SCHOOL OF ACCOUNTING, ECONOMICS AND FINANCE

Value relevance of financial statements of non-financial firms listed on the Johannesburg Stock Exchange

ATANAS SIXPENCE

Student Number: 217071595

Dissertation presented in fulfilment of the requirements for the degree of

Doctor of Philosophy

Supervisor: DR. OLUFEMI PATRICK ADEYEYE

Co-Supervisor: PROFESSOR RAJENDRA RAJARAM

JANUARY 2020

SUPERVISORS' DECLARATION

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

School of Accounting, Economics and Finance

Supervisors Permission to Submit Thesis/ Dissertation for Examination

Name: Atanas Sixpence	No: 217071595	
Title: Mr.		
Qualification: Doctor of Philosophy	School: Accounting, Economics and Finance	
	Yes	No
To the best of my knowledge, the thesis/dissertation is primarily the student's own work and the student has acknowledged all reference sources	✓	
The English language is of a suitable standard for examination without going for professional editing	✓	
Turnitin Report %*	9%	
Comment if % is over 10%:		
I agree to the submission of this thesis/dissertation for Examination	✓	
Supervisor's Name: Dr. Adeyeye, Olufemi Patrick		
Supervisor's Signature:		
Date: 28 January 2020		
Co- Supervisor's Name: Professor Raj Rajaram		
Co- Supervisor's Signature		
Date: 28 January 2020		

* The submission of a Turnitin or equivalent Report is compulsory

DECLARATION

I, Atanas Sixpence, declare that:

i. The research reported in this dissertation, except where otherwise indicated, is my original research.

ii. This dissertation has not been submitted for any degree or examination at any other university.

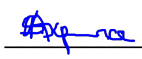
iii. This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

iv. This dissertation does not contain other person's writing, unless specifically acknowledged as being sourced from other researchers. Where other sources have been quoted, then:

   a) their words have been re-written but the general information attributed to them has been referenced; and,

   b) where their exact words have been used, their writing has been placed inside quotation marks, and referenced.

v. This dissertation does not contain text, graphics or tables copied and pasted from the internet, unless specifically acknowledged, and the source being detailed in the thesis and in the references section.



Atanas Sixpence

ACKNOWLEDGEMENTS

I am very grateful to the following:

1. The Almighty for His grace that has enabled me to get this far in this academic endeavour.
2. Tatenda, my caring and loving wife, and my children Tanya Skye, Merghan Tinevimbo and Chloe Ruvimbo. Thank you for your support, without you it would have been virtually impossible to complete my studies. I greatly appreciate your patience because I know I devoted more time to my studies than to you guys and you never complained about it; you actually encouraged me.
3. My supervisors, Dr. Olufemi Patrick Adeyeye and Prof. Rajendra Rajaram. When I started this project, I was very raw in terms of research, but you taught me very valuable lessons on how to conduct academic research. When it seemed all doom and gloom, especially after my proposal presentation, you were there to encourage and show me the way. I also appreciate the constructive criticism you gave me because it helped me in evaluating myself and spurred me to work harder. Without your wisdom, guidance and astuteness, I was definitely not going to complete this project. I will forever be grateful for the valuable time you spared to assist me to achieve my goal. Thank you very much.
4. Kajal Ramnanun, my fellow PhD candidate in the School of Accounting, Economics and Finance for her assistance in printing and submitting this thesis to the College office. She bore all the associated costs. Thank you so much.
5. Mrs. Seshni Naidoo, UKZN Westville Campus Higher Degrees and Research Administrator in the School of Accounting, Economics and Finance. She was my contact person on all administrative issues and I appreciate her patience and help. Thank you for continuing to assist even when, at times, I was a bother, you went beyond the call of duty to assist me.
6. My colleagues in the Department of Finance, National University of Science and Technology, Bulawayo, Zimbabwe. They helped me with ideas and encouraged me to soldier on throughout this difficult journey.
7. The University of KwaZulu-Natal for paying my tuition fees through fees remission. Without this support, it was going to be very difficult to raise the tuition fees.

ABSTRACT

The year 2010 marks a full calendar year after the 2007-2009 global financial crisis (GFC). The GFC was characterised by huge losses across all equity indices on the Johannesburg Stock Exchange (JSE). The losses were not entirely commensurate with the operating performance of listed companies, as reported in their financial statements. While general negative sentiment associated with the GFC was a major driver of the mismatch between firm performance and share price movements on the JSE during the GFC, continued mismatches witnessed in the post-crisis period (2010-2017) raise questions regarding the usefulness of financial statements in explaining share price movements. This research examines value relevance of tangible book value, EBIT from continuing operations, firm size, financial risk, cash dividends, and retained earnings, using a dynamic panel dataset. The population comprises of all non-financial firms listed on the JSE that were active for the entire 2010 to 2017 study period, excluding new listings and de-listings during the period. Purposive sampling from all eligible industry sectors of the JSE was used, where the number selected from each industry was based on the total number of eligible firms in that industry, the population size and the sample size. Based on a population size of 200 firms, 50 were sampled for this research. Value relevance was determined by statistical significance of each financial statement variable, where lack of statistical significance means a variable is not value relevant. Two-step System Generalised Method of Moments (System GMM) was used in this study's regressions. The dependent variables are firm value and share prices, where firm value is measured by market capitalisation, enterprise value and Tobin's Q. EBIT was found to be value relevant regardless of the measure of firm value used while, on the other hand, book value is not value relevant. Firm size was found to have no significant effect on share price movements. Influence of a small firm's discount on share prices of small companies is one of the original contributions of this study. Total debt and debt/equity ratio are the two measures of financial risk used and the debt ratio was found to be value relevant regardless of a firm's risk category. Value relevance of total debt is contingent upon a firm's risk category, leading to a high debt illusion, which is another original contribution of this study. Cash dividends and retained earnings were found to have no impact on firm value, which was measured by market capitalisation and Tobin's Q. Findings in this study inform the decisions of company executives, equity investors, investment analysts, accounting standards setters, and other policy makers.

TABLE OF CONTENTS

CHAPTER FOUR: RESEARCH METHODOLOGY

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

1.0 Introduction

"One of the major objectives in financial reporting is to provide equity investors with information relevant for estimating company value. Value relevance research empirically analyses whether this goal is met" Beisland (2009, p.7). This quotation aptly summarises what the current study is all about. Value relevance focuses on financial statement information's usefulness in explaining firm value or share price movements. Stated differently, value relevance concerns the importance of accounting numbers in ascertaining firm value. This study centres on the association between various firm value measures and the following financial statement items: earnings before interest and taxes (EBIT) from continuing operations, tangible book values, relative financial risk (debt ratios), absolute financial risk (total amount of debt), cash dividends, and retained earnings.

This chapter starts off by giving a background of the study, which will be followed by an account of the financial reporting environment obtaining in South Africa. A motivation of the study is explained before a statement of the research problem is provided. Objectives and research questions closely follow the problem statement. Significance of the study, its scope (theoretical and time) as well as its assumptions are the subject of the next three sections after the research questions. An outline of the thesis and a chapter summary are the last two issues covered in this chapter.

1.1 Background of the Study

Since Ball & Brown's (1968) ground-breaking work, value relevance research continues to be of interest to many researchers, as they seek to get more insights into the usefulness of accounting data in valuing firms. Ball & Brown (1968) showed that accounting figures have a relationship with stock price movements. They concluded that, although the information in financial statements is not very timely in nature, the content is considerable given that a firm's bottom-line contains much information about a firm for that particular period. This laid the foundation for value relevance research from that time up to the present moment. Kothari (2001), Beisland (2009) and Baltariu (2015) give a detailed

account of literature on value relevance over the years. According to these authors' reviews, most research on value relevance from the year 2000 primarily focused on earnings and book values. This is mainly because of the influence of the Ohlson model of 1995, which has these two variables as determinants of firm value. The current study examines value relevance of various financial statement variables on firms listed on the Johannesburg Stock Exchange (JSE).

The JSE, the largest stock market in Africa and ranked within the top 20 in the world by market capitalisation, was founded in 1887 ostensibly during the period when South Africa witnessed its first gold rush. It has grown over the years and at the end of 2017, there were 377 listed companies with a total equity capitalisation of US$1248.90Bn (ASEA 2017 Annual Report). Listed companies have to comply with reporting requirements, among them producing integrated financial reports and publishing their audited financial statements within three months of their financial year end. Equity performance on the JSE is measured by a number of indices like the FTSE/JSE Indices: All-share, Top 40, Mid Cap and Small Cap. The JSE recorded one of its worst performances in the year 2008 when all the four indices recorded losses, the largest being recorded in the Small Cap Index (-31.2%) and the best being the Mid Cap Index (-18.7%). The poor performance is attributed to the fact that the year 2008 marked the peak of the global financial crisis (GFC) that started in late 2007 and ended in 2009[1]. During the GFC, JSE-listed firms that have operations predominantly in South Africa performed well, which is in stark contrast to the poor performance of shares on the JSE. After the GFC, performance of the All-share Index has been in large part not in line with firm performance, as measured by growth in earnings, book values, cash dividends and retained earnings, among other measures of performance. This is not an isolated case of disconnection between share prices and firm performance, as shown by empirical research (Bolton & von Boetticher, 2015). Some researchers have questioned value relevance of accounting data mainly based on a new global trend of knowledge-based economies (especially in the developed world), availability of timely sources of firm performance information as well as the prevalence of non-recurring items in financial statements (Lev & Gu, 2016: Balachandran and Mohanram, 2011 in Davern *et al*, 2019). The scepticism by some scholars, as explained in Section 1.3, helped motivate this study.

[1] This GFC timeline is according to the US National Bureau of Economic Research's report found at https://www.nber.org/cycles/sept2010.html

The GFC of 2007 to 2009 caused investors to incur losses even if they had investments in firms that were reporting splendid financial results. This occurrence, coupled with the views of the school of thought that has grown sceptical of the usefulness of financial statements, presents a real challenge to investors who are dependent on financial statements (annual or half-year) for their investment decision making. It is not uncommon for investors to lose faith in the usefulness of financial statements on the backdrop of their losses during the GFC. Regardless of the scepticism, however, a lot of research, as documented by Kothari (2001), Beisland (2009) and Baltariu (2015), has shown that although financial statements are historical, they contain some useful information for equity valuation. Such conflicting views and findings point to the need for more research in order to help build a body of evidence that can assist investors in firm valuation. This is what this research aims to do on the JSE.

1.2 Financial Reporting Environment in South Africa

Accounting systems in South Africa over the years have largely been under the influence of the British accounting system because of the colonial links between Britain and South Africa (Oberholster, 1999). However, since South Africa's attainment of independence in 1994, there have been some notable changes to the financial reporting landscape. Significantly, a Companies Act was enacted in 2008 and came into force in 2011. The Companies Act governs the conduct of all registered companies in South Africa. The financial reporting environment in South Africa is governed by a myriad of statutes, where applicable statutes depend on the nature of the company and its public interest score. Nature of the company here is defined in terms of whether a company is public or private, state owned enterprise, small and medium scale enterprise (SME), non-profit organisation, bank, and non-bank financial institution, among other categories of companies. A public interest score is calculated based on a company's number of shareholders, number of workers, turnover and third-party liabilities. Scores are allocated to each of these categories based on a predetermined scoring system and an overall score is then determined. At the apex of the various pieces of legislation is the Companies Act of 2008 and all other statutes are subservient to it. Further to the Companies Act, there are statutes that govern financial reporting: for listed companies (the JSE Listing Requirements and the Financial Markets Act of 2012), for banking institutions (the Banks Act of 1990), for non-banking financial institutions (Financial Services Board Act),

among other legislative pieces. The Accounting Standards Board (ASB) regulates financial reporting activities of all companies operating in South Africa.

Listed companies[2] are mandated under the Companies Act to ensure their financial reports are in conformity with International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB). IFRS was adopted in 2005 and this has influenced value relevance of most balance sheet components (Ames, 2013). SMEs have the latitude to either adopt full IFRS or use IFRS for SMEs (Schutte & Buys, 2011). The JSE Listing Requirements also mandate companies listed on the JSE to prepare their books of accounts according to the dictates of IFRS. Financial statements must, inter alia, consist of a profit and loss account, statement of comprehensive income, statement of financial position, statement of changes in equity and a cash flow statement. Companies are also obliged to produce an interim report as well as a full year report for each trading year. The full year results must be reported within three months of a firm's financial year end.

Financial statements for all JSE listed companies must be audited by external auditors. According to the 2005 Auditing Profession Act, only registered auditors are allowed to perform these audits. For categories of companies like private companies and state-owned entities, there are classifications of public interest scores that stipulate whether a company's accounts are to be audited or simply reviewed by a registered auditor[3]. Furthermore, whether financial statements are internally prepared or prepared by an independent organisation plays a part in whether the firm's accounts must be audited by an external auditor or simply reviewed by such. The requirement that financial statements must be audited by an external auditor for all firms listed on the JSE is a necessary safeguard against manipulation of financial statements by listed firms. Failure to comply with this requirement may result in a company being suspended from trading or even delisted from the JSE. While this sanctioning mechanism may not totally eliminate cases

[2] The thrust in this Section is mainly on listed companies because this study makes use of companies listed on the Johannesburg Stock Exchange.

[3] A company with a public interest score of 350 and above must be audited by a registered auditor. For a public interest score within the 100 to 349 range, a company that internally generates its financial accounts must also be audited by a registered auditor. However, for companies whose financial accounts are prepared and reported by an external independent party but fall within the 100 to 349 public interest score range, their accounts are not legally obliged to be audited. They simply have to be reviewed by an independent reviewer. Independent reviewers must be registered auditors. For public interest scores below 100, financial accounts just have to be reviewed. Among allowed reviewers are chartered accountants, registered auditors, and an accounting officer (whose definition is in terms of the Close Corporation Act).

of financial statement manipulation, it certainly reduces the chances of that happening. This is a necessary and sufficient guarantee that enables this study to use financial statements of firms listed on the JSE.

1.3 Motivation

The usefulness of financial statement variables in explaining the value of a firm is an integral component in successful equity investment decision making. If investment analysts and equity investors have knowledge about which financial statement variables explain the movement in share prices, then they will be able to focus only on those particular variables in equity valuation. Rummaging through extant literature on value relevance[4], an inescapable feature that one is confronted with is the conflicting nature of findings concerning which variables are value relevant and which ones are not. Just as an example, while some scholars say book value of equity is value relevant (Mirza, Malik & Abdul-Hamid, 2018; Zulu, De Klerk & Oberholster, 2017), others say it is not value relevant (Lev & Gu, 2016; Omokhudu & Ibadin, 2015). Similarly, contradictions are also found in theories that deal with how accounting data relates to firm value. A case in point is the contradiction between Miller & Modigliani's (1961) dividend irrelevance theory vs. the bird-in-the-hand (Gordon, 1959; Lintner, 1962) and dividend signalling theory (Ross, 1977). If an investment analyst wants to go by the empirical findings in extant literature or the theories, such contradictory findings will leave the analyst even confused. The analyst will be left with questions as to which scholar is correct and which one is wrong. These contradictory empirical findings and theories provided motivation to undertake this research in order to contribute in this area of study.

Further to these controversies, another source of motivation came from observing the research methods adopted by empiricists. The bulk of value relevance studies after the year 1995 make use of the Ohlson model to examine the information content of book value and abnormal earnings. Invariably, researchers use Ordinary Least Squares (OLS) estimators in their studies. A few years ago, the proprietor of the Ohlson model raised reservations about the use of OLS estimators in assessing value relevance of financial statement variables (Ohlson & Kim, 2015). Considering the dominant use of OLS

[4] Literature review papers by Baltariu (2015), Beisland (2009), and Kothari (2001) are just some of the sources of literature that can be utilised in this regard for a quick glimpse of the literature in question if one cannot go through the myriad research papers in this field.

estimators in value relevance studies, Ohlson & Kim (2015) provided a motivation to do this study using alternative and more robust estimators. Still on research methods, researchers predominantly use static models. In this regard, motivation was provided by arguments in Clout & Willet (2016) as well as Alexander, Falta & Willett (2012) to the effect that the association that obtains between the value of a firm and accounting variables is better modelled using dynamic models, specifically autoregressive distributed lag models. The current study therefore sought to use this evidence and adopt methods that are different[5] from the common ones so as to have robust and reliable results that can be useful to investment analysts and equity investors.

1.4 Problem Statement

The value of a firm to an investor is contingent upon the amount of relevant information on the activities of that particular firm that the investor is able to get. Financial statements are the key sources of information for these investors. During the global financial crisis of 2007 to 2009, the JSE All-share Index had a return of -23.20% in 2008. On the other hand, financial statement variables like EBIT from continuing operations and book values had positive growth for most firms in the JSE All-share Index. Whilst the discord between share prices and financial statement variables may be understood due to the negative sentiment associated with the global financial crisis, the trend continued after the crisis period. In the year 2011, the All-share Index had a return of a mere 2.6% and in the year 2016; it recorded another 2.6% annual return[6]. In both years, EBIT from continuing operations and book values recorded good positive growth for the majority of firms in the All-share Index. During the other years between 2010 and 2017, the performance of the All-share Index and firm performance were not moving in tandem. This shows a disconnection between the source of firm performance information (financial statements) and the outcome variable (share prices/ firm value). Ideally, we anticipate a positive association between firm performance indicators and equity prices/ firm value (Beisland, 2009), which is not the case in these years. The problem is that share prices are falling (and stock market investors are incurring losses on their investments), but firms would have reported a profit in their financial statements, which raises a question about the usefulness of financial statement variables in explaining share price movements. Are the

[5] The motivation is not simply about using a different method, but it is based on the author's conviction about the correctness of evidence provided by the scholars cited.
[6] These performance figures are based on the respective years' FTSE Russell Factsheets.

losses incurred by investors a result of markets being over- or under-priced, or is it because information in financial statements is no longer relevant in explaining share price movements? On a broader scale, the usefulness of financial statements in the modern era has been questioned (Balachandran & Mohanram, 2011 and Lev & Gu, 2016). On the other hand, Beisland (2009) and Baltariu (2015) review empirical studies that show that financial statements are value relevant in other markets. These conflicting findings point to the need for more research in this area.

1.5 Aim and Objectives

1.5.1 Aim

The aim of the study is to investigate value relevance of financial statement variables (e.g. tangible book value, firm size, financial risk) of JSE-listed firms.

1.5.2 Objectives

The objectives of the study are:

i. To determine the relationship between both firm value and tangible book values and EBIT from continuing operations.
ii. To ascertain the relationship between firm size and share price movements.
iii. To assess the association between financial risk and share prices.
iv. To measure the association between firm value and both cash dividend payments and retained earnings.

1.6 Research Questions

The broad research question is: To what extent are financial statements of JSE-listed firms' value relevant?

The specific research questions are as follows:

i. To what extent are tangible book values and EBIT from continuing operations useful in explaining value of JSE-listed firms?
ii. What is the influence of firm size on the value relevance of both tangible book values and EBIT from continuing operations?
iii. What is the relationship between financial risk and share price of JSE-listed firms?
iv. What is the relationship between value of JSE-listed firms and both cash dividends and retained earnings?

1.7 Significance of the Study

Value relevance studies have significance to stock market investors and analysts for a variety of reasons. Firstly, they need to know if financial reporting is providing them with information necessary for firm valuation. Secondly, it guides equity analysts on which financial statement information to focus on in equity valuation as they will only focus on those value-relevant variables. This helps them save on time as well as make correct valuations, which in turn, helps them achieve superior returns on their investments. Value relevance research also helps equity analysts in deciding which valuation model to use. Valuation models that incorporate financial statement items that are value relevant are most likely to perform better than those models built on items that are not value relevant. Investment analysts can thus benefit from this research. The investigation will also augment the scant literature on this area of study in South Africa, thus benefiting future researchers as a point of reference.

Regulators and accounting standards setters can also benefit from this research's findings. The level of value relevance can be an indicator of how useful financial statements are to users. Very low levels of value relevance should be a cause for concern to policy makers because this implies that financial statements may not be serving one of their purposes. Policies can then be guided by the desire to have value relevant financial statements, meaning that, such a research may also be useful to accounting standards setters and other policy makers in South Africa, like the Accounting Standards Board and the Johannesburg Stock Exchange.

Findings of this study are also of importance to company executives. For instance, findings on the information content of dividends and retained earnings help company executives to know the impact of their dividend pay-out policies on firm value and any impact of possible changes in dividend polices. Similarly, findings regarding value relevance of debt financing helps firm executives to be aware of their capital structure decisions' effect on firm value. Armed with this knowledge, company managers can then make appropriate decisions that lead to desired outcomes.

1.8 Scope of the Study

Theoretical Scope: As defined in the background of the study, value relevance studies are concerned about the usefulness of financial statement variables in explaining firm

value or share prices of listed companies. This definition sets the theoretical boundaries of this study, i.e. it is only concerned about financial statement variables. It has to be acknowledged that the movement in share prices can be driven by factors other than financial statement variables; general macroeconomic fundamentals like inflation, interest rates and economic growth being some of the factors. These are not considered in this study. The current study only focuses on accounting variables and these variables are tangible book value, earnings before interest and taxes from continuing operations, debt ratio, total amount of debt, cash dividends and retained income. The study analyses the effect of these variables on company value as measured by share prices, market capitalisation, enterprise value and Tobin's Q ratio.

Geographical Scope: The study focuses on companies in South Africa, specifically those listed on the Johannesburg Stock Exchange. There are so many companies that are operating in South Africa. However, focus is only on those companies that are quoted on the JSE. This is because listed companies' financial statements are publicly available as opposed to those of private companies. Furthermore, the stock exchange provides a transparent and freely accessible way of determining the value of a particular company (price discovery process is objective). For these reasons, unlisted companies operating in South Africa are not considered in this study.

Time Scope: The study focuses on the period immediately after the global financial crisis (2010) up to 2017. Justification on the use of this period is given both in the problem statement as well as in Chapter 4, Section 4.7.

1.9 Assumptions

The study entirely makes use of secondary data (financial statements and share prices) that is publicly available. A generic assumption emanating from the use of such secondary data is that published financial statements are prepared according to the appropriate financial reporting standards and governing statutes in South Africa. It is further assumed that companies do not engage in falsification of their financial performance through creative accounting practices. Alternatively, if they do so, an assumption is made to the effect that such manipulation is picked up by the auditors who will then qualify the concerned company's financial statements. Consequently, companies with qualified financial statements (due to creative accounting) were not considered to be part of this

study's sample. Share prices are also assumed to be free from falsification and errors in capturing them. Further to these generic assumptions about the data used, there are specific assumptions about relationships between various variables used in regression models. These assumptions are stated in each and every chapter that addresses the research objectives (i.e. Chapter 5 to Chapter 8). Also, ontological, epistemological and axiological assumptions are left for discussion in Chapter 4, Section 4.2.

1.10 Structure of Thesis

The thesis is organised according to the outline below.

Chapter 1 Introduction

This chapter introduces the study and provides the background issues, covering a discussion of South Africa's financial reporting environment, the problem that is under investigation, the motivation, objectives and research questions. The scope and significance of the study are also covered in this chapter.

Chapter 2 Related Literature

Chapter 2 reviews literature in the value relevance arena, which chronicles value relevance research from the early works to the current state of affairs. Literature is organised in line with the four objectives of the study.

Chapter 3 Theoretical and Conceptual Framework

Theoretical framework is covered in this chapter, which provides a link between literature and the research methodology. The conceptual framework is also provided, forming the basis upon which the models in Chapter 4 are developed.

Chapter 4 Research Methodology

Chapter 4 provides and justifies the models and methods used in this study. It gives the functional form of the models as well as the specific models for each and every objective. Variables in all the models are stated and justified. Data issues, population and sampling method are explained in this chapter, together with the design of the study.

Chapter 5 Data Analysis: The Nexus between Firm Value and Book Value & EBIT

This chapter focuses on the main objective, which is based on an adapted dynamic version of the Ohlson model. Focus is on how tangible book value and earnings before interest and taxes from continuing operations influence three firm value variants (enterprise value, market capitalisation and share price). Various models are used to achieve the main objective, which includes exploring value relevance on a per-share basis.

Chapter 6 Data Analysis: Impact of Firm Size on Value Relevance of EBIT and Book Values

Chapter 6 extends work done in the preceding chapter, where the emphasis now is on finding out if the size of a company has any impact on value relevance of variables used in Chapter 5. It makes use of dummy variables and interaction variables.

Chapter 7 Data Analysis: Value Relevance of Financial Risk

Financial risk is an integral component in any investment setting. In this chapter, the focus is on whether or not the debt ratio and total amount of debt have a connection with share price movements.

Chapter 8 Data Analysis: Value Relevance of Cash Dividends and Retained Earnings

The focus of this chapter is the presentation and analysis of empirical findings on the information content of cash dividends and retained earnings in explaining movements in firm value, motivated by the apparent contradiction between the dividend irrelevance theory and dividend signalling theory, as well as discord in empirical findings.

Chapter 9 Conclusions, Limitations and Further Studies

This chapter gives conclusions in line with the findings of the research on the four objectives of the study. It also covers limitations of the study and proffers suggestions for further research in line with the objectives of the study.

1.11 Chapter Summary

This chapter gave a background and motivation of the study. Apparent differences in theories as well as empirical findings by scholars provided the motivation to undertake

this study. It was also revealed that financial reporting in South Africa follows International Financial Reporting Standards and the governing body is the Accounting Standards Board. The research problem centres on uncovering the reason why, during and after the 2008-09 global financial crisis, there was attenuation of the relationship between share prices and various financial statement variables on the Johannesburg Stock Exchange. The main objective, heavily influenced by the Ohlson model, investigates the effect of tangible book value and EBIT from continuing operations on share prices, enterprise value and market capitalisation. Secondary objectives investigate the relationship between firm value and variables like debt ratio, total amount of debt, retained earnings, and cash dividends. Potential users of findings of this research are company executives, investment analysts, equity investors, policy makers and accounting standards developers. The theoretical scope centres on financial statement variables only and no macroeconomic indicators are incorporated in the regression models used. The period of the study is from the beginning of the year 2010 to the end of 2017. The study assumes that secondary data used for analysis is free from manipulation, especially company financial statements.

The next chapter gives a detailed survey of relevant extant literature in value relevance studies. Relevance of literature is determined by the study's objectives.

CHAPTER TWO

RELATED LITERATURE

2.0 Introduction

Essentially, Chapter 1 launched the study, providing direction as to where the research is headed, via the study's objectives. Chapter 2 takes over through a review of relevant studies that have been done by other researchers. The review is limited to literature that is relevant to the four objectives articulated in Chapter 1. This is meant to provide an appreciation of the state of knowledge, providing the knowledge gap and laying the groundwork for this research to make its own contributions to the body of knowledge. The review compares various scholars' findings in line with the study's objectives. Furthermore, it critically examines both the setting and the findings from various studies. Methodological aspects will also be examined with a view to putting into context what each and every author would have found out. This is because, at times, the results are a function of the methodology used, and if the methodology is not appropriate, the results will not be reliable. This review is however not intended to be prescriptive with regards to the methodology to adopt, but it will simply highlight weaknesses and strengths, if any, of different methodologies. This is intended to make a contribution to the existing knowledge base and inform future studies.

This chapter begins with a survey of extant literature that focuses on why value relevance studies are relevant. This is followed by a survey of literature that addresses how value relevance of variables is interpreted in an empirical setting, after which value relevance literature by the pioneers in this area is reviewed. This provides the context of the evolution of value relevance studies, so that the knowledge gained over the years can be ascertained. After reviewing the ground-breaking work, the chapter then moves on to review studies that were done in the last 10 to 15 years. Kothari (2001) provides a thorough survey of literature from the 1980s and the 1990s, and these studies will generally not form part of this review, except for major ground-breaking studies, e.g. Ohlson (1995), as well as in cases where there has been a dearth in recent studies covering a specific issue. Another review paper by Beisland (2009) provides useful information concerning the state of knowledge in value relevance studies. The current review, as much as possible, endeavours to cover recent studies (except in cases just highlighted above).

This chapter arranges value relevance literature according to the study's objectives. Both empirical and theoretical literature is considered in this review.

2.1 Why Value Relevance Research?

A discussion on the importance of value relevance studies is an issue that few researchers have bothered to engage in. This is so glaring especially within the last 10 to 15 years. Presumably, authors now regard it as a foregone conclusion that there is need for empirical value relevance studies, such that there is no need to devote studies to justify the necessity of value relevance studies. Significant, however, is the fact that authors identify stakeholders to which their studies are relevant when they conclude their studies (Pavone, 2019; Barth, Li & McClure, 2018). Nonetheless, this section reviews the scant studies that have been done to identify relevant stakeholders in this thread of research.

2.1.1 Relevance to Accounting Standards Setters

Holthausen & Watts (2001) studied the importance of value relevance research with specific focus on accounting standards setting, where explicit statements by authors regarding their results' implications to standards setting were used to determine that the study's aim was to contribute to accounting standards setting. This was then followed by a review of these studies' findings and conclusions made on whether or not there is anything in their results that helps in accounting standards setting. The basis upon which Holthausen & Watts (2001) assessed a paper's contribution towards standards setting is clearly stated when they argued that "the potential to draw standard setting inferences from value-relevance papers' results depends on the descriptiveness of the underlying theories of standard setting, accounting and valuation" (p.6). It follows that where these theories have not been fully described, standard setting inferences will not be valid, according to Holthausen & Watts (2001). An evaluation of the aforementioned theories led the authors to conclude that the requisite theories were not described in all value relevance studies they covered. For instance, the authors posit that equity valuation models are constructed from numerous assumptions that are in most cases divorced from the real world, like the assumption that capital markets are efficient. Also, some assumptions lead researchers to use linear models even in cases where the actual relationship is non-linear. This, according to the authors, makes it difficult to infer any standards setting issues from such empirical studies. Holthausen & Watts (2001) also raised some questions of an econometric nature that they alleged to have an effect on

value relevance studies' standards setting influence. Based on the above points, Holthausen & Watts (2001) opined that value relevance research is not of any use to accounting standards setters.

Barth, Beaver & Landsman (2001) provided a rebuttal of Holthausen & Watts (2001)'s conclusion to the effect that value relevance research has no relevance to accounting standards setting. The argument by Barth *et al* (2001) is premised on what the Financial Accounting Standards Board (FASB) stated in its conceptual framework. The framework sets out FASB's objectives with respect to relevance and reliability of accounting statements. Since objectives on how to evaluate accounting numbers are already stated, argues Barth *et al* (2001), the goal of value relevance studies is simply "to operationalize the criteria, and not determine them" (p.4). It is Barth *et al* (2001)'s considered submission that "information can be value relevant but not decision relevant". This is existent where accounting information "is superseded by more timely information." The authors posit that value relevance research is about testing, jointly, both reliability and relevance of accounting numbers. The fact that FASB mentions value relevance studies in its supplements on research can be viewed as evidence that value relevance research has usefulness in the setting of accounting standards. Barth *et al* (2001) argue that Holthausen & Watts (2001) misconstrue the fact that value relevance studies are not a "necessary and sufficient" tool for standards setting to mean that value relevance studies are of no use to accounting standards setters. Since there are other users of accounting data, one cannot expect value relevance studies to be sufficient because there are inputs from these other quarters, which inform accounting standards setting. The fact that value relevance studies are not the only information source for accounting standards setting does not mean it is not useful in that regard. Value relevance studies are not meant to be prescriptive in nature with regards to accounting standards setting. Rather, the purpose of a value relevance study is simply to proffer information that can be used in the process of standards setting. Based on the above arguments, Barth *et al* (2001) concludes that value relevance research has relevance in the formulation of accounting standards. Weighing both sides of the debate, it may be quite naïve to totally dismiss the role that findings from value relevance research studies can play when accounting standards are being set. The fact that accounting standards setters mention value relevance studies in their own studies means that they take into consideration findings from value relevance studies.

Apart from the detailed discussion in Holthausen & Watts (2001), and Barth *et al* (2001) with regards to accounting standards setting, there are also other studies that purport relevance to accounting standards setting. For instance, Jahmani, Cho, Park & Wu (2017) make reference to the FASB in the study's findings, implying that the authors saw relevance of their findings to accounting standards setting. Khanagha (2011) also says the study's findings are useful to accounting standards setters. Findings in the current study can also be useful to accounting standards setters as explained in Chapter 1.

2.1.2 Relevance to Equity Investors

Barth (2000) asserts that accounting acts as a source of information to equity investors, a view that is also shared by Lambert (1996). This role of value relevance research was however questioned by Holthausen & Watts (2001) based on lack of descriptiveness of the underlying theory. Furthermore, they argue that it is not accounting's mandate to supply inputs to equity valuation, citing FASB's explicit statements to the effect that "…financial accounting is not designed to measure directly the value of an enterprise" (p.19). Notwithstanding, that statement also includes a part that says information in financial reports may be used by those intent on business valuation. This is acknowledgement by the FASB that financial statement information is used for equity valuation. Pursuant to this, value relevance research can then play a role in that regard by examining whether or not financial statements, in their current form, are producing any information that is useful in equity valuation. Equity investors were also cited as a stakeholder by Pavone (2019); Amorim, Lima & Murcia (2012); and Khanagha (2011).

The argument by Holthausen & Watts (2001) that accounting is not mandated to supply inputs to equity valuation seems counter-intuitive in that companies exist to maximise shareholder value. A company is only as valuable as the amount of information about its operations that is available in the public domain, and that information is conveyed through financial statements (there are also other means, like analyst briefings and cautionary statements). Equity valuations are necessary to ensure that a listed company's shares are fairly valued, and these valuations make use of financial statement information. In the event that equity valuation uncovers absence of fair valuation, say an undervaluation, new investors will come on board and bid to buy the company's shares, which drives up its share price. Ultimately, the existing shareholders will benefit because their shares will now be worth more. This is another way of maximising shareholder value. In this way,

accounting will have played a role by ensuring that useful and relevant information goes to the market.

2.1.3 Relevance to the Academic Community

Relevance to academic researchers was explicitly cited by Pavone (2019), and Barth, Beaver & Landsman (2001). In this respect, the goal is to extend knowledge frontiers. However, there is no further discussion by authors about the benefits to the academic community that are derived from new knowledge gained. Apparently, when knowledge is in the academic circles, it follows that it will be imparted to students of the profession. These students will either be coming from various business communities, or will join the business fraternity once they complete their studies, either as accounting standards setters, analysts, or business executives (among many other roles). This means that this stakeholder is a feeder to all other stakeholders because of its central role in knowledge impartation.

The academic community is rarely cited as a beneficiary of research findings in this thread. Notably, however, scholars almost always mention the contribution of their studies to the body of knowledge (Der, Polak & Masri, 2016; Clout & Willett, 2016; and Alexander *et al*, 2012). This can be viewed as an implied reference to relevance to the academic community since it is the "custodian" of knowledge. Academic researchers regard non-academic stakeholders as integral because they raise certain issues that would not normally be raised by an academic audience. In this regard, Barth *et al* (2001) gave an example of a research question such as: "are fair values estimates, especially those relating to loans, too noisy to disclose?" (p.14). They argued that academics normally avoid such a normative question due to its demands in an analysis. This shows complementarity between academic and non-academic users of financial statements information.

2.1.4 Relevance to other Users

Besides the interested parties discussed above, Barth *et al* (2001) identifies other stakeholders who have an interest in value relevance research. These include firm executives, regulators, and policy makers. Fundamentally, the authors note that policy implications of a study are typically difficult to draw due to the fact that policy promulgation entails a lot of other factors, like social welfare issues, which are not

considered in a normal value relevance study. The cited regulators include those responsible for financial institutions, such as the Federal Reserve Board, and the Securities and Exchange Commission (both of the USA). In every country, there are equivalents of these regulators, so this relevance is generalizable to other jurisdictions. For instance, Jeroh (2016) specifically recommends the Financial Reporting Council of Nigeria to institute some measures that discourage creative accounting. The recommendations are based on the findings of that particular study, meaning that the regulator was specifically targeted as a user of research findings. The same stakeholders (or part thereof) were also cited by Adenugba, Ige & Kesinro (2016); Cheng & Tzeng (2011); and Alkali, Zuru & Kegudu (2018). Furthermore, Barth *et al* (2001) also identifies stakeholders responsible for preparing financial statements as part of their audience in a previous study by the same authors (i.e. Barth, Beaver & Landsman, 1996). These preparers include bank analysts and managers. Some of the current study's findings are also of relevance to the same stakeholders as explained in the significance of the study in Chapter 1, as well as in the respective chapters that address the study's objectives (Chapters 5 to 8).

Barth *et al* (2001) also notes that a study that is addressed to one audience group often ends up finding relevance to other constituents of the family of financial statement users who were not part of the originally intended audience. As an example, they cite a study by Barth *et al* (1996) whose results were largely meant for the FASB, but in the end, those results also had relevance to those who prepare financial statements. The significance of this point is that, for any research, one has to look beyond what the author specifically states as potential beneficiaries of a study's findings. The audience is usually much wider than the originally intended stakeholder(s). This inter-connectedness of interest in a value relevance study's findings means that one stakeholder's actions often affect other stakeholders, especially those involved in either the preparation of financial statements or those who regulate their preparation. This overlap is also expected in the current study's context.

2.2 Interpretation of Value Relevance

Barth *et al* (2018) defines a variable as being "value relevant if it explains variation in share price" (p.1). This interpretation is in line with Barth *et al* (2001). Beaver (1968) also provides two definitions of "information content", which is what in today's terms is

called “value relevance”. Going by Barth *et al* (2001), the phrase “value relevance” first appears in Amir, Harris & Venuti (1993). Prior to this time, researchers used the term “information content”. The two terms will thus be used interchangeably in the current study. One definition by Beaver (1968) says that accounting data is deemed to have information content if it causes investors to alter their appraisals of future earnings’ probability distributions. Notably, such a change in viewpoints should lead to changes in stocks’ market value (due to the effect on demand and supply of stocks). The second definition is just an extension of the first definition, where in this case, the change in investor expectations must be very large so as to cause a behaviour change by an investor. The behaviour change will be to either buy more shares, or to dispose a portion or even all of the shares they currently own. A commonality of the two definitions is the focus on price adjustments pursuant to new information being availed to the market. Evidently, Beaver’s (1968) definitions pertain to an event study, which shows the then view of how a value relevance study should be structured. Over the years, however, scholars have been determining the usefulness of accounting numbers based on a statistically significant connection between a variable and firm value or share price (Davern *et al*, 2019; Zulu, De Klerk & Oberholster, 2017, and Beisland, 2009). In simple terms, a variable is categorised as being value relevant if it is statistically significant. Variables that lack statistical significance (normally at five per cent level of significance) are deemed not value relevant. Recent studies have not bothered to open the debate on how value relevance should be determined, taking statistical significance as given. Nevertheless, the interpretation of a variable’s information content was also comprehensively addressed in Francis & Schipper (1999).

Francis & Schipper (1999) identified four various interpretations of value relevance. One version is founded on the assertion that accounting data leads equity prices by encapsulating equity prices’ intrinsic values. It is then envisaged that equity prices will drift towards their intrinsic values. “Value relevance would then be measured as the profits generated from implementing accounting-based trading rules” (p.325). The study cites Harris & Ohlson (1990) as one of the studies that makes use of this interpretation. No studies in the recent past were found to have used this interpretation. The challenge with such an interpretation is that the profits are also a function of assumptions made in coming up with the trading rules. These rules are not purely scientific, but are a set of subjective statements that simplify the real world. The level of profits may not be a true

indicator of the information content of a particular variable under investigation. Rather, the profits are "contaminated" by the assumptions that would have been made in the trading rules.

Another interpretation proffered by Francis & Schipper (1999) says that accounting data is deemed to have relevance if it includes variables that are useful in equity valuation models or, alternatively, the data assists in coming up with the variables. To establish value relevance of earnings, say, using the dividend discount model, it will be contingent upon how good predictors of dividends are earnings (i.e. if earnings can be used to predict dividends in the dividend discount model), then, earnings will be deemed value relevant. However, this version of value relevance may not be very appropriate because it makes an implicit assumption that the valuation models in question work perfectly well. Without this implicit assumption, a variable may be deemed not useful in equity valuation simply because of the flaws in the model. A flawed model may cause an otherwise useful variable to lose value relevance.

The third version is based on a statistical relationship between accounting numbers and share prices. Timeliness of accounting information is germane in this interpretation: as information (news) gets to the market, investors accordingly revise their expectations regarding the future. This revision of expectations results in them taking positions in a particular stock. The positions can either be to buy, hold or sell stocks. A decision to either purchase or dispose the stock directly impacts the stock's price. This, therefore, creates a link between the news that comes onto the market and the eventual share price movement. The existence of this link (or lack thereof) is the subject of a value relevance investigation. Event studies mostly use this interpretation. The two definitions of information content put forward by Beaver (1968) have one thing in common with this version, i.e. the observation of market participants' reaction around a particular event. Noteworthy, however, is the difficulty in ascribing a given stock price movement to a particular event if different or unrelated events occur simultaneously. Even without simultaneity of observable events, a given price reaction may be a result of a market correction from previous events, which is then wrongly credited to the current event.

Just like the previous interpretation, the fourth interpretation is also based on a statistical link between accounting data and equity prices. The correlation between equity prices

and information used by investors is viewed as an indicator of value relevance. Timeliness in this case is not an issue, what is simply required is correlation. Regrettably, correlation does not necessarily mean that a specific set of accounting data is used by investors. Rather, it may simply be the case that accounting data is positively correlated with non-accounting data that is used by investors. This argument is nonetheless tricky to sustain in empirical studies because of the difficulty in identifying all the non-accounting data in question and, secondly, attributing the exact effects to each of the non-accounting data in question. Invariably, this is the interpretation adopted by a myriad of scholars, the current study included. While this interpretation obviously has some weaknesses, this is also true with every other interpretation as discussed under each of the other three versions. The best interpretation is thus a function of what a particular study intends to achieve. A discussion on the justification of using this interpretation is engrossed in Chapter 4.

2.3 Value Relevance Research: The Genesis

The famed Ball & Brown's (1968) work laid the groundwork for modern-day value relevance research, where the "…objective was to assess the usefulness of existing accounting income numbers by examining their information content and timeliness" (p.176). Ball & Brown (1968) used two models to accomplish the task, i.e. a regression model with two independent variables (earnings per share and net income) and a "naïve model" with one independent variable, earnings per share. A distinction was made between expected and unexpected earnings, where unexpected earnings were viewed as the driver of share price movements. The study traced the sign of change of stock returns some twelve months prior to announcement of annual results in the annual report using the Abnormal Performance Index (API). The index in month *K* is given by:

$$API_K = \frac{1}{N}\sum_{n=1}^{N}\prod_{k=-11}^{K}(1 + \lambda_{nk}) \quad \ldots(2\text{-}1)$$

In Equation 2-1, *N* represents the number of assets and *K* is the holding period. The API is an equal weighting scheme where a dollar is invested in equal amounts (indicated by *1/N*) in all *N* assets. Stock *n*'s residual of returns in month *k* is represented by λ_{nk}. The focus was only on the sign, and not the size, of the equity returns. Results showed that "the annual income is useful in that if actual income differs from expected income; the market typically has reacted in the same direction" (pp. 169-170). However, the market

anticipated the results some months before the income figures were released, such that there were no notable jumps in share prices around the date of announcing the results. The medium used to convey income figures to the market ahead of the annual report's release (possibly interim reports and dividend announcements) remained an issue for further study, as suggested by Ball & Brown (1968). In the final analysis, the study found that income numbers are useful in determining unexpected stock market returns, but they concluded that the annual reports do not come to the market in a timely fashion. The study is typically an event study, where changes in security prices around the date of release of annual reports will be a testimony of the usefulness of accounting data contained in yearly financial reports. Later on, Brown & Warner (1985) analysed event study methodologies, concluding that daily data presented fewer challenges to event studies.

While Ball & Brown (1968) is arguably the watershed in empirical value relevance research: there are some less-known empirical studies in value relevance of accounting data that pre-date Ball & Brown (1968). One such work is Ashley (1962), which focused on the impact of good news and bad news regarding firms' earnings and dividends. A few years later, Ball & Brown (1968) also focused on earnings (but not dividends). Ashley (1962) divided the study sample into four categories of good news and another four categories of bad news. The good and bad news centred around changes in earnings and dividend announcements. The null hypothesis tested by Ashley (1962) is that "the mean percentage change of stock prices of a sample of companies representing "good" news is not different from the mean of a sample of companies representing "bad" news" (p.82). To accomplish the task, average percentage changes in share prices were calculated for the two samples between a "base date and eight subsequent dates". It was found out that the average percentage changes between good news and bad news samples varied by three standard deviations at the minimum, concluding that equity prices react remarkably to fluctuations in earnings and dividends. Perhaps the most significant conclusion is that share prices "respond to changes in earnings and dividends relatively quickly, but certainly not completely, within the first three or four days after the base date" (p.85). The null hypothesis tested was thus rejected in favour of the alternative, which said that the means of the samples are different. The results are generally in conformity with those from Ball & Brown (1968). If Ashley (1962) can be viewed as naïve in its approach, another empirical study that pre-dates Ball & Brown (1968), but has more rigour and applies regression techniques to establish the effect of accounting data on equity prices,

is Benston (1967). The study analysed the effect of sales and net income on share prices, where all variables were transformed into their natural logarithms. An important point about the share price data used is that monthly share prices were used, and the author admitted, in the conclusion, that "a period of a month is too long for the effect of accounting data on stock prices to be measured. Weekly or even daily stock price data could be substituted for the monthly dependent variable" (p. 28). In this context, the current study uses daily stock prices. Benston (1967) found out that the impact of accounting data on share prices was not very profound considering very low elasticities recorded (although there was some statistical significance of model variables). Notwithstanding, the study's findings conform to those by Ashley (1962).

The pick of the post-Ball & Brown (1968) studies is probably Beaver (1968), which was done almost at the same time with the renowned study by Ball and Brown. The thrust of Beaver (1968) was to investigate "investors' reaction to earnings announcements, as reflected in the volume and price movements of common stocks in the weeks surrounding the announcement date" (p.67). A total of 506 yearly announcements were studied. This shows that, just like Ball & Brown (1968), Beaver (1968) is also an event study. The study period spanned from 1961 to 1965, involving 143 companies listed in the USA. The study reported a connection between the size of unexpected income and equity returns. Specifically, higher stock returns were found in portfolios with the biggest unexpected earnings (both positive and negative). Beaver re-visited the same subject area a few years later. Possibly picking up from Ball & Brown (1968)'s suggestions for further study, Beaver (1974) incorporated not just the sign, but also the size of abnormal earnings in an analysis of the association between accounting data and equity market returns. Apparently, the 1974 study also builds on the 1968 (reviewed above) study by the same author. It was found out that those portfolios that were made up of shares that exhibited very large negative and positive unexpected returns produced higher returns in absolute terms when compared to those portfolios with moderate unexpected returns. Lev & Ohlson (1982) report that Patell (1976) had similar findings to Beaver (1974) using a model that "improved" Ball & Brown (1968)'s "naïve model" by incorporating management's forecasts of earnings. Brown & Kennelly (1972) adopted a methodology similar to that of Ball & Brown (1968), but focused on quarterly earnings' usefulness in explaining share price movements. They employed earnings per share (adjusted for dividends and stock splits), one of the variables used in both sets of models in Ball &

Brown (1968), in their models (naïve and regression models). Brown & Kennelly (1972) adopted an experimental design that attempts to forecast future earnings per share. A comparison was then made between an EPS figure predicted by the model and the actual EPS figure. Portfolios based on different forecasting rules were formulated, followed by a calculation of the abnormal returns. This would then be expressed as an index, and the best forecasting rule is the one that maximises its index. The study found that quarterly models were superior to annual models, suggesting that interim financial statements had more information content than annual statements. Specifically, quarterly reports increased annual income's predictive ability by 30 to 40%. Results from Brown & Kennelly (1972) are largely consistent with those in Ball & Brown (1968).

Gonedes (1973) took a rather different dimension to most empirical studies on the usefulness of accounting numbers in explaining share price movements by focusing on systematic risk. In particular, the study analysed the information content of accounting data in explaining systematic risk. A comparison was made "between the risk-information impounded in security prices and the risk-information in accounting income numbers" (p.428). The measures of risk used are variance and covariance, and the explanatory variables of interest are net income and total assets. Share price relatives, adjusted for dividends, constitute the dependent variable of interest used in the regressions. Gonedes (1973) found a statistically significant link between equity prices and accounting data. The author emphasises that this is obtained through appropriate data transformation which ensured that the models are not mis-specified. In contemporary terms, this means that financial information was found to be value relevant. The results are consistent with Ball & Brown (1968), and all the other studies reviewed so far. Noteworthy, however, is the flagging of some of Ball & Brown (1968)'s findings by Gonedes (1973), potentially for "spurious correlation, a phenomenon that occasionally characterizes results from regression analyses involving ratios" (pp. 436-437).

The diversity of research interests in early studies is also quite evident, and it is demonstrated by studies such as Cassidy (1976). This particular study examined the effect of "accounting procedures" on the information content of financial statements. According to this study, there are earlier studies (Archibald, 1972; Ball, 1972, and Kaplan & Roll, 1972) that also studied the impact of these procedures. The "accounting procedures" in question include changes in depreciation methods and changes in accounting techniques,

like swapping the deferral method when accounting for investment credit for a variety of other choices. In all these studies, the goal was to find out if the market can be deceived by reported profits that are a consequence of some accounting manipulation. While both Ball (1972) and Archibald (1972) found that the market is quite discerning such that it is not deceived by changes in accounting treatments, Kaplan & Roll (1972) found that share prices actually increased around the time manipulated financial results were released. Cassidy (1976) labelled these results "anomalous", and tried to replicate the Kaplan & Roll (1972) study, whose focus was on changes in the treatment of investment credit. Two experimental designs were done, termed Experiment 1 and 2. In the first experiment, results from a sample of firms that took "all current credits into income but continued to defer all past credit" showed abnormal returns when annual results were released (the same as what Kaplan & Roll, 1972 found out), but a reversal of the positive abnormal returns was recorded around two months later. Cassidy (1976) explains that accounting treatment changes are only disclosed in the annual report, such that when the reports were released (around two months later), the market realised the source of reported profits to be accounting manipulation and reacted negatively. The study thus concludes that accounting treatment changes do not deceive the market. This conclusion is consistent with Ball (1972) and Archibald (1972), but conflicts with Kaplan & Roll (1972). Noteworthy, however, is the fact that there are some key differences in how the replication in Experiment 1 was done, e.g. while Kaplan & Roll (1972) used the S & P 500 Index (a weekly index), Cassidy (1976) used the Fisher Index (a monthly index). Another difference is that Cassidy (1976) used a sample size, that is, 100 firms smaller than the study it intended to replicate. The effect of these differences is however downplayed by Cassidy (1976). Despite this assurance by the author, the impact on results of the differences in methodology may be significant. For instance, using two different indices should have an effect on results despite the fact that the author states that the two indices had been highly correlated during previous periods. If there is less than perfect positive correlation (<+1), it means that there is an estimation error. This measurement error then impacts the replicating results.

