vs. 3	3.360520	10.08156	17.97
3 vs. 4	3.071647	9.214941	18.72
4 vs. 5	3.089643	9.268929	19.23
* Significant at the 0.05 level			
** Bai-Perron (Econometric Journal, 2003) critical values.			
Estimated threshold values:			
1: 1.4144999			
2: 0.47019999, 0.93624999			
3: 0.47019999, 0.69509999, 1.4144999			
4: 0.47019999, 0.69439999, 1.4144999, 3.5469999			
5: 0.25589999, 0.34169999, 0.93624999, 1.4144999,			
3.5469999			

Figure A8.1:Residual, actual and fitted values for DS and threshold DE:1999-2017

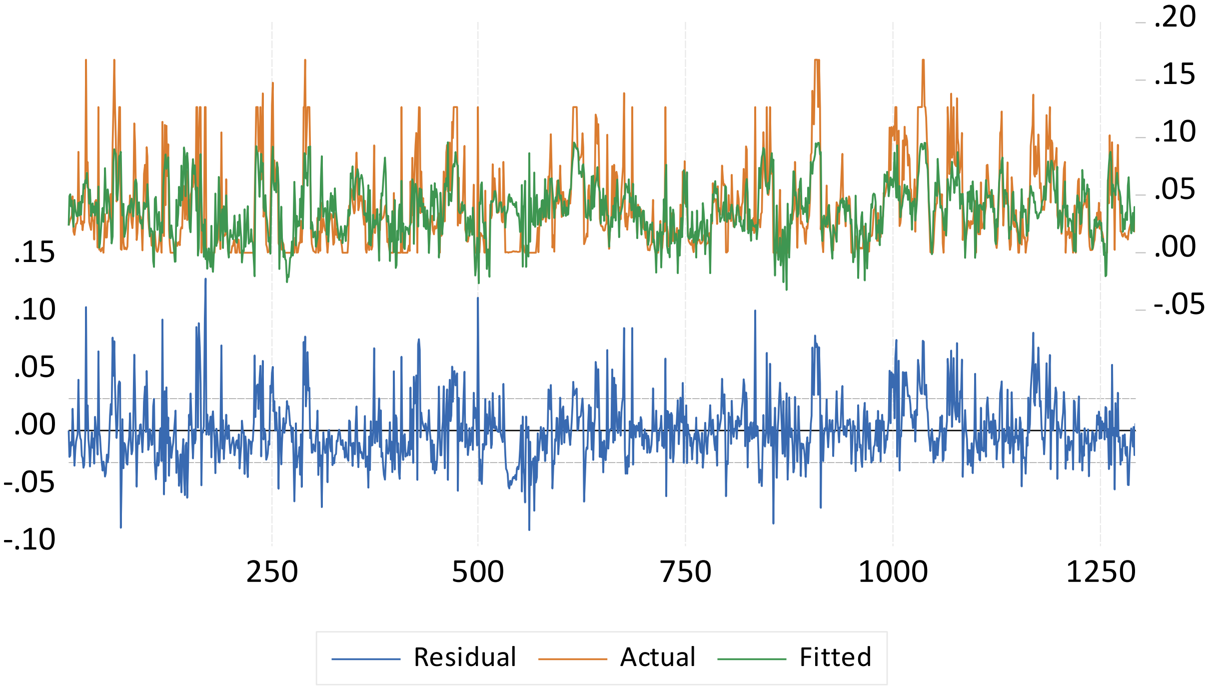


Appendix 9: Target capital structure specification, Residual, actual and fitted values for DS and DE:1999-2017