2.3.1 Methodology Issues in Early Research

Literature from the formative period of value relevance research shows that researchers' interests largely revolved around earnings (Ashley, 1962; Ball & Brown, 1968; Beaver, 1974; and Patell, 1976) save for some studies like Archibald (1972) and Cassidy (1976),

which focused on creative accounting. Invariably, the trend actually continues into the 1980s and the greater part of the 1990s, as documented in reviews by Lev & Ohlson (1982), and Kothari (2001). Ohlson (1995) broke the monotony by introducing book value into the analysis, such that value relevance research started including book value from the late 1990s up to this day. The main objective in the current study also includes book value and earnings, but the exact calculation of the variables in the current research differs from how the majority of the studies in extant literature calculate earnings and book value of equity.

Ball & Brown (1968) basically used equity prices' returns around release dates of annual reports to determine the usefulness of accounting data in determining equity prices. Brown & Kennelly (1972) and other studies reviewed by Lev & Ohlson (1982), like Firth (1976) and Foster (1977), also used the Ball & Brown (1968) methodology in their studies. This is in stark contrast to the contemporary way of determining value relevance, which focuses on statistical significance of variables in a regression model. Notably, a variable is regarded to be value relevant if it is statistically significant, and joint validity of variables is determined based on the explanatory power of the model (mostly R^2 and Adjusted R^2). Noteworthy, however, is the fact that Benston (1967) also analysed statistical significance of variables in his study, way back in the days. Major methodological breakthroughs have been made over the years, and various types of regressions are used, which include time series, cross sectional and panel data models. Replicating a Ball & Brown (1968) study today would involve running a regression and checking the statistical significance of net income and earnings per share. Researchers have generally transitioned away from the Ball & Brown (1968) methodology over the years. Likewise, the current study employs regression analysis techniques (dynamic panel data models) to establish value relevance of various financial statement variables.

Ball & Brown (1968)'s emphasis on equity returns around the announcement dates of annual reports seems to have been kept alive, though in a slightly different way. Researchers now make use of share prices recorded some three months after a firm's financial year end, this being the time when annual financial results are mandated to be released to the market in most jurisdictions. This tally with what Ball & Brown (1968) did, although, in their case, they traced share prices some months before and after announcement date (since it is an event study). In either case, the effect on share prices

of accounting data contained in annual reports will be determined. The current study also uses share prices recorded three months after a firm's financial year end. Further justification of this practice is given in Chapter 4.

Gonedes (1973) raised an important issue concerning empirical research, i.e. how data is handled in a study. The issue is about whether to transform or not to transform a variable. Gonedes (1973) transformed both dependent and independent variables into their natural logarithms, ostensibly to improve the statistical properties of model variables. The author emphasised the significance of appropriate data transformation to ensure that models are not mis-specified. As discussed in Chapter 4 (Section 4.10.3), log transformation of data was examined by Alexander *et al* (2012) as well as Clout and Willett (2016). Both studies argue that log transformation helps to improve statistical properties of models, which is in line with Gonedes (1973). Based on appropriate tests, the current study uses log transformation of data, which is also in line with these three different studies, as justified in Chapter 4.

Early researchers primarily used linear models in analysing the information content of accounting data. Linear models have stood the test of time and are still being used in this era. Based on this review and another review by Lev and Ohlson (1982), no dynamic model was identified in the studies covered. With advances in research methods, dynamic models' use is slowly growing. The current study uses dynamic models for reasons explained in Chapter 4.

2.4 Usefulness of Book Value of Equity and Earnings

Empirical research on value relevance studies that incorporate book value of equity and earnings as independent variables is largely motivated by the Ohlson model of 1995. Davern *et al* (2019) investigated a number of financial statement variables' usefulness in investor decision making in Australia based on a mixed-methods analysis. Both multiple regression models (employing net profit and book value as explanatory variables) and simple regressions (with each of the two variables on their own, plus cash flow, EBIT and EBITDA on their own as well) were used to test combined value relevance as well as value relevance of each variable respectively. The number of issued shares (common equity) was used to deflate the explanatory variables, with equity price as the dependent variable in all cases. The findings revealed that, among other variables, EBIT, EBITDA

and book value have value relevance in Australia. Specifically, the study reported mean Adjusted R-square of 57% (EBITDA), 54% (EBIT), and 52% (net income), suggesting that net income has less value relevance than EBIT and EBITDA. Davern *et al* (2019) refutes findings by other scholars (like Lev & Gu, 2016) to the effect that the joint information content of net income and book value has fallen over the years. The Australian setting is also covered in Clout & Willet (2016), which incorporates American firms in the study sample as well. According to the authors, their motivation for this particular study stems from a call in Ohlson & Kim (2015) for researchers to come up with other novel estimation techniques when using the Ohlson (1995) model in value relevance research. Their contribution in this regard revolves around the use of dynamic models as well as log transformation of data for the model variables. This issue is revisited in Chapter 4 since the current study also uses dynamic models and it log transforms the model variables. Clout & Willett (2016) found out that book value is a sufficient measure of the movements in firm values both in Australia and the USA. Consistent with Clout & Willett (2016), Kwon (2018) found book value as "the most value relevant variable" in South Korea among companies whose "financial and non-financial conditions of issues are poorer than that of normal companies".

Pervan & Bartulovic (2014) studied the usefulness of accounting data for 97 firms listed on five south eastern European stock exchanges. The study covered the period 2005 to 2010 and the main model had earnings and book value as explanatory variables. Joint information content of variables was premised on the level of R^2. The two variables were found to possess value relevance in all the five stock exchanges studied, although there were variations in the coefficients of determination across the five stock exchanges. The findings are consistent with those from Kwon (2018). Furthermore, Pervan & Bartulovic (2014)'s results are also similar to those from a study done on companies quoted on the Amman Security Exchange by Dahmash & Qabajeh (2012). They employed an unbalanced panel regression consisting of 365 observations for the period 2003 to 2008, using the Ohlson valuation framework (but ignoring 'other information' just like most other researchers). Market capitalisation was employed as the dependent variable, with abnormal income and book value being the explanatory variables. Both variables were found to possess information that is valuable in explaining market capitalisation, i.e. they are value relevant.

An emerging market perspective, with evidence that contrasts with Davern *et al* (2019) and Kwon (2018), was provided by Mirza, Malik & Abdul-Hamid (2018) in a study focusing on Malaysian firms. The study employed an adapted Ohlson model, with the main variables being earnings per share and book value per share, while three control variables that include firm size were used. The investigation revealed that earnings are out-rightly not value relevant, but book value has relevance. Another emerging market view of the usefulness of earnings and book values is given by Kumari & Mishra (2018), who concentrated on companies quoted on the Bombay Stock Exchange in India. Remarkably, some studies have indicated that while value relevance has fallen in developed markets, it has actually increased in emerging markets, largely as a result of advances in accounting regulation (Qu & Zhang, 2015). Likewise, the rise in value relevance of earnings and book values in India was attributed to improved regulations in the Indian market by Kumari & Mishra (2018). In an earlier study based on three Ohlson model-type regressions, Khanna (2014) investigated value relevance of Indian firms from April 2006 to March 2011. Entities from the banking, financial, insurance, and central public sectors were left out of the study. Using a Generalised Least Squares random effects model, Khanna (2014) found out that earnings per share (EPS), alongside book value per share, were value relevant in India. In general terms, these results are in conformity with those by Kumari & Mishra (2018), but they conflict with Mirza *et al* (2018) with regards to one variable, i.e. earnings.

Der, Polak & Masri (2016) used a number of simple linear regressions as well as multivariate regressions adapted from the Ohlson model to analyse the usefulness of book values, cash flows and earnings in Singapore. Based on a comparison of Adjusted R-square, pooled regression models revealed that book value's usefulness surpasses that of earnings, with cash flows exhibiting a very weak association with share prices. This largely conforms to Mirza *et al* (2019), but contradicts Kumari & Mishra (2018). Pavone (2019) studied the effect of financial variables on market capitalisation using a dataset of Italian companies for the period 2008 to 2017. Pavone (2019) is one of the few researches that employ market capitalisation as a regressand (which is also used in the current study). The financial variables studied include return on equity, earnings yield, and operating income/turnover per share. While correlation analysis shows some (weak) association between market capitalisation and financial variables, regression analysis proved that not even one of the six explanatory variables possesses statistical significance at 5 per cent

level, meaning that they are not value relevant. Although, market capitalisation is one of the two firm value measures in the current study, there is a marked variation between the predictor variables (tangible book value and EBIT from continuing operations) and those in Pavone (2019). Invariably, researchers use a measure of book value of equity that includes intangible assets, something the current study breaks away from by focusing on tangible book value. More details and justification of this approach are given in Chapter 4.

Contrary to Davern *et al* (2019) and Kumari & Mishra (2018), Almujamed & Alfraih (2019) found out that the usefulness of earnings and book value in Qatar had fallen during the 2012 to 2016 study period. A rather telling rebuttal of financial statement value relevance was given by Lev & Gu (2016), who questioned the usefulness of annual financial statement information in its entirety in the modern era. Their disdain of annual financial statement information is premised on the availability of faster channels of conveying information to the market, such that by the time the annual report is released, all its information will have been incorporated into share prices. Conflicting findings and outright rebuttal provide an impetus for more value relevance research using novel statistical techniques. The current research is part of this drive to uncover empirical realities of the information content of book values and earnings in explaining firm value or equity prices in the emerging market of South Africa.

Zulu *et al* (2017) studied value relevance of half-year and full-year financial statements in South Africa. Based on interim financial statements, book value was found to be value relevant while earnings lacked value relevance. On a comparative basis, interim financial statements were found to be more value relevant than annual financial statements. In another twist to this tale of conflicting findings, Omokhudu & Ibadin (2015) focused on Nigeria Stock Exchange listed firms for the period 1994 to 2013. Their analysis was primarily based on an adapted Ohlson share valuation model, excluding "other information". Using four different methods, Omokhudu & Ibadin (2015) found that earnings, dividends and cash flows have value relevance while book value was found to be statistically insignificant, which conflicts with Mirza *et al* (2018). Just like Omokhudu & Ibadin (2015), Olugbenga & Atanda (2014) also studied Nigeria Stock Exchange listed firms. Using a different dataset of 57 firms, they concluded that earnings, book value, cash flows and dividends were all useful in explaining equity values. In comparison, their

conclusion on book value is different from what Omokhudu & Ibadin (2015) found out. Jeroh (2016) is another study focusing on the Nigerian equity market. Possibly motivated by the Ohlson model, the study investigated the value relevance of book value per share and earnings per share among listed firms for the 2005 to 2014 period. Static regression models were used and they revealed that both variables have a positive and statistically significant association with share price. Notably, however, the Adjusted R^2 is quite low (0.094). The findings are wholly consistent with Olugbenga & Atanda (2014), but partially consistent with Omokhudu & Ibadin (2015). Evidently, there is a diverse range of empirical findings on the same financial statement variables and on the same market. In a majority of cases in general, companies' financial reports are prepared in conformity with the same accounting standards. This spurs further research into this area in order to determine why there are such differences in findings, seeing that the differences do not emanate from the way the accounts are prepared (except for the possibility of creative accounting).

Badu & Appiah (2018) focused on value relevance of book value and earnings in Ghana using models founded on the Ohlson model. They concluded that both earnings and book value are value relevant in Ghana. Specifically, earnings were found to possess more value relevance than book value. In Kenya, Nyabundi (2013) established a significant and positive association between equity prices (dependent variable) and earnings, dividends, and book value for firms quoted on the Nairobi Stock Exchange. Dividends were found to have more explanatory power, whereas, in Nigeria, cash flows were found to have very high explanatory power (Olugbenga & Atanda, 2014). Nyabundi (2013) employed panel data analysis for the period 2005 to 2010 with five share-deflated regression model variables. Ahmadi (2017) studied value relevance of EPS and book value on a sample of firms quoted on the Tunisia Stock Exchange. The sample was drawn from non-financial companies (28), covering the period from 2010 to 2015. The models used were founded on the Ohlson model and the Feltham and Ohlson model (Feltham & Ohlson, 1995). Book values were found to possess more value relevance than EPS. However, the combined value relevance declined when firms had negative earnings (i.e. losses).

2.4.1 Modelling Issues Arising from Literature on Value Relevance of Earnings and Book Value

Most studies reviewed above used the Ohlson model in one form or another. Literature reviews by Baltariu (2015) and Beisland (2009) also show the popularity of Ohlson-type models in value relevance research. Worth noting, however, is that almost all researchers omitted the undefined variable "other information" embedded in the original Ohlson model. Examples of studies that excluded "other information" include Omokhudu & Ibadin (2015); Camodeca, Almici & Brivio (2014); Olugbenga & Atanda (2014); Khanna (2014); Wang, Fu & Luo (2013); and Glezakos *et al* (2012). In line with all these other researchers, this research also excludes "other information" espoused in the Ohlson model. Amongst the major reasons for the exclusion is the fact that the variable is not precisely quantified in the Ohlson model, as well as data challenges regarding potential proxies for "other information". This issue is explained further in Chapter 4.

Value relevance is determined through OLS regression in the majority of cases, where statistical significance of a variable denotes that it is value relevant. An exception to this trend is noted in Khanna (2014) who used GLS. Some studies used panel data (Nyabundi, 2013) while others used pooled regressions (Der, Polak & Masri, 2016). In either case, value relevance is determined through statistical significance of model variables. A rather different methodological approach was adopted by Lee, Lin & Yu (2012). They used a fractional co-integration approach, specifically testing if share prices are co-integrated with book values and residual profit. Confirmation of co-integration and fractional co-integration denotes that the variables are value relevant. The current study determines value relevance through statistical significance of model variables just like the majority of other studies (interpretation number 4 in Francis & Schipper, 1999, reviewed earlier).

Extant literature almost exclusively uses static models. Only a handful of studies in this review employed dynamic models. The current study breaks from this tradition and uses dynamic models, motivated by Clout & Willett (2016), Onali & Ginesti (2015), as well as Alexander *et al* (2012). More details on the justification of this approach are given in Chapter 4.

Another modelling trend noted in the literature is the use of linear models, almost exclusively. As a matter of fact, all studies reviewed here used linear models. In the

majority of cases, researchers did not divulge information regarding whether or not the link between their predictand and predictor variables is linear or not. Testing the nature of this relationship is important to determine the suitability of linear models. Closely related to this issue is whether to use model variables in their raw form or to transform them. Transformation usually helps to linearize the association between dependent and explanatory variables. Share-deflation and log transformation are among a host of data transformation methods, where share-deflation is the most common (Mirza *et al* 2017; Khanna, 2014; Nyabundi, 2013). In some cases, untransformed data was used (Zulu *et al,* 2017; Dahmash & Qabajeh, 2012). Regarding these issues, the current study tests and provides results for linearity tests. With regards to data transformation, the study uses log transformation as justified in Chapter 4. The next section surveys literature relevant to the second objective.

2.5 The Influence of Firm Size on Value Relevance

Hirdinis (2019) investigated the influence of the size of a firm on its value (among other factors), postulating that a large firm size is evidence of firm growth, and investors will naturally favourably respond, thus positively impacting firm value. The study also posits that the size of a firm has a positive effect on firm value based on the understanding that large corporates find it easy to attract external financing. The size of the firm was quantified by the natural log of total assets. Hirdinis (2019) exclusively focused on firms in the mining sector in Indonesia. Regression results surprisingly indicate a negative and significant relationship between firm size and the value of a company. The explanation proffered is that "companies with large assets and inventories may not be able to pay dividends (retained earnings) due to assets that accumulate on accounts receivable and inventory" (p.89). While the study cites similar results by Niresh & Velnampy (2014), a negative relationship was not anticipated. Considering the study's earlier submissions that large firms can easily attract funding for their operations, and that a large firm size is evidence of growth, one would anticipate to get a positive connection between the value of a firm and its size. The negative association is however not confined to Hirdinis (2019) and Niresh & Velnampy (2014) alone. Other studies also found a negative association. The influence of the size of the firm on share prices was also the subject of a study by Jalalian, Barzegari & Mohammadi (2016) using companies quoted on the Tehran Stock Exchange. Unlike Hirdinis (2019), Jalalian *et al* (2016) used sales revenue as a measure of the size of a firm. Consistent with Hirdinis (2019), a negative relationship between the

size of a firm and its stock price was found. However, in this case the association is devoid of statistical significance, meaning that the size of a firm does not affect stock prices.

Yokoyama *et al* (2015) studied the effect of firm size on informativeness of earnings (using a model by Easton & Harris, 1991), on accounting conservatism (using a model by Basu, 1997), and on value relevance (using a model by Ohlson, 1995). The study's subjects are Brazilian firms. Market capitalisation was used to classify firms into large cap and small cap categories. The value relevance model employed share price (adjusted for dividends) as the response variable. The explanatory variables included earnings per share, market-to-book ratio, and a dummy variable representing the size of a company. The current study also utilises a firm size dummy variable as in Yokoyama *et al* (2015). Similarly, it goes further to create interaction variables (interaction between dummy and numerical variables) to get further insights into the influence of firm size. Yokoyama *et al* (2015) tested the hypothesis that large cap firms have lower levels of value relevance than small cap firms. Results show that firm size has a positive association with share price and the relationship is statistically significant in the full sample. When the full sample is divided into large cap firms and small cap firms, the large cap sample has an Adjusted R^2 of 0.5290 while in the small cap sample it is 0.3172. The findings mean that firm size is value relevant and large cap firms have higher value relevance. With respect to value relevance of company size, the results are consistent with Hirdinis (2019), but they contradict Jalalian *et al* (2016). In terms of the nature of the relationship, those two studies conflict with Yokoyama *et al* (2015); this uncovered a positive association between firm size and share price.

Chandrapala (2013) adopted the Ohlson model in studying the link between the size of a firm and information content of its earnings, and book values in Sri Lanka. However, unlike Hirdinis (2019), which included the variable firm size in the model, Chandrapala (2013) simply split the study sample into large and small firms, and then, separately ran the regressions on the two samples. A comparison of Adjusted R^2 between the two samples formed the basis upon which the effect of the size of a company on information content of net profit and book value was determined. Based on pooled cross-section regression, large corporates exhibited a higher Adjusted R^2 (53.09) than small companies (38.02), meaning that big corporates manifest greater value relevance as compared to smaller ones. Bae & Jeong (2007) studied the usefulness of net income and book values

for small and large South Korean firms using the Ohlson Model (albeit excluding "other information"). They divided their sample into sub-samples according to factors like firm size and ownership structure, and then, compared the explanatory power of these sub-samples, which is similar to what was done by Chandrapala (2013). Using Adjusted R^2 to explain explanatory power, Bae & Jeong (2007) showed that big companies had more explanatory power than smaller ones, which conforms with Chandrapala (2013)'s results. These findings are also in line with those by Hodgson & Stevenson-Clarke (2000), who studied information content of net earnings and cash flows using Australian data. Although there is consensus with regards to this subject in other markets, there exists a scarcity of literature on the issue in South Africa. Consequently, there is need to find out if firm size affects share prices in South Africa since there is very little that is known about the issue.

Lam, Sami & Zhou (2013) also studied value relevance of firm size, focusing on China. They found out that those smaller firms with lower growth rates exhibited major improvements in value relevance. These results contradict the findings by Hirdinis (2019) and Chandrapala (2013), among others. The influence of the size of a firm (among other variables) on value relevance was also studied by Sharif, Purohit & Pillai (2015) for companies quoted on the Bahrain Stock Exchange. A pooled OLS regression was used on a dataset of 41 companies for the period from 2006 to 2010. Among a host of other factors, firm size was found to possess value relevance.

2.5.1 Modelling Issues Arising from Literature on Value Relevance of Firm Size

Measures of the size of a firm adopted by scholars are quite varied, and the list includes total assets (Hirdinis, 2019), sales revenue (Jalalian *et al* (2016)), and market capitalisation (Chandrapala, 2013). Unlike the other two studies cited above, firm size was not used as an independent variable in Chandrapala (2013). Rather, it was used only to classify firms into large and small cap categories. According to the author, this is in accordance with other studies like Hodgson & Stevenson-Clarke (2000). The current study also uses market capitalisation, but in a rather different way: it is used to assign an indicator variable that distinguishes between a large firm and a small firm. Regressions for the two categories are not run separately as in Chandrapala (2013). Considering that firms of very diverse sizes are used, the use of firm size variables like total assets and

sales revenue in their raw form may cause scale bias. Presumably, log transformation or share-deflation of these variables can assist in reducing scale bias.

Studies that determine value relevance of firm size by running regressions on different sub-samples of large and small firms simply compared the coefficients of determination to conclude which of the two groups has more value relevance. It is the considered submission of the current study that it is vital to test for statistical significance of the variations in the coefficients between the samples. The coefficients may be different (as they surely will always be between any two different samples), but the variation may be devoid of statistical significance. In the absence of any such tests, one cannot conclude that the sample with a higher coefficient of determination has higher value relevance.

The use of linear models observed in the previous section, as well as in the pioneering studies, is also quite dominant in this area. Furthermore, static models are primarily used. While the current study uses linear models like other studies, it differs from them in that it uses dynamic models. Clout (2007) noted that capital market research largely skirted dynamic models, preferring static models ostensibly because of OLS' potential to produce spurious regressions in cases where the time series lacks stationarity. Such problems, however, can be handled through the use of proper tests or, more importantly, through the use of better estimators other than OLS. The third objective is covered next.

2.6 Value Relevance of Financial Risk

Financial risk for a non-financial firm concerns the quantity of debt in a company's capital structure. Both theoretical and empirical literature exists in this area. Theoretical literature is reviewed first, followed by empirical literature.

Financial risk as measured by the amount of debt that is carried by a company is part of the broader capital structure decisions that company managers make, i.e. how much debt and how much equity (and hybrid securities, to some extent) should a firm have. Capital structure theories comprise of the pecking order theory, the market timing theory, the signalling theory, trade-off theories and the Miller & Modigliani (1958) theory (hereafter called MM). Among these theories, there are some that are directly linked to value relevance of financial risk, and these include the signalling theory, the MM theory, and the pecking order theory.

2.6.1 Capital Structure Signalling Theory

The signalling theory is premised on information asymmetry between firm management and investors. The term "signalling" was first coined by Ross (1977). The theory postulates that firm management has inside information because it would not make sense to make them accountable for their decisions when they have the same information as any other external investor. Managers are thus deemed to send a signal to the market via their choice of financing decision, where they choose the least costly option. If they perceive their firm to be overvalued, they will issue equity. If this is not the case, they will issue debt. Considering that debt payments (interest and capital) are contractual, debt issuance should signal that management is bullish about the future, which should lead to usefulness of debt in explaining the value of a firm. The rationale for information content of debt is that the decision to use or not to use debt will be taken by market participants as an indicator of the fortunes of the company going forward, which should lead to investors either buying or disposing the firm's shares (in line with the perceived fortunes), hence value relevance. Theoretically, therefore, there should be a link between leverage and equity prices, and this is the subject of value relevance studies.

2.6.2 Pecking Order Theory

The pecking order theory (credited to Myers & Majluf, 1984 and Myers, 1984) has some contextual relevance to this research in the sense that the issuance of debt will be viewed by the market as signalling undervaluation of equity. Thus, the pecking order theory is closely related to the signalling hypothesis, postulating that there is a "ranking order" of financing sources that are chosen by firm managers. Where managers believe that their firms are undervalued, they will use debt instead of equity. This is in line with the signalling theory. If these theories are correct, it means that financial risk is value relevant.

2.6.3 Capital Structure Irrelevance Theory

According to MM's capital structure irrelevance theory, the value of a company is not a function of how it is financed, but rather, it is contingent upon its real assets. This hinges on a fundamental assumption of there being no transaction costs and no taxes. This proposition implies that financial risk is not value relevant: being high-risk or low-risk has no effect on the value of a firm. MM, however, later acknowledged that where there are market imperfections and taxes, there exists a connection between the value of a firm

and its capital structure (Miller & Modigliani, 1963). Considering that the real world is replete with imperfections is a motivation to empirically test MM's assertions.

2.6.4 Empirical Literature on Value Relevance of Financial Risk

A myriad of empirical studies has been done to ascertain the effect of a company's financing options (debt vs equity) on firm value. Park (2015) used an extended Ohlson model, incorporating debt in the analysis of financial statements' value relevance. Two models, one linear and another one non-linear, were employed to analyse the connection between equity price and debt ratio. Regression results showed a significant negative association between equity price and debt ratio in the non-linear model. The negative relationship is in sharp contrast to the statistically significant positive coefficient of debt in the linear model. While Park (2015) used financial statement data to determine value relevance, Obaidat (2016) used a questionnaire to find out the information that investors pay much attention to. Since the questionnaire targeted investors, the findings may be deemed reliable, although, some statistical tests that are done with quantitative data may not be possible with this kind of study. Notwithstanding, financial risk was identified as the variable that is on top of the list of value relevant factors by Amman Stock Exchange participants. The findings are consistent with Park (2015) as well as with the pecking order theory and the signalling theory of capital structure. However, they conflict with the proposition by MM.

The relationship between financial risk and value relevance of accounting data was also studied by Davies & Macfubara (2018). Their study focused on the insurance industry in Nigeria. They used a number of variables to measure financial risk, among them are debt-to-total capital ratio and liquidity risk. Using OLS regression, they found that financial risk was significant and positively associated with equity prices of insurance firms. A positive association between debt and the value of a company was also found by Akhtar *et al* (2016) through a study on one hundred companies listed on the Karachi Stock Exchange. They took a capital structure viewpoint, proffering debt's tax shield status as the reason for the positive association between firm value and debt. Theory, however, says that the positive relationship cannot continue forever with every increase in debt. Once the optimal level of debt is attained, more debt results in a fall in firm value. Postulating that firm value is positively related to capital structure contradicts the MM hypothesis (for a frictionless world), which says that firm value is not dependent on the

firm's capital structure. Such an assertion would imply that debt is not value relevant, i.e. there is no link between firm value and the level of financial risk exposure of that particular firm. However, in a world with interest payments that are tax-deductible, MM opined that capital structure and firm value exhibit a positive relationship, just as Akhtar *et al* (2016) and Davies & Macfubara (2018) found out.

Gupta, Kumar & Verma (2016) studied the link between firm value (dependent variable) and operating and financial leverage in Indian manufacturing firms. The study used price/earnings ratio to measure firm value, and OLS regression was used to model the association between company value and leverage. While operating leverage had a negative and statistically significant link with firm value, financial leverage had a statistically insignificant link with firm value. This means that the level of financial leverage in a company's capital structure does not influence firm value. These findings render support to the MM proposition that capital structure does not affect the value of a company. Ogbulu & Emeni (2012) also used OLS regression to model the impact of capital structure on company value in Nigeria based on a random selection of 124 Nigeria Stock Exchange quoted companies. The study hypothesised that firm value is a function of equity and long-term debt. Contrary to what Gupta *et al* (2016) found out, Ogbulu & Emeni (2012) found out that long-term debt determines firm value. Equity was found not to have an influence on firm value. While their findings contradict the capital structure irrelevance theory by MM, they render support to the pecking order theory. A different dimension on the Nigeria Stock Exchange listed firms was given by Enekwe, Agu & Eziedo (2014). They concentrated on the effect of financial gearing on company performance of three pharmaceutical firms between 2001 and 2012. The proxies of financial gearing used are debt/equity ratio and interest coverage ratio. Company performance was estimated by the return on assets. While other researchers used firm value, Enekwe *et al* (2014) used firm performance. They did not uncover any meaningful association between a company's financial performance and the two financial leverage measures. These findings contradict what Ogbulu & Emeni (2012) found out. It is, however, worthwhile to highlight that the two sets of studies' models may not be comparable because their dependent variables, firm value (Ogbulu & Emeni, 2012) and return on assets (Enekwe *et al*, 2014), measure different aspects of the firm. This makes a direct comparison rather problematic. Nonetheless, there are differences among capital structure theories as well as differences in empirical findings on the nexus between the

value of a company and how a company finances its operations. The diversity of findings points to the need for more research in this area.

Robu *et al* (2014) investigated value relevance of distress risk in Romania. Distress risk is, in a way, related to financial risk, where it manifests itself as loan and bond defaults, insolvency and bankruptcy, among other indicators. The results showed significant differences in the means of distressed and healthy companies. This means that distress risk (and by extension, financial risk) has information content.

An investigation on the link between financial risk and the value of a firm (among other variables) in Brazil by Loncan & Caldeira (2014) concluded that "short-term and long-term debt had negative marginal effects on firm value, suggesting a risk-averse behaviour of investors in relation to debt" (p.46). Their research focused on the years 2002 to 2012, utilising an unbalanced panel of all firms quoted on the Brazilian equities market, excluding financial institutions. The implication of their findings is that where a company is deemed high-risk, the value of the company declines, and where a company is categorised as low-risk, firm value increases when it adds more debt. Another study that makes use of panel data models was done by Cheng & Tzeng (2011), focusing on companies quoted on the Taiwan Securities Exchange, covering the period between the year 2000 and 2009. The influence of gearing on company value was determined to be positive, and this relationship has statistical significance.

Habib (2002) studied the influence of financial leverage on information content of book value and earnings in Japan. Pooled and time series regressions were used to model the relationships. The study asserts that since high levels of debt in a company's capital structure mean high default risk, book value should be value relevant in highly geared companies. The logic for that assertion stems from the fact that book value counts for a company's abandonment value, which is critical in case of default and, ultimately, liquidation. Thus, investors should be interested in movements in a firm's abandonment value because it is a rough guide of what will be distributed to them in the event that the company folds. The higher the book value, the greater the potential value to be distributed. Habib (2002) posits that close monitoring of borrowers by banks results in shareholders in these leveraged companies "to free-ride on the banks' monitoring activities and may result in increasing relevance of accounting numbers for highly levered firms" (p.73).

However, although the study says financial statement variables for leveraged firms tend to be value relevant, it does not investigate the value relevance of financial leverage as a variable on its own. The current research intends to contribute on this issue by examining value relevance of total liabilities and the debt ratio (the study's proxies for financial risk).

2.6.5 Modelling Issues Arising from Value Relevance of Financial Risk Literature

Whilst the use of linear models is prevalent in this strand of value relevance literature, a few scholars like Park (2015) employed non-linear models (further to linear models used). The choice of whether to use linear or non-linear models should be a function of the properties of the variables at hand. The properties are determined by conducting linearity tests before adopting either of the two model types. Contrasting signs of regression coefficients on debt (negative sign for the non-linear model and positive sign for the linear model) reported by Park (2015) should be an indicator of the need to transform data so that it conforms with the assumptions of either model type before using any of the two types of models. Alternatively, it shows that either of the two sets of models is inappropriate. The current study uses linear models, chosen after linearity tests for all the four objectives' dependent-independent variable combinations. Results of the linearity tests are presented in each of Chapter 5 to Chapter 8.

Researchers predominantly used long-term debt to measure financial risk. Intermittently, however, some studies investigate the influence of short-term as well as long-term debt (Loncan & Caldeira, 2014). Studies exclusively focus on interest-bearing loans, excluding non-interest-bearing liabilities. The current study, for reasons given in Chapter 4, re-defines debt to mean all forms of indebtedness by including total liabilities in the measurement of debt.

Scholars basically used a wide range of regression analysis techniques that include panel data methods (Loncan & Caldeira, 2014) and cross-sectional data analysis (Ogbulu & Emeni, 2012). While most studies use OLS regression to ascertain the influence of financial leverage on company value (Gupta *et al*, 2016; Ogbulu & Emeni, 2012), in very rare cases, others have used the Generalised Method of Moments (Cheng & Tzeng, 2011). The decision by Cheng & Tzeng (2011) to use GMM was based on the realisation that, since they were using panel data, it was improper to use OLS since the expected values of residuals were non-zero. Furthermore, consideration of the endogeneity bias issue

meant that the Generalised Least Squares method was not appropriate, leading to the choice of GMM. The current study also made the same considerations as Cheng & Tzeng (2011), where System GMM was eventually selected as explained in Chapter 4.

Studies reviewed in this section largely used static models, missing out on the dynamics of share price movements documented by Onali & Ginesti (2015). The current study uses dynamic models in order to improve statistical properties of the models. A thorough discussion of the matter is engrossed in Chapter 4.

2.7 The Usefulness of Cash Dividends and Retained Earnings

The effect of payment of cash dividends on company value is a subject of debate among both theorists and empiricists. The importance of dividends arguably stretches to firm valuation theory, where dividends are used to value a firm via the dividend discount model (discussed in Chapter 3).

2.7.1 Dividend Policy Theories

Dividend policy issues have received a fair share of attention from theorists. There are theories that support, as well as those that are against, the information content of dividend payment. The respective theories are reviewed below.

2.7.1.1 Dividend Irrelevance Theory

Leading the school of thought that says dividends are bad is the Miller & Modigliani (1961) dividend irrelevance theory. Miller and Modigliani (MM) postulated that the decision on whether to pay or not to pay dividends does not influence a company's value. The intuition behind MM's postulation is that firms that pay relatively more dividends give their stockholders less in terms of share price increases and, at the same time, they have to offer the same return to stockholders as compared to those that pay less dividends. Barring differences in dividends and capital gains tax rates, investors should be indifferent on whether to receive their money as dividends or as capital gains. The proposition makes numerous assumptions; among them is the aforementioned one on taxes. Notably, another assumption says that there are no transaction costs (both for disposing shares by shareholders, and flotation costs by firms), such that an investor who is in need of cash can simply sell shares to get the cash. If this is not the case, investors who are in need of cash would prefer dividends over capital gains. On the other hand, a

firm that has paid out a very high dividend can also raise money from the market to pursue profitable opportunities at no flotation cost. In the real world, the fact that tax rates are higher on dividends than on capital gains should help prop up the proposition by another school of thought that says investors actually don't like dividends (covered in the next section). Nevertheless, firms continue to pay dividends and this is a motivation to study this issue in the current investigation.

2.7.1.2 Bird-in-the-hand Theory

Countering the dividend irrelevancy theory is the "bird-in-the-hand theory", which MM termed "bird-in-the-hand fallacy". This theory advocates for value relevance of cash dividend payments (Gordon, 1959; Lintner, 1962). The basis of this argument is that dividends are safe and certain, while price appreciation is risky because share prices can fall at any time. This is particularly so in a bear market in an economic downturn, where price movements have nothing to do with individual firm performance, but they are a function of market-wide negative sentiment. Those shareholders who have received dividends would have long enjoyed their money, but those who were rewarded with price appreciation now watch their reward vanish. The counter-argument by MM is that the choice is between a guaranteed amount of cash dividends today and a guaranteed amount of price increase (of an almost equal amount) today. Anchored on the assumptions made, it means that investors should therefore be indifferent. Investors' indifference was however questioned by some empiricists who said investors are actually averse to dividend payments, ostensibly because of the tax disadvantages associated with dividends (Litzenberger & Ramaswamy, 1979).

2.7.1.3 Tax Preference Theory

Picking up from the last statement above, tax disadvantages associated with dividend payments should actually cause investors to loathe dividends. According to this theory, firms are therefore forced to keep dividend payments as low as possible to avoid a backlash from the market (in the form of share disposals), which will lower firm value. This means that a rise in the amount of cash dividends paid will lower a company's value, implying a negative nexus between the amount of cash dividends paid and company value. Closely related to this theory is the clientele effect, which is explained after all the theories have been discussed.

2.7.1.4. Dividend Signalling Theory

Dividends' information content is also supported by the signalling hypothesis. The theory posits that a change in dividend policy by a firm is a signal given to the market by firm management. In other words, it is management's way of communicating with the market about the state of a firm's cash flows in years to come (Ross, 1977). This is quite important considering information asymmetry between insiders (company executives) and outsiders (equity holders). The insiders, in this particular case, will be implicitly telling the outsiders that either future cash flows are good (increased dividend), or they are bad (reduction in dividends). However, the danger with this notion is that a reduction in dividends can be a strategic move by management in the light of profitable opportunities that lie ahead, and management will therefore want to retain more income to enable the firm to exploit the anticipated future opportunities. It is therefore the duty of every analyst and investor to decipher the motive behind each dividend policy change.

2.7.1.5 Agency Theory

Firm managers are viewed as agents of the firm's shareholders (owners). Agency problem exists between management and shareholders concerning the use of retained earnings by the agents. Specifically, managers may enjoy too much perquisites, using retained income, at the expense of shareholders. Furthermore, they may also sub-optimally invest the retained earnings, again, to the detriment of the shareholders. These two possibilities involve agency costs. Dividend payments provide an avenue for management to reduce the agency costs through payment of higher dividends. Higher dividends mean that the amount left at management's discretion is much lower, which lowers agency costs. In a related matter, management will then be compelled to approach the market in order to raise funds for expansion projects, and capital providers will closely monitor how management uses the borrowed funds, which reduces agency costs and ultimately, benefits shareholders.

2.7.1.6 Tax Clientele Effect

This is not a theory per se, but an effect linked to the tax preference theory. The tax clientele effect, or tax habitat, is premised on the real-life situation that dividends are taxed at higher rates in comparison with capital gains (in numerous jurisdictions). Undoubtedly, there are investors who need a regular income and, because of their individual circumstances, their marginal tax rates may also be lower. On the other hand,

there is also a second group of investors who do not need regular cash (especially institutional investors and high net-worth individuals), and may also face high tax rates on dividends. These two groups of investors will be attracted to firms that suit their cash flow requirements and tax preferences. At the end of the day, firms that pay high dividends will attract the first group of investors (their clientele) who value dividends. In the event that these firms reduce their dividend pay-out ratios, or worse still, scrap dividends altogether, this group of investors will react by selling off their shares, which then affects share price. The same also applies to the second group of investors, i.e. if a firm that is known for paying low (or no) dividends suddenly increases dividend payments remarkably, investors will sell off their shares to avoid a higher tax burden, thus affecting firm value. All in all, it means a firm attracts investors who are inclined to its dividend payment pattern (investors will come to a firm's habitat) such that any changes to the pattern will trigger a response from investors. This will affect stock prices, meaning that dividend policy is value relevant.

2.7.2 Empirical Literature on Value Relevance of Dividends

Bouteska & Regaieg (2017) analysed information content of EPS, dividends per share (DPS) and stock returns for firms quoted on the Tunisian equities market from 2005 to 2015 using panel data regression models. They concluded that both EPS and DPS have value relevance. Evidence on the usefulness of dividends points to the fact that the dividend irrelevance theory as well as the tax preference theory do not apply on the Tunisian stock market. In Nigeria, Alkali, Zuru & Kegudu (2017) analysed value relevance based on an adapted Ohlson model. It was adapted by incorporating dividends and audit quality (further to the usual variables of net income and book values). Value relevance was compared before and after the embracing of International Financial Reporting Standards (IFRS) in Nigeria. Dividends exhibited statistical significance in the pooled sample as well as in the pre- and post-IFRS eras. This implies that dividends are value relevant. Value relevance of dividends in Nigeria was also the subject of Omokhudu & Ibadin (2015)'s investigation. Dividends were found to be value relevant just like in Alkali *et al* (2017). Findings from the Nigerian market are consistent with Bouteska & Regaieg (2017)'s findings on the Tunisian market. Barth, Li and Mclure (2018) studied value relevance of dividends (among other variables) from a slightly different dimension. They focused on the evolution of value relevance of financial statement data from the year 1962 to 2014 in the USA. The research uncovered a fall in the usefulness of net

income and dividends over the study period. The fact that dividends' value relevance was found to have declined shows that, at the very least, dividends possess some value relevance, thus affirming the findings by Bouteska & Regaieg (2017). Again, this raises questions on the cogency of the dividend irrelevance theory and, in the process, gives credence to the bird-in-the-hand theory and other dividend relevance theories. A question that arises from Barth, Li & Mclure's (2018) conclusion revolves around the reason for the decline in dividends' value relevance. Further studies can however explore this issue.

Budagaga (2017) also studied the information content of dividend payments, employing a panel dataset of companies quoted on the Istanbul Stock Exchange. A fixed effects model was used, chosen based on a comparison of the Chi-square log likelihood of the random effects model to that of the fixed effects model. The study adopted the residual income valuation model embedded in Ohlson (1995). Findings showed that dividends are value relevant, where a positive relationship with firm value was shown. The findings by Budagaga (2017) are dents on the dividend irrelevance theory. On the other hand, they are consistent with the agency theory as well as empirical findings by Bouteska & Regaieg (2017). Further evidence that buttresses the above findings was provided by Cole, Yan & Hemley (2016) in a study focusing on three sectors in the USA. A simple linear regression model based on pooled data was used, where equity price was the response variable and dividend per share was the explanatory variable. A positive association was found between equity price and dividends per share, and the relationship is statistically significant. This means that the information contained in dividend payments is useful in share price determination.

Dedman, Jiang & Stark (2017) assessed value relevance of dividends in a rather unconventional way; they included both stock and cash dividends in valuation models that also had net income, book value and capital contributions as the other independent variables. Two separate models testing forecasting ability of cash and stock dividends were developed, one with net income for the following period (NI_{t+1}) and another one with the next period's cash dividend (CD_{t+1}) as dependent variables. The goal was to determine how good are cash dividends as well as stock dividends in predicting future net income and cash dividends. The models were run on various samples that include cash dividend paying companies only, stock dividend paying companies only and those firms paying both types of dividends on the Chinese stock market. Predictive ability is

interpreted to mean value relevance. Results show value relevance of both cash and stock dividends, and where cash dividends are not paid; stock dividends have information content for predicting future net income and cash dividends. Value relevance of cash dividends was also found by Al-Shattarat, Atmeh & Al-Shattarat (2013). The study tested the signalling information content of dividends on the Amman Stock Exchange. Value relevance of dividends was determined by computing abnormal returns around dividend pronouncement dates for both the dividend paying group and the non-dividend paying group. Abnormal equity returns were observed around the dates when dividends were announced. In the non-dividend paying group, no abnormal stock returns were observed when the non-payment of dividends was announced. The authors concluded that their study was in conformity with the dividend signalling hypothesis, implying value relevance of dividends.

On the contrary, Rees & Valentincic (2013) argued against value relevance of dividend payments. Specifically, they posit that value relevance of dividends arises due to some valuation error in the previous year's earnings. Where "other information" is included in valuation models, Rees & Valentincic (2013) assert that core earnings will be estimated correctly, resulting in value irrelevance of dividends. They further stated that value relevance of dividends appears to be over-hyped due to the nexus between net income and dividends. The general conclusion of their study lends support to MM's dividend irrelevance theory. Al-Hares, AbuGhazaleh & Haddad (2012) studied value relevance of net income, dividends and book value in Kuwait; mainly with the objective of finding out if dividends can substitute earnings in valuation models. In a model that has earnings, their results support Rees & Valentincic's (2013) assertion that dividends are not value relevant. Interestingly, however, dividends become value relevant when they are used to substitute earnings, i.e. when earnings are dropped from the model. Benartzi, Michaely & Thaler (1997) examined the extent to which dividends transmit information concerning the level of net income in the future. To achieve this, the study examined if "firms that increase (decrease) dividends in year 0 will have positive (negative) unexpected earnings in years 1, 2, etc." (p.1010). Their results found scant evidence that dividends possess any information that informs us about the level of future net income. Overwhelming evidence was, however, found to the effect that dividends relay past earnings information. The existence of contrasting empirical findings on the same issue simply points to the need for further research on that issue, and the current study intends to do just that.

2.7.3 Empirical Literature on Value Relevance of Retained Earnings

Whilst value relevance of retained earnings has been studied from as far back as the 1950s (Harkavy, 1953), very few studies of late have focused on value relevance of retained earnings, either on their own, or as part of an analysis examining information content of dividends. Two of the few studies are Yemi & Seriki (2018), and Ball *et al* (2017). Yemi & Seriki (2018) studied the association between retained earnings, dividends per share (among other variables) as explanatory variables, and firm value as the response variable, in Nigeria. The value of a company was measured by Tobin's Q (the current study also uses Tobin's Q in some of the models). Multiple linear regression employing OLS was employed to model the association. Findings show that both retained profit and dividend pay-out have value relevance. In both cases, a positive association with firm value was found. In the other study, Ball *et al* (2017) examines retained earnings together with capital contributed by the owners for the period spanning from 1964 to 2016 in the USA. Regressions similar to Fama & MacBeth (1973) were used in a comparative investigation of the information content of retained earnings against that of contributed capital. Retained earnings were found to have explanatory power while contributed capital had no explanatory power. They made an important argument in saying "book-to-market (value) only predicts stock returns because it contains retained earnings" (p.3). This stems from the fact that since retained earnings are cumulative over a firm's lifespan, they contain valuable information because all accounting errors in previous periods would have been corrected in the current retained earnings figure. This is particularly pertinent considering the numerous cases where firms revise and restate their previous year's accounts in the following year. Breaking down book value of equity into its component parts (cumulative earnings and cumulative dividends) for analysis. Ball *et al* (2017) concluded that retained earnings are only value relevant because they subsume earnings from previous periods. Considering numerous studies that have been reviewed in this chapter that found out that earnings are not value relevant, this assertion by Ball *et al* (2017) needs further investigation. The current study will engage in a discussion about this issue in Chapter 8. Ball *et al* (2017) also concluded that "the accumulated dividends component of retained earnings is uninformative" (p.3). It is however not clear what is being referred to as "accumulated dividends component of retained earnings" because retained earnings do not contain dividends. Income is either retained or paid out as dividends, so dividends cannot be a component of retained earnings. In their findings, Ball *et al* (2017) further posit that retained earnings are a suitable proxy for earnings yield.

2.7.4 Modelling Issues Arising from Literature on Value Relevance of Dividends and Retained Earnings

Budagaga (2017) uses panel data models to examine information content of dividends. Yemi & Seriki (2018) also use panel data (unbalanced) in their analysis. In both cases, however, static models were used. Invariably, literature reviewed in this section also uses static models. The current study makes a departure from this trend and employs dynamic panel data models, justification of which is provided in Chapter 4. Yemi & Seriki (2018) uses OLS estimators in their panel data models. The current study does not use OLS estimators since it employs a dynamic panel.

Dedman *et al* (2017) say their analysis is an event study (p.670), presumably because they investigated the effect of payment and non-payment of cash and stock dividends. However, in the true sense of an event study, focus is on timeliness, which does not seem to be the case in Dedman *et al* (2017). Determining forecasting ability cannot be an event study methodology as alleged. Event studies are like the one conducted by Al-Shattarat *et al* (2013), where reactions around a particular event are studied to determine the impact of that event.

Popularity of levels regressions over return regressions is quite evident in the literature reviewed in this section. Researchers consistently used levels regressions. In almost all cases, no discussion is made on how the choice between the two forms was made. This makes it impossible to assess researchers' reasons for their choices, i.e. whether the choices are impulsive or they are a result of careful consideration of strengths and weaknesses of each form: this cannot be determined. The current study provides an in-depth evaluation of the two forms and justifies the use of levels regressions adopted.

2.8 Knowledge Gaps in Extant Literature

Knowledge gaps that emanate from the literature that has been reviewed are discussed in this section. These knowledge gaps informed the decisions made in the current study, the aim being to plug the identified gaps.

2.8.1 Geographical Setting

As documented in literature review by Kothari (2001), Beisland (2009) and Baltariu (2015), value relevance studies have largely been concentrated in the developed capital markets. However, over the years, more researchers have focused on the developing

world e.g. Khanna (2014), India; Omokhudu & Ibadin (2015), Nigeria; Nyabundi (2013), Kenya; Hai, Diem & Binh (2015), Vietnam; Karamzadeh (2013), Malaysia; Chandrapala (2013), Sri Lanka; and Zulu, De Klerk & Oberholster (2017), South Africa. Nevertheless, there is scant literature which focuses on the Southern African region, South Africa included. A knowledge gap thus exists and the current study aims to play a part in plugging that gap.

The absence of much value relevance research in South Africa also means that investors on the JSE have less empirical knowledge of the extent to which published financial statements for listed firms help in share valuation. Empirical knowledge is crucial so that these investors would know which information to use in firm valuation and which information to leave out in their valuations. This saves them time and also helps them make correct investment decisions faster. The desire to provide solutions to these challenges is one of the motivations behind this study.

2.8.2 Use of Static Models

On a methodological scale, extant literature shows that studies on value relevance have largely employed static models (Kothari, 2001; Beisland, 2009; and Baltariu, 2015). The methodology used in any research has far reaching implications on the results of that research. Advances in research methods over the years call for new approaches to the investigation of accounting data's usefulness in explaining the value of a company. Put differently, there is need to explore dynamic models in value relevance research. According to Bond (2002), dynamic models enable the researcher to have consistent estimates of variables under study. This is a desirable feature and it helps in making sure that credible results are found. It is also worthwhile to note that share prices are dynamic in nature (this point is elaborated in Chapter 4), thus using a dynamic model is appropriate in this case. There is a methodological gap in this area of study that this research endeavours to fill.

2.8.3 Predominant Use of Ordinary Least Squares Estimators

Research that has been reviewed in this chapter has shown that researchers invariably use OLS estimators (with the exception of just a few studies). Review papers by Kothari (2001), Beisland (2009), and Baltariu (2015) also indicated that empirical studies predominantly use OLS estimators. Ohlson & Kim (2015) extensively covered two

problems associated with OLS estimators in cross sectional settings. The first problem revolves around the excessive influence of outliers on estimates. Regarding the second shortcoming, Ohlson & Kim (2015) says models build in heteroscedasticity in cross sections. This would then require that all variables be scaled. They showed that OLS consistently underperformed Theil-Sen estimators even after scaling and winsorization of data. Noteworthy, however, is the fact that there are other estimators (besides Theil-Sen) that can handle the shortcomings in question. The current study uses System GMM estimators, which are more robust than OLS estimators.

2.9 Chapter Summary

Literature on the importance of value relevance studies was reviewed first, where value relevance studies are deemed as being of value to firm management, regulators, investors, academics, policy makers and accounting standards setters. Four interpretations of value relevance were identified in the literature, where the interpretation based on statistical association between response and explanatory variables is the most popular in recent studies. This chapter also reviewed both empirical and theoretical literature that is related to the study's four objectives. While there is a bias on more recent literature, the chapter also gave an account of the pioneering studies in capital market research that investigates the usefulness of financial statement data in explaining firm value and/or share prices. It has been shown that while major credit in value relevance research is given to Ball & Brown (1968), there are other empirical studies that pre-date Ball & Brown (1968). Studies like Ashley (1962) and Benston (1967) were identified as some of the pioneers of empirical value relevance studies. In the recent past, researches on the information content of net profit and book value have largely been motivated by Ohlson (1995). A mixed bag of findings characterises the landscape, where some scholars say book value is more value relevant while others say net income has more value relevance. Literature on the influence of the size of a company on its value also delivers inconclusive results due to the divergence of findings. Likewise, value relevance of financial risk also produced the same pattern of empirical results, with some studies saying debt affects firm value while others say it has no relevance just as postulated by MM. The usefulness of dividends in explaining firm value, like in all the other cases, produced contrasting results. Retained earnings have largely not attracted the same interest from researchers as dividends. The next chapter gives the theoretical and conceptual framework of the study.

CHAPTER THREE

THEORETICAL AND CONCEPTUAL FRAMEWORK

3.0 Introduction

The previous chapter gave an account of literature that is relevant to the study's objectives. Contrasting views and findings in all four areas of the current study's focus stand out from Chapter 2. This chapter complements the literature review by providing a theoretical and conceptual basis of relationships envisaged in all models used in the study. A theoretical framework is defined by Adom, Hussein & Agyem (2018) as "a framework based on an existing theory in a field of inquiry that is related and/or reflects the hypothesis of a study" (p.438). Put differently, it is the "research map" or blueprint that guides the investigation. Adom *et al* (2018) define a conceptual framework as "a structure, which the researcher believes can best explain the natural progression of the phenomenon to be studied" (p.439). A conceptual framework serves to explain the way in which the research problem will be unravelled. In line with Miles & Huberman (1994), a conceptual framework "explains, either graphically or in narrative form, the main things to be studied – the key factors, concepts, or variables – and the presumed relationships among them" (p. 18). Consequently, a conceptual framework covers the conceptual and theoretical relationships underpinning every research. In more general terms, a conceptual and theoretical framework is all about the ideas that one has concerning what he/she thinks is going on among the research subjects. These ideas are then put to test in the form of an investigation to uncover the facts that support or conflict with the initial ideas. In this context, there are four objectives, with each objective having different financial statement variables. This chapter provides theoretical and conceptual relationships between the response variable(s) and explanatory variables in each of the four objectives. The perceived relationships form the basis of all the models used to achieve the research's objectives.

The chapter starts off by giving the commonly used theoretical framework in value relevance studies, which focuses on the residual income valuation model, dividend discount model and the clean surplus relation. A brief overview of the Ohlson model, founded on these three concepts, is provided. A diagrammatic representation of the conceptual framework is given, followed by an explanation of each anticipated

relationship. This is arranged according to the study's objectives. After an explanation of each conceptual relationship, the ensuing hypothesis is given immediately thereafter. The chapter ends with a summary of key issues covered in this discussion.

3.1 Theoretical Framework of Value Relevance Research

In general terms, the theoretical framework of value relevance studies lies, in a number of cases, in the relative income valuation model, discounted cash flow (DCF) technique, dividend discount model (DDM) and the clean surplus relation. These theoretical constructs are discussed below in order to help locate the current study's theoretical framework. Theoretical literature reviewed in Chapter 2 also forms part of the theoretical construct, thus reference is made to those theories in the final part of this section (which locates the current study in the existing theory).

3.1.1 Residual Income Valuation Model

Residual income valuation provides the intuition behind models of value relevance, specifically the novel Ohlson (1995) model. Plenborg (2002) documents that Edwards & Bell (1961) pioneered the concept of residual income. Further refinements are credited to Peasnell (1982), and later on, the concept was also incorporated in the Ohlson model, as highlighted above. However, Lo & Lys (2000) argued that residual income valuation appears in Preinreich (1938), amid indications that it even predates this particular study. Residual income, which is also termed economic profit, economic value added or abnormal earnings (these names are used interchangeably), is given by earnings, less a capital charge. The capital charge represents common stockholders' opportunity cost of their funds used in creating net earnings, i.e. the cost of equity capital. The capital charge is given by:

$$C_c = E \times k_e \qquad \ldots (3\text{-}1)$$

where:

C_c = Capital charge; E = Amount of equity capital and k_e = Cost of equity capital (as a percentage).

Residual income, as a concept, determines a firm's worth to equity holders only. A refinement that also includes debt holders was developed by Stern Stuart and Company of the USA, and trademarked it as Economic Valued Added (EVA). The percentage cost

of equity can be determined by models such as the Capital Asset Pricing Model (CAPM). However, to practically implement it requires one to come up with an appropriate risk-free rate as well as the market rate of return. Some assumptions have to be made such that the cost of equity can be different from different analysts' perspectives. This subjectivity causes many empirical researchers to opt to use a straightforward measure like the bottom line (net income) instead of abnormal income. This trend is evident in the literature reviewed earlier (Chapter 2).

The residual income valuation model is used to compute a firm's intrinsic value, which is comprised of book value of equity and the discounted value of future residual income. Thus,

$$FV_0 = b_0 + \sum_{t=1}^{\infty} \frac{RI_t}{(1 + r)^t} \qquad \text{... (3-2)}$$

where:

FV_0 = the current intrinsic value of a company

b_0 = a firm's equity book value at valuation date

RI_t = a firm's residual income at time *t*

r = discount rate = equity's required rate of return

Considering the calculation of residual income (RI_t), Equation 3-2 can be restated as:

$$FV_0 = b_0 + \sum_{t=1}^{\infty} \frac{NI_t - rb_{t-1}}{(1 + r)^t} \qquad \text{... (3-3)}$$

where:

NI_t = a firm's net earnings during time *t*

b_{t-1} = the previous period's equity book value

The product of the required rate of return on equity and the previous period's equity book value (rb_{t-1}) gives the capital charge. The theoretical logic in equations 3-2 and 3-3 is that an investor will only pay more than the book value of equity (a premium over book value), if they can earn abnormal earnings, i.e. if abnormal earnings are positive. Negative residual income actually has the effect of reducing the book value of equity. Expressing net income using an appropriate ratio proxy in Equation 3-3 makes the above argument much more vivid:

$$FV_0 = b_0 + \sum_{t=1}^{\infty} \frac{(ROE_t - r).b_{t-1}}{(1+r)^t} \qquad \ldots (3\text{-}4)$$

In Equation 3-4, we have simply replaced net income in Equation 3-3 by the return on equity ratio (ROE_t). The equation shows that equity investors will be prepared to pay a premium over book value of equity, provided that the company's return on equity exceeds their required rate of return (r). Failure to satisfy that condition means that there will be a "negative abnormal return". In Equation 3-4, EVA uses return on capital employed in place of ROE_t, and weighted average cost of capital in place of r. EVA thus focuses on both equity holders and lenders, unlike residual income, which only focuses on equity holders.

In equations 3-2 to 3-4, the intrinsic value of a company is made up of two factors, i.e. book value of equity and the discounted value of future residual income. To be technically correct, a third factor exists, which however is often neglected, ostensibly due to the difficulty and subjectivity in measuring it. This third factor is the discounted value of a company's future goodwill of equity (Skogsvik, 2002). Given a specific time horizon *T*, goodwill of owners' equity is the discounted value of abnormal earnings beyond time *T*. Estimating this value is quite a monumental task, no wonder why, in most cases, this is just left out of the valuation function. Another plausible reason for omitting goodwill in valuation is that an investor will normally have an investment horizon, *T*. Valuations are then done within this investment horizon (although the firm is assumed to remain as a going concern in the foreseeable future). The cash flows of a firm that are beyond one's investment horizon (which, in principle, is the goodwill) are of no consequence since those cash flows will only accrue after divestment from that firm. In infinite periods (as $T \rightarrow \infty$), and assuming the clean surplus relation (discussed in 3.1.3 below) holds, goodwill approaches zero. This justifies its exclusion.

3.1.2 Discounted Cash Flow (DCF) and Dividend Discount Model (DDM)

Conventionally, the value of a firm is theorised to be the discounted value of future cash flows. The future cash flows, amongst a host of their form, can either be dividends, free cash flows or residual income. In other words, these different forms of a firm's value created in the future can be used to value a firm. Different firm valuation models built on this conceptualisation of value have been formulated; among them is the dividend

discount model. The DDM, which is a widely accepted model for valuation of companies, is given by the following equation:

$$P_t = \sum_{\tau=1}^{\infty} R^{-\tau} E_t(\tilde{\delta}_{t+\tau}) \quad \ldots (3\text{-}5)$$

where: P_t = market value of a firm

$\tilde{\delta}_{t+\tau}$ = net dividends at time $t + \tau$

R = discount rate (risk free rate)

E_t = expected value operator at time t

The above formula is justified on the premise that an investor buys a company's shares expecting to receive a fair share of the value created by the company, and dividends represent that value. The main challenge with this valuation model is that start-ups and growth firms that are not yet declaring dividends cannot be fairly valued. However, the theoretical and conceptual setting of the model is tractable, and dividends can be substituted by other forms of firm value. The bottom line in both the statement of financial position (book value) and the income statement (profits) are good substitutes for dividends. Whilst these can be used to replace dividends in the DDM, Ohlson (1995) conceptualised a model that combines the two bottom line items in what is now commonly known as the Ohlson model, briefly discussed in Section 3.1.4.

Using profits, book value and clean surplus, the DDM can be re-written as a model of accounting numbers. It becomes:

$$P_t = b_t + \sum_{\tau=1}^{\infty} R^{-\tau} E_t(\zeta_{t+\tau}^{a}) \quad \ldots (3\text{-}6)$$

where : b_t = book value at time t (clean surplus)

$\zeta_{t+\tau}^{a}$ = residual profits in period $t + \tau$

Equation 3-6 implies that firm value comprises of the capital invested plus the expected value of residual profits. The future earnings are not yet incorporated in current accounting figures. The equation introduces another concept, the clean surplus relation and this is briefly explained below.

3.1.3 Clean Surplus Relation

According to Wang, Buijink & Eken (2006), "the clean surplus relation is one of the fundamental assumptions to express firm value in terms of observable accounting variables" (p.3). The clean surplus relation is generally stated as:

$$b_t = b_{t-1} + \eta_t - \delta_t \quad \ldots (3\text{-}7)$$

where: b_t = book value at time *t*

b_{t-1} = book value at time *t-1*

η_t = clean surplus earnings at time *t*

δ_t = dividends at time *t*

The clean surplus relation (CSR) basically states that the movement in book value of a company is a function of the value it has created within a given time period and how that value is distributed to shareholders. Put differently, current book value is made up of the previous period's book value and the current period's clean surplus earnings, less dividends paid. Since the difference between net earnings (η_t) and dividends (δ_t) is essentially retained earnings, current book value comprises of the previous period's book value and the current period's retained earnings. Equation 3-7 means that the payment of dividends affects current book value but has no effect on earnings. An implicit assumption in Equation 3-7 is that the firm neither issues more shares nor engages in share buyback schemes between time *t – 1* and time *t.* However, this may not necessarily turn out to be the case. In such a case, the CSR would have to be restated as:

$$b_t = b_{t-1} + \eta_t + \pi - \delta_t \quad \ldots (3\text{-}8)$$

In Equation 3-8, π represents *net* capital inflows between time *t – 1* and time *t.* This composition of CSR appears in Wang *et al* (2006). However, the inclusion of net capital flows is excluded in a definition of CSR by Isidro, O'Hanlon & Young (2004), which says that CSR holds when "net income includes all contemporaneous changes in the balance sheet value of equity other than issues and distributions of equity" (p.383). According to this definition, existence of π is tantamount to dirty surplus accounting, implying that Equation 3-7 is sufficient in describing CSR. The description in Equation 3-7 also appears in Ohlson (2000) on a per share basis (p.8).

An assumption to the effect that CSR holds (on a per share basis) is crucial because it guarantees that the dividend discount model and the residual income valuation model are equivalent (Isidro, O'Hanlon & Young, 2004; Ohlson, 2000). When CSR is violated (termed dirty surplus accounting), the two models will not be equivalent. Furthermore, assuming that CSR holds, it is also significant in that the focus in valuation models shifts from future dividend streams (in the DDM) to current book value (which incorporates the

previous period's book value, earnings and dividends paid). In this way, even young growth firms that are not yet declaring dividends can also be valued without any problem.

In South Africa, firms are mandated to publish a comprehensive income statement and a statement of changes in equity alongside primary financial statements. This helps to reduce dirty surplus flows (like goodwill write-offs) by making them more visible to financial statement users. Reduction of dirty surplus flow helps in enhancing value relevance of financial statements, as it increases transparency by eliminating flows that are prone to manipulation by firm management. Management discretion, which may be open to abuse for remuneration purposes (Biddle & Choi 2002, cited in Wang *et al*, 2006), is also reduced in South Africa by ensuring that firms publish comprehensive income statements in line with International Financial Reporting Standards. Consequently, assuming that CSR holds in South Africa is not an unreasonable supposition. Nevertheless, the current study does not directly use the residual income valuation model, but it uses an adapted Ohlson model in the main objective, which, as shown in the next section, is founded on the CSR and the residual income valuation model.

Ohlson (2000) examined the residual income valuation model (which makes use of the CSR) and concluded that if there are expected changes in shares outstanding, then, on a per share basis, the CSR will not hold. Another telling conclusion from Ohlson (2000) says that GAAP violates CSR since some capital contributions are not accounted for in market value terms. The CSR is however an integral component of the Ohlson model. Empirical evidence has shown that dirty surplus flows have no value relevance (Isidro *et al*, 2004). This being the case, it means that whether or not CSR holds turns out to be inconsequential in empirical value relevance studies because the variables that cause it not to hold have no links with firm value.

3.1.4 The Ohlson Model

Ohlson (1995) theorised that share prices are a function of book value, residual income (also called abnormal income) and "other information" necessary for firm valuation, but not currently captured by the accounts. The dividend discount model (Equation 3-6) forms the theoretical base upon which the Ohlson model is built. The Ohlson model is given by the following equation:

$$P_t = b_t + \gamma_1 \zeta_t^a + \gamma_2 \theta_t \quad \ldots (3\text{-}9)$$

where: $\gamma_1 = \frac{\omega}{R-\omega}$ and $\gamma_2 = \frac{R}{(R-\omega)(R-\alpha)}$

Equation 3-9 shows that firm value equals book value (b_t) adjusted for (i) the current abnormal earnings (ζ_t^a), and (ii) other information that affects future profitability (θ_t). In this instance, *R* is given by *1 + r*. The random process that models ζ_t^a is called the Linear Information Dynamics (LID). The LID is given by:

$$\tilde{\zeta}_{t+1}^a = \omega\zeta_t^a + \theta_t + \tilde{\varepsilon}_{1,t+1} \quad \ldots (3\text{-}10)$$

$$\tilde{\theta}_{t+1} = \alpha\theta_t + \tilde{\varepsilon}_{2,t+1} \quad \ldots (3\text{-}11)$$

In equations 3-10 and 3-1 above, ζ_t^a is the abnormal income for time *t* while θ_t is the "other information" affecting future profits. The parameters of persistence are given by $\omega\ and\ \alpha$. The variables $\tilde{\varepsilon}_1\ and\ \tilde{\varepsilon}_2$ are disturbance terms.

The Ohlson model can thus be viewed as being based on three premises:

i. The DDM (which determines the market value in risk-neutral valuation),
ii. The clean surplus relation, and
iii. The random behaviour of residual profits (ζ_t^a).

The last premise is the one that sets the Ohlson Model apart from other valuation models. The Ohlson Model has some similarities with the residual income valuation model. However, it has an additional proposition: the linear information dynamics.

Lundholm (1995) argues that Ohlson's construct is better than previous constructs because it allows the net worth to transmit through the result: profits and book value appear in the same equation. Combining the DDM, the CSR and the two LID equations (Equations 3-10 and 3-11) gives the Ohlson model. Fukui (2001) says that the LID represents Ohlson's greatest contribution to firm valuation research. Construction of the LID rests upon the assumption that future residual profits are based on prior abnormal profits plus some other information that is yet to be captured by the accounting numbers. Thus, the Ohlson Model hinges on the informational dynamics of residual profits. Combined with the ordinary DDM, the LID serves to put restrictions on the DDM. In other words, the firm is still being evaluated using the DDM but establishing a distinction between current information and the present value of future dividends. Noteworthy,

however, is the fact that the variable, "other information", is not precisely defined in the model. In other words, what makes up other information was left open for interpretation. A wide range of possible measures of other information have been suggested, among them are research and development expenditure, analyst forecasts, long term contracts and new patents. While the impact of future events not currently captured by financial statements on future performance is not in doubt, how to precisely quantify those events remains elusive. In other words, while it is theoretically sound to incorporate other information in firm valuation, operationalizing the theory remains a challenge because every potential measure of other information has its own limitations. Furthermore, the most significant other information relates to events that are not known or whose effects are not known at the present moment. This proposition is theoretically sustained by the fact that if the effects of events surrounding other information are already known, then all firm valuations at time 0 can easily incorporate such effects. Such events will therefore not fit the definition of other information in the Ohlson model. The critical point here is that this other information is unobservable at time 0, making it difficult to incorporate in empirical studies.

3.1.5 Theoretical Framework of the Present Study

The theoretical framework guides both literature review and data analysis. This, according to Adom *et al* (2018), is a very important aspect in any research undertaking. The theoretical foundation of the first (main) and second objectives of the study is located in the residual income valuation theory, clean surplus relation, and the Ohlson model. Theoretical constructs in the current study are borrowed and adapted from these theories based on a conceptualisation of relationships between share price, market capitalisation and enterprise value (as dependent variables), and operating income from continuing operations, tangible book value and firm size (as independent variables). Furthermore, the adaptation of the theoretical constructs is also guided by prior research, which was surveyed in Chapter 2. The justification for adopting the above-named models' theoretical construct is that firm value is not going to be determined based on assumptions about future microeconomic and macroeconomic factors that drive a firm's cash flows (if valuation is based on discounted cash flow techniques). Rather, the focus is on a firm's current book value, and this is not subject to assumptions regarding the future. Limitations of book value, especially those emanating from the effects of different accounting policies chosen by a firm, are acknowledged and appreciated. However, the current study

considers these to be transparent (assuming full disclosure) and manageable than the unenviable task of predicting future economic activity. For instance, firms can boost their book values by "manipulating" what intangible assets like goodwill and patents are worth. To manage this possibility, the current study adopts a conservative view of measuring book value and focuses on tangible book value. This greatly reduces (but not totally eliminates) the effect on firm value of accountants' choice of how they value firm assets.

The theoretical construct of the third objective of this study is located within the capital structure theories surveyed in Chapter 2. Literature review showed that there is no consensus among theorists regarding the influence of debt financing on firm value. While MM's capital structure irrelevance theory dismisses the effect of debt financing on firm value, the debt signalling theory and pecking order theory suggest that financial leverage has value relevance. These theories informed the current study's investigation into value relevance of financial risk as measured by the debt/equity ratio and total amount of debt.

The fourth objective, which focuses on the value relevance of cash dividend payments and retained income, is largely informed by the dividend discount model and dividend theories outlined in Chapter 2. While, on one hand, MM's dividend irrelevance theory suggests that paying or not paying cash dividends does not affect a company's value, on the other hand, the dividend signalling theory, bird-in-the-hand theory, agency theory and tax preference theory advocate for value relevance of dividend payments. All these theories inspired and moulded the current investigation.

3.2 Conceptual Framework

There should be a connection between the relevant theories (identified in a theoretical framework), empirical studies and the concepts envisaged by the researcher. This section explains that link.

Value relevance focuses on how accounting information affects equity prices. Conceptualisation of the interpretation of value relevance used in the current study is motivated by the literature. In Chapter 2, the literature documents that Francis & Schipper (1999) gave four distinct explanations of value relevance, of which two of them are hinged on statistical association between data contained in financial reports and market-driven values of shares. The other version states that accounting data affects equity prices

by capturing the intrinsic value of shares. Share prices are then deemed to drift towards their intrinsic values. Francis & Schipper (1999) also stated that accounting data possesses value relevance if it has variables that are used in valuation models or assists in forecasting them.

This research adopts the interpretation based on a statistical association between equity prices/ firm value (response variable) and financial statement items like book value, earnings, debt, dividends and retained earnings (explanatory variables). Section 4.12.1 in Chapter 4 explains this issue in more detail.

Figure 3-1 is a diagrammatic representation of the study's conceptual framework. At the centre, there is firm value/share price, which is the response variable. It is a function of financial statement variables (EBIT, book value, financial leverage, cash dividends, and retained income) as well as company size. The analysis of value relevance is based on a dynamic model of value relevance. Firm value from the previous period is theorised to affect the current period's firm value, represented by a block arrow on the extreme right of the diagram, written "previous period's share price/firm value". This appears outside a bracket that covers the entire figure, meaning that in all models, the previous period's share price/firm value is always included as an explanatory variable. An AR (1) process is thus theorised, which is in line with the idea behind the CSR.

The main objective focuses on EBIT from continuing operations and tangible book value. The primary question of the study therefore focuses on these variables as well. The figure also shows all the sub-questions that were answered in this study. The research questions are formulated from the respective variables in each objective that are linked to firm value or equity prices. Explanation of conceptual relationships is arranged according to the study's objectives.

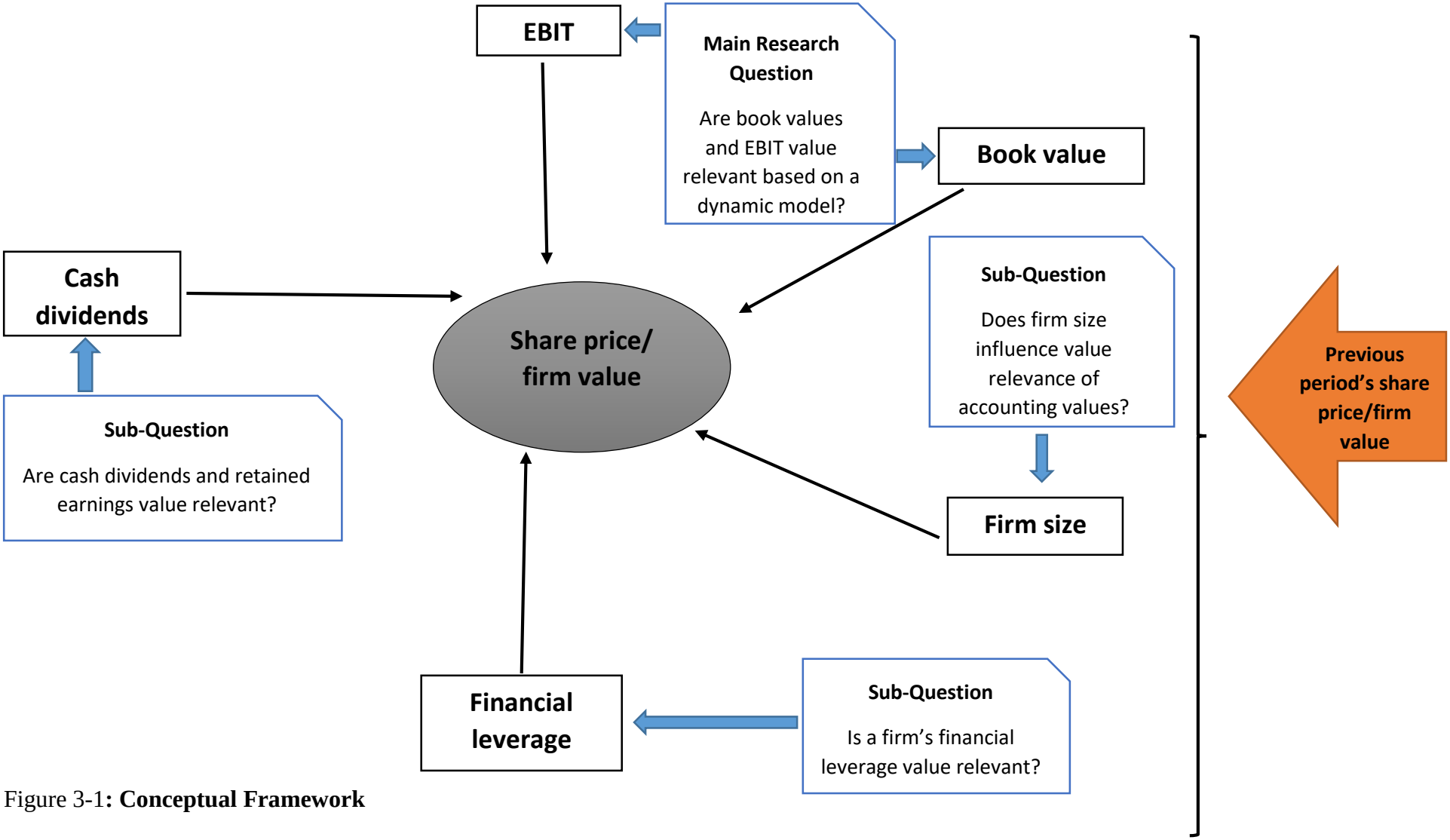


Figure 3-1**: Conceptual Framework**

3.2 Conceptual Underpinnings in Objective 1

The main objective is aimed at determining the relationship between firm value and two financial statement variables motivated by the Ohlson model: operating income and tangible book value. Firm value is measured by market capitalisation, enterprise value and share prices. An account of the conceptual relationships between these firm value measures and the two financial statement variables follows.

3.2.1 Conceptual Relationship between Firm Value and Tangible Book Value

Market capitalisation is one of the firm value measures adopted in this study. It is a product of equity prices and the number of shares in issue at a specific time period. Amongst a host of other measures of firm value, market capitalisation is the one that is a direct outcome of equity market participants' actions. On the other hand, book value measures the net worth of a firm's assets. While intangibles like patents and goodwill are, by definition, assets, in turbulent times, their value falls drastically. In the extreme case of liquidation, these intangible assets have no residual value. A conservative view of firm value thus excludes intangible assets in the computation of book value. The goal of this study is to ascertain the link between a company value measures that shareholders can lay their hands on in the event that a firm liquidates (liquidation value). Resultantly, intangible assets are excluded in calculating the book value, which results in what is technically called tangible book value. The conceptual relationship between the variables can be expressed as:

$$\text{Firm value} = f(\text{tangible assets, total liabilities}) \quad \ldots (3\text{-}12)$$

The difference between the variables in brackets gives tangible book value (i.e. tangible assets – total liabilities). This represents the residual value in the event of liquidation. An increase in this value means that, other things constant, there will be more funds available for distribution to shareholders if the firm is liquidated. Investors will be prepared to pay a higher stock price if tangible book value increases because of the increase in the value of their "liquidation insurance claim", which is the salvage value in a failed company. Higher stock prices result in a rise in market capitalisation. This is the justification for including tangible book value as an explanatory variable in this study, which leads to the first hypothesis:

H1: There is a positive and significant relationship between market capitalisation and tangible book value

An alternative view of firm value adjusts a firm's market capitalisation by adding non-common equity holders' claims like preferred equity and minority interest. Cash and cash equivalents are subtracted, and the result is what a firm is worth to anyone who wants to acquire it, which is called enterprise value. It stands for the takeover value of a company. Enterprise value is included as a dependent variable not because there are a lot of takeovers on the JSE, but because of what it represents to any investor. An asset is worth what a buyer is willing to pay for it, and enterprise value represents a firm's purchase price. The purchase price thus represents value accorded to an asset by the market, which is important to investors. The study envisages a relationship between enterprise value and tangible book value premised on the fact that the net assets are what a firm is all about: a firm is bought because of its assets, which will be used to generate revenues in the future. A rise in the value of the net assets (tangible book value) means that the firm's purchase price (enterprise value) should increase as well. Thus, theoretically, there has to be a positive association between enterprise value and tangible book value. This produces the second hypothesis of the study:

H2: There is a positive and statistically significant relationship between enterprise value and tangible book value

3.2.2 Conceptual Relationship between Firm Value and Operating Income

As highlighted in the theoretical framework, company value is, in theory, the discounted value of cash flows generated in the future, i.e.

$$\text{Firm value} = \sum_{t=1}^{T} CF_t(1+r)^{-t} \qquad \text{... (3-13)}$$

The future cash flows (CF_t), amongst a host of their form, can either be dividends, free cash flows or earnings. While most extant literature (documented by Kothari, 2001; Beisland, 2009; and Baltariu, 2015) uses net earnings as an explanatory variable; this research contends that net earnings include some income streams that are non-recurring. Non-recurring income streams should not be used to explain the future earning capacity

of a firm because they are once-off, they will not be earned again in the foreseeable. Collins, Maydew & Weiss (1997) also note that the size of the once-off items as well as their magnitude had a negative effect on information content of accounting variables over the years. Thus, researchers find or do not find a statistical link between firm value and earnings because of the noise in their earnings measure due to the inclusion of once-off items in earnings. Thus, there is need to focus on earnings streams that have a longer life span, and this is reported by firms in their financial statements as earnings from continuing operations. Earnings that have a longer life span are important because equity valuation assumes that a firm will remain as a going concern for the foreseeable future, and recurring earnings provide the best guess of the firm's future potential. Earnings from discontinued operations have no bearing on future performance because the source of those earnings has been terminated. Resultantly, this study makes a departure from the norm and uses operating income (EBIT) from continuing operations as an explanatory variable. Market capitalisation and enterprise value are, again, the measures of firm value.

Theoretically, EBIT from continuing operations should be related to market capitalisation because it stands for a company's ability to generate income from its operations that are expected to continue. Investors buy shares because of a firm's future potential to offer them a positive return on their investment. Very good prospects (higher EBIT from continuing operations) attract a higher share price or firm value and the opposite is true for poor prospects. Consequently, there has to be a positive relationship between stock prices or firm value and EBIT from continuing operations. This leads to the third hypothesis under the main objective:

H3: There is a positive and significant relationship between market capitalisation and EBIT from continuing operations

A theoretical relationship is also anticipated between enterprise value and EBIT from continuing operations. The purchase price that investors are prepared to pay for an earning asset is contingent upon that asset's projected future cash flows. Given two competing investment assets, an investor is prepared to pay more for that asset which yields higher future earnings. In this setting, the amount that the investor is prepared to pay is the enterprise value. Projected future cash flows are represented by EBIT from continuing operations because these earnings are generated by a permanent or near-permanent base.

Ceteris paribus, higher current EBIT from continuing operations are the best indicator of future potential. The brighter the future potential (represented by higher current operating income from continuing operations), the higher the purchase price (enterprise value) that an investor is willing to pay. This, therefore, leads to the fourth hypothesis under the main objective.

H4: There is a positive and significant relationship between enterprise value and EBIT from continuing operations

It is acknowledged that while the variables book value and earnings do affect firm value or share prices and have attracted much interest from researchers, there are other financial statement variables that also impact share prices and firm value (Beisland, 2009). Such variables include debt ratios, cash dividend payments and retained earnings. This research examines some of these variables to extend the knowledge frontier beyond earnings and book values (popularised by Ohlson, 1995). The next section explores the effect of company size on value relevance of the variables in the main objective through the use of a binary variable that represents firm size.

3.3 Conceptual Underpinnings in Objective 2

The research posits that company size has an effect on value relevance of earnings and book value based on the 'too-big-to-fail' hypothesis. Equity investors feel that they are in a 'comfort zone' when they invest in large firms as opposed to small firms. This is justified because the firm's large size symbolises a rich history of good performance over the years. Investors will anticipate this historically good performance to persist in the future. However, equity investors are aware that, at times, this may not be the case, which forces them to pay attention to performance figures (and not just rely on reputation of the firm). This focus on performance figures by equity investors then contributes to value relevance of large firms' financial statements. Also, the literature documents that large firms tend to have a bigger analyst following than small firms, something that should influence value relevance of financial statement variables in large firms. This research investigates if value relevance is indeed a function of a firm's size. The main contribution of the study in this research area is predicated on exploring interactions between a dummy variable (firm size) and numerical variables. This gives more insight into the nature of

the relationship than simply modelling large-cap and small-cap firms separately, as other researchers like Chandrapala (2013) as well as Bae & Jeong (2007) have done.

Having many analysts that follow large firms' performance means that there is more scrutiny on large firms' operating income from on-going operations and tangible book value. More scrutiny should result in value relevance of firm size/book value interaction variables as well as firm size/operating income interaction variables in large firms than in small firms. In other words, value relevance of both tangible book value and EBIT from continuing operations in large-cap firms is different from that in small-cap firms. Pursuant to all this, the following hypotheses are tested under the second objective:

H5: Firm size affects value relevance of tangible book value

H6: Firm size influences value relevance of EBIT from continuing operations

3.4 Conceptual Underpinnings in Objective 3

Value relevance of financial leverage is tested because of its impact on equity investors' perceptions, and hence, share prices. Where investors perceive an increase in risk levels, other things constant, they will sell the concerned firm's shares. This negatively affects the price of the firm's shares, hence, the link between the two factors. Furthermore, a relationship between share prices and financial risk (measured by the debt/equity ratio and total debt[7]) is hypothesised based on the existence of an optimal debt ratio. Debt is cheaper than equity, but there is an optimal level of debt that, if exceeded, the cost of capital starts to increase, as equity investors increase their required rate of return as a result of perceived increases in risk levels due to higher debt levels. If this happens, it means that the stock price is negatively affected, as some investors start disposing their shares. This is testimony of a theoretical link between share prices and financial leverage.

A firm's total indebtedness (current and non-current liabilities) should be of interest to investors because both forms of indebtedness consume a firm's cash flows. Current liabilities, which are left out in conventional calculations of debt, put a higher strain on a firm's cash flows because of their short-term nature (funds have to be raised to settle them within a short time span). Failure to honour these liabilities may affect relations with

[7]Debt/equity ratio measures relative financial risk while total debt measures absolute financial risk, as per the explanation given in Chapter 4.

suppliers, which may affect a manufacturing firm's access to raw materials on credit. This, in turn, affects its operations, ultimately putting a dent on a firm's bottom line. This is why, in this study, debt is regarded as the sum of current and non-current liabilities: the study postulates to re-define debt to mean any form of financial liability by a firm and not just interest-bearing long-term loans.

Where a firm assumes too much financial risk, theoretically, this should negatively affect its share price, as investors become worried about the ability of the firm to discharge its financial obligations while churning out good returns to equity investors. Too much indebtedness threatens the going concern status of the firm, which is viewed negatively by shareholders, resulting in a negative association between share prices and financial risk. This leads to the following two hypotheses tested under the third objective:

H7: There is a negative and significant relationship between share price and relative financial risk

H8: There is a negative and significant relationship between share price and absolute financial risk

3.5 Conceptual Underpinnings in Objective 4

Cash dividends and retained earnings are also theorised to be related with firm value. These two variables represent value created by a firm during a particular year, where net profits can either be distributed to shareholders in the form of cash dividends, or retained by the firm. Literature has documented that there are theories that say dividend payments have no influence on share prices (MM dividend irrelevance theory), but other theories say dividends affect share prices (Gordon's bird-in-the-hand theory). Empirical researchers have primarily focused on value relevance of cash dividends as shown in Chapter 2. This study extends frontiers by including retained earnings in the model. This is aimed at tracing the whole shareholder value system. The reasoning behind tracing the shareholder value system is to determine whether investors "follow the value". This term is used in this study to mean a situation where investors trace the value created by a firm during a particular trading year to its final destination and accord commensurate recognition of the split in value created. The value created is represented by net income and its final destination can either be cash dividends or retained earnings. By tracing shareholder value, it means investors will incorporate these forms of value into their

equity valuation models. Conceptually, therefore, it means that if a firm declares a cash dividend, investors will positively respond. The positive response will manifest itself in the form of an increase in firm value. Furthermore, the study postulates that if all or some value is retained by the firm, investors will, again, respond positively through increased firm value. The rationale for a positive response when earnings are retained is that these earnings are still at the firm's disposal and can quickly be deployed into profitable opportunities that arise in the future, which ultimately will increase profits to the benefit of shareholders. Furthermore, retained earnings represent value that is still within the firm. Since common equity holders are owners of the firm, the earnings that have been retained are an addition to the owners' "bank balance", which should increase the value of the firm. This leads to the following hypotheses for the fourth objective:

H9: There is a positive and significant association between firm value and cash dividends

H10: There is a positive and significant association between firm value and retained earnings

Firm value is measured by both market capitalisation and Tobin's Q. Tobin's Q is chosen as a measure of firm value because it relates the firm's market value to the replacement cost of its assets. It is also a general guide with regards to whether the firm is under-valued or over-valued. Shareholder value, whether in the form of dividends or retained earnings, will result in a firm being under-valued, fairly-valued or over-valued. Resultantly, there should be a relationship between Tobin's Q and cash dividends and retained earnings. An increase in cash dividends or retained earnings means that net income will have increased. If a firm incurs a loss, other things constant, it will ordinarily not declare a dividend. Under normal circumstances, cash dividend declaration should therefore mean that a firm has performed well, which should lead to an increase in share price (and market capitalisation). The relationship between market capitalisation and cash dividends also stems from the fact that the ex-dividend share price is lower than the cum-dividend share price. An increase in cash dividends leads to a higher cum-dividend share price, meaning that cash dividends positively influence share prices and, by extension, market capitalisation. Retained earnings are expected to have an influence on market capitalisation because they represent an increase in a firm's cash pile, which can be used

to generate more income or even distributed to shareholders in the future. An increase in retained earnings should thus increase market capitalisation.

3.6 Chapter Summary

This chapter provided a link between empirical literature and the research methodology by explaining the theoretical and conceptual foundations of the study. The residual income valuation model, dividend discount model and clean surplus relation form the theoretical base of most value relevance research, and this study makes use of some aspects of these frameworks. The three models or concepts were explained, together with the Ohlson model, which is built upon the three frameworks. A graphical conceptualisation of this study was also presented and explained in line with each and every objective. From a possible four interpretations, based on literature, this study determines value relevance through a statistical association between the response and explanatory variables.

Having laid out the theoretical and conceptual foundation, the next chapter builds upon that foundation by articulating the key aspects of the study's methodology.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.0 Introduction

The theoretical and conceptual framework presented in the previous chapter gave an account of theories, relationships and expectations that underline this investigation. To operationalize the author's assertions, a strategy was crafted in line with the concepts spelt out in the last chapter. The research methodology is a vital component of any research agenda because it is the campus that provides the direction concerning the way in which the study will be done. By definition, a methodology is the cobweb that contains all the intricacies of how a given research problem will be tackled. Research methodology provides the glue that binds together all the theories and empirical realities in a secondary data-based research of this nature by articulating the perspectives, philosophies and methods employed in a given study.

The purpose of this chapter is basically to explain and justify all the choices that the researcher made in the process of this investigation. The choices relate to, among other issues, the paradigm, philosophy, strategy, and techniques and procedures that enabled this research to materialise. The aforesaid are some of the many layers of the "research onion" found in any business research. Explanation and justification of the choices made is important, as it enables the reader to contextualise research findings.

This chapter discusses various aspects of how the research was conducted, starting with the outer layers of the "research onion", and peeling off the layers until we reach the centre. Thus, the research paradigm is discussed first, which is then followed by an expose of the research philosophy. Theory development approach adopted, methodological choice and the research's time horizon are then presented and justified in that particular order. Thereafter, the research design, population of the study, and sampling issues are explained before data and model related aspects are discussed. A data analysis plan is presented according to the study's objectives, and finally, the chapter winds up with a summary of key issues covered in the chapter.

4.1 Research Paradigm

A research paradigm is defined by Žukauskas, Vveinhardt &Andriukaitienė (2018) as a "wide structure encompassing perception, beliefs, and awareness of different theories and practices used to carry out scientific research" (p.123). A paradigm can also be regarded as a "world view" of the entire research problem. Makombe (2017) provides an alternative and precise definition of a paradigm, saying "paradigms do not represent hard and fast sets of rules, but that they are, more accurately, loose and developing guidelines that assist the on-going production and resolution of research problems" (p.3367). Research methods adopted are essentially a function of the research paradigm chosen. Consequently, it is of paramount importance that a paradigm be stated in every study. The function of a research paradigm is primarily to guide the researcher in the search for answers to the research problem.

Saunders, Lewis & Thornhill (2008) identify four research paradigms, namely: functionalist, radical structuralist, interpretive, and radical humanist. These are borne out of combining the objectivist-subjectivist dimension and the regulation-radical change ideological orientation, thus forming a 2 x 2 matrix. The dimension of objectivism and subjectivism is concerned with whether a researcher views the research subject objectively or subjectively. Regarding the regulation view, the researcher "seeks to suggest how organisational affairs may be improved within the framework of how things are done at present rather than radically challenging the current position" (Saunders *et al* 2008, p.132). As the name implies, the radical view confronts and seeks to alter the status quo. The functionalist paradigm is a product of the objectivist view and the regulation element of ideological perspectives. If the objectivist view is, again, adopted, but radical change is preferred (instead of regulation), then, the resultant paradigm is called radical structuralist. A subjectivist stance coupled with regulation yields the interpretive paradigm. Lastly, the radical humanist paradigm involves a subjectivist view and a radical change agenda.

4.1.1 Justification of Paradigm Adopted in this Research

The current research adopted a functionalist paradigm. This was chosen based on the aim of the research, which is to proffer explanations with regards to the nexus between firm value or share prices as dependent variables and a myriad of financial statement variables as independent variables. Furthermore, recommendations are made in line with observed

relationships. All this is done within the context of what obtains currently, i.e. no attempt is made to radically change the current set up of producing financial statements because the regulation of financial reporting is a complex issue that cannot be changed by one research alone. Nonetheless, recommendations are still made, and this is a much more realistic view of the current research problem. The recommendations are meant to stimulate debate so that some improvements can be done within the existent set up. By adopting the functionalist paradigm, the research assumes that all firms being studied are rational organisations. Pursuant to this assumption, rational assertions of observed phenomena are then deemed plausible. The functionalist paradigm is usually associated with the positivist philosophy (which is also the case in the current study), yielding positivist-functionalist research.

4.2 Research Philosophy

Before a discussion of this research's philosophy, there is need to delve into assumptions about ontology, epistemology and axiology. Assumptions on these issues tend to cause the research philosophy to self-select. This means that a thorough explanation of ontological, epistemological and axiological assumptions is largely the justification of a particular research philosophy adopted, and it also makes it easy to comprehend the philosophy.

4.2.1 Ontological Assumptions

Ontology is all about the "assumptions about the nature of reality" (Saunders *et al.* 2008, p.127). These assumptions play a central role in how research subjects are seen. Realism is the ontological position adopted by the researcher in this instance. Alternatively, viewing this posture from an objectivism-subjectivism continuum, the research is located on the objectivism side. This is premised on an assumption that accounting is objective in nature, and it is more of the same in every organisation such that it can be viewed with an objective lens. The focus is on accounting because financial statements are a product of the accounting profession. In the current study, secondary data on firm performance is used. The secondary data comes from published financial statements as well as the stock market. It is assumed that these financial reports are prepared in line with the relevant financial reporting standards. As explained in Chapter 1, the financial statements are also assumed to be free from fictitious, non-existent or cooked-up assets and liabilities. These are hallmarks of objectivism, hence the choice. Furthermore, highest standards of

disclosure of all relevant and material information are assumed to be upheld by all companies selected in this investigation.

4.2.2 Epistemological Assumptions

Makombe (2017) says epistemology is concerned with the connection between the reality of what is there to be known and the person undertaking the research (the knower). Epistemology is thus all about knowledge, i.e. how we know what we know. In this study, empirical knowledge forms the basis of what is known in the area of value relevance of accounting data. This is mainly because the study is also empirical, so, it has to draw what is already in this strand from empirical studies done earlier by other knowers. This research adopted positivism as its epistemological posture because the researcher believes that reality about value relevance of financial statement variables exists. Its existence is independent of human beings, and that is positivism. Epistemological assumptions are inter-twined with ontology, where "adhering to an ontological belief system (explicitly or implicitly) guides one to certain epistemological assumptions" (Rehman & Alharthi, 2016, p.52). To determine the information content of accounting data, objective detachment by the researcher from firms and firm management being studied was the working guideline. While specific modelling assumptions are made as the research unfolds, the study primarily relies on facts and figures generated from firm operations. The assumption therefore is that every aspect of interest in a firm in this kind of investigation can be reduced to numbers, hence, the exclusion of opinions of actors like investment analysts, firm managers, accounting standards setters, and equity investors. A key issue around epistemology is the question about what makes data to be of good quality. Since the current study utilises secondary data, a barometer of the quality of data worth using in this research is the audit opinion found in all audited financial statements. Besides the firm performance numbers, audit opinions were thus considered, the main purpose being to ensure that financial statements used are not qualified by the auditors. Qualification that leads to a firm being excluded from the current research is predicated on accounting practices that violate the generally recognised accounting standards, which govern the preparation of financial statements in South Africa, as explained in Chapter 1.

4.2.3 Axiological Assumptions

Going by Saunders *et al* (2008), axiology "refers to the role of values and ethics within the research process. This incorporates questions about how we, as researchers, deal with

both our own values and those of our research participants" (p.128). As highlighted earlier, this study makes use of secondary data. Consequently, there is no involvement of human beings as participants (such as what would obtain where interviews or questionnaires are used as research instruments). Thus, no assumptions about values of research participants are made. The researcher's own values, nonetheless, play a part in shaping the data gathering process, ensuring that the correct data is gathered. Ethically, the researcher made an undertaking to uphold the highest standards, ensuring that data collected is not manipulated even if the figures may not conform with expectations. In short, share price data and financial statement variables were recorded without any alteration. The inquirer is detached from the data generating process, which makes the whole data collection exercise value-free. This is fundamental to ensure that an objective assessment of the research problem can be made.

4.2.4 Research Philosophy Chosen

A number of research philosophies exist, which include positivism, critical realism, interpretivism, postmodernism and pragmatism. Based on the ontological, epistemological and axiological assumptions explained above, positivism was selected as this research's philosophy. By definition, positivism as a philosophy assumes that there is an objective way of understanding the social and organisational world. In this particular context, the belief is that we can objectively assess the usefulness of financial statement variables in explaining firm value. Organisations are perceived just like natural objects because a company is a legal persona. Thus, epistemologically, the emphasis is on uncovering facts about market-firm dynamics that are measurable. Positivism endeavours to produce knowledge that is correct, and also, not ambiguous. Concerning positivism as a research philosophy, Žukauskas *et al* (2018) says "In this research philosophy, the scientist is an objective analyst and, on the basis of it, dissociates himself from personal values and works independently" (p.123). This quotation aptly summarises what really transpired in the current study. The researcher took a position to detach self from any links with the companies (and by extension, their management) being studied. Personal values did not impede an objective assessment of the research problem. With a positivist philosophy, a problem is identified first. In the current research, this was also the first step, and the research problem was articulated in Chapter 1. After identifying the research problem, positivism dictates that theoretical hypotheses should then be formulated. Chapter 3 of the current research is devoted to formulation of the study's hypotheses, in

line with the positivist philosophy. Using appropriate techniques, the philosophy says the hypotheses are then tested (where we either reject or do not reject the hypotheses), and then, draw some conclusions from the test results. Again, this is the same procedure that was followed in the current study. The positivist philosophy was thus followed based on the assumptions about organisational and financial reporting reality that were made.

4.2.5 Approach to Theory Development

Every research involves a theory in one form or another, which, if not explicitly specified in the research design, normally comes out when results are being presented and conclusions being made. It may be an existing theory, or one that unfolds as a result of observed phenomena. This section explains the process of theory development in the current study. Saunders *et al* (2008) identifies three distinct approaches to theory development, namely: deductive, inductive, and abductive approaches.

4.2.5.1 Deductive Approach

This approach is very prevalent in natural sciences research (where it originated from). It entails a situation where a research begins with a theory, which is then tested based on an appropriate research design. This theory would most probably have been developed from extant literature. Deductive reasoning therefore means that data follows theory.

4.2.5.2 Inductive Approach

On the other hand, data gathering is the starting point where one has adopted an inductive style. Theory is then generated from the collected data. Inductive style is the opposite of deductive style in that, with inductive style, theory follows data, which is the opposite of what happens in a deductive style.

4.2.5.3 Abductive Approach

An abductive method involves observation of a surprising fact at the beginning, and this fact is the conclusion. Premises are then developed to explain the fact so observed, i.e. data is gathered in order to investigate and explain the phenomenon. Based on observed patterns, existing theory can be modified, or a new theory can be developed. Further data gathering will be done to test the theory thus developed or modified. Essentially, abduction is more of a combination of deduction and induction because of its forward and

backwards movement. This is typical of most research in the field of management and business (Saunders *et al.* 2008).

4.2.5.4 Approach Adopted

Fundamentally, the different styles of theory development discussed above are not mutually exclusive. There are no set boundaries cast in stone, and usually, a combination of approaches may address the research problem much better than trying to strictly follow a certain type of reasoning. However, even in cases where a combination is adopted, one form usually dominates the other. The current study primarily adopted a combination of an inductive and a deductive slant to theory development. While abductive style combines deductive and inductive methods, the current study just falls short of alignment with the abductive method purely on the lack of the" back and forth movement" that is emblematic of abductive reasoning. The research problem explained in Chapter 1 was the starting point, which is akin to the "surprising fact", which characterises the first step in the inductive approach. After that, a theoretical and conceptual framework, informed by beliefs about "what really is going on", was developed and propositions made. The propositions are based on both theory and empirical literature. However, for Objectives 3 and 4, existing theory was mainly the starting point; a situation that is characteristic of deductive reasoning. It is within this scheme that it becomes difficult to clearly distinguish between the approaches followed; suffice to say the style includes aspects of both the deductive and inductive slant to the development of theory. Besides informing the research design, the theory development approach helped in the selection of the research's strategy and configuration of the methodology.

4.3 Methodological Choice

The choice here is whether to use a mono-method or adopt a mixed-methods style. The specific methods in question that can be stand-alone or mixed are basically the qualitative and the quantitative methods of analysing data that would have been generated. The goal in this study is to determine whether or not various financial statement variables are useful in explaining share price movements and various measures of firm value, like market capitalisation and enterprise value. Automatically, this means that a qualitative approach is not appropriate because what is required are the measurables from financial statements. Based on the goal of the study, a mono-method quantitative approach was thus selected.

This approach enabled conclusions to be drawn from a dissection of the nexus between firm values and accounting data.

4.4 Research Design

A longitudinal research design was used in the current study. This design was chosen since the goal was to study the same group of companies covering a prolonged period of time in order to determine the usefulness of financial statement variables in explaining share price or firm value movements. This naturally meant that a longitudinal research design is appropriate.

In terms of approach, this research is quantitative as highlighted in Section 4.3 above. It is quantitative in the sense that it uses quantifiable data like equity prices, market capitalisation, enterprise value, EBIT from continuing operations, debt ratios, cash dividends and tangible book values, and determines these variables' level of value relevance. Statistical techniques are used to analyse the numerical data in order to formulate facts and draw conclusions on the research problem. A dynamic model incorporating the first lag of the dependent variable (share price, market capitalisation and enterprise value) is used. Justification for this is provided in Section 4.9.1.

The remainder of the chapter addresses the "centre of the research onion", which focuses on the techniques and procedures followed in conducting this research.

4.5 Population and Sampling Method

The population of the study is comprised of all non-financial companies quoted on the JSE that were active for the entire period from 01 January 2010 to 31 December 2017. There were 377 JSE-listed firms as at the end of 2017[8]. Statistics from the JSE indicate that during the period 2010 to 2017, total new listings were 143 as shown below:

Year	2010	2011	2012	2013	2014	2015	2016	2017	**Total**
New listings	14	16	14	13	24	23	18	21	**143**

These are excluded from the population because their financial reports and share price data are incomplete, leaving 234 firms, inclusive of financial firms. In line with the FTSE Russell Industry Classification Benchmark (ICB) used by the JSE, there were around 123

[8] African Securities Exchanges Association (ASEA) 2017 Annual Report, page 22.

firms classified as 'financials'. Financials that are not newly listed are 52 and this figure is subtracted from 234, giving a total population size of 182 non-financial firms. To cater for measurement and/or classification error, the population size is rounded up to 200 firms. The population size was rounded up because a larger population is always better than a smaller one for inference purposes.

The decision to leave out financial companies is premised on the fact that financial firms' operations are very different from those of non-financials, as well as the unique nature of their assets and liabilities. Also, financial companies are highly leveraged, meaning that combining them with non-financial companies when analysing value relevance of financial leverage may be misleading. Financial firms, like banks, are also governed by a separate set of rules, enforced by central banks, which dictate their financial statement reporting, as highlighted in Chapter 1. This approach is also in line with many other researchers documented in Baltariu (2015) and Beisland (2009).