Table A9.1: Threshold specification for DS and DE: 1999-2017

Discrete Threshold Specification			
Description of the threshold specification used in estimation			
Equation: EQ01			
Date: 09/28/19 Time: 13:13			
Summary			
Threshold variable: Debt-to-equity ratio (-4)			
Estimated number of thresholds: 1			
Method: Bai-Perron tests of L+1 vs. L globally determined thresholds			
Maximum number of thresholds: 5			
Threshold data value: 1.1139			
Adjacent data value: 1.1112			
Threshold value used: 1.113899			
Current threshold calculations:			
Multiple threshold tests			
Bai-Perron tests of L+1 vs. L globally determined thresholds			
Date: 09/28/19 Time: 13:13			
Sample: 5 1292			
Included observations: 1286			
Threshold variable: DE_TRM(-4)			
Threshold-varying variables: C DELTA_DE(-1) DELTA_DE(-2)			
Threshold-non-varying variables: RA_TRM(-1) CF_TRM(-1) SIZE_TRM(-1) INVEST_TRM(-1) VO_TRM(-1)			
Threshold test options: Trimming 0.05, Max. thresholds 5, Sig. level 0.05			
Test statistics employ HAC covariances (Bartlett kernel, Newey-West fixed bandwidth)			
Sequential F-statistic determined thresholds:			1
Significant F-statistic largest thresholds:			1
		Scaled	Critical
Threshold Test	F-statistic	F-statistic	Value**
0 vs. 1 *	5.270906	15.81272	15.37
1 vs. 2	3.205590	9.616770	17.15
2 vs. 3	3.512537	10.53761	17.97
3 vs. 4	2.757022	8.271065	18.72
4 vs. 5	2.438517	7.315552	19.23
* Significant at the 0.05 level			
** Bai-Perron (Econometric Journal, 2003) critical values.			
Estimated threshold values:			
1: 1.113899			
2: 0.59029999, 1.0003999			
3: 0.59029999, 1.0003999, 2.1771999			
4: 0.59029999, 1.0003999, 2.3599999, 3.1487999			
5: 0.59029999, 0.86179999, 1.0115999, 2.3599999, 3.1487999			

Figure A9.1:Residual, actual and fitted values for DS and threshold DE:1999-2017



Appendix 10: Summary statistics for multinomial logistic regression: choice between distribution strategies and the DA effect

Table A10.1: Case-processing summary

Case-processing summary			
		N	Marginal percentage
Payout2	1.00	717	55.7%
	2.00	307	23.8%
	3.00	217	16.8%
	4.00	47	3.6%
Valid		1288	100.0%
Missing		4	
Total		1292	
Subpopulation		1288[a]	
a. The dependent variable has only one value observed in 1288 (100.0%) subpopulations.			

Table A10.2: Model-fitting information

Model-fitting information						
	Model-fitting criteria			Likelihood Ratio Tests		
Model	AIC	BIC	-2 Log Likelihood	Chi-Squared	df	Sig.
Intercept Only	2810.606	2826.089	2804.606			
Final	2461.110	2615.935	2401.110	403.497	27	.000

Table A10.3: Goodness-of-

Goodness-of-fit			
	Chi-Squared	df	Sig.
Pearson	4992.640	3834	.000
Deviance	2401.110	3834	1.000

Table A10.4: Pseudo-R-squared

Pseudo-R-squared	
Cox and Snell	.270
Nagelkerke	.304
McFadden	.144

Table A10.5: Likelihood ratio tests

Likelihood ratio tests						
	Model-Fitting Criteria			Likelihood Ratio Tests		
Effect	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Squared	df	Sig.
Intercept	2512.292	2651.635	2458.292	57.182	3	.000
Profitability	2464.822	2604.165	2410.822	9.712	3	.021
Size	2538.173	2677.516	2484.173	83.064	3	.000
Cash flow	2503.810	2643.153	2449.810	48.701	3	.000
Growth opportunities	2561.753	2701.096	2507.753	106.643	3	.000
Volatility	2534.175	2673.518	2480.175	79.065	3	.000
Liquidity	2457.082	2596.425	2403.082	1.972	3	.578
Working capital	2490.834	2630.176	2436.834	35.724	3	.000
Quick ratio	2455.452	2594.795	2401.452	.342	3	.952
Debt-to-asset ratio	2460.037	2599.380	2406.037	4.928	3	.177
The chi-squared statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.						

Appendix 11: Summary statistics for multinomial logistic regression: choice between distribution strategies and the increase and decrease effect of DE

Table A11.1: Case-processing summary

Case-processing summary			
		N	Marginal Percentage
Distribution strategies	1.00	717	55.8%
	2.00	306	23.8%
	3.00	216	16.8%
	4.00	47	3.7%
Change in debt-to-equity ratio	Decrease	859	66.8%
	Increase	427	33.2%
Valid		1286	100.0%
Missing		6	
Total		1292	
Subpopulation		1286[a]	
a. The dependent variable has only one value observed in 1286 (100.0%) subpopulations.			

Table A11.2: Model-fitting information

Model-fitting information						
	Model-Fitting Criteria			Likelihood Ratio Tests		
Model	AIC	BIC	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept only	2804.172	2819.650	2798.172			
Final	2447.169	2570.992	2399.169	399.003	21	.000

Table A11.3: Goodness-of-fit

Goodness-of-fit			
	Chi-Squared	df	Sig.
Pearson	4886.957	3834	.000
Deviance	2399.169	3834	1.000

Table A11.4: Pseudo-R-squared

Pseudo-R-squared	
Cox and Snell	.267
Nagelkerke	.301
McFadden	.143

Table A11.5: Likelihood ratio tests

Likelihood ratio tests						
	Model-Fitting Criteria			Likelihood Ratio Tests		
Effect	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Squared	df	Sig.
Intercept	2447.169	2570.992	2399.169[a]	.000	0	.
Profitability	2449.909	2558.254	2407.909	8.740	3	.033
Size	2532.632	2640.977	2490.632	91.463	3	.000
Cash flow	2488.658	2597.004	2446.658	47.489	3	.000
Growth opportunities	2544.011	2652.356	2502.011	102.842	3	.000
Volatility	2521.657	2630.002	2479.657	80.488	3	.000
Working capital	2481.327	2589.672	2439.327	40.158	3	.000
Change in DE	2463.723	2572.068	2421.723	22.554	3	.000

The chi-squared statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

Appendix 12: DE and company-specific variables as predictors of choice between distribution strategies

Table A12.1: Debt-to-equity ratio and company-specific variables as predictors of choice between distribution strategies

Table A8.1 presents the multinomial logistic regression parameter estimates of the choice between distribution strategies and the debt-to-equity ratio effects

Distribution strategies[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	95% Confidence Interval for Exp(B) Upper Bound
Dividend payments	Intercept	8.006	1.829	19.171	1	.000			
	Profitability	.023	.011	4.286	1	.038	1.023	1.001	1.045
	Size	-.799	.218	13.440	1	.000	.450	.293	.689
	Cash flow	1.125	1.713	.431	1	.511	3.081	.107	88.555
	Growth opportunities	.000	.006	.000	1	.990	1.000	.988	1.012
	Volatility	-.006	.008	.455	1	.500	.995	.979	1.011
	Liquidity	.241	.177	1.848	1	.174	1.273	.899	1.801
	Working capital	-1.588	1.156	1.886	1	.170	.204	.021	1.970
	Quick ratio	-.055	.238	.054	1	.816	.946	.593	1.509
	Debt-to-equity ratio	.086	.124	.480	1	.488	1.090	.854	1.391
Both (dividend payments and share repurchases)	Intercept	2.424	1.897	1.632	1	.201			
	Profitability	.026	.012	4.929	1	.026	1.026	1.003	1.050
	Size	-.067	.226	.089	1	.766	.935	.600	1.457
	Cash flow	3.440	1.765	3.799	1	.051	31.186	.981	991.226
	Growth opportunities	-.006	.006	.847	1	.357	.994	.982	1.006
	Volatility	-.020	.009	5.079	1	.024	.980	.963	.997
	Liquidity	.019	.189	.010	1	.920	1.019	.704	1.476
	Working capital	.228	1.212	.035	1	.851	1.256	.117	13.498
	Quick ratio	-.141	.255	.308	1	.579	.868	.527	1.431
	Debt-to-equity ratio	.152	.127	1.435	1	.231	1.164	.908	1.493
None (Neither the dividend payments nor share repurchases)	Intercept	8.064	1.911	17.806	1	.000			
	Profitability	.010	.011	.858	1	.354	1.010	.989	1.033
	Size	-1.097	.230	22.670	1	.000	.334	.213	.524
	Cash flow	-3.109	1.796	2.996	1	.083	.045	.001	1.509
	Growth opportunities	.011	.006	3.372	1	.066	1.011	.999	1.023
	Volatility	.018	.008	4.704	1	.030	1.018	1.002	1.035
	Liquidity	.272	.183	2.214	1	.137	1.312	.917	1.876
	Working capital	-3.729	1.241	9.027	1	.003	.024	.002	.274
	Quick ratio	.004	.266	.000	1	.988	1.004	.597	1.690
	Debt-to-equity ratio	.124	.127	.964	1	.326	1.133	.883	1.452

Note: *p<0.1; **p<0.05; ***p<0.01
Number of observations: 1288.

Table A12.1.1 Case-processing summary

Case-processing summary			
		N	Marginal Percentage
Payout2	1.00	717	55.7%
	2.00	307	23.8%
	3.00	217	16.8%
	4.00	47	3.6%
Valid		1288	100.0%
Missing		4	
Total		1292	
Subpopulation		1288[a]	

a. The dependent variable has only one value observed in 1288 (100.0%) subpopulations.