As at 31 December 2017, the JSE was made up of 10[9] level-one industry classifications, which are based on the FTSE Russell Industry Classification Benchmark. At an industry level, the population comprises of 9 industries and these are fairly represented in the sample to enhance sample quality (representativeness). Cluster sampling was utilised, where each industry is viewed as a cluster. Firms were drawn from each cluster using purposive sampling to form the sample of the study. Purposive sampling was used to ensure that both high and low capitalised firms are included in the sample so that Objective 2 can be fulfilled, as well as having a sample that represents both large and small firms. Furthermore, inclusion of both small and large firms by market capitalisation was meant to ensure that there is no bias towards either of these firm size categories. The size of the sample is based on an enhancement of a rule of thumb, which says that if the population of study exceeds 100 individuals, a sample size of between 5 and 10% is deemed representative of the population. This study enhances this rule of thumb by sampling 25% of the population, which yields 50 firms.

[9] They have since been revised to 11 industries effective 01 January 2019 due to the creation of Real Estate as a stand-alone industry.

4.6 Profile of the Research Sample

The research sample comprises of 50 firms from 9 eligible JSE-ICB sectors (level 1). However, as at 31 December 2017, there were no listed firms in the Utilities sector. This, therefore, means that effectively, firms were sampled from 8 sectors. Table 4-1 presents the 8 sectors and their respective sampled firms.

Table 4-1: **Composition of Research Sample**

JSE-ICB Sectors (Level 1) and Firms in Each Sector					
A	**Energy (Oil & Gas)**	**D**	**Industrials**	**F**	**Consumer Services**
1	Sasol	17	Mazor Group	35	Comair
		18	Santova	36	African Media
B	**Basic Materials**	19	Bowler Metcalf	37	Shoprite
2	African Oxygen	20	Bidvest	38	Woolworths
3	Exxaro Resources	21	Workforce	39	Spur Corporation
4	Randgold Exploration	22	Reunert	40	Verimark
5	Assore	23	Bell	41	Massmart Holdings
6	Sephaku Holdings	24	KAP	42	Mr Price
7	Insimbi	25	Raubex	43	Advtech Group
8	Merafe Resources	26	Eqstra		
9	African Rainbow	27	Grindrod	**G**	**Consumer Goods**
10	Implats	28	PSV Holdings	44	Metair
11	Arcelomittal	29	Value	45	Oceana group
12	Northam Platinum	30	Imperial	46	Tiger Brands
13	Argent			47	Steinhoff
14	Hulamin	**E**	**Technology**	48	Nu-world Holdings
		31	Mustek		
C	**Health Care**	32	EOH Ltd	**H**	**Telecommunications**
15	Netcare	33	Cognition	49	MTN
16	Aspen	34	ISA Holdings	50	Telemasters

NB: Financials are excluded and there were no listed firms in the Utilities sector

The number of firms in each industry sector was calculated based on the number of firms in that sector as a fraction of the population, multiplied by the sample size. A conscious decision was made to sample both small and large firms from each sector. However, an exact matching of the number in these two categories was not possible because in some sectors, small firms are in the majority. In such sectors, small firms outnumber big firms in the research sample. Since this is a reflection of the sectors' architecture, it is not considered as a problem. Firms that prepare their financial statements in foreign currency without another set of accounts in Rand (mostly multinational companies with a primary

listing in another country) were excluded from the sample. This is because, while share prices will be in Rand, financial statement variables will be in a different currency meaning that the response variable and explanatory variables are in different currencies. Modelling these together is a problem because of the exchange rate fluctuations incorporated in the association between response and explanatory variables[10].

4.7 Study Period

The research is based on an 8-year period from the year 2010 to 2017 for 50 non-financial firms quoted on the JSE. The period 2010 to 2017 was chosen because 2010 marks the end of the global financial crisis (as outlined in the problem statement, Chapter 1), where the goal is to ascertain value relevance in the post-crisis era. The end date naturally follows from the commencement date of the study (2017). This means that an 8-year period had to be used. This produces a typical short *T*, large *N* scenario which is suited to GMM estimation.

4.8 Functional Form of Research Model

Most extant research on value relevance that applied the Ohlson model is based on a cross-sectional approach (Kothari, 2001; and Beisland, 2009). However, Lee, Chen & Tsai (2014) noted that "the Ohlson model is time-series in nature", hence using the cross-sectional approach is problematic when applying the Ohlson model. Thus, other researchers adopted the time-series approach. The observation by Lee, Chen & Tsai (2004) overlooks the fact that the linear information dynamics in the Ohlson model is autoregressive (Chapter 3), meaning that it is dynamic in nature. Thus, neither a time-series approach nor a cross-sectional approach on its own is able to adequately employ Ohlson-type models to analyse value relevance of financial statement variables unless the study fully incorporates "other information", which however is undefined in the Ohlson model. Therefore, this study examines financial statement information's ability to explain firm value and/or stock price movements using dynamic models. A blend of times series and cross-section data is deemed adequate for this study. This study adopts panel data regression mainly due to the following reasons:

[10] A change in share prices may be witnessed simply as a result of exchange rate gains or losses. For instance, Rand denominated share prices may rise but foreign currency denominated financial statement variables will not have changed. The share price increase will simply be a reflection of the performance of the Rand against the foreign currency, and this distorts the current investigation. This is why firms with foreign currency denominated financial statements are excluded from this investigation.

i. Being time series cross-sectional, panel data provides more data points than other types of data. This escalates the number of degrees of freedom, ultimately reducing the collinearity problem. This has the desirable effect of improving model efficiency. However, increased data points may not necessarily mean more information because of heterogeneity bias.

ii. Omitted variable bias contributes to researchers finding (or not finding) certain effects. Panel data generally allows control over variables that cannot be observed or measured in this study, e.g. differences in business practices among the different companies, or ethical issues relating to each company, which may influence a company's share price.

iii. Unlike in time-series data analysis, panel data enables us to analyse a time series that is non-stationary. This is occasioned by our ability to invoke the central limit theorem across cross-sectional units (given that the cross-sectional units' observations are independent) and prove "that the limiting distributions of many estimators remain asymptotically normal" (Hsiao, 2007, p.5).

iv. Instances where there are measurement errors in variables cannot be ruled out where data is involved. Hsiao (2007) says econometric models can be under-identified as a result of measurement errors. With panel data, the impact of such measurement errors is drastically reduced through the use of various "transformations to induce different and deducible changes in the estimators; hence, to identify an otherwise unidentified model" (Hsiao, 2007, p.5).

v. Panel data affords an opportunity to generate predictions of an individual's behaviour that are more accurate by supplementing data on that individual with data from other individuals in the pool. This is possible where behaviours of these individuals are similar, such that we can learn more about one individual through observing others' behaviour.

vi. In comparison with time series data, panel data enables us to model dynamic relationships better. In a dynamic model (the current study uses dynamic models); collinearity most probably exists between a variable's current value (X_{it}) and the value of the lagged variable (X_{it-1}). In time series, estimating the time adjustment pattern requires some arbitrary restrictions, but in panel data, we rely on differences between individuals to curtail the existence of this specific collinearity problem. Estimation of unrestricted time adjustment patterns will thus be possible (Hsiao, 2007).

4.8.1 System Generalised Method of Moments

Prior research has mainly used OLS estimators to measure value relevance (see Chapter 2 as well as reviews by Kothari, 2001; Beisland, 2009; and Baltariu 2015). However, this research breaks away from the norm and uses System Generalised Method of Moments (System GMM) estimators because, firstly, dynamic models are used (OLS is not suitable for dynamic models) and, secondly, there are few time periods and more companies being studied (which suits System GMM). The GMM estimator is based on the principle of the method of moments, where unknown population characteristics are inferred from sample data. For instance, we can estimate an unknown population average μ from a known sample average $\bar{x}$. The population moment condition gives the population mean as $E(x) = \mu$. Given an *i.i.d.* sample as $\{x_i: i = 1,2,3, \dots, n\}$, the method of moments enables us to get $E(x) = \mu$ from the sample average, which is given by $\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$. To get the GMM estimator, define γ as a px1 parameter vector and d_i as the data observation with a sample size that is equal to n and $i = 1, \dots, n$. Furthermore, define $Q_i(\gamma) = Q(d_i, \gamma)$ as an $mx1$ vector of functions of the data and parameters. Satisfying the moment condition $E[Q_i(\gamma_0)\,] = 0$, where γ_0 is the true parameter value, provides the basis of the GMM estimator. To form the estimator, we choose γ so that the sample mean of $Q_i(\gamma)$ is close to 0.

GMM is applicable to a short *T*, large *N* scenario (Roodman, 2009), i.e. short time period and large number of individuals or groups. This is exactly the situation obtaining here: there are few time periods (8) and many companies (50). In dynamic models, least squares estimators are not appropriate (Bun and Kleibergen, 2010). GMM has several advantages, which include the fact that we do not necessarily have to specify the distribution within the population. Also, it is robust to distributional assumptions like heteroskedasticity, and it handles serial correlation very well. GMM also covers potential endogeneity problems and it is generally consistent. For these reasons, GMM estimators were deemed appropriate for the study.

Essentially, the GMM approach is also one of the solutions to the Nickell bias (dynamic panel bias) that is associated with dynamic panel data models. System GMM (by Arellano & Bover, 1995) was chosen over Difference GMM because the dependent variables in this study (share prices, market capitalisation and enterprise value) are deemed to follow

a random walk. Where the dependent variable is close to a random walk, Blundell & Bond (1998) showed that Difference GMM performs poorly. The reason is that "past levels convey little information about future changes, so, untransformed lags are weak instruments for transformed lags". For this reason, System GMM is preferred over Difference GMM in order to get better results. To implement System GMM, Roodman (2006)'s *xtabond2* command is preferred over other alternative commands because of its flexibility: there is an increased number of options in the use of instruments, as well as enabling one to deal with endogeneity in independent and dependent variables through its IV-style and GMM-style instrument options.

4.8.2 General Model Form

A number of models are used per objective as one of the ways of determining the robustness of the model results. The specific models are given in the section on data analysis plan (4.11).

The models take this general form:

$$lnY_{it} = \beta_0 + \varphi lnY_{it-1} + \beta_1 lnX_{1it} + \beta_2 lnX_{1it-1} + \ldots + \beta_k lnX_{kit-1} + \varepsilon_{it} \quad \ldots (4\text{-}1)$$

for $i = 1, \ldots, N$ and $t = 2, \ldots, T$

The main objective has extra per-share-based models of this form:

$$Y_{it} = \beta_0 + \varphi Y_{it-1} + \beta_1 XPS_{1it} + \beta_2 XPS_{1it-1} + \ldots + \beta_k XPS_{kit-1} + \varepsilon_{it} \quad \ldots (4\text{-}2)$$

for $i = 1, \ldots, N$ and $t = 2, \ldots, T$

Equation 4-1 represents the log-log models while Equation 4-2 are per-share models (linear models). In the above models,

lnY_{it} = the natural log of the dependent variable for firm *i* in period *t*

lnY_{it-1} = the natural log of the first lag of the dependent variable for firm *i*

lnX_{kit} = the natural log of the k^{th} independent variable for firm *i* in time *t* ($k = 1, \ldots, N$)

lnX_{kit-1} = the natural log of the first lag of the k^{th} independent variable for firm *i*

XPS_{kit} = the k^{th} independent variable (deflated by the number of shares in issue) for firm *i* in period *t* (for $k = 1, \ldots, N$)

XPS_{kit-1} = the first lag of the k^{th} independent variable (deflated by the number of shares in issue) for firm *i*

β_0 = regression intercept

β_1, β_2 and β_k = regression coefficients

φ = the coefficient of the lagged response variable

ε_{it} = the disturbance term for company *i* in time *t*

The error term comprises of both unobserved individual-specific time-invariant effects (μ_i) and the idiosyncratic shocks (v_{it}), i.e. $\varepsilon_{it} = \mu_i + v_{it}$. The first lag for each variable is included in all models (shown by the subscript *t-1* in all cases) to capture dynamism in the variables. Justification for using dynamic models is explained in Section 4.9.1.

To run the models, the study uses two-step estimation, Windmeijer-corrected robust standard errors and forward orthogonal deviations transformation in Stata using the *xtabond2* command. Two-step estimation was selected because, besides catering for heteroskedasticity, it is more robust than one-step estimation. Windmeijer-corrected standard errors were preferred to correct for the possibility of bias in finite samples (Roodman, 2009). Forward orthogonal differences were chosen instead of first difference transformation. The first difference transformation has an unwanted feature of magnifying gaps in unbalanced panels. Forward orthogonal deviations maximise sample size in unbalanced panels (Roodman, 2009). This is desirable because where negative variables are reported (e.g. an operating loss), on conversion into natural logs, a missing variable is created. Such a situation will create an unbalanced panel and using forward orthogonal deviation thus becomes handy.

4.8.3 Return vs. Level Regression

An important model specification issue concerns the choice between using a price level specification or a return specification (price change). As highlighted in the literature review, both return and level models are equally popular with researchers. After evaluating the advantages and disadvantages of both return and level specifications of the models (outlined by Kothari & Zimmerman, 1995), this research adopted level specification of the models. This is hinged on the adequacy of the level specification in fulfilling the goal of the research, i.e. analysing value relevance of financial statement variables. Kothari & Zimmerman (1995) opined that slope coefficients in a price level regression are unbiased while those in return models are biased due to some redundant component of earnings (the "stale component"). Adopting level models thus ensures that

the slope coefficients in the regressions are unbiased. Data for level models was transformed into natural logarithms of the variables (for reasons outlined in Section 4.10.3) with the exception of per-share-based models under Objective 1.

4.8.4 Preliminary Analysis and Diagnostic Tests

Before running the regressions, correlation analysis is done, as well as linearity tests, for each of the four objectives. Correlation analysis serves to show the strength of the association between the response variable and explanatory variables, which can help in explaining observed phenomena. It also shows how the independent variables are linked to one another. Knowing this relationship is crucial to avoid collinearity problems. However, in panel data analysis, collinearity is usually not a big problem as explained in Section 4.8 point (i). Linearity tests are meant to determine the appropriateness of the linear models used in this research. Scatterplots are used to show the nature of the relationships. The distribution of residuals is tested by running the regression, estimating the residuals and then plotting a histogram of the residuals. A histogram is preferred over other tools like Q-Q and P-P plots because it provides a pictorial view of the distribution, which is easy to interpret. The study uses robust standard errors to cater for heteroskedasticity. In two-step System GMM, the errors are already robust. Thus, including the robust option (as was done in this study) invokes the necessary finite sample correction to avoid bias, yielding Windmeijer corrected standard errors.

GMM estimation presents two unique problems that have to be taken care of, i.e. instrument proliferation (too many instruments leading to over-identification) and autocorrelation. Over-identifying restrictions and autocorrelation tests are two post-estimation (specification) tests that are necessary to detect those two problems. The Hansen test is used to find out whether or not the over-identifying restrictions are valid. The Sargan test of over-identifying restrictions does not provide any useful information in System GMM (Roodman, 2009); therefore, it is not used. Autocorrelation is tested based on the Arellano-Bond test. Since the first lag of the response variables is included, only the second-order autocorrelation matters. In both tests, the *p*-values should not be significant for the null hypothesis (of the absence of autocorrelation and validity of over-identifying restrictions) not to be rejected. Statistical significance means there will be autocorrelation (Arellano-Bond test) and instruments will not be valid (Hansen test).

4.9 Static vs Dynamic Models

A simple static model takes this form $Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it}$. On the other hand, a simple dynamic model takes this form $Y_{it} = \beta_0 + \alpha Y_{it-1} + \beta_1 X_{it} + \varepsilon_{it}$. Another form of dynamic models includes a lag of the independent variable as an explanatory variable (X_{it-1}), termed an autoregressive distributed lag model. Strengths and weaknesses of both static and dynamic models were considered and, after careful evaluation, dynamic models were selected for reasons given below.

4.9.1 Justification for using Dynamic Models

Extant finance literature demonstrates that the level of tomorrow's share price is, to a certain extent, dependent on the current share price (Onali & Ginesti, 2015; Lo & MacKinlay, 1988). This, therefore, shows that share price movements are autoregressive in nature. Any attempt to explain share price movements should thus incorporate this dynamism. For this reason, the current research uses models with these dynamics to explain value relevance of accounting data. Literature also documents a number of other reasons that are pro-dynamic models in capital market research as explained below.

According to Bond (2002), employing a dynamic model enables one to obtain consistent estimates of other parameters. This is achieved even if the coefficient on the lagged dependent variable is not directly needed. Furthermore, Bond (2002) says that a dynamic model of the form $Y_{it} = \theta Y_{it-1} + \beta_1 X_{it} + \beta_2 X_{it-1} + (\mu_i + v_{it})$ "does not require models for the X_{it} series to be specified in order to estimate the parameters (θ, β)" (p.15). This feature is quite attractive as it simplifies the estimation procedure. Therefore, this study adopts the lagged dependent variable (either market capitalisation, enterprise value or share price) as an explanatory variable to ensure that consistent estimates of coefficients for tangible book value, operating income, cash dividends, *etc.* (independent variables) are obtained. Coefficients on the lagged variables are not of any specific interest; hence, they will not be interpreted. Their inclusion is simply to enhance statistical properties of the models.

The choice of dynamic models is also informed by Onali & Ginesti (2015) who demonstrated that including the lag of dependent variables (i.e. a dynamic model) in price level models significantly improves model performance as it reduces the omitted variable bias. It is almost always the case that there will be omitted variable bias in such a study

because, as argued by Ohlson (1995), "other information" plays a critical role in determining share prices. This study omits this undefined "other information'', meaning that there is bound to be omitted variable bias. Even if "other information" is included, omitted variable bias is still bound to exist because that variable cannot capture all the micro-level determinants of future firm value. The bias will be greatly reduced by adopting the first lag of the dependent variables (AR (1)), hence the need for such a dynamic model. Deeper lags (lag 2 and above) were not considered, as this would deplete the sample size. Further support of dynamic models was provided by Alexander *et al* (2012), as well as Clout & Willett (2016) who proved that using an autoregressive distributed lag (ARDL) model when modelling the relationship between market values and financial statement data yields better results. This is because of an enhancement of the statistical properties of the model. Resultantly, the research adopts ARDL model (which is another form of dynamic models) as a way of improving models' statistical properties. Improved statistical properties lead to efficient models and unbiased coefficient estimates.

Furthermore, the effect of financial statement variables on firm value can be theorised to be distributed over some future time period. This stems from the proposition that markets take some time to analyse and comprehend the impact of financial statements. This is supported by the case where earnings remain relatively flat over two reporting periods, but share prices continue to fluctuate. While general macro-economic conditions may be a contributing factor, market correction based on published financial statements cannot be completely ruled out. To capture this dynamism, this study includes the first lag of each independent variable as an explanatory variable (ARDL). Regarding market correction, Ball *et al* (2017) says that "accounting effects, which reduce the informativeness of bottom-line net income, effectively average out through accumulation because noise in accounting accrual estimates reverses in subsequent periods" (p.1). This means, previous period accounting information is useful in the next period via the corrections, and including a lag of the independent variables in a way, helps capture this correction. Ou & Penman (1989b) lend more vivid support to this thread when they submitted that "the earnings number itself captures information in prices with a lag" (p.112). The authors also cite Beaver, Lambert & Morse (1980) as having findings to the same effect. An alternative, but complementary justification of a distributed lag model, is predicated on a partial adjustment mechanism involving share prices and accounting data.

In this regard, Clout & Willett (2016), citing Greene (2008) p.679, says, "Its foundations lie in the theory that the market partially adjusts its buying and selling practices based on comparing the last period's observed market value with the collective expectations of its participants, based on the long-run relation between market and book values" (p.1021). For all these reasons, the current study uses dynamic models.

4.10 Data Issues

The study uses secondary data that is readily available on the public domain. Various aspects of the data are discussed in this section.

4.10.1 Types of Data

Financial year-end equity prices or firm values are required as the dependent variables in the various regressions. For the main objective, the other variables are EBIT from continuing operations and tangible book value. This data was plucked out of individual firms' audited year-end financial statements. Stock price data recorded on the first working day after three months from the financial year-end was collected from the Yahoo Finance website. Using stock prices recorded three months after financial year-end helps to circumvent "look-ahead bias" noted by Banz & Breen (1986). Accounting information only gets to investors on receipt of financial results, something that takes place after three months from financial year-end. Look-ahead bias is the use of data not currently available, but assumed to be available. Further to that, using equity prices recorded three months after financial year-end is in recognition of the fact that companies in South Africa are obliged to publish their financial results, at most, three months after their financial year-end. Thus, the study endeavours to ensure that financial statement information filters through to stock prices, hence, doing away with the need to make the controversial assumption about stock market efficiency. Financial statements for the selected firms were obtained from the companies' websites. Variables of interest were then either taken from these statements or calculated based on various financial statement data. The way model variables were calculated is shown under each and every objective in Section 4.11.

4.10.2 Data Sources

Table 4-2 presents a summary of the data that was used for each objective and the sources of that data.

Table 4-2: **Data Requirements and Sources for each Objective**

Objective	Data Required	Data Sources
1	Stock prices, market capitalisation, enterprise value, EBIT from continuing operations, & tangible book values.	Stock price database, statement of comprehensive income, & statement of financial position.
2	Market capitalisation, stock prices, EBIT, & tangible book values	Stock price database, income statements & balance sheets.
3	Stock prices, total liabilities, debt/equity ratios, & shares in issue.	Stock price database, income statements, & balance sheets.
4	Stock prices, Tobin's Q, market capitalisation, cash dividends, & retained earnings.	Stock price database, statement of financial position & income statements.

4.10.3 Data Transformation

In statistical modelling, data transformation entails altering the scale of the original raw data so that the data conforms to the underlying assumptions (like homoscedasticity and normality) of the modelling techniques employed. Transformation also helps to linearize an otherwise non-linear association between the response and explanatory variable, where transformation can be on either of these variables, or on both of them. Linearizing the relationship makes linear models appropriate to model the relationship between variables. In this study, data transformation was done on the dependent and independent variables. Due care was taken to ensure that data transformation, while helping to enhance certain assumptions, does not result in violation of other fundamental assumptions, as explained below.

Before data was transformed, several tests that include normality and linearity tests were done based on raw data. Data was then log-transformed and the statistical properties were noted and compared with the untransformed scenario. Log-transformation specifically enhanced linearity between response variable and explanatory variables, a key assumption in all models. These tests' results are provided in each of the following chapters that address the study's objectives. Log-transformation of data was also informed by Alexander *et al* (2012) and Clout & Willett (2016). Alexander *et al* (2012) posit that when examining links between market values and financial statement variables, models are likely to be better specified when all variables are logged and an autoregressive distributed lag model is used. This study therefore uses log-transformation

of data. Normality of residuals was also enhanced by log-transformation, yielding residuals that are roughly log-normally distributed. However, normality is not a strict and necessary assumption in this study's models (since the study uses Generalised Method of Moments estimators).

4.11 Data Analysis Plan

This section first delves into how value relevance is determined in this study in the light of the four different versions proffered by Francis & Schipper (1999). After that, the section then provides the specific models used, and an outline of how each and every objective was fulfilled. Specifics on variable calculation are also provided under the respective objectives. This segment is arranged in line with the research objectives.

4.11.1 Interpretation of Value Relevance

Value relevance is determined based on a variable's statistical significance, i.e. version number four reviewed in Chapter 2. The research aims to establish if the various financial statement variables possess information that is useful in explaining firm value. Statistical significance is the best way to determine a particular variable's information content. As highlighted in Chapter 2, statistical significance of a financial statement variable may only mean that accounting data is positively correlated with non-accounting data that is used by analysts, and not necessarily that they use accounting data. Fundamentally, the same can also be said about all the other three interpretations. For instance, in an event study, the fact that share prices move around the pronouncement dates of a company's results does not necessarily mean that the prices are being driven by that pronouncement. There could be another piece of macro-economic news that comes to the market concurrently with the pronouncement, e.g. economic growth statistics or inflation figures. Furthermore, there could be firm-specific, non-accounting news, like a change in the company's top management team. An event study does not isolate these effects; it simply looks for a movement in share prices (Ball & Brown, 1968), and then, makes a conclusion. This analysis is cemented by Beaver (1974) who said, "any attempt to remove the effects of market-wide events would eliminate the effects of the earnings report as well" (p.71). Therefore, based on the currently available techniques and what this study aims to achieve, statistical significance of an accounting variable is deemed to be a sufficient indicator of accounting data's value relevance.

4.11.2 Objective 1 (Value Relevance of Tangible Book Values and EBITCO)

The predictor variables in this model are earnings before interest and taxes from continuing operations (EBITCO), tangible book values (TBV) and the first lag of firm value as well as the first lags of EBITCO and TBV. The two explanatory variables were included in this model based on their theoretical relationship with firm value, as explained in the conceptual framework, as well as other studies that have shown that these variables have a relationship with firm value, e.g. Ohlson (1995). Dynamism is included via the lag of firm value as well as the first lags of EBITCO and TBV as per the justification given earlier. A panel regression was run in order to satisfy the primary objective. Below is the level specification of models to address this objective:

$$lnFV_{it} = \beta_0 + \varphi lnFV_{it-1} + \beta_1 lnb_{it} + \beta_2 lnb_{it-1} + \beta_3 lnEBIT_{it} + \beta_4 lnEBIT_{it-1} + \varepsilon_{it} \quad \ldots (4\text{-}3)$$

where:

$lnFV_{it}$ = the natural log of the value of firm *i* in period *t*

$lnFV_{it-1}$ = the natural log of the first lag of the value of firm *i*

FV = firm value, which is either market capitalisation, enterprise value, or share price

lnb_{it} = the natural log of firm *i*'s book value in period *t*

lnb_{it-1} = the natural log of the first lag of book value for firm *i*

$lnEBIT_{it}$= the natural log of firm *i*'s earnings before interest and taxes in period *t*

$lnEBIT_{it-1}$ = the natural log of the first lag of firm *i*'s earnings before interest and taxes

β_0 and β_k = the constant, and regression coefficient for variable *k* respectively

φ = the coefficient of the response variable's first lag

ε_{it} = disturbance term for company *i* in time *t* (= $\mu_i + v_{it}$)

Table 4-3 shows how the model variables were calculated. Nested models were created from Equation 4-3 (independent variables and their first lags are dropped from the model, one at a time) and run as one of the robustness checks used in the study. This checks robustness of results to dropping an explanatory variable from Equation 4-3. Besides being a robustness check, dropping one variable at a time helps to determine information content of the remaining variables without controlling for the dropped variable. Results in some models were also tested for sensitivity to changes in the instrument lag structure.

In another set of models, the number of shares in issue for the period was used to deflate all the explanatory variables in the models to get per-share-based models. In this case, the

dependent variable is share price (in line with a per-share analysis). The number of shares outstanding is preferred because, besides helping to control for heteroskedasticity, this gives per-share analysis, which is in line with how investors analyse company performance: an investor is interested in the value created for each share that they hold. Total earnings may appear very attractive (due to the large total figure), but the whole picture may change if one analyses earnings attributed to each share held. For this reason, the analysis is also done on a per-share basis.

Just as in Equation 4.3, nested models as well as different instrument lag limits are used to check robustness of model results in Equation 4-4. The per-share regression equation is as follows:

$$P_{it} = \beta_0 + \varphi P_{it-1} + \beta_1 BVPS_{it} + \beta_2 BVPS_{it-1} + \beta_3 EPS_{it} + \beta_4 EPS_{it-1} + \varepsilon_{it} \quad \ldots (4\text{-}4)$$

where:

P_{it} = the share price for firm *i* in period *t*

P_{it-1} = the first lag of share price for firm *i*

$BVPS_{it}$ = book value per share for firm *i* in period *t*

$BVPS_{it-1}$ = the first lag of book value per share for firm *i*

EPS_{it} = earnings per share for firm *i* in period *t*

EPS_{it-1} = the first lag of earnings per share for firm *i*

β_0 and β_k = the constant, and the regression coefficient in respect of variable *k*, respectively

φ = the coefficient of the response variable's first lag

ε_{it} = disturbance term for company *i* in time *t* (= $\mu_i + v_{it}$)

In the above set of models, log-transformation is dropped, and raw share prices are used. This is a research sub-plot meant to check the impact of log-transformation on model results, which is motivated by Clout & Willett (2016)'s assertions on the impact on results of log-transformation of data.

Variables are defined/calculated as shown in Table 4-3.

Table 4-3: **Variables Calculation**

Variable name	**Calculation or definition**
EBIT = EBITCO	Operating income (less income from discontinued operations, if any)
Tangible book value	Total assets – Intangible assets (like goodwill) – total liabilities
Enterprise value	(Share price x issued shares) + preferred stock + minority interest + total debt – cash & cash equivalents
Market capitalisation	Share price x issued shares
Share price	Share price recorded three months after financial year end
BVPS	Tangible book value ÷ issued shares
EPS	EBITCO ÷ issued shares

4.11.3 Objective 2 (Impact of Firm Size on Value Relevance)

To determine the impact of firm size on value relevance, firm size (using market capitalisation as a proxy) is added to the models used in Objective 1 (Equation 4-3) in the form of a binary variable, i.e. large capitalisation and small capitalisation. The reason for using dummy variables, rather than simply running regressions for high capitalisation counters on their own, and low capitalisation counters on their own, is to enable analysis of the interaction between the dummy variable and numerical variables (EBITCO and TBV). The sample is sub-divided into high capitalised counters and low capitalised counters, using a dummy variable (1= large, 0 otherwise). The basis of classification into high and low capitalisation categories is explained in Chapter 6. The model used is as follows:

$$lnP_{it} = \beta_0 + \varphi lnP_{i,t-1} + \beta_1 lnBV_{it} + \beta_2 lnBV_{it-1} + \beta_3 lnEB_{it} + \beta_4 lnEB_{it-1} + \gamma D + \alpha_1(D * lnEB_{it}) + \alpha_2(D * lnBV_{it}) + \varepsilon_{it} \quad \ldots (4\text{-}5)$$

where:

lnP_{it} = the natural log of share price for firm *i* in period *t*

$lnP_{i,t-1}$ = the natural log of the first lag of share price for firm *i*

$lnBV_{it}$ = the natural log of firm *i*'s tangible book value in period *t*

$lnBV_{it-1}$ = the natural log of the first lag of tangible book value for firm *i*

$lnEB_{it}$ = the natural log of earnings before interest and taxes from continuing operations for firm *i* in period *t*

$lnEB_{it}$ = the natural log of the first lag of earnings before interest and taxes from continuing operations for firm *i*

D = dummy variable operator = $\begin{cases} 1\ for\ large-cap\ firms \\ 0\ for\ small-cap\ firms \end{cases}$

$D * lnEB_{it}$ = interaction variable between dummy and earnings before interest and taxes for firm *i* in period *t*

$D * lnBV_{it}$ = interaction variable between dummy variable and tangible book value for firm *i* in period *t*

φ = coefficient of the first lag of the dependent variable

β_0 and β_k = the constant, and regression coefficient for the k^{th} variable respectively

α_i = differential slope coefficients

γ = differential intercept.

ε_{it} = disturbance term for company *i* in time *t* (= $\mu_i + v_{it}$)

To avoid dummy variable trap, only one category is created. The independent variables used (EBITCO and TBV) are drawn from the main model in Objective 1. Justification of these variables' inclusion is thus the same as that given under the main objective.

4.11.4 Objective 3 (Value Relevance of Financial Leverage)

Results from an analysis of value relevance of financial leverage inform company executives' capital structure decisions in their quest to ensure that the market correctly values their companies. The literature revealed that most studies measure leverage as total debt divided by total assets. In this study, financial risk is given by the debt/equity ratio and the total amount of debt. Two measures of financial risk are used to determine if investors consider the debt ratio, the absolute debt amount, or both. Debt/equity ratio measures relative financial risk, i.e. debt relative to a firm's size of equity. Total debt measures absolute financial risk, i.e. debt viewed independently, without comparison to any other variable. The two measures may appear to be the same, but they are different: absolute amount of total debt may seem to be too much on its own, but may not be that bad when the value of equity is taken into consideration. The goal is to find out if investors have what this study calls a "high debt illusion" (where absolute total debt is deemed too much but debt/equity ratio is deemed right) or not. The central question in this investigation is: does the market allow firms to assume liabilities that are commensurate with their equity or it punishes firms incurring what the market thinks are very high levels of liabilities, regardless of their equity levels? This is an interrogation of the psychology and thought process of investors when confronted by firms of different sizes with different debt levels.

With regards to equity measurement, the study breaks from tradition and uses market capitalisation as a measure of the value of equity. This is done in order to get a measure of equity that is as close as possible to market consensus. Total debt is the sum of current and non-current liabilities. This definition is adopted because it aptly captures the equity investor's view of a company's indebtedness, as outlined in the conceptual framework.

The model used to accomplish this task is as follows:

$$lnP_{it} = \beta_0 + \varphi lnP_{i,t-1} + \beta_1 DE_{it} + \beta_2 DE_{it-1} + \beta_3 lnTD_{it} + \beta_4 lnTD_{it-1} + \varepsilon_{it} \quad \ldots (4\text{-}6)$$

where:

lnP_{it} = the natural log of share price for firm *i* in time *t*

$lnP_{i,t-1}$ = the natural log of the first lag of share price for firm *i*

DE_{it} = debt/ equity ratio for firm *i* in time *t*

DE_{it-1} = the first lag of debt/equity ratio for firm *i*

$lnTD_{it}$ = the natural log of total debt for firm *i* in time *t*

$lnTD_{it-1}$ = the natural log of the first lag of total debt for firm *i*

φ = the coefficient of the response variable's first lag

β_0 and β_k = the constant, and regression coefficient for the k^{th} variable respectively

ε_{it} = disturbance term for company *i* in time *t* (= $\mu_i + v_{it}$)

Table 4-4 summarises how model variables were either calculated or defined.

Table 4-4: **Variable Calculation**

Variable name	**Calculation or definition**
Share price	Share price recorded three months after financial year end
Total debt	Current + non-current liabilities
Debt/equity ratio	Total debt ÷ equity
Equity	Total market capitalisation three months after fiscal year end

4.11.5 Objective 4 (Value Relevance of Cash Dividends and Retained Earnings)

This objective is motivated by the apparent opposing viewpoints of Miller and Modigliani's "dividend irrelevance theory" versus Gordon (1959) and Lintner (1962)'s "bird-in-the-hand theory". Chapter 2 documented that dividend irrelevance theory says dividends do not matter because if investors are in need of cash, they can always dispose their shares for cash. The tax preference theory seemingly supports this view by saying that investors would rather have capital gains than cash dividends because dividends

generally have higher tax rates than capital gains. On the contrary, Gordon (1959) and Lintner (1962) posit that dividends are relevant and investors consider dividend policy when making their equity investment decisions. These counterviews motivated this objective and the study makes an inquiry into the issue from a value relevance perspective.

As noted in the previous chapter, net income is either distributed or retained in the company. Thus, to have a complete picture, this objective incorporates both cash dividends and retained earnings in the same model. This analysis should provide guidance to company executives to know the implications of their dividend policies on how investors value their companies. For instance, if dividends are value relevant, company executives can prioritise dividends (by having higher pay-out ratios) than capital gains.

The model used to fulfil this objective is:

$$lnFV_{it} = \beta_0 + \varphi lnFV_{i,t-1} + \beta_1 lnDV_{it} + \beta_2 lnDV_{it-1} + \beta_3 lnRE_{it} + \beta_4 lnRE_{it-1} + \varepsilon_{it} \quad \ldots(4\text{-}7)$$

where:

$lnFV_{it}$= the natural log of firm value for firm *i* in time *t*

$lnFV_{i,t-1}$ = the natural log of the first lag of firm value for firm *i*

$lnDV_{it}$ = the natural log of total dividends paid by firm *i* in time *t*

$lnDV_{it-1}$ = the natural log of the first lag of total dividends for firm *i*

$lnRE_{it}$= the natural log of earnings retained by firm *i* in time *t*

$lnRE_{it-1}$ = the natural log of the first lag of retained earnings for firm *i*

β_0 = regression intercept

φ = coefficient of the first lag of firm value

β_k = regression coefficient for the k^{th} variable ($k = 1, \ldots, N$)

ε_{it} = disturbance term for company *i* in time *t* ($= \mu_i + v_{it}$)

Just like with the other objectives, an independent variable (and its first lag) is dropped from Model 4.7, one at a time, to create two nested models. These models serve both to analyse value relevance without controlling for another variable, as well as to check the sensitivity of model results to dropping a correlated variable.

The research hypothesises that including retained earnings in the model reduces omitted variable bias because of the expected correlation between retained income and dividends. The value of the firm is represented by two variables, namely: market capitalisation and Tobin's Q ratio. Using two versions of firm value is aimed at analysing the relationship from two different perspectives. Analysis using market capitalisation as a measure of firm value provides an indication of relationships based on what the market perceives to be the value of firms. On the other hand, using Tobin's Q ratio provides a different dimension in which relationships are assessed based on firms being over- or under-valued (being correctly valued where Tobin's Q exactly equals 1 is quite rare). Other studies that have used Tobin's Q in determining value relevance of dividends and retained earnings include Yemi & Seriki (2018). Definitions or calculations of variables used in this objective are given in Table 4-5.

Table 4-5: **Variable Calculation**

Variable name	**Calculation or definition**
Market capitalisation	Share price x shares in issue.
Tobin's Q ratio[11]	(Market capitalisation + preferred stock + debt) ÷ Book value of total assets.
Preferred stock	Value of outstanding preference shares.
Debt	Long term debt + short term liabilities – short term assets.
Dividends	Cash dividends to ordinary shareholders of the company declared at the end of the year.
Retained income	Total cumulative income retained by the company at financial year end.

4.12 Chapter Summary

This chapter detailed how the research was conducted. A functionalist research paradigm was adopted. Based on the ontological, epistemological and axiological assumptions made, positivism was selected as this research's philosophy. A combination of deductive and inductive reasoning was adopted as the approach to theory development. The population of the study was identified as all non-financial firms quoted on the Johannesburg Stock Exchange that were active for the entire period from January 2010 to December 2017. Purposive sampling was used to select 50 firms that constitute the study sample from all eligible JSE ICB sectors. The number of firms selected from each sector was determined by the number of firms in that sector as a proportion of the

[11] This formula is the approximate *q* advocated for by Chung and Pruitt (1994). The method was adopted after careful consideration of data requirements and computational burden in alternative versions without commensurate precision benefits.

population size. An eight-year period from 2010 to 2017 is used for the study. Justification for using dynamic models includes the need to have efficient and unbiased estimates of variable coefficients. Employment of System Generalised Method of Moments estimators was informed by the fact that least squares estimators are not appropriate in dynamic models, plus the fact that Generalised Method of Moments estimators are unbiased and robust. The reason to log-transform model variables was essentially to improve statistical properties of the models. Financial statements were taken from the companies' websites. Stock price data was predominantly obtained from the Yahoo Finance website.

The next chapter presents an analysis of research findings on the value relevance of tangible book values and operating income from continuing operations.

CHAPTER FIVE

THE NEXUS BETWEEN FIRM VALUE AND BOOK VALUE & EBIT

5.0 Introduction

The preceding chapter gave an account of the research methodology that was adopted in this study. This chapter implements the methods described by focusing on the main objective. The primary objective of the study is to analyse value relevance of tangible book value and earnings before interest and taxes (EBIT) from continuing operations, using a dynamic panel dataset of firms listed on the JSE. This chapter uses models adapted from the Ohlson valuation model. Two measures of firm value are used as dependent variables (enterprise value and market capitalisation), with tangible book value and EBIT from continuing operations as the independent variables. Results from these two measures are compared. Enterprise value is mostly used in measuring firm value for takeover purposes, i.e. a firm's purchase price. Market capitalisation is the consensus value of what many equity market players deem the firm is worth, given by share prices and the number of issued shares. Enterprise value is considered better than market capitalisation because it includes important variables like debt and cash, which are not considered in market capitalisation. Besides the aforementioned measures of firm value, the study also adopts share price as a dependent variable in another set of models, with the same independent variables as in the first two sets of models. The motivation behind this analysis is that, regardless of the firm value, investors will narrow down this firm value to individual shares, i.e. share price. Share price is the cost that one pays to get a slice of what the firm is worth, hence this analysis. The last scenario analyses value relevance on a per-share basis by deflating income and book value by the number of shares in issue.

The chapter starts off by stating the models that are used to achieve the main objective. The assumptions underlying implementation of the regression models are explained in the next section. After this, a preliminary analysis of the data is done, focusing on descriptive statistics, linearity and normality test results as well as correlation analysis. Regression analysis results are presented and analysed next, followed by a discussion of the findings. A summary of key points raised rounds off the chapter.

5.1 The Models

In order to accomplish the primary objective stated above, the research uses level regressions, where figures are deflated by converting them to natural logarithms (log-log models) as well as being deflated by the number of shares in issue (per share basis models). The log-log models used, given and justified in Chapter 4, are as follows:

$$lnFV_{it} = \beta_0 + \varphi lnFV_{it-1} + \beta_1 lnBV_{it} + \beta_2 lnBV_{it-1} + \beta_3 lnEBIT_{it} + \beta_4 lnEBIT_{it-1} + \varepsilon_{it} \quad \ldots(5\text{-}1)$$

$$lnFV_{it} = \beta_0 + \varphi lnFV_{it-1} + \beta_1 lnBV_{it} + \beta_2 lnBV_{it-1} + \varepsilon_{it} \quad \ldots (5\text{-}2)$$

$$lnFV_{it} = \beta_0 + \varphi lnFV_{it-1} + \beta_1 lnEBIT_{it} + \beta_2 lnEBIT_{it-1} + \varepsilon_{it} \quad \ldots (5\text{-}3)$$

where:

$lnFV_{it}$ = natural log of firm value (measured by enterprise value and market capitalisation) for firm *i* in the current period

$lnFV_{it-1}$ = natural log of firm value for firm *i* in the previous period

$lnBV_{it}$ = natural log of tangible book value for firm *i* in the current period

$lnBV_{it-1}$ = natural log of tangible book value for firm *i* in the previous period

$lnEBIT_{it}$ = natural log of firm *i*'s earnings before interest and taxes from continuing operations in the current period

$lnEBIT_{it-1}$ = natural log of earnings before interest and taxes from continuing operations for firm *i* in the previous period

β_0 = regression constant

β_k = regression coefficient for the k^{th} variable (for k = 1, 2,…, N)

φ = regression coefficient for the response variable's first lag

ε_{it} = disturbance term for company *i* in period *t* (= $\mu_i + v_{it}$)

The models above produce results for Scenario 1 and 2. Moving on to Scenario 3, another set of models replaces the dependent variable (firm value) with the log of share price and retains all the independent variables in equations 5-1,5-2 and 5-3 above. In Scenario 4, market capitalisation, tangible book value and EBIT from continuing operations are all deflated by the number of shares in issue, yielding "per share based" models. This is in addition to the log-transformation used, which is a way of determining the impact of data transformation method on model results. The per share-based models are as follows:

$$P_{it} = \beta_0 + \varphi P_{it-1} + \beta_1 BVPS_{it} + \beta_2 BVPS_{it-1} + \beta_3 EPS_{it} + \beta_4 EPS_{it-1} + \varepsilon_{it} \quad \ldots (5\text{-}4)$$

$$P_{it} = \gamma_0 + \varphi P_{it-1} + \gamma_1 BVPS_{it} + \gamma_2 BVPS_{it-1} + \varepsilon_{it} \quad \ldots (5\text{-}5)$$

$$P_{it} = \gamma_0 + \varphi P_{it-1} + \gamma_1 EPS_{it} + \gamma_2 EPS_{it-1} + \varepsilon_{it} \quad \ldots (5\text{-}6)$$

where:

P_{it} = stock price for company *i* in period *t*

P_{it-1} = stock price for company *i* in period *t-1*

$BVPS_{it}$ = tangible book value per share for company *i* in period *t*

$BVPS_{it-1}$ = tangible book value per share for company *i* in time *t-1*

EPS_{ik} = operating earnings per share for company *i* in time *t*

EPS_{it-1} = operating earnings per share for company *i* in time *t-1*

β_0 = regression constant

β_k = regression coefficient for the k^{th} variable, where *k* represents all explanatory variables

φ = regression coefficient for the lagged dependent variable

ε_{it} = the error for firm *i* in time *t* (= $\mu_i + v_{it}$)

5.2 Model Assumptions

Statistical package, Stata version 12, was used to run the regressions. System GMM was chosen over Difference GMM[12]. Assumptions are given to enable interested researchers to replicate the analysis done in this study. The models were run based on the following assumptions:

1. Errors are correlated within, and not across, individuals. Roodman (2009) says that for this to hold, time dummies have to be included when implementing System GMM in Stata using *xtabond2* command. For this reason, all the above stated regression equations make use of time dummies.
2. The first lag of all dependent variables[13] is deemed to be endogenous in all the models, consequently, they are instrumented GMM-style as per Roodman (2009).
3. The independent variables[14] are assumed to be exogenous and entered instrumental variable (IV)-style in all the models in line with Roodman (2009). Further to these variables that appeared in the model, net asset value and the average debt/equity ratio were incorporated in the model as additional IV-style instruments. Additional instruments provide more information and increase model efficiency (Roodman, 2009). The reason for including average debt/equity ratio stems from an assumption that shareholders are concerned about a firm's capital structure because equity ranks

[12] The reasons for the use of System GMM estimators were explained in Chapter 4.

[13] These are share price, enterprise value and market capitalisation.

[14] These are the log of tangible book value, log of earnings before interest and taxes from continuing operations, operating earnings per share, and tangible book value per share.

lower than debt in case of liquidation. If the average debt ratio is quite high[15], shareholders view this negatively, thus there is a link between share price and the level of a firm's indebtedness. Net asset value represents firm value in excess of total liabilities of the firm. Any form of firm indebtedness puts a strain on a firm's cash flows. Higher net asset values should therefore be desirable to equity holders. This should thus influence firm value and share prices.

4. Share prices are assumed to follow a random walk. As explained in Chapter 4, this assumption contributed to the selection of System GMM over Difference GMM.

Considering that log-transformations of negative values[16] will create gaps, orthogonal deviations were deemed useful to maximise sample size, as explained in Chapter 4.

5.3 Preliminary Analysis

The following sections present descriptive statistics, linearity test results, correlation analysis results as well as probability distribution analysis results.

5.3.1 Descriptive Statistics

Table 5-1 exhibits descriptive statistics on raw data relating to variables used in the regression equations given earlier.

Table 5-1: **Descriptive Statistics**

VARIABLES	(1) N	(2) Sum	(3) Mean	(4) SD	(5) Minimum	(6) Maximum
Market capitalisation	400	1.175e+13	2.938e+10	6.000e+10	1.890e+07	4.083e+11
Share price	400	26,607	66.52	96.86	0.0300	609.3
Book value	400	4.095e+12	1.024e+10	2.613e+10	-2.280e+10	2.149e+11
EBIT	400	9.849e+11	2.462e+09	7.218e+09	-1.045e+10	4.965e+10
Earnings per share	400	2,080	5.199	9.687	-10.62	71.49
Book value per share	400	9,525	23.81	43.52	-49.95	329.8
Debt/equity ratio	400	329.3	0.823	0.870	0.0500	4.145
Enterprise value	400	1.262e+13	3.154e+10	6.415e+10	1.220e+07	4.179e+11
Net asset value	400	7.127e+12	1.782e+10	4.021e+10	-5.287e+10	3.005e+11
Number of firms	50	50	50	50	50	50

Descriptive statistics chosen are the number of observations (N), sum, mean, standard deviation (SD) as well as the minimum and maximum values. Variables whose descriptive statistics are given are enterprise value, market capitalisation and share price

[15] The actual level is subjective and contingent upon the market being analysed (Eiteman, Stonehill & Moffett, 2013).

[16] There are chances that some companies' operating income from continuing operations will be negative, i.e. loss from continuing operations. Even tangible book values can be negative at times.

as well as the explanatory variables. Furthermore, descriptive statistics for net asset value and debt/equity ratio are also presented (the additional regression instruments).

The sample comprised of both high capitalised and low capitalised stocks as shown by the standard deviation as well as the gap between minimum and maximum values on the variable market capitalisation. This is further shown by the same statistics on the variable share price. This is a deliberate strategy to ensure that there is no bias towards either large or small capitalised firms. The variable enterprise value also shows the wide diversity of the research sample, which increases sample quality.

There is an acceptable variation in the model variables as shown by the standard deviation as well as the distance between the minimum and maximum values. The statistic 'minimum' on the variable EBIT shows that there are some years where firms reported operating losses, but these are not too many since the average is a large positive figure: about half of the largest observation on EBIT. There are also some struggling firms, as shown by negative book values. However, considering the small gap between the average and maximum values, there are very few firm-year combinations with negative book values. Per-share based metrics earnings per share and book value per share also show this trend. Negative book values arise largely because the study uses a conservative measure: 'tangible book value', where intangible assets like goodwill and patents are subtracted from total assets. The implication of negative operating income and book values is that some observations will be lost when these variables are converted into their natural logarithms.

Sampled firms are, on average, not highly indebted as shown by an average debt/equity ratio of 0.823, which is below unity. In normal circumstances, this would be deemed too high, but in this particular case, it is considered normal because debt in this study includes all forms of indebtedness (current plus non-current liabilities), instead of long-term borrowings used in most studies. However, there are a few highly indebted firms, as shown by a maximum debt/equity ratio of 4.145. This diversity also ensures that results will not only be applicable to just one end of the debt continuum. Net asset value in this study is measured as the difference between market capitalisation and total liabilities, which can be an alternative to book value. This also shows that there are few cases where market capitalisation is less than total liabilities (shown by the negative minimum value).

5.3.2 Linearity Tests

An assumption was made that there exists a linear association between response variables and explanatory variables. It is therefore imperative to test if the association between the response variables and the explanatory variables is linear. To achieve this, scatter diagrams were used. In all cases, linearity tests were first done before variables were converted into their natural logs and re-run again after conversion into natural logs. A comparison of results shows that log-transformation makes the relationship much more linear. Figure 5-1 and Figure 5-2 below show the results of the analysis where natural log of enterprise value is the dependent variable.

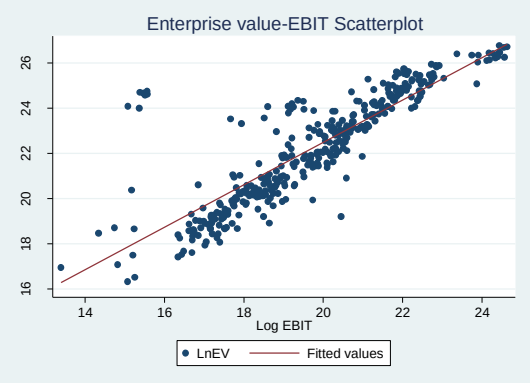


Figure 5-1: **Enterprise value and EBIT**

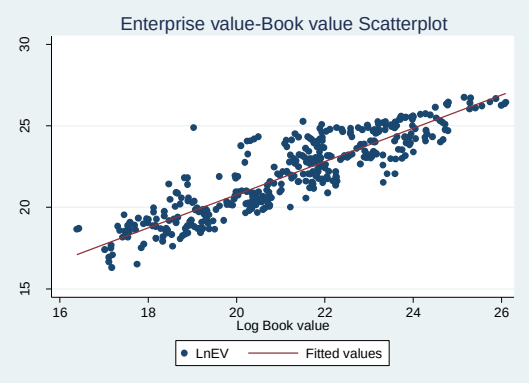


Figure 5-2: **Enterprise value and Book value**

The figures above show a positive linear association between the natural log of enterprise value and the natural logs of EBIT and tangible book value. A positive linear relationship means that as operating income increases, enterprise value also increases. Similarly, when book value increases, enterprise value also increases. Consequently, a linear dynamic model can be used on this dataset.

Figures 5-3 and 5-4 show the scatter diagrams where the natural log of market capitalisation is the response variable. Operating income and tangible book value are the explanatory variables.

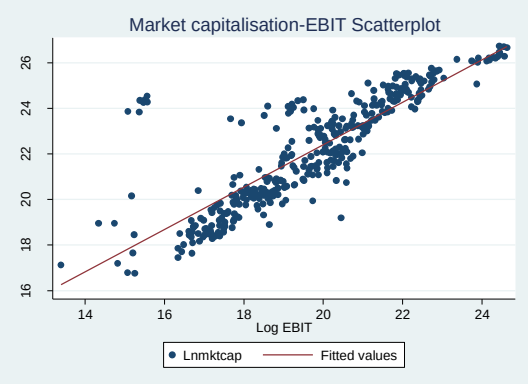


Figure 5-3: **Market cap and EBIT**

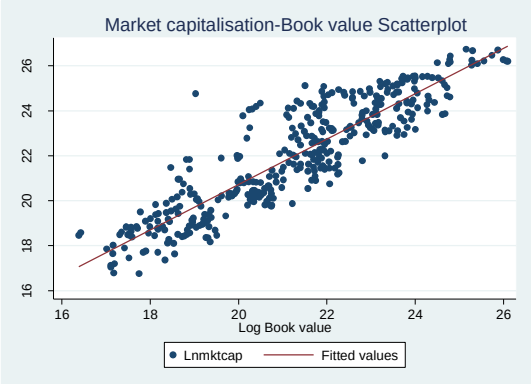


Figure 5-4: **Market cap and Book Value**

The diagrams depict a positive linear association between the natural log of market capitalisation and the natural logs of EBIT and book value. A rise in operating income occasions an upsurge in market capitalisation (driven by a rise in stock price). Likewise, a rise in tangible book value also occasions an increase in market capitalisation. The scatter diagrams are almost similar to Figure 5-1 and 5-2 respectively, implying that in this case, the two dependent variables can substitute one another, even if they measure different aspects of firm value. Since the relationship is linear, a linear model is thus appropriate.

Figures 5-5 and 5-6 present the results of linearity tests where the natural log of stock price is the response variable. This is Scenario 3, where the explanatory variables are still tangible book value and operating income from continuing operations. Just like in the previous two scenarios, the relationship between the natural log of stock price and the natural log of EBIT is positive and linear. This means that as operating income increases, share prices will also increase. The association between stock price and tangible book value is also positive and linear, implying that an increase in tangible book value leads to an increase in share prices. Pursuant to the observed linear relationships, linear dynamic models are thus appropriate.

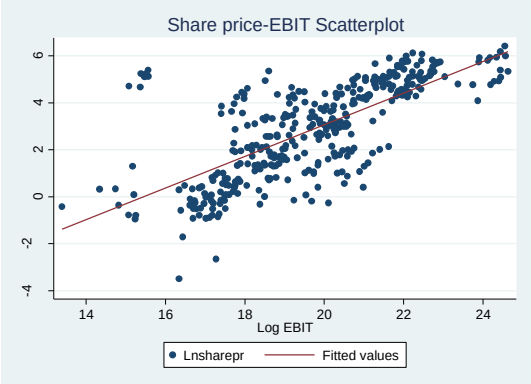


Figure 5-5: **Share Price and EBIT**

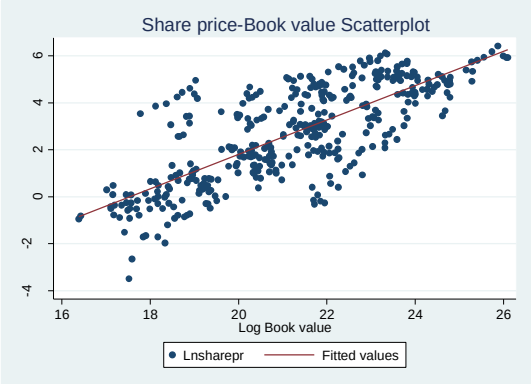


Figure 5-6: **Share Price and Book Value**

Figures 5-7 and 5-8 present scatter diagrams where untransformed share price (in its raw form) is the dependent variable and operating earnings per share (EPS) and tangible book value per share (BVPS) are independent variables. These are the variables in Scenario 4.

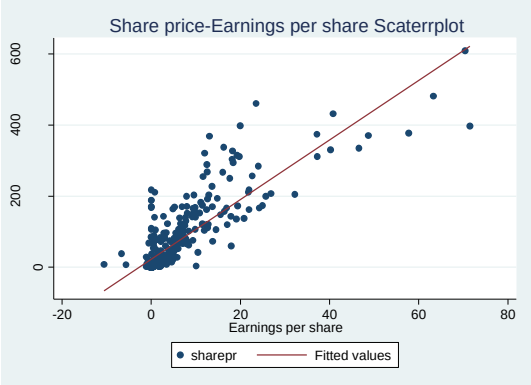


Figure 5-7: **Share Price and EPS**

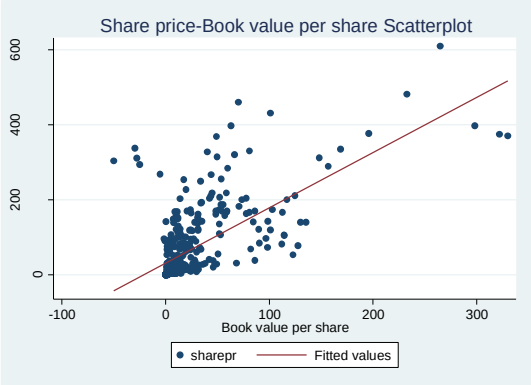


Figure 5-8: **Share Price and BVPS**

Figures 5-7 and 5-8 show that the association between untransformed share prices and EPS and BVPS is positive and fairly linear. An increase in EPS results in a rise in stock price. Similarly, an upsurge in BVPS results in a rise in share price. However, the nature of the linear relationships is different from the previous three scenarios: in this case, most variables are concentrated within a short range. The diagrams show the significance of data transformations in linearizing the association between response and explanatory variables.

The next section assesses the correlations between the variables in this study.

5.3.3 Correlation Analysis

Table 5-2 presents the coefficients between the variables. An asterisk next to a correlation coefficient indicates statistical significance (5% significance level was used). Below each correlation coefficient are the respective *p*-values given in brackets.

Table 5-2: **Correlation Matrix**

	Market Cap	**Enterprise value**	**Share Price**	**EBIT**	**Book value**	**EPS**	**BVPS**
Market cap	1.0000						
Enterprise value	0.6612*	1.0000					
	(0.0000)						
Share price	0.9029*	0.5471*	1.0000				
	(0.0000)	(0.0000)					
EBIT	0.8430*	0.6562*	0.7213*	1.0000			
	(0.0000)	(0.0000)	(0.0000)				
Book value	0.8971*	0.6090*	0.7662*	0.7862*	1.0000		
	(0.0000)	(0.0000)	(0.0000)	(0.0000)			
EPS	0.5527*	0.7151*	0.5807*	0.6591*	0.5044*	1.0000	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		
BVPS	0.4934*	0.5409*	0.5146*	0.4239*	0.6367*	0.7194*	1.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

The matrix shows that there exists a positive and statistically significant association between enterprise value and EBIT (0.6562), as well as enterprise value and tangible book value (0.6090). Linearity tests also indicated that these variables have positive relationships. EBIT and tangible book value show a high, positive and statistically significant relationship, but the correlation coefficient is below 0.8 (0.7862), implying very low chances of collinearity between the explanatory variables. On a per-share basis, EPS and BVPS have a positive and significant association, with a correlation coefficient of 0.7194. This coefficient is however lower than the one exhibited between EBIT and tangible book value. This evidences the fact that share deflation of variables helps to reduce chances of collinearity.

A positive and statistically significant association exists between market capitalisation and EBIT (0.8430), and tangible book value (0.8971). This shows a much stronger association between market capitalisation and the independent variables than what was observed between enterprise value and the same independent variables. When market capitalisation is deflated by the number of shares in issue to yield price per share, the

relationship is still positive and statistically significant. However, the correlation coefficients are now much lower, where the coefficient between share price and EBIT is 0.7213, and that between stock price and book value is 0.7662. This suggests a stronger link between the explanatory variables and total firm value than with the price per share.

The correlation coefficients amongst the variables: enterprise value, market capitalisation and share price, are of no consequence because these are dependent variables used in various models, and they are not used together in the same model. Similarly, EPS and BVPS are only used with the dependent variable share price. Nevertheless, a correlation coefficient of 0.6612 between market capitalisation and enterprise value suggests that the two firm value variants are not very good proxies of each other. A positive and statistically significant association exists between share price and EPS (0.5807), and BVPS (0.5146). The coefficients are weaker than those between stock price and EBIT, and stock price and tangible book value. Deflating EBIT and tangible book value by the number of shares in issue seems to weaken the relationship between the variables, something that is also suggested by Figure 5-7 and 5-8.

5.3.4 Data Normality Tests

The Shapiro-Wilk test was used to check whether the distribution of data is normal or not. The normality of model residuals' distribution was checked using histograms. Regressions were run, residuals predicted and then, the histograms were done on the residuals. The results of the Shapiro-Wilk test are given in Table 5-3.

The table shows that the natural logarithms of all but one variable are not normally distributed. The only normally distributed variable is the natural logarithm of EBIT. The study does not assume that data is normally distributed, so, there is no problem with lack of data normality.

Table 5-3: **Shapiro-Wilk Test Results**

Variables	**W**	**V**	**Z**	**Prob > Z**
Log share price	0.96016	10.967	5.699	0.00000
Log market cap.	0.96678	9.147	5.267	0.00000
Log book value	0.98376	4.402	3.524	0.00021
Log EBIT	0.99231	2.000	1.644	0.05010
Log EV	0.96966	8.352	5.050	0.00000

It is also worthwhile inspecting the distribution of residuals from the models used. The distribution of residuals for the four different scenarios assessed is given in Figures 5-9 to 5-12. Figure 5-9 depicts the distribution of residuals for the base model where the natural logarithm of enterprise value is the dependent variable. Figure 5-10 depicts results where the natural logarithm of market capitalisation is the dependent variable.

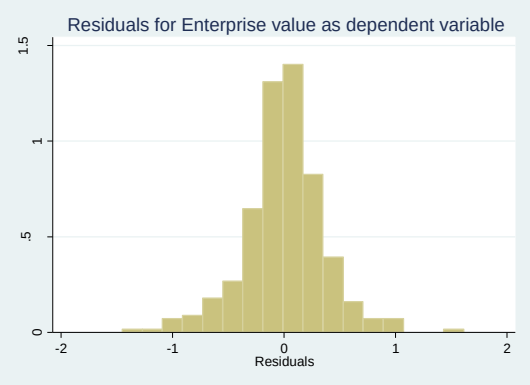


Figure 5-9: **Enterprise Value Residuals**

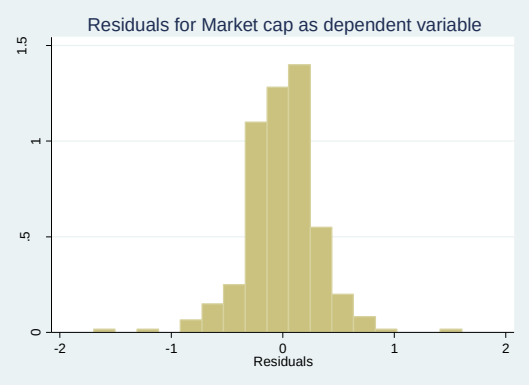


Figure 5-10: **Market Capitalisation Residuals**

In both cases, the residuals are not exactly normally distributed, but are a fair approximation of a normal distribution, with Figure 5-9 being much closer to a normal distribution than Figure 5-10. The peak in Figure 5-10 is not centred on zero while that in Figure 5-9 is almost centred on zero.

Figure 5-11 shows a histogram of residuals where the log of stock price is the outcome variable, while Figure 5-12 shows a histogram of residuals where untransformed share prices are the outcome variable, and EPS and BVPS are explanatory variables.

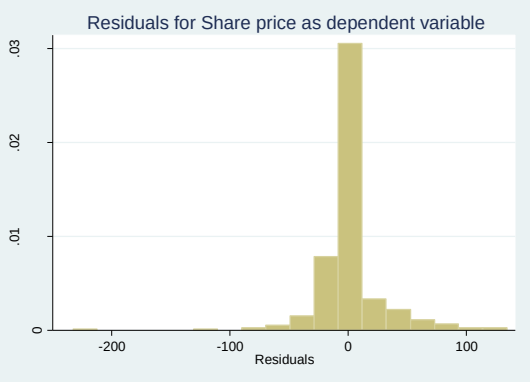


Figure 5-11: **Log Share Price Residuals**

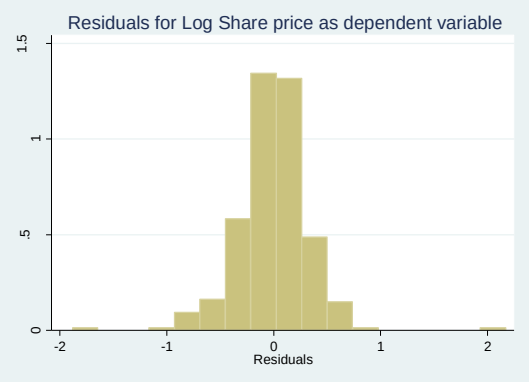


Figure 5-12: **Share Price Residuals**

Just like the previous scenarios, the residuals are not normally distributed. Figure 5-11 is a better approximation of a normal distribution than Figure 5-12, which is heavily skewed[17]. Normality is however not a strict assumption in System GMM estimators, so, non-normality is not a major problem in all the four scenarios analysed in this study.

Regression results for the four scenarios are presented in the following sections:

5.4. Relationship between Firm Value Variants and Book Value & EBIT

This segment presents the findings on regression models that focus on the association between firm value (response variable) and book value and EBIT (independent variables). Two variants of firm value are used: Section 5.4.1 presents the first variant, which uses enterprise value as the measure of firm value while Section 5.4.2 presents the results of the second variant where market capitalisation is used to measure firm value.

5.4.1 Relationship between Enterprise Value and Book Value & EBIT

Table 5-4 presents regression results for Scenario 1 (the first variant). To assess value relevance without controlling for the other variable, book value and EBIT[18] are dropped from the model, one at a time. This also serves as a way of checking the robustness of the model results. Furthermore, the lag structure is also changed to check the sensitivity of the model results to lag changes. This gives rise to six models, where Model 1 is the base model. Model 4 is similar to Model 1, the only difference being the lag structure. Model 1 results are thus directly compared to Model 4 results for purposes of checking the sensitivity to lag changes. Comparisons are also made between the results of Models 1, 2 and 3 to check the effect of dropping a variable. The results are assumed to be robust, implying that there should be small changes in the coefficients of the variables as well as their levels of significance. Models 2 and 3 are also compared to Models 5 and 6 respectively.

[17] The distribution is negatively skewed. With log-transformation of the dependent variable share price; this skewness is heavily reduced. This option was however not adopted because the goal is to determine the impact of log-transformation of data on the model results. This is part of the evidence in that respect.

[18] The variables are dropped together with their first lags.

Table 5-4: **Regression Results (Log Enterprise Value as Dependent Variable)**

VARIABLES	Model 1 Lag (1 3) Log EV	Model 2 Lag (1 3) Log EV	Model 3 Lag (1 3) Log EV	Model 4 Lag (1 2) Log EV	Model 5 Lag (1 2) Log EV	Model 6 Lag (1 2) Log EV
Log of Lag Enterprise value	0.901***	0.988***	0.953***	0.914***	1.003***	0.947***
	(0.098)	(0.061)	(0.049)	(0.100)	(0.056)	(0.054)
Log EBIT	0.151**	0.145***		0.146**	0.165**	
	(0.056)	(0.050)		(0.064)	(0.064)	
Log of Lag EBIT	-0.067	-0.124*		-0.076	-0.160*	
	(0.074)	(0.069)		(0.099)	(0.083)	
Log Book value	0.404*		0.434*	0.402		0.450*
	(0.215)		(0.236)	(0.257)		(0.250)
Log of Lag Book value	-0.382**		-0.395*	-0.381*		-0.405*
	(0.178)		(0.204)	(0.208)		(0.213)
Constant	0.044	-0.129	0.117	0.018	-0.151	0.129
	(0.309)	(0.306)	(0.257)	(0.348)	(0.302)	(0.288)
Number of instruments	36	34	34	32	30	30
Number of observations	309	318	341	309	318	341
Number of firms	48[19]	49	49	48	49	49
Arellano-Bond test for AR(1)	-3.69	-3.77	-3.69	-3.72	-3.82	-3.68
P-value for AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(2)	1.07	1.17	0.21	1.10	1.24	0.22
P-value for AR(2)	0.282	0.242	0.834	0.272	0.213	0.829
Hansen test statistic	30.19	28.88	26.22	27.88	26.11	25.92
P-value for Hansen test	0.179	0.225	0.342	0.112	0.162	0.169

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

a) Results of Models 1 and 4

The probability of *F* in the two models shows that both models are significant at 1% level, meaning that the explanatory variables used in the study jointly explain the movement in enterprise value. Model 1 uses 36 instruments while Model 4 uses 32 instruments. The number of observations in both cases is 309 while the number of firms is 48, which is much higher than the number of instruments used. This means that there is no problem of too many instruments in the two models.

Model 1 depicts a positive and statistically significant association between enterprise value and EBIT. This means that as EBIT increases, firm value, as measured by enterprise

[19] Two companies were automatically dropped from the analysis because they have very few observations. Aspen Holdings has negative tangible book values in 6 of the 8 years. Also, PSV Holdings has negative operating income in 6 of the 8 years. On conversion to logs, these negative values become missing observations, leading to too few observations per company. Where the focus is on either book value only or operating income only, there will be 49 companies because only one will have been dropped.

value, also increases. The relationship is significant at 5% level. When the lag structure is changed in Model 4, the relationship is still positive and statistically significant at 5% level. The coefficient of EBIT registers a marginal change from 0.151 in Model 1 to 0.146 in Model 4. Windmeijer corrected standard errors are small in both cases, changing from 0.056 (Model 1) to 0.064 (Model 4). The small changes in the coefficient show that the results are robust to lag structure changes. Statistical significance means that EBIT from continuing operations is value relevant, where enterprise value is used to measure firm value.

Book value has a positive association with enterprise value, where the coefficient is 0.404 (Model 1), which marginally changes to 0.402 when the lag structure is changed in Model 4. A positive relationship means that an increase in tangible book value leads to an increase in a firm's enterprise value. Windmeijer corrected standard errors are small relative to the coefficients, and the errors exhibit minor movement as a result of changes in the lag structure. However, the relationship between enterprise value and tangible book value is not statistically significant at 5% level. This denotes that tangible book value is not value relevant when enterprise value is deployed to represent firm value on the JSE, i.e. tangible book value does not influence a firm's takeover value.

b) Results of Models 2 and 5

The variable tangible book value and its first lag were dropped from the base model, yielding Models 2 and 5. These two models have the same variables, but they use different lag limits. In both cases, the explanatory variables jointly explain the movement in firm value as shown by the probability of *F*. Model 2 has 34 regression instruments while Model 5 has 30 instruments. In both cases, there are 318 observations and 49 firms, which is much larger than the number of instruments used. Therefore, there is no instrument proliferation in the two models.

Dropping tangible book value from the base model causes the coefficient of EBIT to move from 0.151 in Model 1 to 0.145 in Model 2. Windmeijer corrected standard errors only marginally move from 0.056 to 0.050, when book value is dropped. There is still a positive and statistically significant relationship (at 1% level) between enterprise value and EBIT. This shows that if we do not control for tangible book value, the level of statistical significance of EBIT changes from 5% to 1%. In relation to Models 2 and 5,

changing the lag length causes the coefficient of EBIT to change from 0.145 to 0.165, while Windmeijer corrected standard errors change from 0.050 to 0.064. These show that the results are quite robust to lag structure changes as well as to dropping a correlated variable.

c) Results of Models 3 and 6

EBIT and its first lag were also dropped from the base model and this gave rise to Model 3 and Model 6. Variables in the two models are the same, but they use different lag limits to check the sensitivity of results to lag structure changes. Both models are significant at 1% level as shown in the probability of *F* in the two models. This shows that the explanatory variables used in the models jointly expound the change in enterprise value. Model 3 has 34 instruments while Model 6 has 30 instruments. The two models have 341 observations and 49 firms, a figure that is larger than the instrument count, implying that the problem of too many instruments does not exist in both models.

Dropping EBIT from the model causes the coefficient of tangible book value to change from a Model 1 value of 0.404 to 0.434 in Model 3. Windmeijer corrected standard errors change from 0.215 to 0.236. The recorded changes are quite small and they are within a range that would be expected to occur when a correlated variable is dropped. The relationship between enterprise value and tangible book value is still positive, but not statistically significant at 5% level. When the lag limit is changed in Model 6, the coefficient of book value changes from 0.434 (Model 3) to 0.450 (Model 6), while Windmeijer corrected errors change from 0.236 to 0.250 respectively. These minor changes attest to the fact that the model used in this analysis is robust and its results are reliable. Whether we control or we do not control for EBIT, tangible book value remains statistically insignificant across the two lag structures used. Therefore, tangible book value does not explain the movement in a firm's enterprise value. The following section discusses diagnostic test results for all the six models.

d) Diagnostic Test Results

The models were subjected to autocorrelation tests as well as mean stationarity tests, and the results are in the lower panel of Table 5-4. In all the six models, we fail to reject the null hypothesis of no serial correlation of order 1 [AR (1)] based on the Arellano-Bond test for serial correlation since the *p*-values of AR (1) are all lower than 0.05. This is

expected because the full error term ε_{it} contains fixed effects (Roodman, 2009). The full error term is given by:

$$\varepsilon_{it} = u_{it} + v_i \quad \ldots (5\text{-}7)$$

Arellano & Bond (1991) came up with a model for testing serial correlation in the idiosyncratic error term u_{it}.The Arellano-Bond autocorrelation test is also applied to the residuals in differences (besides the fixed effects). Autocorrelation of order one in differences is expected because Δu_{it} and Δu_{it-1} are mathematically related since they share the term u_{it}. This means that there should be AR (1). The existence of first-order autocorrelation is thus not informative. The only autocorrelation that is informative is second-order autocorrelation [AR (2)]. Based on the Arellano-Bond test, we reject the hypothesis that there is second-order autocorrelation because all the *p*-values of AR (2) are larger than 0.05 and we conclude that there is no autocorrelation problem in the six models.

The Sargan/Hansen tests were considered in testing for the validity of over-identifying restrictions in the models. In System GMM, the Sargan test does not convey any useful information; it is useful in Difference GMM (Roodman, 2009). Consequently, the results of the Sargan test are of no use here and they are not displayed in Table 5-4. Thus, the relevant test for mean-stationarity is the Hansen test, where the probability should be greater than 0.05 for us to reject the null hypothesis. In all the six models, we reject the null hypothesis and conclude that the over-identifying restrictions are valid. This validates the instruments used. The models are not weakened by too many instruments.

The next section presents regression results for Scenario 2 where the natural logarithm of market capitalisation is used as a dependent variable, maintaining everything else used in Scenario 1 (the independent variables and the instruments used). Results from the two scenarios are compared thereafter.

5.4.2 Relationship between Market Capitalisation and Book Value & EBIT

In Scenario 2, market capitalisation is used to measure firm value. Table 5-5 presents the regression results for this scenario.

Table 5-5: **Regression Results (Log Market Capitalisation as Dependent Variable)**

Variables	Model 1 Lag (1 3) Log M. C.	Model 2 Lag (1 3) Log M. C.	Model 3 Lag (1 3) Log M. C.	Model 4 Lag (1 2) Log M. C.	Model 5 Lag (1 2) Log M. C.	Model 6 Lag (1 2) Log M. C.
Log of Lag Market Cap.	0.976***	0.996***	0.996***	0.973***	1.005***	0.994***
	(0.043)	(0.033)	(0.022)	(0.045)	(0.029)	(0.025)
Log EBIT	0.207***	0.199***		0.209***	0.200***	
	(0.045)	(0.040)		(0.055)	(0.055)	
Log of Lag EBIT	-0.161**	-0.194***		-0.161**	-0.205***	
	(0.064)	(0.048)		(0.079)	(0.066)	
Log Book value	0.144		0.206*	0.146		0.234
	(0.099)		(0.122)	(0.100)		(0.140)
Log of Lag Book value	-0.172*		-0.218*	-0.174*		-0.247*
	(0.096)		(0.120)	(0.095)		(0.133)
Constant	0.256	0.051	0.377*	0.283	0.040	0.457**
	(0.185)	(0.181)	(0.192)	(0.207)	(0.191)	(0.216)
Number of instruments	36	34	34	32	30	30
Number of observations	309	318	341	309	318	341
Number of firms	48[20]	49	49	48	49	49
Arellano-Bond test for AR(1)	-3.66	-3.77	-3.69	-3.66	-3.79	-3.69
P-value for AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(2)	0.92	0.65	-0.82	0.93	0.63	-0.83
P-value for AR(2)	0.355	0.515	0.414	0.352	0.532	0.405
Hansen test statistic	25.38	25.36	28.91	25.15	23.14	27.00
P-value for Hansen test	0.385	0.386	0.223	0.196	0.282	0.135

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

a) Results of Models 1 and 4

Just like with the first scenario, these two models are similar in all aspects except the lag limits used. Model 1 is the base model and Model 4 is used to check the sensitivity of the base model to changes in lag limits. Explanatory variables in Models 1 and 4 jointly explain the movement in market capitalisation at 1% significance level, according to the *F*-test. Model 1 has 36 regression instruments while Model 4 has 32 instruments. Both models have a total of 309 observations and 48 firms, which is much more as compared to the number of instruments used. This is necessary in order to circumvent the problem of instrument proliferation.

EBIT exhibits a positive relationship with market capitalisation in both models. As a firm's EBIT increases, market capitalisation increases as investors see value in the firm

[20] The same explanation for this number of firms given in Table 5.4 also applies in this case.

in question. The association is statistically significant at 1% level. When the lag limit is changed in Model 4, the relationship is still significant at 1% level. The coefficient of EBIT in Model 1 is 0.207 and it marginally changes to 0.209 in Model 4. Windmeijer corrected standard errors are 0.045 in Model 1, changing to 0.055 as a result of a change in lag limits in Model 4. The changes for both the coefficient and the standard errors are small, implying that the results are robust to lag limits changes. The results show that EBIT from continuing operations is value relevant on the JSE.

Book value also exhibits a positive relationship with market capitalisation: as book value increases, firm value also increases. This is quite logical because an increase in tangible book value means a rise in the residual value that is available to shareholders of the company in the event of liquidation. This gives a sense of security to investors. Firms with high tangible book values should therefore attract more investors, and this drives up the firms' market capitalisation. The coefficient of book value is 0.144 in Model 1, which marginally changes to 0.146 in Model 4. Standard errors are small and they also change marginally between the two models. However, the association between book value and market capitalisation lacks statistical significance. This means that book value is not value relevant on the JSE.

b) Results of Models 2 and 5

To check model sensitivity to the removal of a variable, tangible book value and its first lag were dropped from the base model. In addition to being a sensitivity measure, dropping tangible book value also enables an assessment of value relevance of EBIT without controlling for tangible book value to be done. This gives rise to Models 2 and 5. The remaining explanatory variables jointly explain the movement in market capitalisation at 1% level according to the *F*-test. Model 2 made use of 34 regression instruments while Model 5 used 30 instruments. In either case, the number of instruments is much lower than the 318 observations and 49 firms in both models. Thus, no instrument proliferation exists.

Dropping tangible book value causes the coefficient of EBIT to change from a Model 1 value of 0.207 to 0.199 in Model 2. The association between market capitalisation and EBIT is still positive and statistically significant (at 1% level). This means that whether or not we control for tangible book value, the results remain the same. Corrected standard errors also marginally change from 0.045 to 0.040. These minor changes mean that the

model is robust. Changing the lag limit causes the coefficient of EBIT to, again, marginally change from 0.199 (Model 2) to 0.200 (Model 5). Corrected standard errors are small and they also register small changes, showing that the model is robust.

c) Results of Models 3 and 6

EBIT and its first lag were also dropped from the base model, yielding Model 3 and Model 6. The *F*-test shows that the remaining explanatory variables still jointly explain the movement in market capitalisation at 1% significance level. Model 3 employs 34 instruments while Model 6 has 30 instruments. In both cases, there are 341 observations and 49 companies. A comparison between the number of instruments and the number of observations and companies shows that there is no instrument proliferation in the models.

As a result of dropping EBIT from the model, the coefficient of tangible book value moves from 0.144 in Model 1 to 0.206 in Model 3. There is still a positive and statistically insignificant association between market capitalisation and tangible book value. Dropping EBIT thus has no effect on tangible book value's lack of value relevance, i.e. controlling for EBIT and not controlling for EBIT, the result is the same. Changing the lag structure causes the coefficient of tangible book value to change from a Model 3 value of 0.206 to a Model 6 figure of 0.234 and the corrected standard errors change from 0.122 to 0.140. The relationship remains insignificant at 5% level. Thus, changing lag limits also has no effect on model results: book value is still not value relevant on the JSE.

Diagnostic test results are discussed in the next section.

d) Diagnostic Test Results

Diagnostic test results are displayed in the lower section of Table 5-5. The Arellano-Bond test shows that, as expected, we fail to reject the presence of serial correlation of order 1 in all the six models. This is because all the *p*-values for first-order serial correlation are lower than 0.05. However, we reject the second-order autocorrelation in all the models since the *p*-values for AR (2) are all larger than 0.05. This shows that autocorrelation does not exist in all the six models. The Hansen test of over-identifying restrictions shows that the instruments used in these models are valid and the models are not weakened by too many instruments, since all the probabilities for the Hansen test are greater than 5%.

5.4.3 Comparison of Results for Scenarios 1 and 2

Results from Scenario 1 depict a positive and statistically significant association between firm value (enterprise value) and EBIT from continuing operations across all the four models with the variable[21]. Scenario 2 also shows the existence of a positive and statistically significant association between firm value (market capitalisation) and EBIT across all the four models. Robustness checks implemented attest to the fact that all the models are robust. Diagnostic test results show that the models are valid and their results are reliable. This, therefore, shows that, regardless of the measure of firm value used, EBIT from continuing operations is value relevant. EBIT explains movements in both market capitalisation and enterprise value on the JSE, even though the two variables are not perfect proxies, based on their correlation coefficient.

The same two scenarios produce consistent results to the effect that tangible book value is not value relevant at 5% significance level across all the eight models (four from Scenario 1 and another four from Scenario 2). This means that the movements in enterprise value and market capitalisation on the JSE cannot be explained by firms' residual value of net tangible assets.

A discussion of these results is done after examining the relationship between share price (dependent variable) and tangible book value & EBIT from continuing operations and EPS & BVPS (independent variables) in the next two sections.

5.5 Relationship between Share Price and Book Value & EBIT

While the main focus in this chapter is on how tangible book value and EBIT from continuing operations affect firm value, assessment of the impact of EBIT and tangible book value has been extended to share prices because share price is the cost that an investor pays to get a slice of the firm's value. The goal is to uncover if there exists an association between this cost (share price) and EBIT & tangible book value, or the relationship only exists at a "macro level" (firm value level). The same models that were used in the previous sections are also used.

[21] EBIT from continuing operations was dropped from two of the six models in Scenario 1. Similarly, it was also dropped from two of the six models in Scenario 2.

The next section presents Scenario 3, where the natural log of stock price is the response variable and the explanatory variables are as in the previous two scenarios. Scenario 4 is a little bit different in that it uses untransformed stock price (raw stock price) as the response variable and then deflates EBIT and tangible book value by the sum of all common stocks in issue to get the independent variables EPS and BVPS respectively. These results are compared, the goal being to determine if the method of data transformation has any influence on model results. The comparison is therefore between log-transformation and deflating all variables by the number of shares outstanding.

5.5.1 Relationship between Log Share Price and Book Value & EBIT

Table 5-6 displays Scenario 3 regression results, where the natural logarithm of stock price is the response variable.

Table 5-6: **Regression Results (Log Stock Price as Response Variable)**

VARIABLES	Model 1 Lag (1 3) Log S.P.	Model 2 Lag (1 3) Log S.P.	Model 3 Lag (1 3) Log S.P.	Model 4 Lag (1 2) Log S.P.	Model 5 Lag (1 2) Log S.P.	Model 6 Lag (1 2) Log S.P.
Log of Lag Share price	0.985***	0.992***	0.995***	0.983***	0.996***	0.997***
	(0.034)	(0.039)	(0.032)	(0.039)	(0.040)	(0.035)
Log EBIT	0.172***	0.172***		0.172***	0.163***	
	(0.041)	(0.042)		(0.052)	(0.054)	
Log of Lag EBIT	-0.147***	-0.169***		-0.144**	-0.162**	
	(0.051)	(0.049)		(0.063)	(0.062)	
Log Book value	0.073		0.191	0.070		0.190
	(0.134)		(0.120)	(0.133)		(0.123)
Log of Lag Book value	-0.099		-0.205*	-0.097		-0.205*
	(0.131)		(0.120)	(0.132)		(0.121)
Constant	0.106	-0.011	0.274	0.068	0.006	0.297
	(0.456)	(0.395)	(0.484)	(0.559)	(0.436)	(0.564)
Number of instruments	36	34	34	32	30	30
Observations count	309	318	341	309	318	341
Number of firms	48	49	49	48	49	49
Arellano-Bond test for AR(1)	-3.67	-3.59	-3.63	-3.51	-3.54	-3.63
P-value for AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(2)	0.86	0.78	-0.60	0.87	0.76	-0.61
P-value for AR(2)	0.392	0.436	0.545	0.385	0.446	0.544
Hansen test statistic	31.18	31.65	31.98	30.46	30.73	31.20
P-value for Hansen test	0.149	0.136	0.128	0.063	0.590	0.053

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

a) Results of Models 1 and 4

The *F*-test shows that both models are significant at 1% level. This means that the variables tangible book value, EBIT, and the lag of share prices are jointly statistically significant in explaining stock price movements. Model 1 has 36 instruments (both standard and GMM) while Model 4 employs 32 instruments, where the number of observations in both cases is 309. The number of companies in both models is 48. There is no problem of too many instruments since the number of observations and companies exceed the number of instruments used.

Model 1 shows the existence of a positive and statistically significant (at 1% level) relationship between share price and EBIT from continuing operations. Changing the lag limit in Model 4 still yields a positive association between stock price and EBIT, where the association is, again, statistically significant at 1% level. The level of statistical significance is thus not sensitive to an alteration of the lag limit. In Model 1, a one per cent increase in EBIT increases share prices by about 0.172 per cent and this coefficient remains constant when the lag limit is changed in Model 4. Windmeijer corrected standard errors in both models are quite low (0.041 and 0.052) and they do not change much as a result of a variation of the lag structure used in the model.

There is also a positive association between stock price and tangible book value in both models. The coefficient of book value is 0.073 in Model 1 and it registers a marginal change from 0.073 to 0.070 in Model 4 as a result of a change in the lag limit used. Windmeijer corrected standard errors for tangible book value also registers a marginal change when the lag structure is changed. These minor changes show that the model is robust and its results are reliable.

Further to changing lag limits, one dependent variable at a time is dropped to determine each independent variable's information content without controlling for the other variable. Besides, that also measures the sensitivity of the model's results to dropping a correlated variable.

b) Results of Models 2 and 5

The variable book value and its first lag were dropped from Models 1 and 4 to produce Model 2 and Model 5. The two models are similar in all aspects except that they use

different lag limits, just like the case with Model 1 and Model 4. The resultant models are still statistically significant at 1% level, according to the *F*-test. Therefore, the remaining explanatory variables still jointly explain movements in share price. Model 2 has 34 regression instruments while Model 5 has 30 instruments (standard and GMM instruments in both cases). At 318, the quantity of observations in the two cases exceeds the sum of regression instruments used. The number of groups in each model (49) is also more than the number of instruments used per model. Hence, there is no problem of too many instruments.

The resultant models show that EBIT from continuing operations again exhibit a positive and statistically significant relationship with stock prices. The coefficient of EBIT remains constant at 0.172 in Model 2, even if some explanatory variables have been dropped from Model 1. This means that whether we control for tangible book value or not, the level of statistical significance of EBIT from continuing operations is not affected. Windmeijer corrected standard errors marginally change from a Model 1 value of 0.041 to 0.042 in Model 2, showing that model results are stable. Comparing Models 2 and 5 reveals that the coefficient of EBIT only moved from 0.172 (Model 2) to 0.163 (Model 5), and this is the only time that the coefficient changes from 0.172 across the four models. Furthermore, the Windmeijer corrected standard errors under the two models are relatively low and registered small changes as a result of a variation in the lag structure. The level of statistical significance of EBIT remains constant at 1%. All this attests to the fact that Models 1 and 4 are stable and their results are reliable.

c) Results of Models 3 and 6

Model 3 and Model 6 dropped the other variable of interest, EBIT from continuing operations and its first lag. The *F*-test reveals that these models are statistically significant at 1% level, meaning that the remaining variables still jointly explain share price movements. A total of 34 instruments were used in Model 3 while Model 6 has 30 instruments. Both models have 341 observations and 49 companies each, meaning that there is no instrument proliferation in these models.

The variable tangible book value still has a positive relationship with share price in both models, but again, it is not statistically significant. This shows that whether we control for EBIT from continuing operations or not, tangible book value will remain devoid of

value relevance on the JSE. Dropping EBIT and its first lag from Model 1 causes the coefficient of book value to change from a Model 1 figure of 0.073 to 0.191 in Model 3. Windmeijer corrected standard errors register a small change when a correlated variable is dropped. Changing the lag limit causes the coefficient of book value to change from 0.191 in Model 3 to 0.190 in Model 6. This shows that the results are not sensitive to changes in lag limits. However, the change in the coefficients when EBIT is left out of the model is not as small as the change due to lag limit changes. Although the changes are not very substantial, there is some sensitivity of tangible book value to the removal of EBIT from the model. This can be explained by the fact that the correlation between share price and tangible book value (0.7662) is higher than that between share price and EBIT (0.7213). Furthermore, the correlation between EBIT and tangible book value is quite high (0.7862). The combined effect of these relationships can help explain why the coefficient of tangible book value changed that much. However, Windmeijer corrected standard errors did not change significantly. This shows that the model is stable.

d) Diagnostic Test Results

Diagnostic test results appear in the lower panel of Table 5-6. As expected, we fail to reject the hypothesis that there exists first-order serial correlation in first differences using the Arellano-Bond test for autocorrelation for all the six models under Scenario 3. This is because the *p*-values for AR (1) in the six models are all less than 0.05. However, we reject the existence of serial correlation of order two using the same test since, in this particular case, *p*-values for second-order serial correlation are all larger than 0.05. This, therefore, shows that there is no serial correlation in the models. The Hansen test shows that the over-identifying restrictions are valid, meaning that the instruments used are appropriate and the model is robust.

The next section presents Scenario 4, which basically uses Scenario 2 models before log-transformations and then deflates all the variables (dependent and independent) by the sum of stocks in issue. The earnings per share (EPS) figures in this particular case are not the EPS figures reported by the firms in their financial statements; but this is simply a result of dividing EBIT from continuing operations by the total common stocks in circulation. Similarly, book value per share (BVPS) is derived from dividing tangible book value by the sum of common stocks in circulation.

5.5.2 Relationship between Raw Share Price and EPS & BVPS

Value relevance was also tested on a per-share basis. The motivation behind this is that the value on a per-share basis should be of interest to shareholders because whatever value that is generated by the company, it is allocated to shareholders according to the number of shares they have. EBIT or after-tax profit for the company may give an investor some false sense of comfort and satisfaction because they will be looking at a large after-tax profit figure. The situation may however change when the profits are allocated to each share issued. Value per share is thus worth analysing.

Analysis in this scenario also stems from observing that researchers have found divergent results concerning value relevance of earnings and book values. Clout & Willet (2016) argue for "the need for a logarithmic transformation of the data to give statistically well-specified models" (p.1017). From extant literature, one observes that different researchers transform their data differently, e.g. log-transformation (Matson & Huguenard, 2007) vis-à-vis deflating by the number of shares in issue (Khanagha, 2011; Khanna, 2014). There are also some who choose not to deflate their data, e.g. Camodeca, Almici & Brivio (2014). This research does not consider the non-deflated scenario in line with Göttsche & Schauer (2011) who argued that "un-deflated regression results might suffer from a coefficient bias and heteroscedasticity" (p.13), due to scale bias. This analysis hypothesises that the reason why researchers find conflicting results is due to the different methods of data transformation they use. This is a sub-plot that is analysed in this section by comparing the findings to those in Scenario 3 which uses log transformation of data.

The same models that were used to determine value relevance of EBIT from continuing operations and tangible book value in the other scenarios are also employed to test the information content of operating earnings per share (EPS) and tangible book value per share (BVPS). The regression results are presented in Table 5-7.

a) Results of Models 1 and 4

The *F*-test shows that both models are statistically significant at 1% level, meaning that the combination of EPS and BVPS mutually explicate the change in stock prices under different lag limits. Model 1 has 30 instruments while model 4 has 26 instruments. In these two models, the total count of observations (350) exceeds the instrument count. Furthermore, the sum of companies is also greater than the number of instruments. This

is desirable to ensure that we do not have too many instruments, which will result in unreliable results.

Table 5-7: **Regression Results (Raw Share Price as Dependent Variable)**

VARIABLES	Model 1 Lag (1 3) Raw S.P.	Model 2 Lag (1 3) Raw S.P.	Model 3 Lag (1 3) Raw S.P.	Model 4 Lag (1 2) Raw S.P.	Model 5 Lag (1 2) Raw S.P.	Model 6 Lag (1 2) Raw S.P.
Lag Share price	0.896***	0.941***	0.995***	0.942***	0.982***	0.999***
	(0.068)	(0.064)	(0.044)	(0.087)	(0.057)	(0.043)
Earnings per share	3.587***	3.549***		3.709***	3.632***	
	(1.080)	(1.184)		(1.086)	(1.185)	
Lag earnings per share	-2.176	-2.639**		-2.886**	-3.121**	
	(1.309)	(1.097)		(1.427)	(1.242)	
Book value per share	0.500		0.838	0.585		0.612
	(0.519)		(0.620)	(0.643)		(0.711)
Lag book value per share	-0.607		-0.913	-0.662		-0.684
	(0.531)		(0.624)	(0.664)		(0.720)
Constant	4.329	2.996	4.299	1.571	-0.363	1.111
	(13.071)	(10.700)	(11.011)	(13.462)	(12.643)	(9.713)
Number of instruments	30	28	28	26	24	24
Number of observations	350	350	350	350	350	350
Number of firms	50	50	50	50	50	50
Arellano-Bond test for AR(1)	-2.09	-2.10	-2.01	-2.08	-2.21	-2.15
P-value for AR(1)	0.036	0.035	0.045	0.037	0.027	0.032
Arellano-Bond test for AR(2)	-0.30	-0.14	-1.80	0.11	0.11	-1.76
P-value for AR(2)	0.762	0.890	0.072	0.915	0.914	0.079
Hansen test statistic	21.84	20.69	19.77	18.43	16.90	15.21
P-value for Hansen test	0.239	0.295	0.346	0.188	0.262	0.364

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

Both models show that EPS has a positive and statistically significant (at 1% level) relationship with untransformed share prices. An increase in EPS by one-unit results in an upsurge in stock prices by 3.587 units based on Model 1 results. Changing the lag limit in Model 4 causes the coefficient of EPS to change to 3.709. The variable retains statistical significance at 1% level despite the change in the lag limit. Windmeijer corrected standard errors are small and they register a marginal change when the lag structure is changed (1.080 vs 1.086). This is an indication that the model is stable. The two models provide evidence that EPS is value relevant on the JSE.

BVPS has a positive association with untransformed stock price, but the association is devoid of statistical significance in both models. Even though there is lack of statistical

significance, there is evidence that the models are robust: the coefficient of book value in Model 1 is 0.500 and it changes to 0.585 in Model 4 when the lag limit is changed. Furthermore, Windmeijer corrected standard errors register a fairly small change as a result of a change in the lag limit. Therefore, the results provide evidence that BVPS is devoid of value relevance. This is in conformity with all the other models where book value was found to lack value relevance.

b) Results of Models 2 and 5

The variable BVPS and its first lag were dropped from Models 1 and 4 to give Models 2 and 5 respectively. The remaining variables in the resultant models still have 1% level of statistical significance, according to the *F*-test. Model 2 utilises 28 regression instruments while Model 5 utilises 24 instruments. The number of instruments in both models is less than the number of observations (350) as well as the number of companies, so there is no problem of too many instruments.

In both models, EPS still has a positive association with stock price, the same association that obtains in Models 1 and 4. As a result of dropping a correlated variable, the coefficient of EPS changes from a Model 1 value of 3.587 to 3.549 in Model 2; this means that dropping variables has very little impact on model results. Furthermore, EPS remains statistically significant at 1% level in Model 2. This means that whether one chooses to control for BVPS or not, that choice does not influence value relevance of EPS. Windmeijer corrected standard errors register modest changes when BVPS is left out of the model. This means that Model 1 is robust and the results are reliable. Concerning sensitivity to lag limit changes, the coefficient of EPS changes to 3.632 in Model 5 from 3.549 in Model 2. The change is within what is expected to occur when a different lag structure is used in the same regression model. Very large changes are the ones that become a problem as that would indicate model fragility. In this particular case, the robustness checks implemented indicate that the models are robust. What we learn from these models is that EPS remains value relevant despite lag limit changes, variables being dropped or the method of data transformation used.

c) Results of Models 3 and 6

Models 3 and 6 resulted from dropping EPS and its first lag from Models 1 and 4 respectively. Again, this is part of the robustness measures implemented as well as

assessing value relevance without controlling for the other variable. The *F*-test shows that Models 3 and 6 are significant at 1% level (just like the other models), meaning that the remaining variables jointly explicate the change in untransformed stock prices. Model 3 has 28 regression instruments while Model 6 has 24 instruments. Comparing the number of instruments to the 50 companies and 350 observations in both models shows that there is no problem of too many instruments.

In response to dropping EPS and its first lag, the coefficient of BVPS changes from a Model 1 value of 0.500 to 0.838 in Model 3. There is still a positive relationship between BVPS and share price and, once again, the relationship is not statistically significant in Model 3. The implication of this is that whether we control for EPS or not, BVPS still lacks value relevance. Comparing Model 3 to Model 6 shows that the coefficient of BVPS changes from 0.838 to 0.612 in Model 6 in response to a variation in lag limits used. Windmeijer corrected standard errors also register small changes. In Model 6, there is, again, a positive, but statistically insignificant, association between BVPS and equity price. This means that BVPS is not value relevant regardless of which lag limits are used. Minor changes recorded in the coefficient of BVPS when EPS is dropped and lag limit changed, coupled with similar marginal changes observed in the values of corrected standard errors, attest that the models are robust.

d) Diagnostic Test Results

Diagnostic test results are presented in the bottom panel of Table 5-7. As expected, in all the six models under Scenario 4, we fail to reject the existence of first-order autocorrelation as measured by the Arellano-Bond test. This is because all the *p*-values of first-order serial correlation are lower than 0.05. With regards to second-order autocorrelation, the probabilities of AR (2) for all the models are greater than 0.05, indicating that there is no autocorrelation in the models. Mean stationarity as measured by the Hansen test also shows that the over-identifying restrictions are valid and the models are robust. This is because in all the six models the probabilities exceed 0.05.

5.6 Comparison of Scenarios 2, 3 and 4

Scenarios 3 and 4 are an extension of Scenario 2, which employs market capitalisation as the response variable. In Scenario 3, the dependent variable market capitalisation is deflated by the sum of stocks in issue to give stock prices and the stock prices are

transformed into their natural logarithm. In Scenario 4, the share prices remained untransformed, but the independent variables EBIT from continuing operations and tangible book value are deflated by the sum of stocks in issue to give EPS and BVPS respectively. The study evaluates the effect of two variants of earnings (log EBIT and EPS) and two variants of tangible book value (log book value and BVPS) on model results. In all the cases, what stands out is that log EBIT as well as EPS are statistically significant, meaning that they are value relevant. This is observed whether or not we control for tangible book value and BVPS. Focusing on the three scenarios being compared we find that the two variants of earnings are able to explicate the change in market capitalisation, log stock price and untransformed stock price. The method of transforming operating income has thus not impacted the results of the models. Model specification tests also show that both log-transformed and share deflated models are correctly specified.

Likewise, results in all the scenarios show that both variants of book value (log book value and BVPS) are not statistically significant, meaning that they are not value relevant. This means that no matter how tangible book value is transformed, it will remain value irrelevant. The variants of book value therefore do not explain the movements in market capitalisation, log share price and untransformed share price.

5.7 Discussion of Findings

This research's findings show that earnings before interest and taxes from continuing operations possess value relevance, but tangible book value is devoid of value relevance on the JSE. The findings both confirm and contradict the findings by other researchers on the same market and elsewhere in the developing world.

The relationship between enterprise value and accounting variables is an issue that has not gained much attention from researchers. Enterprise value represents the takeover value or purchase price of a firm. This research found that EBIT from continuing operations is value relevant while tangible book value is not. This means that the takeover value of a company is affected by its EBIT, but not by its tangible book value. Investors who wish to take over a firm can thus use that firm's EBIT in their valuations. Thus, models that ascertain the takeover value of a company should include EBIT from continuing operations. The implication of EBIT being value relevant, where enterprise

value is the response variable, is that if the firm is taken over, the new owners will get fair value for their money because what they pay (enterprise value) is directly related to the earnings of that firm. Earnings from continuing operations measure the firm's ability to retain its going concern status and generate stockholder value consistently. This is important to investors after a takeover because stockholders are worried about the safety of their investment. Where a firm continues to grow its EBIT, it means that besides the investors' funds being safe, a positive return will also be generated for the new owners.

Book value does not necessarily determine future earnings, hence, its lack of value relevance in this respect. What the new owners of a company are interested in are future earnings to be generated by the firm that they would have taken over, and this is ably represented by EBIT from continuing operations. All in all, findings in Scenario 1 support the hypothesis that enterprise value is influenced by EBIT, but they also conflict with the other hypothesis that enterprise value is related to book value. The expectation was that enterprise value will be influenced by tangible book value because the value of a firm in a takeover should be a reflection of what the firm's net assets are worth. Furthermore, it is the firm's assets that are used to generate earnings in the future. The higher the net assets, other things constant, the higher the potential to grow operating income in the future. Lack of value relevance probably means that intangible assets like goodwill and patents (disregarded in calculating tangible book value) are highly regarded when a firm is being valued for a takeover[22]. If so, it means their exclusion may contribute to the remaining figure's lack of value relevance. However, more research is needed in this regard in order for a concrete affirmation of that hypothesis to be made. Another possible explanation on why tangible book value is not value relevant is that there are not many takeovers that occur on the market, so, the takeover value is not considered by many investors in their normal day-to-day trading. The takeover value will only be considered when there is news of such an event happening, and the occurrence is very rare. However, this argument is weakened by the statistical significance of the relationship between enterprise value and the other variable, EBIT from continuing operations.