Table A12.1.2 Model-fitting information

Model-fitting information						
	Model-Fitting Criteria			Likelihood Ratio Tests		
Model	AIC	BIC	-2 Log Likelihood	Chi-Squared	df	Sig.
Intercept only	2810.606	2826.089	2804.606			
Final	2460.914	2615.739	2400.914	403.693	27	.000

Table A12.1.3 Goodness-of-fit

Goodness-of-fit			
	Chi-Square	df	Sig.
Pearson	4725.104	3834	.000
Deviance	2400.914	3834	1.000

Table A12.1.4 Table Pseudo-R-squared

Pseudo-R-squared	
Cox and Snell	.269
Nagelkerke	.303
McFadden	.144

Table A12.1.5 Likelihood ratio tests

Likelihood ratio tests						
	Model-fitting Criteria			Likelihood Ratio Tests		
Effect	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Squared	df	Sig.
Intercept	2517.240	2656.583	2463.240	62.326	3	.000
Profitability	2463.721	2603.064	2409.721	8.807	3	.032
Size	2536.543	2675.886	2482.543	81.629	3	.000
Cash flow	2502.584	2641.927	2448.584	47.670	3	.000
Growth opportunities	2558.606	2697.949	2504.606	103.692	3	.000
Volatility	2535.143	2674.486	2481.143	80.229	3	.000
Liquidity	2464.915	2604.258	2410.915	10.001	3	.019
Working capital	2488.581	2627.923	2434.581	33.667	3	.000
Quick ratio	2455.689	2595.032	2401.689	.776	3	.855
Debt-to-equity ratio	2460.037	2599.380	2406.037	5.124	3	.163

The chi-squared statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

Appendix 13: Leverage factor and company-specific variables as predictors of choice between distribution strategies

Table A13. 1: Leverage factor and company-specific variables as predictors of choice between distribution strategies

Table A5.3 presents the multinomial logistic regression parameter estimates of the choice between distribution strategies and the leverage factor

Distribution Strategies[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	95% Confidence Interval for Exp(B) Upper Bound
Dividend payments	Intercept	8.263	1.773	21.712	1	.000			
	Profitability	.024	.011	4.547	1	.033	1.024	1.002	1.046
	Size	-.810	.216	14.038	1	.000	.445	.291	.679
	Cash flow	.979	1.683	.338	1	.561	2.662	.098	72.086
	Growth opportunities	.000	.006	.001	1	.973	1.000	.988	1.012
	Volatility	-.005	.008	.433	1	.511	.995	.979	1.011
	Liquidity	.214	.167	1.644	1	.200	1.238	.893	1.717
	Working capital	-1.618	1.144	2.001	1	.157	.198	.021	1.866
	Quick ratio	-.075	.238	.099	1	.753	.928	.581	1.481
	Leverage factor	.010	.013	.558	1	.455	1.010	.984	1.037
Both (dividend payments and share repurchases)	Intercept	3.045	1.839	2.740	1	.098			
	Profitability	.026	.012	5.031	1	.025	1.026	1.003	1.050
	Size	-.106	.225	.223	1	.636	.899	.579	1.396
	Cash flow	3.438	1.738	3.915	1	.048	31.132	1.033	938.342
	Growth opportunities	-.006	.006	.809	1	.368	.994	.983	1.007
	Volatility	-.019	.009	4.681	1	.030	.981	.964	.998
	Liquidity	-.044	.179	.060	1	.807	.957	.674	1.360
	Working capital	-.010	1.198	.000	1	.993	.990	.095	10.355
	Quick ratio	-.154	.255	.367	1	.545	.857	.520	1.412
	Leverage factor	.009	.014	.356	1	.550	1.009	.981	1.037
None (neither the dividend payments nor share repurchases)	Intercept	8.485	1.858	20.862	1	.000			
	Profitability	.010	.011	.879	1	.348	1.011	.989	1.033
	Size	-1.118	.229	23.835	1	.000	.327	.209	.512
	Cash flow	-3.150	1.769	3.170	1	.075	.043	.001	1.374
	Growth opportunities	.011	.006	3.508	1	.061	1.011	.999	1.023
	Volatility	.019	.008	4.790	1	.029	1.019	1.002	1.036
	Liquidity	.232	.172	1.811	1	.178	1.261	.900	1.767
	Working capital	-3.923	1.227	10.225	1	.001	.020	.002	.219
	Quick ratio	-.011	.266	.002	1	.966	.989	.587	1.665
	Leverage factor	.006	.014	.184	1	.668	1.006	.979	1.033

a. The reference category is share repurchases.