[22] A justification for this hypothesis is that when a company is bought, the new owners will also be hoping to benefit from the good name that the target firm has built in the industry over the years. Under normal circumstances, a company with a bad name may not attract suitors as much as one with a good reputation would do. This therefore should explain why intangibles like goodwill may be valuable in takeover targets.

Just like what was obtained in Scenario 1, findings in Scenario 2 support the hypothesis that EBIT influences market capitalisation, but tangible book value does not have an influence on market capitalisation. On one hand, the results converge with Davern *et al* (2019) who found out that EBIT and EBITDA possess information that helps explain the movement in equity prices in Australia. On the other hand, they also conflict with Davern *et al* (2019) regarding information content of book value. The current investigation established that tangible book value lacks value relevance, while Davern *et al* (2019) says book value is value relevant[23]. Similarly, the current study's findings also partly contradict those by Dahmash & Qabajeh (2012) who used market capitalisation as the response variable in a modified Ohlson model, using Jordanian data. Specifically, they found that book value and abnormal income possess value relevance, with abnormal income having greater value relevance than book value. Their measure of earnings is different from the one used in this study but the findings are in conformity with each other. The difference lies on book value, which they found to be value relevant while the current study established that tangible book value is not value relevant. The difference may be attributed to divergences in the measurement of book value between the two studies; one includes intangible assets while the other one does not include them. Another possible explanation is that the two studies focus on different markets. It does not mean that a variable has to be universally value relevant[24]. Since dynamics in different markets are different, we should expect differences in what traders in one market consider when they trade relative to another market. However, one may argue that if the definition of value is the same, then, value drivers should not vary depending on the market being analysed.

Scenario 3 generated findings that are in line with the first two scenarios: there is support for the hypothesis that EBIT from continuing operations has an influence on share prices. However, the findings fail to confirm the hypothesis that tangible book value influences equity price movements, which, again, conforms to the first two scenarios' findings. Regarding findings by other researchers, a study by Zulu, De Klerk & Oberholster (2017) on the JSE found that the book value of equity in interim financial statements was value relevant, but earnings were not value relevant, contrary to this study where earnings were found to possess information that is useful in explaining firm value changes while book

[23] Clout & Willett (2016) also investigated value relevance in Australia and the results lend support to those by Davern *et al* (2019).
[24] Similarly, it does not mean that when a variable is not value relevant in one market, then, that has to be universal across different world markets.

value lacks such information. The difference in findings may be as a result of the use of interim financial statements in Zulu *et al* (2017), as well as the methodological differences. The current study uses annual financial statements, a dynamic panel regression using System GMM estimators, and share prices recorded three months after a firm's financial year end. Their study used share prices at the close of the financial year (which may suffer from look-ahead bias) and applied OLS[25] regression. The current study's results are in line with what Omokhudu & Ibadin (2015) found out on the Nigeria Stock Exchange, where earnings were found to be value relevant, but book value was not statistically significant. The findings are comparable to those in the current study despite the methodological differences. Contrary to the current study as well as Omokhudu & Ibadin (2015)'s findings, Mirza, Malik & Ali Abdul-Hamid (2018) found out that book value has value relevance while earnings were found to lack value relevance in Malaysia.

A point to note regarding information content of earnings is the myriad versions of earnings used by researchers, among them are net income after taxes before extraordinary items (Camodeca, Almici & Brivio, 2014), profit after tax (Khanna, 2014), and comprehensive net income (Jahmani *et al*, 2017). The reason why some versions of earnings are not value relevant is that they do not provide useful information to investors with regards to a firm's ability to consistently churn a positive return in the future. For instance, comprehensive income includes income from discontinued operations and other non-core activities, which may not recur in the future. Furthermore, net income is affected by a firm's financing decision, such that given the same amount of EBIT for two firms; a highly geared firm's net income is lower than that of a firm that has no debt because of debt interest payments. While the tax-shield effect of debt has to be acknowledged for a levered firm, this is a financing issue rather than an operating issue. The difference in net income between the two firms does not mean that the levered firm performed poorly, it is simply a reflection of the firm's capital structure, and that is not permanent. This research opines that value relevance lies more with persistent operating capacity (represented by operating income from continuing operations) rather than financing issues because future income is generated from sound operating decisions. This thread is also in line with Collins, Maydew & Weiss (1997) who argued that the decline in information content over the years is caused by "…the increasing frequency and

[25] Ohlson & Kim (2015) document the limitations of OLS estimators when assessing the relationships between financial statement variables and stock market performance indicators.

magnitude of one-time items, the increasing frequency of negative earnings, and changes in average firm size and intangible intensity across time" (p.39).

Pervan & Bartulovic (2014) found out that earnings and book value have value relevance on five South Eastern European Exchanges studied between 2005 and 2010. Their results on earnings are the same as those found in this study. On a per-share basis using a Generalised Least Squares Random Effects model, Khanna (2014) found that earnings per share and book value per share were value relevant in India. This is partially contrary to what was found in this research (Scenario 4), where only earnings per share are value relevant, but book value per share is not value relevant. There is also no convergence between the findings in this research and those by Ahmadi (2017) who found that book value is more value relevant than earnings per share. The same study also found that value relevance declined when firms had negative earnings. The issue of negative earnings was not investigated in this study because there are very few firm-year combinations that have negative earnings.

Invariably, all the models showed that operating income has information that is useful in explaining movements in firm value. Ball *et al* (2017) weighed in with an important point when they said "decomposing "bottom line" earnings into operating versus non-operating components, and into accruals versus cash flow components, increases the predictive power over the cross section of average returns" (pp. 4-5). While the current study did not decompose earnings into the accruals portion and the cash flow portion, it focused on the operating component. Significantly, most studies that found out that earnings are not value relevant used bottom line earnings. Going by the findings of Ball *et al* (2017), use of un-decomposed earnings may help explain why they found out that earnings are devoid of value relevance, i.e. the relationship between net income and share price may have been attenuated by the use of earnings figures that are not decomposed. An adjunct dimension in the debate about earnings' information content was provided by Beaver (1974) who said that (citing MM) if earnings are adjusted for measurement errors through the use of instrumental variables, then the resultant figure will possess information content. However, an opposing view says it is better to simply use the instrumental variables in the first place without involvement of earnings. Nonetheless, the current study used instrumental variables in the earnings model, which may have helped the operating income to be value relevant.

EPS was found to have value relevance and EPS in this instance represents the value that has been created (on a per-share basis) from a company's continuing operations. A rise in this value is a positive sign to investors because that increases shareholder value. Furthermore, it also shows that the firm's operations are growing, and growth leads to a positive return on investment. The fact that EPS is value relevant means that investors view this measure as a good indicator of firm performance. However, it should be noted that the EPS figure used in this study is not the EPS figure reported by firms in their financial statements. Firms report various forms of earnings per share, which include headline EPS, basic EPS, diluted EPS, and on-going EPS. This research does not cover these forms of EPS, but simply deflates EBIT by shares in issue. In Scenarios 1, 2 and 3, the natural logarithm of EBIT was found to be value relevant. In Scenario 4, share-deflated EBIT is also value relevant, meaning that the method of data transformation has no influence on model results.

BVPS in all models in Scenario 4 is not value relevant. Considering that there are no variations of BVPS, unlike EPS, this research found enough evidence suggesting that BVPS is not value relevant on the JSE. However, an adjustment that can affect the BVPS figures used in this study is the adjustment of shares outstanding in cases where there are dilutive securities like convertible preference shares, convertible bonds and stock warrants. Furthermore, this study used a conservative measure of book value, where intangible assets were not considered, and yielding tangible book value. The adjustment of the number of shares in issue should however not be of major significance due to the fact that the book value was found not to be value relevant as well. Considering that the book value was share-deflated to get BVPS in Scenario 4, but all the other scenarios used the natural logarithm of book value and got similar results, it is evident that the method of data transformation does not determine a variable's value relevance. A variable that is value relevant remains value relevant regardless of the data transformation method used and the same can also be said of variables that are not value relevant.

Despite the assertions by Clout & Willett (2016) to the effect that logarithmic transformation is necessary to get models that are correctly specified, this research found no evidence to support this hypothesis, i.e. logarithmic transformation is not a necessity in order to get correctly specified models. Consistent and robust results were found irrespective of the method of data transformation used. However, Clout & Willett's

(2016) observation that without log-transformation, there is "greater departure from normality of the residuals" is supported by this study (see Figure 5-12). In view of favourable results of diagnostic tests and robustness measures taken in all scenarios, we reject the hypothesis that the method of data transformation has an effect on research findings.

Comparison of findings in the current study and those in extant literature revealed the lack of consensus among researchers regarding information content of operating income and book value. Methodological differences by scholars may be a contributing factor in this regard. Further to that, however, this study postulates that the differences in findings by different scholars should be a function of some non-accounting factors during reporting season that cause equity investors to trade shares, based on "noise" rather than firm fundamentals. To advance this argument, consider a company whose financial year end is 31 December. During the whole year, the economic environment has been good and the company records good positive growth in earnings. Now, consider that around January or February of the following year (the reporting season), the general economic environment is negatively affected by some macro-economic events like unfavourable government policy pronouncements or a liquidity crunch. A liquidity crunch normally causes a decline in share prices. A bear market thus develops during the reporting season, but it was not there during the whole operating year. What then unfolds is that the company will report positive growth in its earnings, but due to a bear market, its share price will fall (or marginally rise). Assuming that many companies experience this unfortunate event during their reporting season, the effect on information content of earnings will be severe. If such cycles repeat for a number of years within the study period, then regression will not find a connection between stock prices and earnings. Events during the period under study are therefore crucial, such that if one researcher's window (study period) has this noise while the other researcher's window doesn't have that noise, the results will be different. However, while this may help explain differences in the findings by scholars, information content of financial statements strictly concentrates on accounting data and not the "noise". Consequently, these differences will continue to occur in the light of the aforesaid situation.

The findings in this study have implications to company executives, the stock market as well as accounting standards setters. These implications are discussed in Chapter 9 under recommendations of the study.

5.8 Chapter Summary

This chapter tested the hypothesis that tangible book value and EBIT from continuing operations affect both firm value and share prices. Four different scenarios were considered. The first scenario had the natural log of enterprise value as a measure of company value. In the second scenario, log market capitalisation was utilised as a proxy for the value of a company. These two scenarios had log tangible book value and log EBIT from continuing operations as explanatory variables. In both cases, EBIT from continuing operations was found to have value relevance, but tangible book value has no value relevance. The third scenario used the natural logarithm of stock price as the response variable, while the predictor variables remained as in the first two scenarios. The results showed that EBIT from continuing operations affects share price movements, while tangible book value has no information that explains share price movements. The last scenario used untransformed share price as the response variable. To get the predictor variables, tangible book value and EBIT from continuing operations were both deflated by the sum of stocks in issue to get the book value per share and earnings per share respectively. On a share-deflated basis, the book value per share lacks value relevance while earnings per share is value relevant. Regardless of the firm value measure used, EBIT from continuing operations remained value relevant, while tangible book value was consistently devoid of value relevance. The research provided evidence that the method of data transformation has no material influence on value relevance results.

The next chapter extends work done in this chapter by focusing on the influence of firm size on value relevance of book value and EBIT from continuing operations on the JSE.

CHAPTER SIX

IMPACT OF FIRM SIZE ON VALUE RELEVANCE OF EBIT & BOOK VALUE

6.0 Introduction

The previous chapter revealed that EBIT from continuing operations is value relevant, while tangible book value has no information that explains the movement in firm value. This chapter builds upon these findings from Chapter 5 by analysing the influence of company size on information content of EBIT from continuing operations and tangible book value. Firm size is generally determined by market capitalisation of a firm during the period in question. Large capitalisation tends to instil a sense of security, where an investor believes that investing in a large firm guarantees safety of their investment. The motivation of this analysis centres on the desire to uncover any analysts' biases along firm size lines: does the distinction between big and small companies influence value relevance of EBIT from continuing operations and tangible book value? In other words, does size really matter in value relevance of accounting data? If the too-big-to-fail hypothesis holds, then that should play a part in the minds of equity analysts and investors when they value firms. The sense of security, false or real, from the belief that big firms will not fail may influence the investment choices that investors make. Whilst it is quite rational to expect investors to prefer large firms, this however does not necessarily mean that accounting data for such firms will be value relevant, hence the need for this research. The findings of this research help in explaining the psychology of equity investors' decision-making process when confronted with firms of varying market capitalisation.

This chapter uses the same dependent and independent variables that were used in the last chapter in Scenario 3[26]; the only difference being the inclusion of a firm size dummy variable and interaction dummy variables. Resultantly, this chapter does not cover descriptive statistics and correlation analysis because these are essentially the same as in Chapter 5. Normality tests are however done because of the differences in the actual models used (due to the inclusion of dummy variables). The next section presents normality test results, followed by a description of how firms were categorised into high-

[26] The dependent variable in Chapter 5, Scenario 3, is the natural logarithm of share price. The independent variables are the natural logarithms of tangible book value and EBIT from continuing operations.

and low-cap categories. The model of the study is presented and, thereafter, regression results are presented and analysed. A discussion of results is then followed by a chapter summary.

6.1 Normality Test Results

Testing the distribution of residuals involved, firstly, running the regression for the base model (Model 1 in Section 6.3). The residuals were then estimated, and a histogram was used to depict the distribution of the residuals. Figure 6-1 shows the resultant distribution.

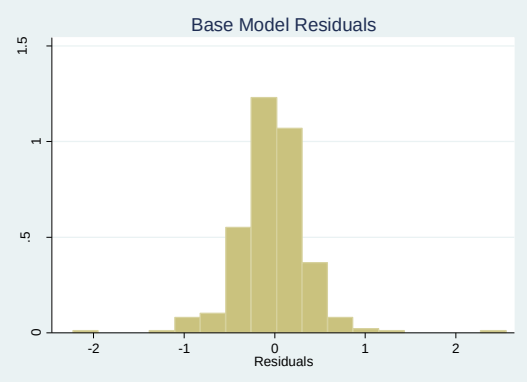


Figure 6-1: **Residuals**

From Figure 6-1, the residuals of the regression are not perfectly normally distributed. However, the distribution is a fair approximation of a normal distribution. Regardless of the non-normality of regression residuals, there are no problems in running the regression because normality of residuals is not a strict requirement in such an analysis.

6.2 Firm Size Categorisation Criteria

Categorisation into large- and small-capitalised firms varies from one market to the other, where a large-cap firm on one market may be categorised as a small-cap firm on another market due to differences in total market capitalisation between the two bourses. For markets like the JSE, one can easily pick large-cap firms from the JSE Top 40 Index and small-cap counters from the so-called penny stocks. However, there are other stocks that are not in these distinct categories, like mid-cap stocks, which results in three categories instead of the desired two (large and small). The question that arises is how then does one determine large and small firms between 2010 and 2017? Hodgson & Stevenson-Clarke (2000) proposed a systematic way of categorising firms into the two groups: firms with market capitalisation that is lower than the median market capitalisation of all quoted

companies are designated as small capitalised firms, and those with market capitalisation larger than the median market capitalisation are classified as large firms. This approach was adopted by other scholars who analysed the effect of firm size on value relevance, such as Chandrapala (2013). A practical challenge associated with this approach centres on the large number of listed firms on big stock exchanges and the fluctuating market capitalisation of firms during a particular year, and over the years covered by the study period. In this instance, fluctuating market capitalisation is a problem because during one year, a firm may qualify as a large-cap firm and the following year, it drops to a small-cap firm, causing categorisation discord within a panel. Regardless of these challenges, this categorisation format remains a practical and systematic way of classifying firms into the two categories in the absence of indices focusing on large and small firms.

Analysis of market capitalisation of firms in the JSE Top 100 Index[27] shows that minimum market capitalisation of firms in this Index is just over R10 billion. The median market capitalisation over the study period is also around R10 billion. This benchmark was therefore adopted as the cut-off point in categorising firms into large and small firms: market capitalisation of R10 billion and above puts a firm into the large-cap category while anything below this figure qualifies a firm into the low-cap category. To circumvent the problem of changing market capitalisations from one year to the other, this study used the average market capitalisation for each firm between 2010 and 2017. Applying this categorisation on the sample of the study produces 22 large-cap companies and 28 small-cap companies.

It was not possible to have an equal number of firms in the two categories because of the need to satisfy sector quotas during the sampling period. To explain this issue in general terms, suppose that 8 firms have to be sampled from a particular sector (A), based on the criterion given in Chapter 4. It may turn out that there are only three eligible large-cap firms in Sector A. This means that it is not possible to sample 4 small-cap and 4 large-cap companies. This generally was the case in most of the sectors, meaning that an attempt to sample more firms from another sector to cover up for the lack of large-cap firms in Sector A was not possible. Consequently, the sample ended up with more small-cap firms

[27] The JSE Top 100 Index was chosen to be a fair guide to large-cap companies considering that the population size was shown in Chapter 4 to be around 200 companies. It is acknowledged that this Index includes non-financial companies and firms listed during the study period. These companies are not part of this study. However, a comparison of the Top 100 Index's lowest capitalised firm and the median between 2010 and 2017 showed that the Index is a fair guide to categorisation into large and small firms.

than large-cap firms. The number of large-cap firms is nonetheless large enough to enable meaningful regressions to be run on the sub-sample.

6.3 The Model

The models used, developed and justified in Chapter 4, are as follows:

$$lnP_{it} = \beta_0 + \varphi lnP_{it-1} + \beta_1 lnBV_{it} + \beta_2 lnBV_{it-1} + \beta_3 lnEB_{it} + \beta_4 lnEB_{it-1} + \gamma D + \alpha_1(D * lnEB_{it}) + \alpha_2(D * lnBV_{it}) + \varepsilon_{it} \quad \ldots (6\text{-}1)$$

$$lnP_{it} = \beta_0 + \varphi lnP_{it-1} + \beta_1 lnEB_{it} + \beta_2 lnEB_{it-1} + \gamma D + \alpha_1(D * lnEB_{it}) + \varepsilon_{it} \quad \ldots (6\text{-}2)$$

$$lnP_{it} = \beta_0 + \varphi lnP_{it-1} + \beta_1 lnBV_{it} + \beta_2 lnBV_{it-1} + \gamma D + \alpha_1(D * lnBV_{it}) + \varepsilon_{it} \quad \ldots (6\text{-}3)$$

where:

lnP_{it}= natural log of share price for firm *i* in period *t*

lnP_{it-1} = natural log of share price for firm *i* in period *t-1*

$lnBV_{it}$ = natural log of tangible book value for firm *i* in period *t*

$lnBV_{it-1}$ = natural log of tangible book value for firm *i* in period *t-1*

$lnEB_{it}$ = natural log of EBIT from continuing operations for firm *i* in period *t*

$lnEB_{it-1}$ = natural log of EBIT from continuing operations for firm *i* in period *t-1*

D = dummy variable, where 1 stands for large-cap firms, and 0 otherwise

$D * lnEB_{it}$ = interaction variable between dummy and the log of EBIT from continuing operations for firm *i* in time *t*

$D * lnBV_{it}$ = interaction variable between dummy and the log of tangible book value for firm *i* in period *t*

$\varphi \; and \; \beta_k$ = slope coefficients for lagged dependent variable and regression coefficients respectively (for $k = 1, 2, \ldots, N$)

β_0 = the constant

α_k = differential slope coefficients (for $k = 1, 2, \ldots, N$)

γ = differential intercept.

ε_{it} = disturbance term for firm *i* in time *t*

6.4 Key Assumptions

In order to operationalize the stated models using *xtabond2* command in Stata, the following assumptions are made:

i. There exists a linear relationship between equity prices (response variable) and tangible book value and EBIT from continuing operations.

ii. There is no serial correlation in idiosyncratic errors across individual firms. In line with Roodman (2009), time dummies are included to ensure that this assumption holds.

iii. The impact of EBIT from continuing operations and tangible book value on share prices depends on whether a firm is large or small. To capture this, interaction variables are included.

6.5 Regression Results

Table 6-1 presents results for the six regressions used to analyse the impact of firm size on value relevance of tangible book value and EBIT from continuing operations. There are two sets of models, with three models in each set. Each set has a different lag structure from the other set. Thus, Model 1 and Model 4 are basically the same, the only difference being the lag structure used as robustness check on the base model results in line with Roodman (2009). Likewise, Model 2 is similar to Model 5, with the exception of different lag limits used. The same pattern holds for Model 3 and Model 6. The presentation of model results is thus done according to this pairing, with reference to the base model. The instrument matrix is collapsed in models 1, 2 and 3. This is then changed in models 4, 5 and 6 by limiting it to the first lag [lag (1 1)].

In the first set of models, Model 1 has all the explanatory variables. In Model 2, value relevance is assessed without controlling for tangible book value and its associated interaction variable. In Model 3, value relevance is examined without controlling for EBIT from continuing operations and its associated interaction variable. The same pattern holds for the second set of models. This approach also serves to determine sensitivity of the results to dropping some variables and it is another avenue for testing the robustness of results.

Table 6-1: **Regression Results**

VARIABLES	Model 1 Lag collapsed Log Share price	Model 2 Lag collapsed Log Share price	Model 3 Lag collapsed Log Share price	Model 4 Lag (1 1) Log Share price	Model 5 Lag (1 1) Log Share price	Model 6 Lag (1 1) Log Share price
Log of Lag share price	1.155***	1.162***	1.101***	1.136***	1.156***	1.135***
	(0.049)	(0.062)	(0.059)	(0.062)	(0.080)	(0.044)
Log EBIT	0.216***	0.154**		0.214***	0.148**	
	(0.055)	(0.060)		(0.060)	(0.061)	
Log of Lag EBIT	-0.200***	-0.249***		-0.180***	-0.246***	
	(0.065)	(0.074)		(0.065)	(0.079)	
Log book value	0.113		0.218	0.085		0.198*
	(0.127)		(0.134)	(0.127)		(0.115)
Log of Lag book value	-0.251**		-0.298**	-0.231**		-0.305***
	(0.115)		(0.127)	(0.114)		(0.108)
Large (firm size dummy)	-0.787	-1.391	-0.099	-0.609	-1.297*	-0.205
	(0.976)	(0.933)	(1.035)	(0.794)	(0.760)	(1.021)
EBIT*Large (interaction dummy)	-0.034	0.057		-0.047	0.054	
	(0.041)	(0.044)		(0.051)	(0.035)	
BV*Large (interaction dummy)	0.064		0.003	0.069		0.008
	(0.051)		(0.047)	(0.052)		(0.045)
Constant	2.215***	1.528*	1.416	2.047***	1.591*	1.899**
	(0.723)	(0.900)	(0.877)	(0.735)	(0.836)	(0.734)
Number of instruments	23	20	20	28	25	25
Number of observations	309	318	341	309	318	341
Number of firms	48	49	49	48	49	49
Arellano-Bond test for AR(1)	-3.65	-3.69	-3.79	-3.48	-3.59	-3.61
P-value for AR(1)	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(2)	0.94	1.06	-0.63	0.81	1.01	-0.70
P-value for AR(2)	0.350	0.287	0.532	0.418	0.311	0.484
Hansen test statistic	14.33	12.85	13.04	17.10	17.83	15.77
P-value for Hansen test	0.074	0.117	0.110	0.195	0.164	0.262

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation

***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

6.4.1: Results for Models 1 and 4

The *F*-test shows that both models are significant at 1% level, an indication that the explanatory variables used in the models explain the movement in share prices. Model 1 has 23 instruments whereas Model 4 employed 28 instruments. There are 309 observations from 48[28] companies in both models, which is more than the number of instruments used. This denotes that there is no instrument proliferation. In both models, the year 2011 (time dummy) was dropped due to collinearity.

EBIT from continuing operations has a positive and statistically significant relationship with share price in Model 1, meaning that as EBIT increases (decreases), equity price increases (decreases) too. The relationship is statistically significant at 1% level in Model 1, where the regression coefficient is 0.216. When the lag limit is changed in Model 4, EBIT still has a positive association with equity price, and the association is statistically significant. The level of statistical significance remains constant at 1% even though the lag limit has been changed. Furthermore, changing the lag limit causes the regression coefficient of EBIT to marginally change from 0.216 (Model 1) to 0.214 (Model 4). Windmeijer corrected standard errors are very low and they change from a Model 1 figure of 0.055 to 0.060 in Model 4. These marginal changes show that the models' results possess a desired trait of robustness to changes in the lag structure.

Using the same[29] models as those used in Chapter 5, the results show that there is no change in the nature of the association between equity price and EBIT, i.e. a positive association still exists. The level of statistical significance (1%) is also the same as that of Models 1 and 4 in Chapter 5, Scenario 3. This suggests that incorporating a firm size indicator variable and interaction variables has no material effect on the results.

Tangible book value has a positive relationship with share price in the two models. This suggests that, as tangible book value increases, the equity price also increases. The coefficient of book value is 0.113 in Model 1, changing to 0.085 when the lag limit is changed in Model 4. However, just like in Chapter 5, tangible book value is, again, not statistically significant, meaning that one cannot infer much from the share price-tangible

[28] Two firms were automatically dropped by the software because they have very few observations. Aspen has negative book values in 6 of the eight years while PSV Holdings has losses in 6 of the eight years. Conversion into logs means these observations are lost, leaving just two observations. On differencing, just one observation will be left, so the firms were dropped automatically.
[29] The only difference lies in the lag structure and the addition of dummy and interaction variables.

book value relationship. The small movement in the coefficients of tangible book value, coupled with constant Windmeijer corrected standard errors when the lag structure is changed, shows model robustness to changes in lag limits.

The firm size dummy variable (Large) has a coefficient of –0.787 in Model 1 and –0.609 in Model 4, which, however, is not statistically significant in both models. Since there are only two groups (big and small companies), the existence of a disparity in the intercepts of the two groups can simply be obtained from *t*-test results. According to the *t*-test, the intercepts between large and small firms are not different, meaning that firm size is not value relevant on the JSE. This research thus shows that the distinction between large-cap and small-cap firms provides no useful information to JSE investors.

The interaction term between large firms and EBIT (EBIT*Large) has negative coefficients in Model 1 and Model 4. The negative coefficients mean that, since large firms were coded 1, EBIT has a lower effect in big companies than in small companies, suggesting that investors are concerned with EBIT in small companies than they do in big companies. However, the interaction variable has no statistical significance in the two models. The Wald test (output not shown) confirms that the interaction variable is not statistically significant; hence, it is not value relevant.

The variable BV*Large models the interaction between tangible book value and the firm size dummy variable (Large). The interaction variable has positive coefficients in the two models, meaning that tangible book value has a larger effect in large firms (coded 1) than in small firms. However, the *p*-values show that this is not statistically significant in both models, and confirmation of this is given by the Wald test.

a) Model Diagnostics

Autocorrelation is tested by the Arellano-Bond test. We fail to reject the existence of first-order autocorrelation [AR (1)] in both models as signified by the *p*-values of first-order serial correlation that are lower than 0.05. This is expected to happen, and therefore, it does not provide useful information. Given that the *p*-values are greater than 0.05 for second-order serial correlation, we conclude that both models do not suffer from serial correlation. The Hansen test testifies validity of the over-identifying restrictions in both

models since the *p*-values exceed 5 per cent. The models are robust and they do not suffer from too many instruments.

6.4.2 Results for Models 2 and 5

The variable tangible book value and the interaction variable BV*Large were dropped from the model as a robustness check as well as to assess information content of the remaining variables without controlling for the dropped variables. Model 2 and Model 5 have the same variables but use different lag limits, which are meant to check the sensitivity of the results to changes in lag structure. There are 318 observations in both models from 49[30] firms. Model 2 has 20 instruments whereas Model 5 has 25 instruments, which means there is no problem of too many instruments. The year 2011 (time dummy) was dropped due to collinearity in both models. The *F*-test indicates that the two models have statistical significance, meaning that the remaining variables mutually explicate the change in equity prices.

EBIT from continuing operations exhibits a positive association with equity price in both Model 2 and Model 5, and the association is significant. The same relationship was obtained in the main models that have all the explanatory variables. When we do not control for tangible book value and BV*Large, a change in the level of statistical significance is recorded from 1% in Model 1 to 5% in Model 2[31]. Dropping the two variables causes the coefficient of EBIT from continuing operations to change from 0.216 in Model 1 to 0.154 in Model 2, and Windmeijer corrected standard errors change from 0.055 to 0.060 respectively. These changes are within an expected range when some variables are left out of a model. Changing the lag limit causes the coefficient of EBIT to marginally change from the Model 2 value of 0.154 to 0.148 in Model 5. The level of statistical significance remains the same between Model 2 and Model 5, while Windmeijer corrected standard errors marginally change form 0.060 in Model 2 to 0.061 in Model 5. This means that the models are robust to changes in lag structure. The model also shows robustness to dropping the variables book value and BV*Large, since the changes in the coefficients and the corrected standard errors are relatively small.

[30] Since book value has been left out of the model, the only firm to be dropped is the one with too many financial years where losses were reported (PSV Holdings).

[31] At 0.014, the probability of ***t*** is not far from 1% statistical significance. Such kind of a small change is expected to occur when a correlated variable is dropped. In this particular case two variables were dropped.

The firm size dummy variable (Large) still has a negative coefficient in both models, changing from -0.787 in Model 1 to -1.391 in Model 2 when tangible book value and BV*Large are dropped. A negative coefficient suggests that the influence of firm size is lower in large-cap firms (which are coded 1) than in small-cap companies. The coefficient of the variable Large changes to -1.297 in Model 5 as a result of a variation in the lag limit. Just as in the other models, the dummy variable has no statistical significance, denoting that firm size does not influence share prices of JSE-listed firms.

The interaction variable EBIT*Large has a positive coefficient in Model 2 and Model 5. A positive coefficient suggests that operating income from continuing operations has a bigger influence on share price in big companies than in small companies. Nonetheless, this implication has no firm ground to stand on because the variable is not statistically significant. The research thus fails to find evidence that the influence of operating income from continuing operations on share prices is contingent upon a firm's size.

a) Model Diagnostics

According to the Arellano-Bond test for autocorrelation, we fail to reject existence of first-order autocorrelation in the two models since the *p*-values of first-order serial correlation are lower than 5 per cent. Based on the same test, we dismiss the hypothesis that there is serial correlation of order two and conclude that autocorrelation does not exist in the two models. According to the Hansen test, the over-identifying restrictions are valid and the models are robust. This stems from the fact that the Hansen test's *p*-values are more than 5 per cent in the two models.

6.4.3 Results for Models 3 and 6

Model 3 and Model 6 drop the variables EBIT and EBIT*Large. Like before, this serves to check the responsiveness of the results to dropping these variables and also determining value relevance of the remaining variables without controlling for the dropped variables. These two models have the same variables but have different lag limits so as to test the responsiveness of the results to changes in lag structure. Model 3 has 20 instruments and 341 observations whilst Model 6 has 25 instruments and 341 observations as well. Comparing the instrument count to the number of observations and companies shows that there is no problem of too many instruments. The year 2017 (time dummy) was dropped in both models due to collinearity. The *F*-test reveals that both models have statistical

significance at 1 per cent level. The meaning of this is that the remaining variables mutually explicate the changes in equity prices.

The variable book value exhibits a positive association with equity price in the two models, meaning that as tangible book value increases (decreases), the share price also increases (decreases). However, at 5 per cent level of significance, the relationship is devoid of statistical significance in the two models. The inclusion of dummy and interaction variables has therefore not caused a shift in tangible book value's lack of value relevance. This deduction is based on results in Chapter 5 where dummy and interaction variables were not in the models and tangible book value was not value relevant. The observed relationship may therefore be due to chance. After dropping two variables in Model 3, the coefficient of tangible book value is 0.218, having changed from a Model 1 value of 0.113. This shows that when we do not control for EBIT and EBIT*Large, a modest change is recorded in the coefficient of tangible book value. Changing the lag limit causes the coefficient of tangible book value to change from the Model 3 value of 0.218 to 0.198 in Model 6. Windmeijer corrected standard errors register marginal changes, emanating from both a change in lag structure and a change in model variables, which implies model robustness.

Besides the first lag of the response variable (equity price), the only other explanatory variable that is maintained in all the six models is the firm size dummy variable, Large. This variable, again, has negative coefficients in Models 3 and 6, which is consistent with the sign in all the other four models, i.e. regardless of changes in model variables and lag limits, it maintains the negative coefficient. A negative sign on the coefficient of Large means that the effect of firm size on value relevance is lower for large-cap companies than for small-cap companies. However, the firm size dummy variable remains statistically insignificant across all the six models.

The interaction variable BV*Large has positive coefficients in both models. However, the coefficients are very low, especially after dropping EBIT and EBIT*Large from the models. The interaction effects between tangible book value and the indicator variable Large are thus very remote. A positive coefficient means that the variable book value has a bigger influence on equity price in large-cap firms (which were coded 1) than in small-

cap firms. Being statistically insignificant, coupled with the small size of the coefficient[32] of the interaction variable, however, implies that the influence of the interaction variable is inconsequential.

a) Model Diagnostics

As expected, *p*-values in the Arellano-Bond test for first-order autocorrelation are below 0.05 (0.000 in both cases). We thus fail to reject presence of serial correlation of order one in the models but dismiss the proposition that there exists serial correlation of order two based on AR (2) probability values that are more than 5 per cent in both models. We conclude that there is no serial correlation in the two models. The Hansen test indicates validity of the over-identifying restrictions and robustness of the models (*p*-values exceed 5 %). We reject the hypothesis that the models are weakened by too many instruments.

The next section discusses all the results that have been presented.

6.5 Discussion of Results

Findings have indicated that the level of value relevance of EBIT from continuing operations and tangible book value does not change between large-cap and small-cap firms. Thus, whether a firm is large or small does not impact value relevance of EBIT from continuing operations and tangible book value. This means that investors are only concerned about a firm's actual financial performance, and not whether it is big or small. The assertion that investors are only concerned about a company's financial performance stems from the fact that only EBIT from continuing operations is value relevant in these models, and EBIT represents a company's financial performance. Contrariwise, tangible book value remained statistically insignificant with and without firm size dummy and interaction variables. Investors' focus on frim financial performance is justified on the grounds that a positive return can only be obtained if a firm posts a profit during a particular period.

The research also found out that firm size has no influence on equity prices. The findings are in line with Jalalian, Barzegari & Mohammadi (2016) who postulated that company size does not exert any effect on pricing of shares. On the contrary, Hirdinis (2019) found

[32] The small coefficients imply that there is no practical significance. This is further to the lack of statistical significance shown by *p*-values in regression.

out that firm size negatively affects firm value, i.e. as a company grows in size, its value goes down. A negative association between the size of a firm and its value was also found by Niresh & Velnampy (2014). The negative association between company size and company value contradicts Yokoyama *et al* (2015) in which a positive and statistically significant association between company size and equity prices was uncovered. As highlighted in Chapter 2, a negative association between company size and company value is difficult to justify. However, in support of Hirdinis (2019), one may argue that as a company grows bigger, its operations will become opaque such that its value relevance declines. On the other hand, there is also a school of thought which says that information disclosure is actually more in big companies than in small companies (this view is discussed below), which goes against the proposition of opaqueness in large firms as a reason for their low levels of value relevance. The reason advanced by Hirdinis (2019) to the effect that large firms may fail to pay dividends, resulting in their low levels of value relevance, goes against empirical evidence from the current study's sample of large firms. Specifically, large firms in this study's sample paid dividends consistently. Furthermore, whether or not payment of dividends is value relevant is another contentious issue and it is fully addressed in Chapter 8.

The interaction between EBIT from continuing operations and firm size as well as the interaction between tangible book value and firm size were also found to possess no effect on equity prices in this research. The findings contradict Ghayoumi, Nayeri, Ansari, & Raeesi (2011) who opined that company size has an influence on equity price. However, in Ghayoumi *et al* (2011), book value was also not significant in large firms. On the contrary, Chandrapala (2013) found that value relevance of big companies is more than that of small companies and proffered the same explanation as Bae & Jeong (2007) and Hodgson & Stevenson-Clarke (2000) for that phenomenon. Specifically, they posit that large companies attract a lot of attention from investment analysts than small companies, which then results in value relevance of big companies being more than that of small companies. However, inasmuch as small companies may attract less interest from investors, the question that still remains is this: what do these few investment analysts who follow small companies use in equity valuation? One would expect them to use indicators of firm performance to value these small firms. Financial statements are one such traditional source of firm performance indicators, and this should translate into information content of accounting data, even for small companies. This would then

contradict the reasons proffered by Chandrapala (2013), Bae & Jeong (2007), and Hodgson & Stevenson-Clarke (2000). Value relevance is not about the number of analysts who follow a certain stock, rather, it is about the link between share price and a particular variable. Even if there are few analysts that follow a particular stock, there can still be a connection between equity price and the variable(s) that the analysts rely on in ascertaining the value of a company. Having many investment analysts following certain stocks does not necessarily translate into value relevance of a particular financial statement variable because the analysts could be using different variables, thus rendering the numbers argument worthless. Alternatively, if there are many analysts who follow large firms, this may result in a premium on large firms' shares due to supply and demand factors: there will be many investors who want to buy shares of large firms, but those who hold the shares are not willing to sell them, unless one pays a premium. Movement in share prices of large firms will thus be driven by other factors that are not necessarily their net income and book values, which negatively affects information content of these variables. The existence of a premium on share prices of large firms should therefore reduce value relevance in large firms. This hypothesis is consistent with Lam, Sami & Zhou (2013) who argued that information content is actually more in small companies with low growth rates than in large companies. However, the role played by low growth rates in the determination of value relevance in small companies is not clear from Lam, Sami & Zhou (2013)'s study.

Arguing that value relevance of big companies is greater than that of small firms conflicts with findings by Hirdinis (2019), Niresh & Velnampy (2014) as well as Lam, Sami & Zhou (2013) who actually say the opposite is true. Evidently, postulating that information content is greater in big companies than in small companies has received a proportionately larger backing from scholars (as shown in Chapter 2) than the contrasting view of Hirdinis' (2019) camp. The popular view is therefore worth further scrutiny to determine the grounds for such backing in view of what the current study found out. The most likely explanation for large firms having more value relevance than small firms (if indeed that is the case) can be the existence of a 'small firms discount', which is defined in this context as a lack of confidence in the ability of a small firm to continue as a going concern and perform well consistently, such that analysts put a discount on small firms' share

prices regardless of what the small firms' fundamentals deserve. The discount[33] is in relation to small firms' intrinsic values, determined by financial performance indicators. This, then, results in lack of (or lower levels of) value relevance for small firms. Large firms, on the contrary, are deemed capable of producing good results consistently, and investment analysts have confidence in them. Consequently, investment analysts and investors do not put a discount on large firms' share prices. It is a psychological issue rather than an issue of less interest in small firms. Prudent analysts look for value (a good return on investment), and this value can be found in both small and large firms. The current study's findings thus suggest that equity investors on the JSE are prudent since they do not trade based on a firm's size but its operating performance.

Less information disclosure in small firms than in large firms has also been cited as a potential reason why small firms have lower levels of value relevance (Brimble & Hodgson, 2007). This argument is, however, weakened by the fact that both large and small firms in a particular jurisdiction are governed by the same regulations, meaning that information disclosure requirements are the same regardless of firm size. In this instance, the only information worth considering is the one contained in financial statements because this is a value relevance of accounting data issue. No evidence has been provided to prove that small firms disclose less information about book values and earnings than large firms: book values are book values and earnings are earnings. As long as the accounts are prepared under the same accounting standards, then, this issue of less information disclosure should not arise, unless it is a case of qualified financial statements[34]. If financial performance of small firms can be shown to lack consistency, then, this should be the most plausible reason why some researchers find that small firms' level of financial statement value relevance is lower than that in big firms, which generally are consistent in their performance. Consistent performance makes it easier to forecast future financial performance indicators than a situation where performance is

[33] This study further postulates that the small firms discount is not constant over time. It is a function of general macroeconomic fundamentals that cause firms to go bankrupt such that when these fundamentals change, the discount also changes. These changes further weaken the relationship between equity prices and financial statement variables, thus affecting information content in small firms.

[34] Even if the argument is that small firms' financial statements have higher chances of being qualified than those of large firms, the focus must be on the reason why the accounts have been qualified. Qualification of financial statements does not necessarily mean that everything in those accounts has been condemned. The only worthwhile qualification is a case where a firm violates accounting principles in recognising income and expenses as well as recording assets and liabilities. These issues would mean that a firm's reported book values and earnings are incorrect and misleading.

erratic. Thus, consistency is an issue when ascertaining value relevance of accounting data.

The results also show negative coefficients for EBIT*Large in base models. This means that, since large firms were coded 1, EBIT from continuing operations has a lower effect in big companies than in small companies, suggesting that investors are concerned about operating income in small companies than they do in big companies. This feeds into the too-big-to-fail hypothesis. The negative coefficients imply that for large firms, investors consider other variables instead of EBIT from continuing operations, but for small firms, EBIT from continuing operations is given more prominence. This may be an indication that investors trust that large firms will always produce positive earnings growth, but they do not have the same trust in small firms so they monitor their earnings much more closely. It may also mean that investors find large firms' earnings to contain too many income streams (for instance, income streams from so many business units, investments or subsidiaries), some of which are difficult to determine their future levels or persistence such that they opt to use other variables that can be analysed easily. However, in this particular case, the interaction variable EBIT*Large is devoid of statistical significance, meaning that the observed association may be as a result of mere chance. There is therefore no evidence supporting the too-big-to-fail hypothesis, neither can it be said that JSE investors focus on EBIT from continuing operations more in small companies than in big ones.

The fact that firm size has no influence on share price movements is not surprising because equity investors and analysts are interested in the value that a firm creates: if a large firm does not create (or actually destroys) value, shareholders will not benefit. If a small firm creates shareholder value, shareholders will benefit from the value created, either in the form of capital gains or dividends, which is what investors want. While being large may be regarded as an indicator of historically good performance (it takes years of solid performance to build a large corporate), that is historical, and new investors are interested in future performance. However, in general terms, large firms are usually stable, which should be attractive to investors because the chances of a large firm going into liquidation (and causing losses to investors) are very low. Nonetheless, events of the not-so-distant past have dealt a major dent on the notion of too-big-to-fail due to the failure of big firms like Lehman Brothers of the USA during the 2008 global financial

crisis. The firm size dummy variable (Large) remains statistically insignificant across all the six models. This is enough evidence that the size of the firm has no link with equity prices. Investors are not bothered by the size of the firm because that does not add to the bottom line of the firm.

Findings regarding influence of firm size on information content of accounting data have implications to equity analysts, investors and company executives. These implications are discussed in Chapter 9. Conclusions, limitations and suggestions for further study arising from analysis in this chapter are also covered in Chapter 9.

6.6 Chapter Summary

This chapter examined the influence of firm size on value relevance of EBIT from continuing operations and tangible book value on the Johannesburg Stock Exchange using an adapted Ohlson-type dynamic model. The chapter extended analysis that was done in the previous chapter by incorporating a company size indicator variable and two interaction variables into the models used in Chapter 5. Firm size categorisation was determined by a firm's average market capitalisation over the study period. An average market capitalisation of R10 billion and above signifies a large-cap firm while anything below that figure means a firm is categorised as a small-cap. This criterion yielded 28 small-cap companies while 22 are large-cap companies. Results showed that EBIT from continuing operations remained value relevant after the inclusion of dummy variables into Chapter 5 models. Similarly, tangible book value was devoid of value relevance. The firm size dummy variable was not statistically significant, meaning that company size does not exert any influence on information content of financial statements. Interaction variables were also not value relevant, meaning that value relevance of tangible book value and EBIT from continuing operations does not depend on the size of a company. No evidence to support the too-big-to-fail hypothesis was found.

The next chapter analyses the usefulness of relative and absolute financial risks in explaining firm value movements.

CHAPTER SEVEN

VALUE RELEVANCE OF FINANCIAL RISK

7.0 Introduction

The previous chapter analysed the influence of company size on value relevance of financial statements, and this chapter goes a gear up by focusing on what every institution tries to minimise, i.e. financial risk. For a non-financial institution, financial risk is commonly measured by its financial leverage (Park, 2015): the higher the debt ratio, the higher the perceived risk. It is a well-documented fact in finance literature that debt is cheaper than equity, but there is also an optimum level of debt, beyond which debt ceases to be the preferred financing choice for a firm. This being the case, financial risk should thus play a part in determining value relevance of financial statements. The study considers both relative financial risk and absolute financial risk. The debt/equity ratio is used to measure relative financial risk while total debt measures absolute financial risk. Findings of this study are expected to inform finance managers about the implications of the levels of their firms' debt on share prices, and ultimately shareholder value.

This study investigates value relevance of financial risk using a dynamic panel model of value relevance. The chapter starts off by stating the dynamic model (which was developed and justified in Chapter 4) that is used to do the analysis. Model assumptions and the research sub-groups used are presented next. After that, some preliminary analysis follows, covering issues such as descriptive statistics and linearity tests, and then moves into the actual analysis of financial risk value relevance.

7.1 The Model

This study measures financial risk using two variables: the debt/equity ratio and the total amount of debt. Two measures of financial risk are used to determine if investors consider relative risk only (the debt ratio), absolute risk only (the total amount of debt), or both. As explained in Chapter 4, the study breaks from tradition and uses market capitalisation as a measure of the value of equity, and total debt is the sum of current and non-current liabilities. The dynamic model used to determine whether or not financial risk is value relevant is as follows:

$$lnP_{it} = \beta_0 + \varphi lnP_{i,t-1} + \beta_1 DE_{it} + \beta_2 DE_{it-1} + \beta_3 lnTD_{it} + \beta_4 lnTD_{it-1} + \varepsilon_{it} \quad \ldots (7\text{-}1)$$

$$lnP_{it} = \beta_0 + \varphi lnP_{i,t-1} + \beta_1 DE_{it} + \beta_2 DE_{it-1} + \varepsilon_{it} \quad \ldots (7\text{-}2)$$

$$lnP_{it} = \beta_0 + \varphi lnP_{i,t-1} + \beta_1 lnTD_{it} + \beta_2 lnTD_{it-1} + \varepsilon_{it} \quad \ldots (7\text{-}3)$$

where:

lnP_{it} = natural logarithm of share price of firm *i* in the current period

$lnP_{i,t-1}$ = natural logarithm of the first lag of share price of firm *i*

DE_{it} = debt/equity ratio of firm *i* in the current period

DE_{it-1} = debt/equity ratio of firm *i* in the previous period

$lnTD_{it}$ = natural logarithm of total debt of firm *i* in the current period

$lnTD_{it-1}$ = natural logarithm of total debt of firm *i* in the previous period

$\varepsilon_{it} = \mu_i + v_{it}$ = the disturbance term of company *i* in time *t*

Independent variables are dropped from Model 1, one at a time, to check the sensitivity of the model results to dropping some variables (giving rise to nested Model 2 and Model 3). Besides acting as a sensitivity measure, Model 2 also gives the value relevance of relative risk without controlling for absolute risk. Likewise, Model 3 assesses the information content of absolute risk without controlling for relative risk.

7.2 Model Assumptions

The model is premised on the following assumptions:

i. There is a linear relationship between the dependent variable (share price) and total debt and debt/equity ratio.

ii. The first lag of share price is predetermined; thus, it is instrumented GMM-style in *xtabond2* in line with Roodman (2009).

iii. Debt/equity ratio and total debt are deemed exogenous and are therefore entered instrumental variable (IV)-style in *xtabond2*. A further instrument in the form of book value per share is added, also IV-style. The addition of book value per share as an instrument arises from the fact that if a firm is liquidated, all creditors have to be paid from the value of the firm's assets, and book value represents the bulk of this value. Book value should therefore be a good instrument for leveraged firms. Book value is the asset's construction or acquisition value, less any impairment of value like depreciation. It does not increase as a result of an increase in market value or inflation. This historical cost accounting perspective

provides a balanced conservative view of residual value in case of liquidation, making it a useful instrument to investors who are worried about the going concern status of high-risk firms. This value is divided by the number of shares in issue since firm value is also being examined on a per-share basis, i.e. share price.

iv. There is no autocorrelation in idiosyncratic errors across individuals. To enhance this assumption, time dummies are included in the model in line with Roodman (2009).

7.3 Research Samples

The following three samples are utilised in the determination of value relevance of financial risk:

i. The full sample.
ii. Firms with an average debt/equity ratio that is less than one (low-risk firms).
iii. Firms with an average debt/equity ratio that is greater than or equal to one (high-risk firms).

Classification of companies into high-risk and low-risk categories is based on an eight-year average debt/equity ratio cut-off point of unity. Under normal circumstances, a debt ratio closer to unity is high-risk. In this case, this is not the case because of the measure of equity that is used. Where equity is taken as the balance sheet figure reported by a company (book value of equity), the cut-off point should be less than unity, possibly around 0.5. In such circumstances, the actual level should depend on the capital market being assessed because in the developed capital markets like the USA, higher debt ratios of up to 60% are accepted as opposed to capital markets in the developing world (Eiteman, Stonehill & Moffett, 2013). In this particular case, a higher cut-off point is deemed appropriate because equity is measured by market capitalisation, which in normal circumstances is far higher than the book value of equity found in a firm's statement of financial position. Adopting a lower cut-off point while using market capitalisation as a measure of equity will understate the level of financial risk faced by a company.

7.4 Research Hypotheses

The research tested these two hypotheses developed in Chapter 3:

H1: There is a negative and significant relationship between share price and relative financial risk.

H2: There is a negative and significant relationship between share price and absolute financial risk.

7.5 Descriptive Statistics

JSE raw data descriptive statistics for the full sample with respect to the variables used in the financial risk model are given in Table 7-1.

Table 7-1: **Descriptive Statistics**

Variables	(1) N	(2) Sum	(3) Mean	(4) SD	(5) Minimum	(6) Maximum
Share price	400	26,607	66.52	96.86	0.0300	609.3
Book value per share	400	9,525	23.81	43.52	-49.95	329.8
Total debt	400	4.624e+12	1.156e+10	2.598e+10	981,915	1.817e+11
Debt/equity ratio	400	333.6	0.834	1.076	0.00204	8.100
Number of firms	50	50	50	50	50	50

A total of 50 JSE-listed firms form the sample of this study, and selected descriptive statistics are displayed in Table 7-1 above. There are 400 observations for each variable from the eight-year study period. The dependent variable share price has reasonable deviation as shown by its standard deviation (SD) of 96.86. The range of values as shown by the mean, minimum and maximum values does not show any potential bias that may arise when the regression model is run since the sample comprises of both lowly- and highly-priced stocks. The standard deviations of independent variables (comprising of total debt and debt/equity ratio) show that there is reasonable deviation within the sample, considering that both high- and low-risk firms are included in the sample. The existence of wide diversity within the sample is further exhibited by the gap between the minimum and maximum values for the two independent variables. Specifically, debt/equity ratio shows that there are some firms with very low levels of risk (minimum value 0.00204) while others are very risky (maximum value 8.100). This is necessary to ensure that the results are not biased towards low-risk or high-risk firms only, but rather, they are balanced for generalisability. Book value per share is not an independent variable, rather, it is an additional regression instrumental variable. Its standard deviation, as read with the minimum and maximum values, also shows the same diversity of the sample as shown by other statistics. This is necessary to ensure high sample quality.

7.6 Correlation Analysis

Table 7-2 displays the correlation matrix for the study's variables. An asterisk next to a correlation coefficient denotes statistical significance at 5% level. Probabilities are given in brackets below the respective correlation coefficients.

Table 7-2: **Correlation Matrix**

VARIABLES	Share price	Total debt	Debt/Equity ratio	Book value per share	Average debt ratio
Share price	1.0000				
Total debt	0.7178*	1.0000			
	(0.0000)				
Debt/Equity ratio	-0.4276*	0.0640	1.0000		
	(0.0000)	(0.2013)			
Book value per share	0.5146*	0.4645*	-0.1493*	1.0000	
	(0.0000)	(0.0000)	(0.0027)		
Average debt ratio	-0.4455*	0.0376	0.8052*	-0.1774*	1.0000
	(0.0000)	(0.4535)	(0.0000)	(0.0004)	

Correlation analysis helps to show the nature and strength of the association between the response variable (stock price) and explanatory variables (total debt and debt/equity ratio). It also helps as an indicator of potential collinearity problems where the independent variables have very high correlation coefficients of more than 0.8. In such circumstances, a further investigation using the variance inflation factor may be required.

The two financial risk measures (total debt and debt/equity ratio) are the explanatory variables while share price is the response variable. As expected, debt/equity ratio has a negative relationship with share price, although the association is not very strong (–0.4276). The association is statistically significant at 1% level. This means that as levels of relative risk increase, share prices fall as investors become concerned about the safety of their investments. The opposite is also true, where a reduction in relative risk triggers a rise in share price because investors perceive a reduction in the chances of debt distress. Debt distress may cause firms to default on their loan repayment obligations and other payables, which may ultimately lead to liquidation and loss of value to shareholders, if reconstruction fails. Resultantly, shareholders are justified in trading their shares based on the levels of firm debt. Average debt ratio has a slightly stronger relationship with

share price (–0.4455) than the debt/equity ratio. The variable is however only used to classify companies into low-risk and high-risk categories, it is neither a regression variable nor an instrumental variable.

Unlike debt/equity ratio, total debt has a strong and statistically significant relationship (at 1% level) with share price but, contrary to expectations, the relationship is positive (0.7178). In this study, total debt is measured as the sum of current liabilities and non-current liabilities (and not long-term debt, as is the norm). The positive relationship points to the fact that current liabilities outweigh long-term debt because long-term debt has a negative association with company value (beyond the optimum debt ratio). Current liabilities are normally directly related to operating activity in a firm: the higher the activity, the higher the current liabilities. Examples of current liabilities that are directly related to operating activity in a company include trade payables, value added tax, corporate tax, and utility bills such as water and electricity. Analysis of the firms' financial statements shows that a number of them do not have long-term debt, but they do have current liabilities. This explains the positive relationship between share price and total debt.

A chance of collinearity between the two explanatory variables is very low, with a correlation of 0.064 between total debt and debt/equity ratio. The relationship is not statistically significant. The correlation coefficient that exceeds 0.8 (i.e. 0.8052), which exists between average debt ratio and debt/equity ratio is immaterial because average debt ratio is only used for purposes of classifying companies into high-risk and low-risk categories. Average debt ratio is neither an explanatory variable nor an instrumental variable. The regression's instrumental variable, book value per share, has a relatively strong association with stock price (0.5146). This is desirable because it conveys useful information about share price movements. However, the relationship is devoid of statistical significance at 1 per cent level.

7.7 Distribution of Residuals

This study sample is divided according to each firm's average debt/equity ratio over the eight-year study period, where firms with an average debt/equity ratio greater than or equal to one are classified as high-risk firms and those with average debt ratios that are less than one are classified as low-risk firms. The models were run along these lines,

residuals predicted and histograms are used to visualise the distributions. Residuals for the full sample were also predicted and a histogram was used to depict the distribution. Figures 7-1 and 7-2 below present the histograms for low- and high-risk firms respectively.

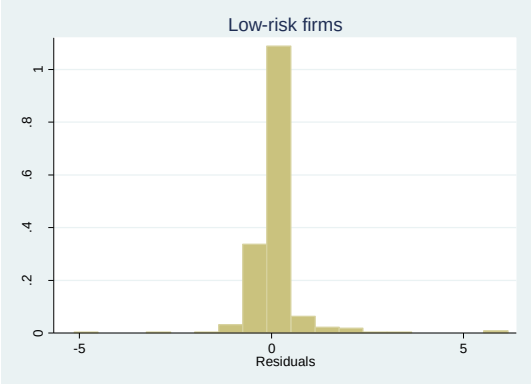


Figure 7-1: **Low-risk Firms**

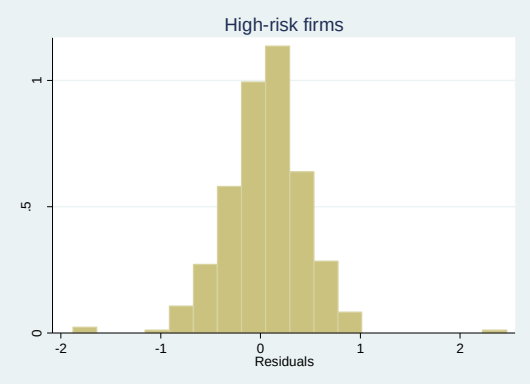


Figure 7-2: **High-risk Firms**

Figure 7-3 below is a histogram of the regression residuals for the full sample.

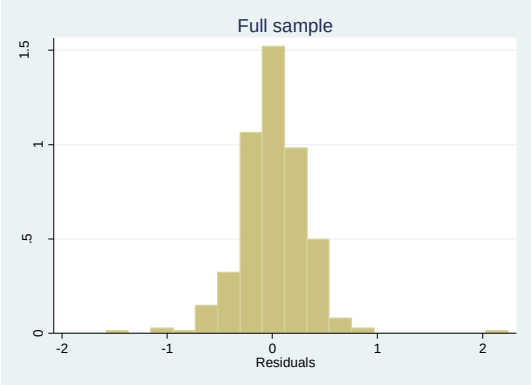


Figure 7-3: **Full Sample**

Histograms for low- and high-risk firms as well as the full sample, as shown in Figures 7-1, 7-2 and 7-3 respectively, confirm that all the residuals are not perfectly normally distributed. The full sample's distribution approximates a normal distribution better than the other two distributions. The distribution for high-risk firms is however not a bad approximation of a normal distribution. The distribution for low-risk firms, which are in the majority (35 firms), is unexpectedly the least in terms of approximating a normal or log-normal distribution. However, normality of residuals is not a strict assumption in

dynamic panel regression, implying that the analysis does not suffer from any normality problems.

7.8 Linearity Tests

A linear dynamic model is employed to determine the information content of absolute and relative financial risk for firms quoted on the Johannesburg Stock Exchange. It is thus worthwhile to check whether the association between the response and explanatory variables is linear or not. Figures 7-4 and 7-5 below depict the association between share price and debt ratio, and share price and total debt respectively.

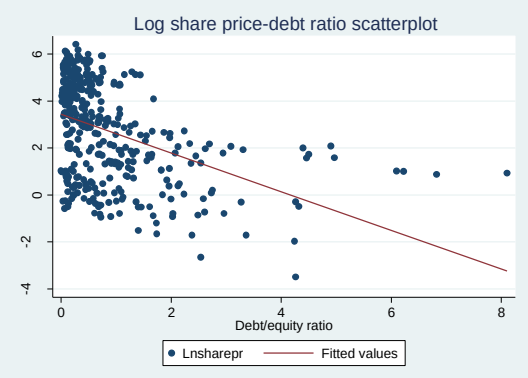


Figure 7.4: **Share Price-Debt Ratio**

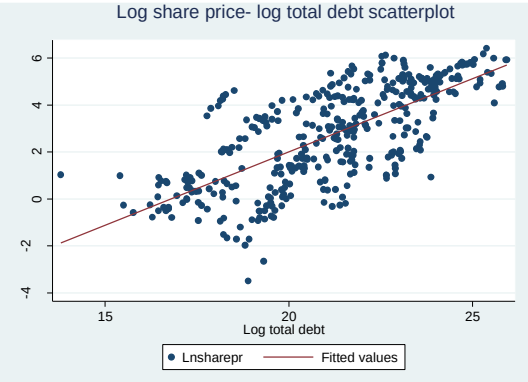


Figure 7.5: **Share Price-Total Debt**

There exists a negative and linear association between share price and the debt/equity ratio. The correlation analysis also showed a negative relationship between these two variables. Since the relationship is linear, it is proper to use linear models in this study.

The relationship between share price and total debt is positive. This corroborates what the correlation matrix showed earlier. Given that the relationship is linear, a dynamic linear model can thus be used to analyse the association between stock price and total debt. The contrasting relationships shown in Figure 7-4 and 7-5 illustrate the effect of deflating variables: before deflating, a positive relationship exists, but after deflating, a negative relationship is observed. Assessment of information content of financial risk follows next.

7.9 Value Relevance of Financial Risk

Analysis of value relevance of financial risk is done in two parts: firstly, value relevance of the risk measures is done on the full sample. This is then followed by an analysis of

high-risk and low-risk sub-samples. A comparison of the results is done between the low-risk and high-risk categories, with reference also being made to the full sample results.

7.9.1 Results for the Full Sample

Table 7-3 presents regression results for the JSE full sample.

Table 7-3: **Full Sample Results**

VARIABLES	Model 1 Lag collapsed Log Share price	Model 2 Lag collapsed Log Share price	Model 3 Lag collapsed Log Share price
Log of Lag Share price	0.952***	0.986***	0.981***
	(0.046)	(0.026)	(0.013)
Log Total debt	0.201***	0.129***	
	(0.055)	(0.036)	
Log of Lag Total debt	-0.176***	-0.128***	
	(0.063)	(0.037)	
Debt/Equity ratio	-0.227***		-0.195***
	(0.064)		(0.063)
Lag of Debt/Equity ratio	0.174**		0.166**
	(0.086)		(0.076)
Constant	-0.570	-0.238	-0.122
	(0.449)	(0.337)	(0.102)
Number of instruments	13	11	11
Number of observations	350	350	350
Number of firms	50	50	50
Arellano-Bond test for AR(1)	-3.44	-3.84	-3.70
P-value for AR(1)	0.001	0.000	0.000
Arellano-Bond test for AR(2)	-0.14	-0.77	0.06
P-value for AR(2)	0.892	0.442	0.949
Hansen test statistic	0.63	0.66	0.55
P-value for Hansen test statistic	0.429	0.417	0.459

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

As highlighted earlier, book value per share is used as an additional instrumental variable. The *F*-test shows that all the three models are significant at 1% level. The year 2015 (time dummy) was dropped in all the three models due to collinearity. The full sample has a maximum of 350 observations and 13 instruments for the main model (Model 1). The other two models (nested models), where one variable is dropped at a time as a robustness check, have 11 instruments each. The instrument matrix is collapsed to curtail the instrument count. This becomes critical when the sample is divided into high-risk and low-risk categories, since the observations and groups become fewer per sample. The

number of instruments is lower than the number of observations, a condition necessary to ensure there is no instrument proliferation.

Total debt has a positive relationship with share price; the same relationship that was portrayed by both the correlation matrix and the linearity scatter diagram. The association has statistical significance at 1% level. The coefficient of total debt is 0.201 in Model 1, changing to 0.129 in Model 2, when debt/equity ratio is dropped from the main model. The level of statistical significance remains constant at 1%. Windmeijer corrected standard errors are low, marginally changing from a Model 1 value of 0.055 to 0.036 in Model 2. Total debt is, therefore, value relevant whether we control for the debt/equity ratio (Model 1) or not (Model 2).

Just as was shown by the correlation matrix and linearity scatter diagram, debt/equity ratio has a negative association with share price in Model 1 and Model 3. An increase (decrease) in relative risk results in a decrease (increase) in share prices. The relationship has statistical significance at 1 per cent level in the two models. The coefficient of debt/equity ratio is –0.227 in Model 1 and it changes to –0.195 in response to dropping the other independent variable. Windmeijer corrected standard errors marginally change from 0.064 (Model 1) to 0.063 (Model 3). Just like total debt, the debt/equity ratio has information content with or without controlling for total debt.

a) Model Diagnostics

We fail to reject the hypothesis that there is first-order [AR (1)] or second-order [AR (2)] autocorrelation in first differences if the probability of *z* is less than 0.05. If it is greater than or equal to 0.05, we reject the hypothesis and conclude that there is no autocorrelation. The *p*-values for AR (1) are below 5 per cent in all the three models. This means that we fail to reject the existence of first-order autocorrelation, which however is not informative since this is expected to happen by construction. Based on AR (2) *p*-values that are greater than 0.05 in all the models, we dismiss the proposition that there is serial correlation of order 2. We thus conclude that there is no autocorrelation in the three models. The Sargan test of over-identifying restrictions does not give any useful information in System GMM (Roodman, 2009), so, we use the Hansen test to check the validity of over-identifying restrictions. The Hansen test shows that the over-identifying restrictions are valid and the models are not weakened by too many instruments. Based

on diagnostic test results and sensitivity results, which showed marginal changes in coefficients and standard errors when one variable is left out of the model, we conclude that the model is robust and its results are reliable.

The full sample is broken down into low-risk and high-risk sub-samples so as to determine the information content of financial risk through a comparison of results from the two risk categories. A comparison to the full sample results is also done. Regression results from the two risk categories are presented in the next section.

7.9.2 Results for Low-risk and High-risk Sub-samples

High-risk firms have an average debt/equity ratio that is greater than or equal to one. An average debt/equity ratio that is less than one represents low-risk firms. Table 7-4 presents the regression results for the two sub-samples. Models 1 to 3 focus on low-risk firms while Models 4, 5 and 6 measure value relevance in high-risk firms.

Table 7-4: **Results for Low-risk and High-risk Samples**

	Low-risk Firms			**High-risk Firms**		
VARIABLES	**Model 1 Log S.P.**	**Model 2 Log S.P.**	**Model 3 Log S.P.**	**Model 4 Log S.P.**	**Model 5 Log S.P.**	**Model 6 Log S.P.**
Log of Lag Share price	0.943***	0.960***	0.987***	0.942***	1.006***	0.959***
	(0.066)	(0.042)	(0.015)	(0.112)	(0.087)	(0.035)
Log Total debt	0.322***	0.142***		0.387**	0.030	
	(0.105)	(0.032)		(0.142)	(0.138)	
Log of Lag Total debt	-0.281**	-0.118***		-0.388*	-0.096	
	(0.115)	(0.036)		(0.202)	(0.183)	
Debt/Equity ratio	-1.148***		-0.705***	-0.218***		-0.205**
	(0.171)		(0.204)	(0.055)		(0.069)
Lag of debt/equity ratio	0.928***		0.611**	0.197*		0.179*
	(0.286)		(0.252)	(0.099)		(0.091)
Constant	-0.563	-0.247	0.094	0.357	1.432	0.351*
	(0.648)	(0.423)	(0.072)	(1.915)	(2.356)	(0.172)
Number of instruments	13	11	11	13	11	11
Number 0f observations	245	245	245	105	105	105
Number of firms	35	35	35	15	15	15
Arellano-Bond test for AR(1)	-2.45	-3.20	-2.80	-1.43	-1.41	-1.70
P-value for AR(1)	0.014	0.000	0.005	0.003	0.008	0.009
Arellano-Bond test for AR(2)	0.62	-1.22	0.14	0.94	0.72	1.30
P-value for AR(2)	0.537	0.221	0.891	0.348	0.470	0.192
Hansen test statistic	0.04	0.18	0.04	0.06	0.22	0.13
P-value for Hansen test	0.848	0.668	0.845	0.801	0.640	0.719

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

a) Results for Low-risk Firms

The *F*-statistics for all the three models in this category are significant at 1% level. This means that the variables in the models jointly explain the movement in share prices on the JSE. The instrument matrix was collapsed in all the models, giving rise to a total of 13 instruments for Model 1 and 11 instruments each for Models 2 and 3. Collapsing the instrument matrix is one way of reducing the instrument count (Roodman, 2009). In all three models, there are 245 observations from 35 low-risk firms, meaning that there is no instrument proliferation in the models. The year 2017 (time dummy) was dropped in Models 1 and 3 while in Model 2, the year 2013 (time dummy) was dropped due to collinearity.

There is a positive relationship between share price and total debt. As noted earlier, the positive relationship is due to the inclusion of current liabilities that are directly related to business activity (and not long-term debt only) in the calculation of total debt. Total debt for low-risk firms is statistically significant at 1% level in Model 1; the same level obtained in the full sample. The coefficient of total debt is 0.322 in Model 1, changing to 0.142 in Model 2, implying that there is little sensitivity to dropping the other variable (debt ratio). Windmeijer corrected standard errors are low and within a reasonable range for the two models (0.105 in Model 1 and 0.032 in Model 2), implying that the model is quite stable. The fact that the total debt for low-risk firms is value relevant on the JSE means that investors are concerned about a company's total indebtedness, even if the company is not highly indebted in relation to its market capitalisation. Trading by investors takes into account distress risk that is posed by both current and non-current liabilities.

Debt/equity ratio has a negative and statistically significant relationship (at 1% level) with share price in Model 1 and Model 3. This means that as the debt/equity ratio increases, share prices decline: a one-unit increase in the debt ratio leads to a 1.148-unit decrease in share prices in Model 1, as investors perceive more risk. The reverse movement is also true. Dropping the variable total debt from the model does not materially alter the results: the level of statistical significance remains at 1% and the coefficient of debt/equity ratio changes from –1.148 (Model 1) to –0.705 (Model 3). Windmeijer corrected standard errors also register modest changes when total debt is dropped from the model. All this

evidences that the model is stable and its results are reliable. These results conform with those in the full sample.

i. Model Diagnostics

According to the Arellano-Bond test for autocorrelation, we fail to reject the hypothesis that there is first-order autocorrelation in all the three models since the probabilities for AR (1) are less than 0.05. This is expected because it is mathematically correct that there should be first-order autocorrelation (Roodman, 2009). Its existence is therefore not informative. We, however, refute the hypothesis that there is serial correlation of order 2 since the *p*-values for AR (2) are all greater than 0.05, thus concluding that there is no autocorrelation in all the three models. Based on probabilities that are greater than 0.05 in all the three models, the Hansen test gives credence to the over-identifying restrictions used and we conclude that the models are robust and their results are reliable.

b) Results for High-risk Firms

These firms have average debt ratios that are greater than or equal to one over the eight-year study period. The results for high-risk firms are given in Models 4, 5 and 6. According to the *F*-test, all the three models have statistical significance at 1 per cent level. The year 2017 (time dummy) was automatically left out due to collinearity in Models 4 and 6 while in Model 5, the year 2013 (time dummy) was dropped for the same reason. Instrument proliferation was controlled by collapsing the instrument matrix, resulting in Model 4 having 13 regression instruments. Model 5 and Model 6 have 11 instruments each. All the models have 105 observations from 15 high-risk firms. Since the number of observations and groups is higher than the number of instruments in all the three models, there is no problem of too many instruments.

Just like in the full sample and the low-risk sub-sample, total debt still has a positive association with stock price in high-risk firms. Total debt is however only statistically significant (5% level) in Model 4. The coefficient of total debt is 0.387 in Model 4, which changes to 0.030 after debt/equity ratio has been dropped from the model. Windmeijer corrected standard errors register marginal changes between Model 4 and Model 5. Value relevance of total debt in high-risk firms produces mixed results: it is statistically significant in Model 4 (multivariate model), but when we do not control for debt/equity ratio in Model 5 (simple regression model), total debt ceases to be statistically significant.

The findings are thus different from those in both the full sample and the low-risk sub-sample where total debt is consistently value relevant.

Debt/equity ratio has a negative and significant relationship with share price in Models 4 and 6. The only difference is that in Model 4, it is significant at 1% level (*p*-value = 0.001) while in Model 6, it is significant at 5% level (*p*-value = 0.010). This change is in harmony with the change in statistical significance exhibited with total debt. The coefficient for debt/equity ratio in Model 4 is –0.218 while in Model 6, it marginally changes to –0.205. Windmeijer corrected standard errors also marginally change between the two models (from 0.055 to 0.069). Changes in regression coefficients and corrected standard errors are within the ranges that are expected to occur when one variable is dropped from the model. This indicates model robustness. However, the level of sensitivity to dropping debt/equity ratio from the model is higher in the high-risk sub-group than in the low-risk sub-group.

i. Model Diagnostics

According to the Arellano-Bond test for autocorrelation, for high-risk firms, we fail to reject the hypothesis that there is first-order autocorrelation in the models based on AR (1) *p*-values that are less than 5 per cent. We however reject the hypothesis that there is second-order autocorrelation in first differences for all the three models. This shows that there is no autocorrelation in the three models. With regards to mean stationarity, the Hansen test results show that the over-identifying restrictions are valid and the models are robust. Model results are thus reliable.

A discussion of the findings follows in the next section.

7.10 Discussion of Findings

The findings on absolute debt (total debt) and relative debt (debt ratio) are discussed below.

7.10.1 On Total Debt

The variable total debt (absolute risk) was found to be value relevant for both the full sample and low-risk firms' sample on the JSE. For high-risk firms, total debt is value relevant in the multivariate model, but not statistically significant, if we do not control

for debt/equity ratio (simple regression model). Based on simple regression model results, it means that consciously or not, investors tend to react in a way that is unwarranted by the absolute levels of total debt carried by high-risk companies. This overreaction creates a disconnection between share price movements and total debt changes. As total debt changes, share prices disproportionately change, as some investors begin to worry about the going concern status of the company in question. The fear of losing one's investment may cause a rational investor to behave irrationally in the face of perceived excessive risk. For low-risk companies, this overreaction is not apparent because total debt is value relevant. This feeds into the notion that there is an ideal debt ratio, beyond which debt ceases to be cheaper than equity. However, there is generally no agreement in literature with regards to the actual level of this ideal debt ratio. Eiteman, Stonehill & Moffett (2013) suggest the existence of different ideal debt ratios in different markets. Based on findings, this study surmises that the ideal debt ratio is just below unity[35]. Anything above unity causes equity investors' required rate of return to increase, thus increasing the weighted average cost of capital.

Alternatively, the reason for the lack of value relevance of total debt in high-risk firms is due to investors' concern over the high levels of a firm's total indebtedness. As they perceive high risk levels, investors will value such stocks at a discount to the stocks' intrinsic value. The discount causes a disconnect between the two variables if it is not adjusted in line with total debt changes, manifesting itself as a lack of value relevance. Pursuant to that, this research hypothesizes that there is a 'high debt illusion' that causes investors to put a discount on shares of high-risk firms and maintain that discount regardless of changes in absolute total debt values (until the average debt ratio falls below unity[36]). 'High debt illusion' is defined here as a situation where a firm has total debt that is higher than its market capitalisation and the debt is perceived to be too much, leading to undervaluation of its shares. This is an illusion because, when the total liabilities are taken into context (dividing by equity to give debt/equity ratio), debt/equity ratio is unquestionably value relevant. One of the major contributions of this study to value relevance of risk research is the postulation that high-risk firms' shares are valued at a

[35] This proposition is based on the definition of total debt suggested in this study, i.e. debt is comprised of both current and non-current liabilities. In cases where total debt incorporates interest bearing long-term debt only, the ideal debt ratio should be much lower than unity. If this is not the case, it means the sum of all liabilities will be higher, leading to excessive risk.

[36] When average debt ratio falls below unity, the firm is classified into the low-risk category where total debt is consistently value relevant. This means that the discount falls away once a firm enters the low-risk category.

discount to their intrinsic value and this discount is maintained until debt ratio is less than one. This has implications for company executives and these implications are discussed in Chapter 9 under recommendations.

Lack of value relevance of total debt in the high-risk firms' category is consistent with findings by Gupta, Kumar & Verma (2016) who found out that financial leverage is not value relevant in Indian manufacturing companies. They are also somewhat consistent with MM's theory of capital structure irrelevance. However, a comparison with MM's theory may not be entirely feasible because the current study's variables do not exclusively focus on capital structure issues as MM did. For instance, current liabilities that are included in total debt are not part of the traditional measures of debt. MM's theory uses the traditional measure of debt, making a direct comparison problematic. The current study's risk measure nonetheless subsumes the traditional risk measure.

Results from the full sample and the low-risk sample support the capital structure signalling theory where, by using more debt, firm managers are signalling to the market that the future is good[37]. This causes investors to buy shares in these companies, hence value relevance of debt. The results also prop up the pecking order theory, irrespective of the definition of debt adopted in this study. In this case, company executives have a ranking order of how they finance company operations. They have an option of buying raw materials in cash (which is akin to equity) or incurring trade payables (which is analogous to borrowing). Incurring more trade payables ranks higher when managers foresee good future performance; this will enable them to pay off their liabilities. If they do not think that the future is good, they will avoid adding more liabilities because they will be aware that failure to honour their obligations may lead to their company being liquidated. Liquidation will result in them losing their jobs and their source of livelihood, so, they will try as much as possible to avoid it. Resultantly, total liabilities inform us about the firm's future potential. On the other hand, simple regression results from the high-risk firms' category negate the aforementioned theories.

[37] It shows that the future is good because a good future is the only way they will be able to generate income to repay principal and interest. Extended to other liabilities, management is also signalling that they will be capable of paying off their liabilities in the future as a consequence of some good financial performance (profitability). Failure to perform well means they will not be able to pay off their liabilities, so they will not incur them in the first place.

7.10.2 On Debt Ratio

Debt/equity ratio (relative risk) is value relevant regardless of whether a firm is classified as a low-risk or a high-risk company. Results from the full sample also confirm value relevance of the debt/equity ratio. These findings are in unison with the pecking order theory and capital structure signalling theory, but they, however, conflict with MM's capital structure irrelevance theory (discussed earlier). Empirical results from the linear model in Park (2015), where the debt ratio was found to be value relevant, lend support to the findings in the current study. Findings by Ogbulu & Emeni (2012) are also consistent with what was found out in this study. On the contrary, the debt ratio was found to lack value relevance by Enekwe *et al* (2014). This difference may be due to the fact that Enekwe *et al* (2014) focused on firm performance while the current study focused on share prices. The two variables measure different aspects in a company. Research that is comparable to the current study in terms of methodology includes Loncan & Caldeira (2014) and Cheng & Tzeng (2011), who used panel data models. Furthermore, Cheng & Tzeng (2011) also used GMM estimators, just like the current study. The difference however lies in the fact that both studies used static models, while the current study used dynamic models. Despite this difference, the findings from both studies are consistent with those in the current study.

The findings by Robu *et al* (2014) to the effect that financial leverage is value relevant[38] on the Budapest Stock Exchange resonate with the findings in this study in general terms, although the methodology and risk variables are different. They used financial leverage ratio (total debt/shareholders equity) and debt ratio (total debt/total assets) to measure financial risk. Although these variables are different from those in this study, they are nevertheless comparable. The primary data (questionnaire) based findings by Obaidat (2016) on the Amman Stock Exchange also lend support to the findings in this research, i.e. financial risk is value relevant (even though the exact measures of financial risk differ). The informativeness of financial risk generally implies that equity investors are concerned about the likelihood of losing their investments. Consequently, they factor in financial risk in equity valuations regardless of whether a company is high-risk or low-risk.

[38] Specifically, the results showed investors consider financial distress as a bad sign when they make decisions on whether or not to buy, hold or sell shares. This means value relevance of financial risk.

Further empirical evidence on the information content of financial risk was given by Akhtar *et al* (2016) in an analysis of companies quoted on the Karachi Stock Exchange, which is in line with this study's findings. For high-risk firms, results of the multivariate model (for total debt) and both models (for debt/equity ratio) in this study support an assertion by Habib (2002) that value relevance is high in highly geared firms. Banks' close monitoring activities are cited as the reason for high value relevance of financial statements in highly-geared firms. The argument is that banks will closely monitor all firms that they would have lent substantial amounts of money to, and this close monitoring is what Habib (2002) cites as the driver in value relevance of highly geared firms. This proposition is however not tested in this study.

7.10.3 On Debt Ratio vs. Total Debt

The results in this research imply the superiority of the debt/equity ratio over total debt in terms of information content because the debt ratio possesses value relevance across risk categories (and the full sample) in both simple and multivariate models. This is not the case with total debt, whose value relevance is contingent upon a company's risk category. This superiority points to the fact that when using debt in firm valuation, there is need to deflate total liabilities by a firm's market capitalisation in order to get an "objective" measure of risk that is relevant to all firms (i.e. debt/equity ratio). Debt ratio is more "objective" than total debt because it deflates total liabilities by the total consensus value arising from market participants' actions. This consensus value (market capitalisation) is generally viewed as objective since it is a result of actions of numerous buyers and sellers on the market agreeing[39] on what the company is worth (the share price). The ratio is also easily comparable to other firms, as opposed to total liabilities which may not be easily comparable if the firms are of different sizes. The fact that it is objective and easily comparable with peers helps to explain why the debt/equity ratio is value relevant across firms of varying risk levels. Company executives should therefore be cognisant of the fact that whether they use short-term or long-term debt, the market correctly responds to these forms of debt. Investors are so discerning that they cannot be fooled to think that a firm has low leverage when it uses short-term debt to finance its activities. Apparently, the market factors in all forms of indebtedness, not just interest-bearing borrowings. This shows that the market is aware that all liabilities present some

[39] This agreement between buyers and sellers is shown by way of a convergence between the shares' bid prices (buyers' price) and ask prices (sellers' prices) into a "sale price". Without this agreement, no shares will be bought or sold on a stock exchange.

level of pressure on a firm's cash flows; this is why the measure of relative risk adopted in this study is value relevant. These findings have implications for accounting standards setters and these are discussed in Chapter 9 under recommendations of the study.

7.11 Chapter Summary

This chapter examined value relevance of absolute and relative financial risk on the JSE using dynamic panel data models. Absolute financial risk is measured by total debt while debt/equity ratio measures relative financial risk. Both current and non-current liabilities constitute debt while market capitalisation is used as a proxy for equity. The study used System GMM, two-step estimation; Windmeijer corrected (robust) standard errors and forward orthogonal deviations transformation. Book value per share was used as an additional instrumental variable in *xtabond2* command in Stata. Regression models were first run on the full sample of 50 companies. After that, the study sample was then divided into two groups of companies: those with an eight-year average debt/equity ratio greater than or equal to one (high-risk firms) and those with an average debt/equity ratio that is less than one (low-risk firms). In the full sample, both debt/equity ratio and total debt were found to possess value relevance. Debt/equity ratio was also found to be value relevant on the JSE regardless of the debt classification of the company. Total debt is value relevant in low-risk firms while in high-risk firms, multivariate and simple regressions give different results. Specification tests showed that all models are correctly specified.

The next chapter explores value relevance of retained earnings and cash dividends, which is the last objective of the study.

CHAPTER EIGHT

VALUE RELEVANCE OF CASH DIVIDENDS AND RETAINED EARNINGS

8.0 Introduction

Investment management entails taking risks and getting a commensurate return for the risks taken. The previous chapter determined that relative risk has information content across risk categories while absolute risk's information content depends on a firm's risk category. This chapter complements it by focusing on part of the return side of the risk-return trade-off theory, i.e. cash dividends. Cash dividends represent a return on investment (the return can also take another form, i.e. capital gains). When a firm makes net profits at the close of its trading year, the profits can either be distributed to equity holders as dividends, or retained in the company. These variables represent how value created during the year is handled by a firm: it can either be distributed to shareholders or retained for future redeployment by the firm. Although retained earnings are not the only source of funding for a firm's future growth, they are integral to a firm when it wants to exploit profitable opportunities in the absence of debt and new capital injection by the owners. This is because retained earnings are already at a firm's disposal and can be utilised relatively quickly as opposed to debt and new capital injection by shareholders, which take time to be realised. Retained earnings can therefore be viewed as a signal by management to the market regarding future fortunes of the company. Nevertheless, if a firm makes a loss during a particular financial year, this reduces cumulative retained earnings. In this respect, retained earnings provide the first line of defence against a harsh operating environment by absorbing losses.

On the other hand, cash dividends represent the immediate and direct reward to shareholders of the firm. The other form of reward comes as capital gains when share prices rise. This, however, is not guaranteed because share prices can fall at any time, resulting in a loss of value. Cash dividends do not suffer from this problem once they are paid (the bird-in-the-hand). Resultantly, these two variables capture the movement of value created by a firm during a particular financial year.

This study is intended to uncover the nature of the relationship between company value (measured by market capitalisation and Tobin's Q, hereafter termed Q-ratio) and the value created during a particular year (dividends and retained earnings). The research also interrogates the applicability of dividend theories on the Johannesburg Stock Exchange (JSE).

The study falls into the broad category of value relevance research, where statistically significant variables are said to be value relevant. Value relevance has particular importance to firm managers, accounting standard setters as well as investors in general. The chapter commences with information on the models used in the study. This is followed by descriptive statistics of the data used in the chapter. Correlation analysis, linearity test results as well as normality test results are given before presentation and analysis of empirical results is done. A chapter summary follows the interpretation and discussion of results.

8.1 The Models

To accomplish the task on hand, the study utilised the following models developed in Chapter 4:

$$lnFV_{it} = \beta_0 + \varphi lnFV_{i,t-1} + \beta_1 D_{it} + \beta_2 lnRE_{it} + \beta_3 lnRE_{it-1} + \varepsilon_{it} \quad \ldots (8\text{-}1)$$

$$lnFV_{it} = \beta_0 + \varphi lnFV_{i,t-1} + \beta_1 lnRE_{it} + \beta_2 lnRE_{it-1} + \varepsilon_{it} \quad \ldots (8\text{-}2)$$

$$lnFV_{it} = \beta_0 + \varphi lnFV_{i,t-1} + \beta_1 D_{it} + \varepsilon_{it} \quad \ldots (8\text{-}3)$$

where:

$lnFV_{it}$ = natural log of firm value for company *i* in time *t*

$lnFV_{i,t-1}$ = natural log of firm value for company *i* in time *t-1*

D_{it} = dummy variable for dividend payments for company *i* in time *t*, where D = 1 if dividend was paid and 0 otherwise

$lnRE_{it}$ = the natural log of cumulative retained earnings for company *i* in time *t*

$lnRE_{it-1}$ = the natural log of cumulative retained earnings for company *i* in time *t-1*

β_0 = regression intercept

φ = coefficient for the first lag of firm value

β_k = regression coefficient for the k^{th} variable (for k = 1, 2, …, N)

ε_{it} = disturbance term for company *i* in time *t* (= $\mu_i + v_{it}$)

8.2 Assumptions

Two-step System GMM is used in Stata, utilising Roodman's *xtabond2* command, just like in the other chapters. The regressions are run based on the following assumptions:

i. A linear association exists between the response variables (market capitalisation and Q-ratio) and explanatory variables (cash dividends and retained earnings). Linearity tests are done to confirm this assumption.

ii. No autocorrelation exists between idiosyncratic errors across individuals. According to Roodman (2009), use of time dummies enhances this assumption. In this regard, time dummies are included in all regressions.

iii. The first lag of firm value[40] is a predetermined variable. Predetermined variables are instrumented GMM-style when using *xtabond2* in Stata (Roodman, 2009).

iv. The independent variables are exogenous and, in line with the command being used, they are entered instrumental variable (IV)-style in *xtabond2*. To enhance efficiency of the model, Roodman (2009) states that additional instruments from the dataset can be used. Net profit and average debt/equity ratio are used as additional IV-style instruments. The reason for using net profit is that both cash dividends and retained earnings are derived from net profit. This net profit is affected by interest payments on debt and the settlement of other short-term liabilities of a firm. Highly indebted firms (with high average debt/equity ratios) may find themselves constrained in either declaring a cash dividend or having any profits to retain. For these reasons, these variables were deemed good instruments in such a model.

8.3 Research Hypotheses

This research tests the following hypotheses developed in Chapter 3.

H1: There is a positive and significant association between firm value and payment of cash dividends.

H2: There is a positive and significant association between firm value and retained earnings.

[40] Firm value is the dependent variable. As indicated earlier, the dependent variables used are market capitalisation and Q-ratio.

8.4 Descriptive Statistics

Table 8-1 presents descriptive statistics on JSE raw data for the study sample.

Table 8-1: **Descriptive Statistics**

Variables	(1) N	(2) Sum	(3) Mean	(4) SD	(5) Minimum	(6) Maximum
Market Cap.	400	1.175e+13	2.938e+10	6.000e+10	1.890e+07	4.083e+11
Share price	400	26,607	66.52	96.86	0.0300	609.3
Average debt ratio	400	329.3	0.823	0.870	0.0500	4.145
Dividends	400	3.481e+11	8.702e+08	2.695e+09	0	2.351e+10
Retained income	400	3.724e+12	9.309e+09	2.272e+10	-1.405e+09	1.767e+11
Q-ratio	400	1,512	3.780	18.93	-152.6	310.1
Net profit	400	7.594e+11	1.899e+09	6.522e+09	-9.634e+09	8.170e+10
Number of firms	50	50	50	50	50	50

There are 400 firm-year combinations from 50 firms over the eight-year study period. For the dependent variable (market capitalisation), the minimum and maximum values indicate that the sample is diverse, including both low- and high-value shares. There is reasonable dispersion from the mean, as seen from a comparison of the mean and the minimum & maximum values, as well as the standard deviation (SD). The same pattern is also evident on the independent variables (dividends and retained earnings): there is acceptable deviation, which is not expected to pose any problems when running the regressions. In all cases, raw data is transformed into natural logs before running the regressions. This reduces the influence of outliers and any scale bias that may be observed from raw data statistics presented here. Q-ratio, the other dependent variable, shows that there are some firm/year combinations depicting that the company is undervalued. This is indicated by the negative minimum value of Q-ratio. The large negative minimum value and the large positive maximum value are just isolated cases because the average is a positive 3.78. The explanatory variable, ‘cash dividends’, has a minimum value of zero, indicating that there are some firms that did not declare dividends during one or more years under study.

The regressions utilise two additional instrumental variables, namely: net profit and average debt/equity ratio. Net profit depicts wide deviation, which is symptomatic of the inclusion of small and large capitalised firms. The deviation is however not expected to pose any scale bias in the regression because, in this instance, net profit is only an instrumental variable. The other instrumental variable has no such deviation since the figures are means of debt ratios.

8.5 Correlation Analysis

Table 8-2 depicts the correlation matrix.

Table 8-2: **Correlation Matrix**

	Market Cap	**Q-ratio**	**Cash Dividends**	**Retained Income**	**Net Profit**	**Av. debt ratio**
Market Cap	1.0000					
Q ratio	0.4606*	1.0000				
	(0.0000)					
Cash dividends	0.8639*	0.3462*	1.0000			
	(0.0000)	(0.0000)				
Retained Income	0.9108*	0.1551*	0.8458*	1.0000		
	(0.0000)	(0.0026)	(0.0000)			
Net profit	0.4125*	0.1403*	0.4684*	0.4332*	1.0000	
	(0.0000)	(0.0053)	(0.0000)	(0.0000)		
Average debt	-0.3329*	-0.4230*	-0.3183*	-0.1642*	-0.1406*	1.0000
Ratio	(0.0000)	(0.0000)	(0.0000)	(0.0013)	(0.0049)	

Correlation analysis helps as a precursor to the regression models by identifying the nature of the relationships and whether or not these relationships have statistical significance. The study used 5 per cent significance level in the correlation analysis, where an asterisk next to a correlation coefficient indicates a statistically significant relationship. The *p*-values are given in brackets beneath the respective correlation coefficients.

There is a strong, positive and statistically significant relationship between market capitalisation and cash dividends. This implies that a rise in the amount of cash dividends paid translates into a rise in company value. The implication is that when a higher[41] cash dividend is declared; investors will positively respond through an increase in demand for stocks of that particular firm. The increase in demand leads to an upsurge in the firm's stock price, resulting in a commensurate increase in market capitalisation. The opposite movement should also hold, where failure to declare dividends (or a fall in the declared dividend) should result in a decline in stock prices and the attendant market capitalisation. The relationship is also positive and statistically significant between Q-ratio and cash dividends, although, it is not that strong (0.3462). Considering that market capitalisation

[41] Higher relative to the previous period's declared cash dividend.

is embedded in the numerator for the Q-ratio, a weakened relationship either means that the additional variables in the Q-ratio have a weaker relationship with cash dividends, or it simply means that conversion to a ratio results in a weakened relationship between the variables (a combination of the two is also possible). A very strong positive relationship exists between market capitalisation and retained earnings (0.9108). The relationship is statistically significant. This means that as retained earnings pile up, firm value also increases[42]. These positive relationships between market capitalisation and both retained earnings and cash dividends show that whatever the firm decides to do with its net profits (distribute or retain), the action will have a positive effect on the value of a company. The relationships between Q-ratio and the same variables are however not as strong as with the other measure of firm value (market capitalisation), where the relationship between Q-ratio and retained earnings is the weakest (0.1551). A relatively weak positive relationship between market capitalisation and Q-ratio (0.4606) suggests that the two firm value measures may not be good proxies of each other. However, the relationship is statistically significant.

Another positive and statistically significant association exists between market capitalisation and net profit but the association is not very strong (0.4125). The relationship is weaker between Q-ratio and net profit (but it is statistically significant). An increase (decrease) in net profit results in an increase (decrease) in both market capitalisation and Q-ratio. Failure to grow a firm's bottom-line is, therefore, viewed negatively by investors. A negative and statistically significant association obtains between market capitalisation and average debt/equity ratio. This means that an increase in the amount of debt is viewed negatively by investors, perhaps anticipating debt distress. However, with a correlation coefficient of –0.3329, the association is not very strong. The two independent variables, i.e. cash dividends and retained earnings, have a high and statistically significant positive association. In all the regression models, cash dividends are represented by a dummy variable and not the actual amount of cash dividends paid. This means that the 0.8458 correlation coefficient between cash dividends and retained income is inconsequential in this case. Therefore, the collinearity problem does not exist in this particular case.

[42] The possibility that retained earnings that have accumulated over the years will be eaten up by future losses seems not to be a major issue in this instance

A strong positive correlation was anticipated between net profit and either cash dividends or retained earnings, but that is not the case. Net profit and cash dividends exhibit a positive correlation coefficient of 0.4684 while net profit and retained earnings have a positive correlation coefficient of 0.4332. Both relationships are, however, statistically significant. A strong positive correlation between net profit and cash dividends was expected because dividends are declared from net profits such that an increase in net profits would result in a rise in cash dividends. If that fails to happen, then there should be a strong correlation between net profit and retained earnings because if companies are not paying out more as they make more profits, they will be retaining more. This, again, is surprisingly not the case. What this means is that companies do not have a consistent dividend pay-out ratio, which automatically increases dividend payments when profits increase. Neither is there also a consistent retention ratio for the companies involved. The results suggest that dividend pay-out ratios and retention ratios are subject to change from one year to another depending on the circumstances, leading to weak correlation coefficients. A small bias towards cash dividends is evident. Net profit and average debt/equity ratio, the two additional instrumental variables, have a weak negative correlation (–0.1406). The relationship is, however, statistically significant. All the other remaining relationships are statistically significant but the correlation coefficients lean towards the weak side.

8.6 Distribution of Residuals

The process of checking the distribution of residuals involved running the base models, predicting the residuals and then constructing a histogram. A histogram is preferred over other alternative measures of normality (like Shapiro-Wilks, P-P, and Q-Q plots) as it gives an easy-to-interpret visual of the distribution. Figure 8-1 and 8-2 depict the distribution of the residuals where market capitalisation and Q-ratio are the dependent variables (DV), respectively.

In both cases, the residuals are not normally distributed, but rather, they are skewed, with longer left tails (negatively skewed). Market capitalisation exhibits a much longer left tail than the Q-ratio. However, these distributions are fair approximations of a normal distribution when compared to distributions done based on untransformed market capitalisation and Q-ratio (output not shown). Log-transformation helped to normalise (and linearize as seen in the next section) the relationships. While the information on

distributions is insightful about the data generating process, there is no strict requirement for residuals to be normally distributed when using System GMM. Consequently, there is no problem with the data in this case.

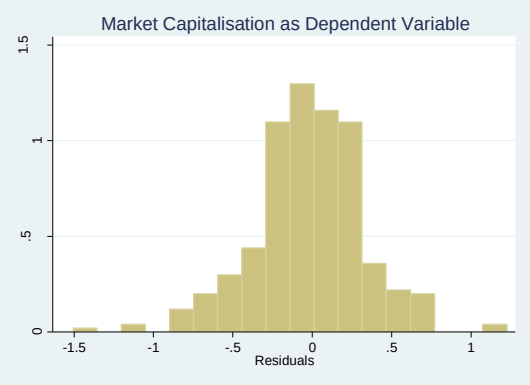


Figure 8-1: **Market Cap as DV**

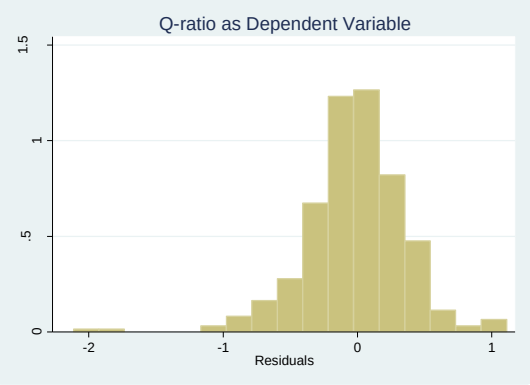


Figure 8-2: **Q-ratio as DV**

8.7 Linearity Analysis

Figure 8-3 and 8-4 show scatterplots between market capitalisation and cash dividends, and market capitalisation and retained earnings respectively.

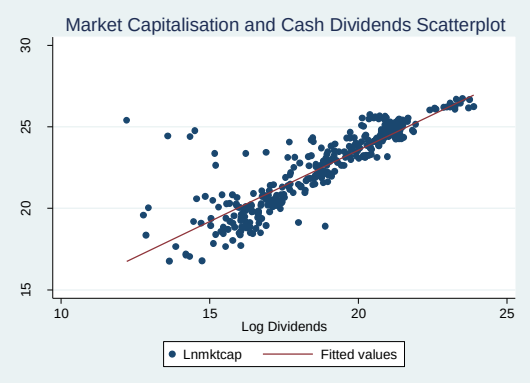


Figure 8-3: **Market Cap-Dividends**

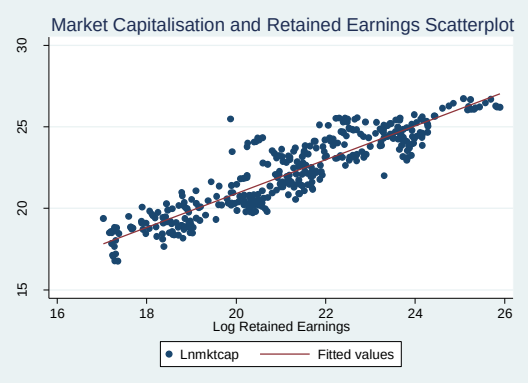


Figure 8-4: **Market Cap-Retained Earnings**

This research makes use of linear models. It is therefore imperative to test the linearity of the relationship between the dependent and independent variables. This helps in determining the suitability of the linear models used in the research. Figure 8-3 shows that the association between market capitalisation and cash dividends is positive and linear. Figure 8-4 shows that the same relationship also obtains between market capitalisation and retained income. However, both relationships were not perfectly linear before the log-transformation of both the dependent and independent variables. This

shows that linear models based on log-transformed data are appropriate in this investigation.

A quick check was done on the Q-ratio/cash dividends scatterplot and Q-ratio/ retained earnings scatterplots, which revealed that the relationships are not linear. Converting both cash dividends and retained earnings to their natural logarithms with the Q-ratio untransformed did not yield any better results. Transforming the Q-ratio into natural log[43] yielded fairly positive and linear relationships, as depicted in Figure 8-5 and 8-6. Since the relationships are linear, it is suitable to utilise linear models in this research.

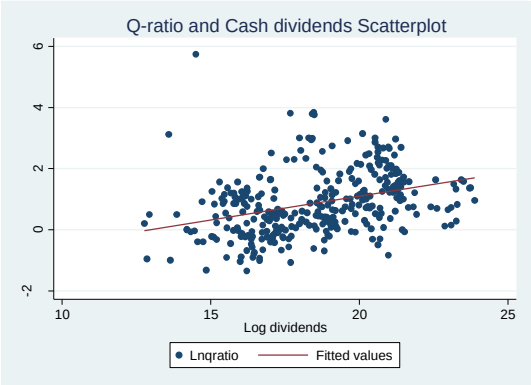


Figure 8-5: **Q-ratio to Dividends**

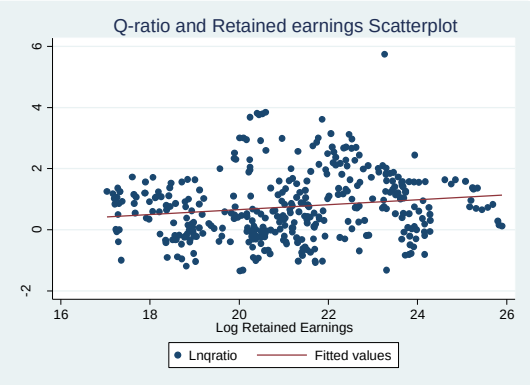


Figure 8-6: **Q-ratio to Retained Earnings**

8.8 Value Relevance of Cash Dividends and Retained Earnings

The effect of cash dividends and retained income on firm value is examined from two perspectives. The first one uses market capitalisation as the measure of firm value. The second perspective uses Q-ratio to measure firm value. The motivation for using two measures of firm value is to address different aspects of firm value: market capitalisation is simply the consensus value by market participants while Q-ratio tells us whether or not a firm is over-, under- or correctly-valued. The actions of various market participants give rise to over- or under-valuation of shares, which is also linked to market capitalisation, since movement in share prices directly affects market capitalisation. This means that the two measures of firm value are related, but a little bit different, thus ensuring that a wider view of firm value is examined.

[43] Normally, ratios are used just as they are, i.e. untransformed. However, in this case, transformation was necessary to achieve linearity. Other studies that have also used natural logs of ratios include Glezakos, Mylonakis & Kafouros (2012), Sloan (1996) and Fama & French (1992).

8.8.1 Results with Market Capitalisation as a Measure of Firm Value

Table 8-3 displays the regression results as well as the diagnostic test results where market capitalisation is the response variable.