Table A13. 1.1 Case-processing summary

Case-processing summary			
		N	Marginal Percentage
Payout2	1.00	717	55.7%
	2.00	307	23.8%
	3.00	217	16.8%
	4.00	47	3.6%
Valid		1288	100.0%
Missing		4	
Total		1292	
Subpopulation		1288[a]	

a. The dependent variable has only one value observed in 1288 (100.0%) subpopulations.

Table A13. 1.2 Model-fitting information

Model-fitting information						
	Model-Fitting Criteria			Likelihood Ratio Tests		
Model	AIC	BIC	-2 Log Likelihood	Chi-Squared	df	Sig.
Intercept only	2810.606	2826.089	2804.606			
Final	2464.821	2619.646	2404.821	399.785	27	.000

Table A13. 1.3 Goodness-of-fit

Goodness-of-fit			
	Chi-Squared	df	Sig.
Pearson	4705.944	3834	.000
Deviance	2404.821	3834	1.000

Table A13. 1.4 Pseudo-R-squared

Pseudo-R-squared	
Cox and Snell	.268
Nagelkerke	.302
McFadden	.143

Table A13. 1.5 Likelihood ratio tests

Likelihood ratio tests						
	Model-Fitting Criteria			Likelihood Ratio Tests		
Effect	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-Squared	df	Sig.
Intercept	2520.332	2659.675	2466.332	61.511	3	.000
Profitability	2467.982	2607.325	2413.982	9.161	3	.027
Size	2539.213	2678.556	2485.213	80.392	3	.000
Cash flow	2506.087	2645.430	2452.087	47.266	3	.000
Growth opportunities	2562.150	2701.493	2508.150	103.329	3	.000
Volatility	2538.145	2677.488	2484.145	79.324	3	.000
Liquidity	2471.107	2610.450	2417.107	12.286	3	.006
Working capital	2492.897	2632.240	2438.897	34.076	3	.000
Quick ratio	2459.606	2598.949	2405.606	.785	3	.853
Leverage factor	2460.037	2599.380	2406.037	1.216	3	.749

The chi-squared statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

Appendix 14: List of companies included in the sample listed on the JSE

Table A.14.1: List of companies included in the sample listed on the Johannesburg Stock Exchange

Number of cross sections:68				
C_ID	Company		C_ID	Company
1	Aeci Limited		40	Grindrod Ltd
2	African Oxygen Limited		41	Group Five Ltd
3	African Rainbow Min Ltd		42	Hudaco Industries Ltd
4	Anglo American Plat Ltd		43	Imperial Logistics Ltd
5	Anglo American Plc		44	Invicta Holdings Ltd
6	Anglogold Ashanti Ltd		45	Italtile Ltd
7	Arcelormittal Sa Limited		46	Labat Africa Ltd
8	Assore Ltd		47	Metair Investments Ltd
9	Delta Emd Ltd		48	Mr Price Group Ltd
10	Drd Gold Ltd		49	Murray & Roberts Hldgs
11	Harmony Gm Co Ltd		50	Nampak Ltd
12	Hwange Colliery Ltd		51	Nictus Ltd
13	Impala Platinum Hlgs Ltd		52	Nu-World Hldgs Ltd
14	Lonmin Plc		53	Oceana Group Ltd
15	Merafe Resources Ltd		54	Pick N Pay Stores Ltd
16	Northam Platinum Ltd		55	Ppc Limited
17	Omnia Holdings Ltd		56	Rcl Foods Limited
18	Sappi Ltd		57	Reunert Ltd
19	Sasol Limited		58	Rex Trueform Group Ltd
20	Spanjaard Limited		59	Shoprite Holdings Ltd
21	Trans Hex Group Ltd		60	Sun International Ltd
22	York Timber Holdings Ltd		61	Super Group Ltd
23	Adcorp Holdings Limited		63	Tiger Brands Ltd
24	African & Over Ent Ltd		64	Tongaat Hulett Ltd
25	Avi Ltd		65	Transpaco Ltd
26	Barloworld Ltd		66	Trencor Ltd
27	Basil Read Holdings Ltd		67	Tsogo Sun Holdings Ltd
28	Bidvest Ltd		68	Wilson Bayly Hlm-Ovc Ltd
29	Bowler Metcalf Ltd			
30	Cafca Limited			
31	Cashbuild Ltd			
32	Caxton Ctp Publish Print			
33	City Lodge Hotels Ltd			
34	Clicks Group Ltd			
35	Combined Motor Hldgs Ltd			

36	Compagnie Fin Richemont			
37	Crookes Brothers Ltd			
38	E Media Holdings Ltd			
39	Elb Group Ltd			