Table 8-3: **Results with Market Capitalisation as Response Variable**

VARIABLES	Model 1 Lag (2 3) Log M.C.	Model 2 Lag (2 3) Log M.C.	Model 3 Lag (2 3) Log M.C.	Model 4 Lag (2 2) Log M.C.	Model 5 Lag (2 2) Log M.C.	Model 6 Lag (2 2) Log M.C.
Log of Lag Market Cap.	0.996***	1.009***	1.011***	1.039***	1.042***	1.010***
	(0.040)	(0.036)	(0.025)	(0.051)	(0.044)	(0.039)
Log Retained income	0.089	0.086		0.082	0.080	
	(0.141)	(0.145)		(0.142)	(0.142)	
Log of Lag Retained income	-0.095	-0.103		-0.129	-0.130	
	(0.128)	(0.134)		(0.138)	(0.139)	
Dummy (dividend payment)	0.071		0.003	0.011		0.008
	(0.068)		(0.068)	(0.080)		(0.088)
Constant	0.199	0.212	-0.080	0.174	0.175	-0.029
	(0.175)	(0.178)	(0.527)	(0.166)	(0.168)	(0.819)
Number of instruments	26	25	24	22	21	20
Number of observations	330	330	350	330	330	350
Number of firms	49[44]	49	50	49	49	50
Arellano-Bond test for AR(1)	-3.39	-3.39	-3.67	-3.40	-3.40	-3.70
P-value for AR(1)	0.001	0.001	0.000	0.001	0.001	0.000
Arellano-Bond test for AR(2)	-0.43	-0.26	-0.70	-0.27	-0.26	-0.72
P-value for AR(2)	0.670	0.796	0.483	0.783	0.797	0.473
Hansen test statistic	19.95	20.39	20.17	15.91	15.97	16.21
P-value for Hansen test	0.174	0.157	0.165	0.144	0.142	0.133

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

The analysis makes use of nested models as a way of checking value relevance of one variable without controlling for the other independent variable. For instance, Model 2 gives information content of retained income without controlling for the payment of cash dividends, while Model 3 focuses on the payment of cash dividends without controlling for retained earnings. This also serves as a measure of sensitivity of the model results to dropping a variable. Furthermore, different lag limits are used to check sensitivity of the model results to variations in the lag structure. Models 1 and 4 are similar, except that they have different lag limits, so, their results are presented and analysed together. One

[44] PSV Holdings has accumulated losses (negative retained earnings) in all the eight years, resulting in missing observations on conversion to natural logs. Consequently, it was dropped by the software, leaving 49 firms.

independent variable at a time is dropped, yielding Models 2 & 5 as well as 3 & 6. Presentation of results thus follow this pairing.

a. Results for Models 1 and 4

The *F*-test shows that the two models are significant at 1 per cent level, meaning that the explanatory variables jointly explicate movements in market capitalisation. Model 1 has 26 instruments while Model 4 has 22 instruments, with both having 330 observations and 49 firms. In both cases, the number of instruments is far less than the number of observations and groups, implying there is no problem of too many instruments normally associated with GMM estimation.

In Model 1, market capitalisation and retained earnings have a positive association. Correlation analysis also showed a positive association between the two variables. However, in this particular case, the association is statistically insignificant. A change in the lag structure (in Model 4) has no major impact on the results, where the relationship is still positive and statistically insignificant. The coefficient of retained income is 0.089 in Model 1, which marginally changes to 0.082 as a result of a change in the lag limit. Thus, the results are also robust to changes in the lag structure. Windmeijer corrected standard errors barely change between the two models, implying robust results. Lack of statistical significance means that retained earnings are not value relevant on the JSE.

The indicator variable for the payment or non-payment of cash dividends has a positive coefficient in Model 1. A positive coefficient (where cash dividend payment was coded 1) means that firms that pay cash dividends will have a higher market capitalisation than those that do not pay cash dividends. The correlation matrix and the scatterplot also produced a positive association between market capitalisation and the amount of cash dividends. However, the relationship is not statistically significant, implying that the observed relationship may be due to chance. Changing the lag structure in Model 4 also still yields a positive association, which, again, lacks statistical significance. The coefficients are within the same range in spite of a variation in the lag limit (0.071 & 0.011). Windmeijer-corrected standard errors are also within a similar range. This means that the model is robust to lag structure changes, yielding reliable results. Payment of dividends is thus not value relevant on the JSE.

i. Diagnostic Test Results

In Models 1 and 4, we fail to reject the existence of first-order autocorrelation [AR (1)] as measured by the Arellano-Bond test for autocorrelation. This is because both *p*-values for first order serial correlation are lower than 5 per cent. By construction, first-order autocorrelation is bound to exist; hence, its existence is not informative. What matters is the second-order autocorrelation [AR (2)]. We dismiss the existence of serial correlation of order 2 in the two models, since the *p*-values for the Arellano-Bond test statistic for AR (2) are both greater than 5 per cent. This means that there is no autocorrelation in both models. According to the Hansen test of over-identifying restrictions, the instruments used are valid and the models are robust. This is because the *p*-values are both greater than 5 per cent. The models are thus not weakened by too many instruments.

b. Results for Models 2 and 5

The dummy variable is dropped from Model 1 and Model 4, yielding Model 2 and Model 5 respectively. As highlighted earlier, these nested models are meant both to measure sensitivity of the results to dropping a variable and measuring value relevance of just one independent variable (without the other). According to the *F*-test, Model 2 and Model 5 possess statistical significance at 1 per cent level, meaning that dropping the dummy variable has no effect on the statistical significance of the remaining explanatory variables. They still jointly explain the movement in market capitalisation. Model 2 has 25 instruments and 330 observations while Model 5 has 21 instruments and 330 observations as well. The observations are from 49 firms in both models. Comparison of all these figures shows that there is no problem of too many instruments.

Dropping the dummy variable causes the coefficient of retained earnings to marginally change from a Model 1 figure of 0.089 to 0.086 in Model 2. The association between market capitalisation and retained earnings is still positive and statistically insignificant after the dummy variable has been dropped. This shows that whether or not we control for cash dividend payments, the association between market capitalisation and retained earnings remains positive and statistically insignificant. The results are therefore robust to dropping a correlated independent variable. Windmeijer corrected standard errors also change marginally. Comparing Model 2 to Model 5 shows that changing the lag limit does not change the nature of the association between the response and explanatory variable (it is still positive and statistically insignificant). The regression coefficients,

again, marginally change form 0.086 (Model 2) to 0.080 (Model 5). Windmeijer corrected standard errors also change marginally. All these small changes show that the results are robust to changes in lag structure, which is a desirable trait. These models affirm earlier results (from Model 1 and Model 4) to the effect that retained earnings provide no useful information that explains the movements in market capitalisation on the JSE.

i. Diagnostic Test Results

According to the Arellano-Bond test for autocorrelation, as expected, we fail to reject the hypothesis that there is first-order autocorrelation in Model 2 and Model 5 since the *p*-values for AR (1) in the two models are less than 5 per cent. However, the same test shows that we dismiss the hypothesis which says there is serial correlation of order 2 due to the *p*-values for AR (2) that are greater than 5 per cent. We, therefore, conclude that there is no autocorrelation in Model 2 and Model 5. Validation of the regression instruments used is based on the Hansen test. The test has *p*-values that are greater than 5 per cent in the two models. This means that the over-identifying restrictions are valid and the models are not weakened by too many instruments.

c. Results for Models 3 and 6

Retained earnings were dropped from Model 1 and Model 4, and the resultant nested models are Model 3 and Model 6 respectively. There is still a 1% level of statistical significance for the two models, again, showing that the remaining explanatory variables jointly explain the movement in market capitalisation. Dropping retained earnings means that all the 50 firms are now utilised, producing 350 observations in both models. Model 3 has 24 instruments while Model 6 has 20 instruments. Comparing the number of instruments to the number of observations and groups shows that there is no problem of too many instruments in both models.

The indicator variable for the payment or non-payment of cash dividends still shows a positive coefficient. Just like in Model 1 and Model 4, the indicator variable is not statistically significant. This shows that whether or not we control for retained earnings, the association between market capitalisation and cash dividend payment remains positive and devoid of statistical significance. Besides being statistically insignificant, the coefficients of the dummy variable are very small (0.003 and 0.008), meaning that payment or non-payment of dividends has very little connection with market

capitalisation. Thus, the relationship is both statistically and practically insignificant. The results are however robust to lag structure changes as well as to dropping a variable. Dividend payment is thus not value relevant on the JSE[45]. These robustness checks are complemented by diagnostic tests. The results are shown in the lower panel of Table 8-3 and their analysis is the subject of the next section.

i. Diagnostic Test Results

The *p*-values for AR (1) in the Arellano-Bond test for autocorrelation are both less than 5 per cent. This means that we fail to reject the hypothesis that there is first order autocorrelation in Model 3 and Model 6. The existence of first-order autocorrelation is expected and therefore not informative. Based on *p*-values for AR (2) that are greater than 5 per cent in the two models, we reject the hypothesis that there is second-order autocorrelation in each model. This means that there is no autocorrelation either in Model 3 or in Model 6. According to the Hansen test of over-identifying restrictions, we reject the hypothesis that the models are weakened by too many instruments. This is because the test statistic's *p*-values are greater than 5 per cent in the two models. The test also validates the instruments used.

8.8.2 Results with Q-ratio as a Measure of Firm Value

This section presents an alternative view, where Tobin's Q is used as a proxy for firm value. Table 8-4 displays the regression results.

Presentation of model results is done along the same pairings as in the previous case (Scenario 1) where market capitalisation proxies firm value. Diagnostic test results for all the six models appear in the lower panel of Table 8-4 and are analysed after model results for each pair have been presented and analysed.

[45] This analysis uses a dummy variable, where payment of dividends was coded 1, and zero for non-payment. To complement Model 3 and Model 6, regressions were, again, run where the dummy variable was replaced by the natural logarithm of the actual amount of cash dividends paid. Since retained earnings are not in these models, the observed high correlation coefficient between cash dividends and retained earnings is, again, inconsequential. The results (output not shown) still indicate that cash dividends are statistically insignificant at 5% level. The regression coefficients are however not as small as in Model 3 and Model 6, meaning that practical insignificance is not an issue when actual amount of dividends is used.

Table 8-4: **Results with Q-ratio as Dependent Variable**

VARIABLES	Model 1 Lag (1 3) Q ratio	Model 2 Lag (1 3) Q ratio	Model 3 Lag (1 3) Q ratio	Model 4 Lag (2 4) Q ratio	Model 5 Lag (2 4) Q ratio	Model 6 Lag (2 4) Q ratio
Log of Lag Q ratio	0.903***	0.912***	0.915***	0.904***	0.916***	0.932***
	(0.042)	(0.036)	(0.047)	(0.054)	(0.044)	(0.048)
Log Retained income	0.124	0.132*		0.145*	0.151*	
	(0.079)	(0.076)		(0.084)	(0.083)	
Log of Lag Retained income	-0.128	-0.134*		-0.143*	-0.147*	
	(0.077)	(0.074)		(0.081)	(0.080)	
Dummy (dividend payment)	0.066		0.003	0.067		0.023
	(0.063)		(0.070)	(0.065)		(0.075)
Constant	0.044	0.054	0.014	-0.152	-0.139	-0.023
	(0.200)	(0.182)	(0.073)	(0.223)	(0.217)	(0.092)
Number of instruments	33	32	31	29	28	27
Number of observations	321	321	341	321	321	341
Number of firms	48	48	49	48	48	49
Arellano-Bond test for AR(1)	-3.43	-3.44	-3.87	-3.35	-3.39	-3.87
P-value for AR(1)	0.001	0.001	0.000	0.001	0.001	0.000
Arellano-Bond test for AR(2)	-0.84	-0.70	-0.38	-0.79	-0.67	-0.44
P-value for AR(2)	0.403	0.482	0.703	0.427	0.505	0.659
Hansen test statistic	28.35	27.77	30.77	26.15	25.98	25.28
P-value for Hansen test	0.164	0.183	0.101	0.096	0.100	0.118

Notes: Standard errors are in parentheses. AR(K) is the test for the Kth order autocorrelation
***, ** and * represent statistical significance at the 1%, 5% and 10% levels.

a) Results for Model 1 and 4

Different lag limits are used in these two models, but the explanatory variables are the same. The two models are significant at 1% level as shown by the *F*-test, thus the explanatory variables jointly explain the changes in the Q-ratio. Model 1 has 33 instruments and 321 observations. Model 4 has 31 instruments and 321 observations as well. In both cases, there are 48[46] firms in each model. Instrument proliferation is non-existent since the number of instruments is less than the number of firms and observations.

In both models, there is a positive association between retained earnings and the Q-ratio, meaning that as firms retain more earnings, share prices move above their intrinsic values, resulting in an increase in the Q-ratio (i.e. shares become more over-valued or less under-

[46] Two firms were automatically dropped by the software from the regression models because of too few observations. Aspen Holdings has a negative Q-ratio in six of the eight years under investigation. PSV Holdings Limited has negative retained earnings (accumulated losses) in all the eight years studied. These negative figures became missing observations on conversion to natural logarithms. Any missing observations count of six and above results in a firm being dropped for having too few observations.

valued). The correlation analysis also showed a positive relationship between these variables. However, in this case, not much can be read from this relationship because it is not statistically significant. Concerning robustness of model results to lag limit changes, the coefficient of retained earnings changes from 0.124 in Model 1 to 0.145 in Model 4 in response to a change in the lag limit. Windmeijer corrected standard errors are 0.079 in Model 1, changing to 0.084 in Model 4 when the lag structure is changed. Such small changes show model robustness. Results in these two models are similar to those in the previous scenario where market capitalisation was used to measure firm value, i.e. retained income is not value relevant.

The dummy variable has a positive and statistically insignificant association with the Q-ratio in both models. There is a marginal movement in the coefficient of the dummy variable pursuant to a change in the lag structure. Windmeijer corrected standard errors also register a marginal shift when the lag limit is changed in Model 4, thus showing that the model is robust. The results thus show that payment or non-payment of dividends has no information content regarding over- or under-valuation of shares on the JSE. Similar results were obtained in Scenario 1. The model diagnostic test results for the two models are presented below.

i. Model Diagnostics

The Arellano-Bond test for autocorrelation shows that we fail to reject presence of serial correlation of order 1 in the two models, which is in accordance with expectations. This is based on AR (1) *p*-values that are less than 5 percent in both models. The *p*-values for second-order autocorrelation are both greater than 0.05, meaning that we reject the hypothesis that there is autocorrelation in the models. The over-identifying restrictions are valid and the models are not weakened by too many instruments as shown by *p*-values for the Hansen test that are more than 0.05 in the two models. These tests, together with robustness checks implemented, show that the model results are reliable.

b) Results for Model 2 and 5

Models 2 and 5 are a result of dropping the dummy variable from Model 1 and Model 4 respectively. They assess information content of retained earnings without controlling for the payment or non-payment of cash dividends. The remaining variables still jointly possess statistical significance at 1% level, as shown by the *F*-test, the same significance

level as in Model 1 and Model 4. The models have 32 instruments (Model 2), and 28 instruments (Model 5). Each model has 48 firms and 321 observations. There is no problem of too many instruments since the number of firms and observations far exceeds the number of instruments used.

Just like in the first scenario, retained earnings still have a positive association with the Q-ratio. At 5% level of significance, the relationship is not significant in both models. This means that whether or not we control for the payment and non-payment of cash dividends, retained earnings remain positively associated with the Q-ratio, but devoid of statistical significance. The coefficient of retained earnings reacts to dropping the dummy variable by marginally moving from 0.124 in Model 1 to 0.132 in Model 2. Windmeijer corrected standard errors also register a very small change between Model 1 and Model 2 (0.079 to 0.076). When the lag limit is changed, the coefficient of retained earnings moves to 0.151 in Model 5. The change is within what would reasonably be expected to happen when one explanatory variable is dropped from a model, thus showing model resilience. Lack of statistical significance of retained earnings is consistent with what was found in the previous models.

i. Model Diagnostics

As shown by the Arellano-Bond test for serial correlation, the *p*-values for first-order serial correlation in Model 2 and Model 5 are both below 5 per cent. This means that, as expected, we fail to reject the hypothesis that there is first-order autocorrelation in these two models. Based on AR (2) *p*-values that are greater than 5 per cent in both models, we reject the hypothesis that there is second-order autocorrelation in these models. We thus conclude that there is no autocorrelation in Model 2 and Model 5. The Hansen test's *p*-values are greater than 5 per cent in the two models, meaning that the over-identifying restrictions are valid and the models are not weakened by too many instruments.

c) Results for Model 3 and 6

These models consist of the dummy variable and the first lag of the dependent variable, with retained earnings having been dropped. They test information content of payment and non-payment of cash dividends without controlling for retained earnings. The *F*-test shows that the predictor variables still jointly explicate the movement in the dependent variable (at 1% level of significance). Model 3 has 31 instruments while Model 6 has 27

instruments. Both models have 341 observations and 49[47] companies. The number of observations exceeds the number of firms and instruments used in both models, which is desirable in order for the models not to suffer from the problem of too many instruments.

Payment of cash dividends still exhibits a positive association with the Q-ratio. Just like in the other models, the association is not statistically significant. Lack of statistical significance means that payment of dividends is not value relevant. Just like in Scenario 1, whether or not we control for retained earnings does not materially affect the lack of statistical significance, and the nature of the relationship between Q-ratio and the indicator variable for cash dividend payments. The coefficient of the dummy variable changes from 0.066 in Model 1 to 0.003 in Model 3 in response to retained earnings being dropped. Changing the lag structure causes the coefficient of the dummy variable to change from the Model 3 value of 0.003 to 0.023 in Model 6. The coefficients of the dummy variable are relatively small in all four cases, implying very little association between the Q-ratio and cash dividend payment. This means that there is also a lack of practical significance further to the lack of statistical significance since the coefficients are quite small. The weak relationship is also confirmed by the results of the correlation analysis presented earlier. Windmeijer corrected standard errors register small changes between the two models when the lag structure is changed. Autocorrelation tests as well as tests for validity of over-identifying restrictions are presented in the next section.

i. Model Diagnostics

Based on the Arellano-Bond test for autocorrelation, we fail to reject the hypothesis that there is first-order autocorrelation in Model 3 and Model 6. This is because AR (1) in the two models has *p*-values that are lower than 5 per cent, which is according to expectations. However, *p*-values for AR (2) are greater than 5 per cent in both models. This provides evidence that there is no autocorrelation problem in the two models. The *p*-values for the Hansen test of over-identifying restrictions are greater than 5 per cent in both models. This validates the instruments used in both models.

[47] Since these models drop the variable retained earnings, PSV Holdings Limited is restored to the regression models. Only Aspen Holdings remain excluded from the analysis due to having too few observations.

8.9 Discussion of Results

The results have shown that whether or not a JSE-listed firm pays a cash dividend, that decision does not influence both proxies of firm value. Firm value was measured by market capitalisation and Q-ratio. As a robustness check, a second set of regressions (output not shown) was run for Scenario 1, where actual cash dividends paid were used instead of a dummy variable for payment or non-payment of dividends. The results still show that cash dividends are not value relevant. This shows that investors do not place much significance on cash dividends because that is not the only way that they can receive value from their investment. Shareholders' wealth can also increase from capital gains.

The expectation is that if cash dividends are not value relevant, then retained earnings should be value relevant. This expectation is premised on a notion of 'following the value' by investors, where value here refers to net profits, which can either be given out as dividends or retained for future deployment into the business. In either case, investors should consider that in firm valuation. This turns out not to be the case as both cash dividends and retained income are devoid of value relevance. Retained income provides a firm with "free funds" to deploy into profitable opportunities that may arise in the future. However, even firms without these free funds can still exploit such opportunities by either borrowing from the bank or raising funds from the market through a rights issue. Considering the existence of these other alternatives, this may be the reason why investors on the JSE do not tie future performance of a firm to its amount of retained earnings. An increase in firm value is a reflection of the market's expectation of good future performance. The argument, then, is that future performance can still be good if management is able to source cheap funds and implement new projects and expand existing ones. If there are no profitable opportunities available, or if management is not able to either identify them or take advantage of them, then, the retained earnings will not add any value to the firm, resulting in their lack of value relevance. In some cases, cumulative retained earnings may be swallowed up by future losses[48], which do not benefit investors.

[48] Losses in the future actually destroy value that would have been created in prior periods. The chances that value represented by retained earnings can easily be destroyed if a firm incurs losses in the future can be the reason why investors do not link firm value to retained earnings, hence their lack of value relevance.

A view from two measures of firm value yielded the same results: cash dividends and retained income are not value relevant on the JSE. This study posits that as long as value is created, how that value is handled thereafter has no much bearing on a firm's future performance (this is supported by the results on the JSE). A share price (hence market capitalisation) communicates the view of the market on a particular firm's future cash flows, and that future does not hinge on money leaving the firm (dividends), or money that can still be lost if a firm makes losses (retained earnings). This is one of the novel contributions of this study to value relevance research.

Comparing the study's findings with existing dividend theories reveals that the results both confirm and contradict these theories. The study found that dividend payments are not value relevant. These findings go against the bird-in-the-hand theory. According to this theory, dividend payment impacts the value of a company. The certainty of cash dividends is much better than the potential capital gains when share prices rise. While the study's findings negate the bird-in-the-hand theory, they however provide empirical support to Miller and Modigliani (MM)'s dividend irrelevancy theory (Miller & Modigliani, 1961). This theory says that the payment of dividends has no effect on the value of a company because firm value depends on future earning capacity, which is not related to dividends paid. MM contended that dividends paid actually reduce firm value. If investors want cash, they can obtain that at any time by selling off their shares. However, such an argument is flawed in the sense that a shareholder may need cash, but at the same time, they don't want to dispose any of their shares because they may not be able to build the same portfolio again in the future. In this case, cash dividends are preferable to capital gains. Walter's (1963) model also views dividends as being value relevant, where a firm's dividend pay-out ratio is dependent on the relationship between the internal rate of return (r) of the firm and its cost of capital (k). An increase in the pay-out ratio reduces firm value if $r > k$. Where $r < k$, increasing the pay-out ratio increases firm value. If this holds, it implies that JSE firms are not following this guideline when they declare dividends. This, then, causes dividends not to be value relevant. The fact that cash dividends are not value relevant suggests that cash dividends cannot be used to lessen agency costs between company managers and owners of the company. Thus, the results in the current study do fail to back the agency theory.

A number of empirical studies have been done to determine value relevance of dividends and, to a lesser extent, retained earnings. Dividend pay-out ratio and retained income were found to be value relevant in Nigeria by Yemi & Seriki (2018). Using OLS estimators, Omokhudu & Ibadin (2015) also found that dividends, earnings and cash flows were value relevant on the Nigerian stock market. Ball *et al* (2017) provided further evidence on the value relevance of retained earnings. Value relevance of dividends shows that while dividends represent an outflow of funds from the firm, this outflow are reflected in the ex-dividend stock price (which is used as a response variable in most studies). Dividend announcements naturally result in an increase in stock price because the cum-dividend share price is higher than the ex-dividend share price. From ex-dividend date, share prices fall so as to account for the dividends that are no longer attached to the shares from that date. Assuming that a firm performs at a constant level until the next dividend declaration date; upon announcement of a dividend, the cum-dividend share price rises, only to fall at the ex-dividend date. This pattern helps explain why dividends are value relevant. However, the question arises on why, in some cases, this does not lead to value relevance of dividends, like the JSE scenario in the current study. A possible explanation to this phenomenon is that, while cum-dividend and ex-dividend share prices are different, it is the degree of share price adjustment that is inconsistent with the change in cash dividends paid, such that there is no association between share price movements and cash dividend payments. Normally, the lure of the cash dividend causes investors to pay a premium in the hope of getting a cash dividend. However, if investors are not very much attracted to cash dividends, the association between share price adjustment and cash dividend payment will be weak, leading to lack of value relevance. Declared cash dividends may fall below market expectations, which may affect value relevance of such dividend payment.

Bouteska & Regaieg (2017) studied information content of dividends in Tunisia and found that dividends were value relevant. Budagaga (2017) also determined that cash dividends possess information that explains movement in firm value. On the contrary, Rees & Valentincic (2013) argued that model specification issues influence value relevance of dividends; the link between core earnings, dividends and other information was cited as being crucial in this respect. Specifically, they opined that effective modelling of core earnings and other information leads to lack of value relevance of dividends due to absence of a valuation error in the preceding year. Such an argument

augurs well with the findings of this study. Whether dividends are value relevant or not is premised on their information content with regards to future performance. This area was explored by Lintner (1956) who hypothesised that a firm will only increase dividends when it views an increase in earnings as permanent. This means that dividend pay-out has information content about future cash flows, which is what drives the firm value. The base model used in this study does not capture increases or decreases in dividends due to the use of a binary variable that takes the value of 1 or 0. Even if dividends are increased or reduced, it will still be recorded as a 1, meaning that the change is not captured. This may help explain the disparity in the findings. However, a model that captures the level of dividends was also used and there was no change in the results, thus negating Lintner's (1956) hypothesis. Benartzi, Michaely & Thaler (1997) also investigated this issue and reported very little evidence of the information content of dividend pay-out changes. Extant literature reveals that value relevance of dividends is inconclusive, but this research posits that dividends are not value relevant. Observed value relevance of dividends in some studies may be driven by unobservable psychological factors peculiar to each market. This is an issue that needs further research to uncover the psychological factors (if indeed that is the case) that drive value relevance of cash dividends (plus any other financial statement variables).

Al-Hares, AbuGhazaleh & Haddad (2012) studied value relevance of book value, earnings and dividends on the Kuwait Stock Exchange. Model results proved that the payment of dividends is not informative, which supports the findings of this research. However, when earnings were removed from the model, dividends became value relevant, which contradicts this study's findings: removal of retained earnings does not change the lack of statistical significance of dividends. Al-Hares *et al* (2012) also found that splitting net income into dividends and retained income (which was also done in the current study) resulted in dividends as well as retained income being value relevant. The findings, again, contradict what this research found out.

Lack of value relevance of cash dividends and retained income in the current study can also be explained by taking into consideration the findings in Chapter 5. Operating income from continuing operations was found to possess a positive and statistically significant association with stock prices. This means that when financial results are announced, share prices respond accordingly. Suppose that an increase in earnings is

reported, a commensurate increase in share prices will occur. An analogy will make the argument clearer: take these earnings to be a full orange. A dividend is then declared from these earnings. This is akin to cutting and sharing the orange. The size of the orange does not change because it has been cut and distributed. Similarly, the earnings that were initially reported are the same earnings that are being distributed, the amount has not changed. We cannot expect share prices to rise simply because a dividend has been declared. Share prices rise if earnings have grown even if a dividend has not been declared. The current share price subsumes the value embedded in the reported earnings. How the earnings are distributed does not make them much more or less valuable. It is like the orange that has been cut: it does not grow because it has been cut and its price is not determined by how it is going to be cut and shared. Share prices either rise or fall in response to an increase or decrease in value created, and in this case, no further value has been created. Declaring a dividend does not create value, it distributes it. Equity investors are, therefore, interested not in how value is distributed (how the orange is cut) but in the initial value created (the full orange). The price of the orange (share price) is not dependent on how it is cut (dividends and retained earnings) but it depends on its size and quality (earnings). In the final analysis, how value created is distributed does not explain share prices, and this should not be a surprise from the analogy given. Equity investors focus on earnings, and not cash dividends and retained earnings since these two naturally come from reported earnings.

The fact that both cash dividend payments and retained earnings do not contain information that helps to explain market capitalisation and Q-ratio has implications to managers of companies, investment analysts, and equity investors. The implications are discussed in Chapter 9. Conclusions and areas for further study emanating from this chapter are also provided in Chapter 9.

8.10 Chapter Summary

This chapter examined the impact of cash dividend payments and retained income (independent variables) on firm value on the Johannesburg Stock Exchange. Two measures of firm value were used, i.e. market capitalisation and Q-ratio. A positive relationship was recorded between the retained earnings and Q-ratio. In all the models used, this relationship lacked statistical significance. The indicator variable for payment or non-payment of cash dividends has a positive coefficient when market capitalisation

is the response variable. The coefficient remains positive when Q-ratio replaces market capitalisation as the dependent variable. However, the relationship between Q-ratio and the two independent variables is not statistically significant, implying that cash dividend payments and retained earnings do not explain movements in the Q-ratio. Retained earnings and cash dividend payment or non-payment therefore have less importance in analysts' valuation models. The findings both confirm and contradict existing dividend theories and empirical research findings by other scholars. Valuation models that include cash dividends and retained earnings are of less value to JSE investors since the variables are not value relevant. The two hypotheses of this objective are thus rejected.

The next chapter concludes the study by providing a summary of findings under each objective, conclusions, recommendations, limitations of the study, and areas for further research.

CHAPTER NINE

CONCLUSIONS AND RECOMMENDATIONS

9.0 Introduction

The previous chapter examined the last of the study's four objectives, which found out that neither cash dividends nor retained earnings are value relevant. This chapter marks the end of this investigation into value relevance of financial statement variables on the Johannesburg Stock Exchange. It starts off with a summary of the research's findings. The summary highlights key findings under each and every objective. After the summary of findings, conclusions are then drawn based on what was found out in the study. Recommendations are then provided to various stakeholders identified in the significance of the study in Chapter 1. A discussion of limitations of the study follows thereafter. The study's limitations provide a guide for identifying areas of focus in further research, which comes after the limitations. Just like in the other chapters, a chapter summary ends the discussions in Chapter 9.

9.1 Summary of Findings

The summary of research findings is arranged according to the four objectives of the study outlined in Chapter 1.

9.1.1 Findings on Value Relevance of Tangible Book Value and EBIT

Value relevance of tangible book value and EBIT from continuing operations was assessed using four scenarios. The summary of findings is thus also arranged according to the four scenarios for easy tracking and comprehension.

9.1.1.1 Scenario 1

The first scenario used the natural logarithm of enterprise value as the response variable. The predictor variables are the natural logarithms of tangible book value and EBIT from continuing operations. Two sets of three models were used, where each set has a different lag structure from the other set. In the multivariate models, EBIT exhibited a positive association with enterprise value. The association is significant at 5% level, and it remains at the same level after the lag structure has been changed. When we do not control for

tangible book value[49], EBIT is still statistically significant at 5 percent level in one set of lag limits. The other set registers a change from 5 per cent to 1 percent level. The regression coefficients and Windmeijer corrected standard errors between the various models register marginal changes in all cases. The meaning of all this is that EBIT from continuing operations is value relevant on the JSE. Tangible book value has a positive relationship with enterprise value, but the relationship lacks statistical significance at 5 per cent level. If we do not control for EBIT, tangible book value still has a positive but statistically insignificant relationship with enterprise value. The same statistically insignificant relationship is obtained even after the lag structure has been changed. This, therefore, indicates that tangible book value does not explain movements in enterprise value on the JSE.

9.1.1.2 Scenario 2

This scenario uses the natural logarithm of market capitalisation as the response variable. The explanatory variables are just the same as those used in the first scenario. The same lag structure as in Scenario 1 is also used to find out sensitivity of the results to lag limit changes. When we control for tangible book value, EBIT from continuing operations has a positive association with market capitalisation. This association is statistically significant at 1 per cent level, meaning that EBIT is value relevant. When the lag limit is changed, there is still a positive and statistically significant association between EBIT and market capitalisation. The level of statistical significance remains constant at 1 per cent. When we do not control for tangible book value, EBIT from continuing operations still has a positive and statistically significant relationship with market capitalisation. The level of statistical significance is, again, static at 1 per cent. Changing the lag limit neither alters the nature of the relationship nor the level of statistical significance. Tangible book value exhibits a positive and statistically insignificant relationship with market capitalisation when we control for EBIT from continuing operations. Changing the lag limit has no material effect on the results, as tangible book value remains statistically insignificant. When we do not control for EBIT from continuing operations, the two models used still show a positive and statistically insignificant relationship with market capitalisation. This means that tangible book value is not value relevant on the JSE.

[49] In other words, this means dropping the variable tangible book value and its first lag. This then yields a "simple regression" model.

9.1.1.3 Scenario 3

The only difference between this scenario and the first two scenarios is the use of the natural logarithm of stock price as the response variable. Everything else remains the same. When we control for tangible book value, EBIT from continuing operations has a positive relationship with stock price and the relationship has statistical significance at 1 per cent level. The level of statistical significance does not change when the lag limit is changed. EBIT from continuing operations still has a positive relationship with stock price when we do not control for tangible book value. Similarly, the relationship's level of statistical significance is still unchanged at 1 per cent level. The results, therefore, showed that EBIT from continuing operations is value relevant. Tangible book value exhibits a positive relationship with stock price when we control for EBIT from continuing operations. The relationship is however devoid of statistical significance at 5 per cent level. Changing the lag limit does not alter the results. When EBIT is dropped from the model, tangible book value maintains a positive and insignificant association with share price. When the lag limit is changed, the results do not change. This shows that tangible book value is not value relevant.

9.1.1.4 Scenario 4

This scenario used raw or untransformed stock price as the response variable. The predictor variables are earnings per share and book value per share. These were found by simply deflating EBIT from continuing operations and tangible book value by the number of shares in issue respectively. The number of models and the lag limits used are the same as those in the other three scenarios. Earnings per share has a positive association with share price in a model where we do not control for book value per share. The association is statistically significant at 1 per cent level. Changing the lag limit still yields the same positive association at the same level of statistical significance. Dropping book value per share from the model still leaves earnings per share with a positive association with share price. The level of statistical significance is unchanged at 1 per cent. Changing the lag limit neither changes the nature of the relationship nor the level of statistical significance. Earnings per share was thus found to be value relevant. Book value per share exhibits a positive and statistically insignificant association with stock price when we control for earnings per share. A similar model with a different lag limit also shows a positive relationship with share price, and the relationship is, again, not statistically significant. When we do not control for earnings per share, book value per share exhibits a positive

relationship with share price. The association is devoid of statistical significance at 5 per cent level. Changing the lag limit does not alter book value per share's lack of statistical significance and positive association with stock price. All this means that book value per share is not value relevant on the JSE.

9.1.2 Findings on the Impact of Firm Size on Value Relevance

The second objective followed up on the work done under the main objective by investigating the impact of company size on information content of tangible book value and EBIT from continuing operations. To achieve this, a company size indicator variable and interaction variables are incorporated into the models used in Chapter 5. Two groups of three models per group are used (which gives a total of six models), where each group has a different lag structure from the other group. The first group of models shows that EBIT from continuing operations has a positive relationship with stock price and this association is statistically significant at 1 per cent level. When we do not control for tangible book value and an interaction variable BV*Large[50], EBIT from continuing operations still has a positive association with share price. The level of statistical significance however changes from 1 per cent to 5 per cent. The change in regression coefficient is small and standard errors register small changes as well. When the lag structure is altered, EBIT from continuing operations still exhibits a positive and statistically significant relationship with share price. The level of statistical significance is 1 per cent, which is identical to the level of significance recorded in a similar model that has a different lag structure. Comparable models[51] between the two groups of models have the same levels of statistical significance. It only changes across models with different explanatory variables (after dropping some variables). The results, therefore, show that EBIT from continuing operations is value relevant.

Tangible book value has a positive relationship with share price. However, this relationship is not statistically significant. When we do not control for EBIT and EBIT*Large[52], tangible book value still records a positive relationship with share price. The relationship is, again, not statistically significant. The changes in the coefficient of

[50] BV*Large is a variable created from the interaction between the company size indicator variable (Large) and the numerical variable tangible book value.
[51] Comparable in terms of having the same explanatory variables. The only difference is the lag structure that changes between the two groups of models.
[52] EBIT*Large is a variable that is created from the interaction between the numerical variable EBIT from continuing operations and the firm size dummy variable Large.

tangible book value resulting from dropping the two variables are small. Changing the lag structure still yields a positive relationship between tangible book value and share price. The relationship, once again, remains statistically insignificant at 5 per cent level. This means that tangible book value is not value relevant.

The firm size dummy variable, Large, has negative coefficients when we control for EBIT from continuing operations and EBIT*Large. When we control for tangible book value and BV*Large, negative coefficients are still observed on the dummy variable. A negative coefficient means that the effect of company size on value relevance is lower in large-cap firms (which were coded 1) than in small-cap firms. Changing the lag structure does not materially change the results since the coefficients are still negative, registering small changes across models with different lag limits. However, *p*-values for the dummy variable indicate that the variable is not statistically significant in all the six models. This means that firm size is not value relevant.

The interaction variable EBIT*Large has a negative coefficient, and this coefficient remains negative when the lag structure is changed. A negative coefficient means that the influence of EBIT from continuing operations is smaller in large-cap firms than in small-cap firms. However, EBIT*Large is not statistically significant. When we do not control for tangible book value and BV*Large, there is a positive coefficient on the interaction variable. The coefficient remains positive when the lag structure is changed. A positive coefficient means that the influence of EBIT from continuing operations is bigger in large-cap firms than in small-cap firms. Nevertheless, the variable is not statistically significant. Lack of statistical significance across the four models means that value relevance of EBIT from continuing operations does not depend on whether a firm is large-cap or small-cap. The interaction effects have no information content.

The interaction variable BV*Large has a positive coefficient, which is not statistically significant. Changing the lag structure has no material effect on the results since the coefficient of BV*Large remains positive and statistically insignificant. A positive coefficient means that tangible book value has a larger impact in large-cap firms than in small-cap firms. When we do not control for EBIT and EBIT*Large, there is still a positive coefficient on the interaction variable. Just as in the other scenarios, the

interaction variable is not statistically significant. This means that whether a firm is large-cap or small-cap has no effect on tangible book value's lack of value relevance.

9.1.3 Findings on Value Relevance of Financial Risk

The information content of financial risk was determined by regressing financial risk variables on share price. Debt/equity ratio and total amount of debt are the two financial risk indicators used. The analysis first focused on the full sample, and then, the full sample was divided into low-risk and high-risk companies.

9.1.3.1 For the Full Sample

In the full sample, debt/equity ratio exhibited a negative and statistically significant association with share price (at 1 per cent level) in the multivariate model. When the variable total debt was dropped from the model, the simple regression model shows that the level of debt/equity ratio's statistical significance remains unchanged at 1 percent and the relationship is still negative. Regression coefficients register minimal changes as a result of dropping total debt from the model. Debt/equity ratio is therefore value relevant in the full sample. Total debt also possesses statistical significance at 1 percent level in the full sample, where the association with share price is positive. Dropping the variable debt/equity ratio does not alter the level of statistical significance of total debt, just like the case with the other variable. The regression coefficients register reasonable changes when the debt ratio is dropped from the multivariate model. Total debt is thus also value relevant. Diagnostic tests (Arellano-Bond test for serial correlation and Hansen test for validity of over-identifying restrictions) show that there is no autocorrelation and the over-identifying restrictions are valid. The minimal changes in regression coefficients and standard errors recorded when either variable is dropped indicate that the models are robust and their results are reliable.

9.1.3.2 For the Low-risk Companies

Regression results from the low-risk firms sample indicate that total debt has a positive and statistically significant association with stock price. The level of statistical significance in the multivariate model is 1 per cent, and this level is maintained even after the debt/equity ratio has been dropped from the model. The coefficient of total debt registers a change within a reasonably expected range when the debt ratio is left out of the model (as a sensitivity check). The debt/equity ratio enjoys a negative relationship

with share price in both models used to examine this relationship. The relationship is statistically significant at 1 per cent level in the multivariate model. After dropping the variable total debt, debt/equity ratio's level of statistical significance remains unchanged at 1 per cent in the simple linear regression model. What this means is that both total debt and debt/equity ratio are useful in explaining stock price movements on the Johannesburg Stock Exchange. Changes in the value of the coefficient are within ranges that would be expected to occur when an explanatory variable is dropped from a model. These changes are also witnessed on the Windmeijer corrected standard errors. Diagnostic test results show that the models are correctly specified. The model is robust and its results are reliable. The results from the low-risk companies' sample are consistent with the results from the full sample.

9.1.3.3 For the High-risk Companies

Just like in the full sample and the low-risk sample, total debt has a positive association with share price. In the multivariate model, the relationship is statistically significant at 5 per cent level. When the variable debt/equity ratio is dropped from the model, total debt ceases to be statistically significant, thus, simple regression and multivariate regression produce contrasting results. This is different from what was observed under both the full sample and the low-risk firms' sample. There is thus some level of sensitivity to dropping a value relevant variable. That level of sensitivity is however expected to occur when a value relevant variable is dropped from a model. The debt/equity ratio, again, exhibits a negative association with share price in both the multivariate model and the simple regression model. In the multivariate model, debt ratio is statistically significant at 1 per cent level. Dropping the variable total debt causes a minor change in the coefficient and the level of statistical significance changes from 1 per cent to 5 per cent. Windmeijer corrected standard errors also register a very small change after dropping total debt from the model. The level of sensitivity exhibited after dropping total debt from the model is reminiscent of the sensitivity exhibited after dropping debt/equity ratio. The Arellano-Bond test shows that there is no autocorrelation in the models while the Hansen test shows that over-identifying restrictions are valid. Debt/equity ratio is value relevant in the high-risk sample, which is consistent with the results from the other two samples. Total debt, however, lacks value relevance on its own, but if we control for debt/equity ratio, it will be value relevant.

9.1.4 Findings on Value Relevance of Cash Dividends and Retained Earnings

This investigation utilised market capitalisation and Tobin's Q-ratio as dependent variables, while retained earnings and cash dividends are independent variables. An indicator variable was primarily used to represent payment (coded 1) or non-payment of cash dividends (coded 0), instead of the actual amount of cash dividends paid. However, another regression was run where the actual amount of cash dividends paid replaced the indicator variable just to check if there is any change in the results. The summary of the findings is presented according to the two dependent variables used.

9.1.4.1 When Market Capitalisation is used as the Dependent Variable

Retained earnings exhibited a positive association with market capitalisation, implying that an increase in retained earnings leads to an increase in share prices, which drives up market capitalisation. The relationship is, however, not statistically significant. When we do not control for the payment or non-payment of cash dividends, retained earnings still exhibit a positive and statistically insignificant relationship with market capitalisation. Changing the lag structure used in the models has no material impact on the results, where the relationship between market capitalisation and retained earnings remains positive and devoid of statistical significance. Retained income is thus not value relevant on the JSE. A positive coefficient was observed on the indicator variable representing payment and non-payment of cash dividends. The variable is however not statistically significant. When we do not control for retained earnings, a positive coefficient still persists on the dummy variable. Dropping retained earnings has no effect on the lack of statistical significance of the indicator variable. When the lag structure is changed, positive coefficients are still observed and the indicator variable is, again, not statistically significant. Therefore, the payment and non-payment of cash dividends does not explain movements in market capitalisation on the JSE. Arellano-Bond tests for autocorrelation show that all models used have no autocorrelation problem. Similarly, the Hansen test for over-identifying restrictions shows that the instruments used are valid and the models are not weakened by too many instruments. Value relevance of cash dividends was, again, tested by using the actual amount of cash dividends paid and not an indicator variable. Since the correlation coefficient between retained earnings and cash dividends is above 0.8, cash dividends were used in the models that do not control for retained earnings to avoid collinearity (i.e. retained earnings were dropped). The amount of cash dividends paid was, again, found to lack statistical significance, meaning that cash dividends are not

value relevant. This confirmed the results found using an indicator variable for payment and non-payment of cash dividends.

9.1.4.2 When Q-ratio is used as the Dependent Variable

The indicator variable for the payment and non-payment of dividends has a positive coefficient, which is similar to what was observed under the first scenario. The positive coefficients suggest that companies that pay cash dividends have a higher Q-ratio than those that do not pay cash dividends. However, the variable is devoid of statistical significance, meaning that the observed relationship may be due to chance. When we do not control for retained earnings, the coefficient for the indicator variable is, again, positive and without statistical significance. When the lag structure is changed, a positive coefficient is observed on the indicator variable. Lag structure changes also do not change the lack of statistical significance of the dummy variable. Payment or non-payment of cash dividends is therefore not value relevant on the JSE. The results are robust to both dropping a variable and lag structure changes. Retained earnings exhibit a positive relationship with Q-ratio, meaning that an increase in retained earnings causes a company to be more over-valued or less under-valued. Nevertheless, the relationship is devoid of statistical significance. When the lag structure is changed, there is no change in the nature of the relationship as a positive association between Q-ratio and retained earnings still persists. Once more, the association lacks statistical significance. When we do not control for the payment of cash dividends, again, a positive relationship is recorded. At 5 per cent level of statistical significance, the relationship is not significant. These results mean that retained earnings have no information that explains over- or under-valuation of shares. Autocorrelation tests showed that there is no autocorrelation in the models, while the Hansen test showed that the over-identifying restrictions are valid. The results are therefore reliable.

9.2 Conclusions

Conclusions of the study are arranged according to the study's objectives.

9.2.1 On Value Relevance of Tangible Book Value and Operating Income

This is the main objective of the study, and it involved four different angles of analysing the value relevance of tangible book value and earnings before interest and taxes from continuing operations. Form three different angles, EBIT was found to be useful in

explaining firm value on the JSE. We, therefore, fail to reject hypothesis 3 and hypothesis 4, and conclude that EBIT from continuing operations has a relationship with both enterprise value and market capitalisation on the JSE. The same analyses found out that tangible book value is not useful in explaining firm value. Consequently, we reject hypothesis 1 and hypothesis 2, and conclude that tangible book value does not explain both enterprise value and market capitalisation on the JSE. The fourth angle found out that the operating earnings per share (EPS) has information content, while tangible book value per share (BVPS) did not convey useful information in explaining firm value on the JSE. We, therefore, conclude that EPS explains share prices, while BVPS does not explain share prices. These findings both confirm and conflict with the findings by other researchers in the field of value relevance research. One contribution of this study is that the method of data transformation does not materially change a variable's value relevance. This stems from the fact that both log-transformed and share deflated variables produced essentially the same results. Another contribution of the study is the affirmation of the narrative in extant literature to the effect that deflating variables by the number of shares outstanding helps to reduce collinearity between variables. This is based on a comparison of correlation coefficients between tangible book value and EBIT before transforming, after log-transforming, and after share deflating, the variables. The lowest correlation coefficient between the two variables was found after share deflation of the variables. A postulation that arose in literature to the effect that including book value in valuation models reduces the omitted correlated variable bias, could not be substantiated by simple regression results: controlling or not controlling for book value had no effect on value relevance of EBIT. The study thus concludes that the inclusion or exclusion of book value in equity valuation models has no bearing on omitted correlated variable bias. The novelty of this study centred on the methodology and how the explanatory variables were calculated. While extant literature invariably uses static models and OLS estimators, the current study used dynamic models and System GMM estimators. Regarding measurement of explanatory variables, the study adopted a conservative measure of book value of equity, i.e. tangible book value. This is different from what most researchers have done. Furthermore, the study also focused on operating income from continuing operations instead of the usual net income and abnormal earnings.

9.2.2 On the Influence of Firm Size on Value Relevance

The current study found out that the firm size dummy variable is not statistically significant. It also found out that the interaction variables between firm size and numerical variables are not statistically significant. Consequently, both hypothesis 1 and 2 are rejected. Despite some researchers' assertions, this research concludes that value relevance of tangible book value and EBIT from continuing operations does not vary according to firm size, i.e. firm size has no influence on value relevance of these variables. Another conclusion drawn from findings in Chapter 6 is that the too-big-to-fail hypothesis does not hold on the JSE[53]. A contribution of the current study is that what matters to equity investors is not the size of the company, but the income that a firm produce. A large-cap firm that does not create value for its shareholders is not worth investing in because one cannot get a return (dividend or capital gain) from a firm's size. Another contribution of the current study is that both large-cap and small-cap firms are governed by the same accounting standards and reporting requirements, meaning that the assertion by some scholars that small firms' value relevance is lower due to their lower levels of information disclosure is unfounded and merely a conjecture. Furthermore, the current study made a contribution by showing that many analysts' following of large-cap firms may actually result in a premium on large-cap companies' shares such that their financial statements' value relevance may not be superior to that of small-cap firms. It proposed the existence of a "small firms discount" as a plausible explanation for lack or lower levels of value relevance in small-cap firms, which is another contribution of this study to the body of knowledge. The novelty of the study centres on exploring the interaction effects between the firm size dummy variable and numerical variables, i.e. tangible book value and EBIT from continuing operations.

9.2.3 On Value Relevance of Financial Risk

The study also analysed the information content of absolute and relative financial risk for high-risk and low-risk companies. Relative financial risk was measured by debt/equity ratio, while total liabilities measured absolute financial risk. Both current and non-current liabilities constitute debt, while market capitalisation was employed as an equity proxy. The postulation that financial risk should comprise of all types of liabilities is one of the

[53] This does not mean that big companies have failed on the JSE. Rather, there is no empirical evidence to suggest that the hypothesis holds. The empirical evidence to support the hypothesis should have come in the form of positive coefficients and statistical significance of the interaction variables. Since large firms were coded 1, a positive coefficient would mean that the influence of firm size is higher in large firms than in small firms. Whilst this may not be entirely conclusive, it would help to explain the hypothesis.

contributions of this study to empirical value relevance research. The relative financial risk measure has information content for both low-risk and high-risk companies, hence, we fail to reject hypothesis 1 in the full sample, low-risk and high-risk samples. On the other hand, the absolute financial risk measure is value relevant for low-risk companies, but generally not value relevant for high-risk companies (based on simple regression results). We thus reject the first part of hypothesis 2 since the research found a positive (and not negative) association between share price and absolute financial risk. We fail to reject the second part of hypothesis 2 for low-risk firms but reject it for high-risk firms. At any point in time when a company's total liabilities are more than its market capitalisation, the company's shares will be traded at a discount to their intrinsic value by the market. This is another contribution of this study to value relevance research. A further contribution is that risk proxies that factor in the size of a firm's equity (debt/equity ratio) are superior measures than those measures that consider debt in isolation (total debt). Linked to this point is the fact that deflating total debt with market capitalisation (equity) results in the anticipated negative relationship between debt and share prices. Before deflating, a positive relationship exists between the two variables. Findings on the information content of financial risk factors both confirm and conflict with results from other empirical studies and relevant capital structure theories.

9.2.4 On Value Relevance of Cash Dividends and Retained Earnings

The final objective focused on the value relevance of cash dividends and retained earnings, the two channels through which the value created by firms during a particular year finds its way to a company's shareholders. The study found out that both variables have no information that explains movement in market capitalisation and Q-ratio. Therefore, based on the study's findings, we reject hypothesis 1 and conclude that dividend payments are not value relevant. We also reject hypothesis 2 and conclude that retained earnings have no statistically significant association with firm value. The study also concludes that investors on the JSE do not "follow the value", which is another unique contribution of this study. This means that investors do not place any importance on how value created is distributed to shareholders, i.e. whether cash dividends or price appreciation[54] is chosen as the distribution channel, which is immaterial because either way, that value has already been created and shareholders will enjoy it in one form or

[54] Price appreciation resulting from an increase in the amount of equity as a result of profits that would have been retained by a company.

another. Another conclusion that arises from the aforesaid is that firm value can neither be created nor destroyed by the way that value is apportioned to a firm's shareholders. Another contribution of this study is that payment or non-payment of cash dividends does not lead to a company being over- or under-valued. This is based on models that used Tobin's Q ratio as the dependent variable, where cash dividend payment or non-payment was found to lack information content. Q-ratio indicates whether a firm is over- or under-valued.

9.3 Recommendations

Recommendations proffered are based on what this study found out. Each recommendation is linked to specific findings from which the recommendation is drawn for ease of reference, i.e. a very brief summary of the findings is given before the recommendation is provided and justified. The section is arranged according to various stakeholders who could have an interest in the study's findings.

9.3.1 Recommendations to Accounting Standards Setters

Chapter 5 revealed that operating income from continuing operations is value relevant. The calculation of this variable was made possible by the fact that companies in South Africa are mandated to produce comprehensive financial statements in line with International Financial Reporting Standards. Besides being value relevant, operating income from continuing operations provide more information about the going concern status of a company as well as the company's future cash flow levels. This is very pertinent to various users of financial statement information. Therefore, accounting standards setters are advised to maintain the requirement that mandates companies to produce comprehensive financial statements. Earnings from discontinued operations have become more visible because of this requirement, thus making financial statements more informative about company operations. Companies' activities have become less opaque and such transparency helps to build resilient companies for the benefit of shareholders, management and workers, regulators and the macro economy at large. Accounting standards setters can also put more measures that protect the integrity of reported EBIT as a way of helping investors and ensuring that accounting statements remain useful to investors. Tangible book value is the other explanatory variable used in Chapter 5, and it was found to lack value relevance. The calculation of the variable was also made possible because companies are mandated to disclose their intangible assets. Accounting standards

setters can make the accounts more user-friendly by including a clause that requires companies to have a line item called ‘tangible book value’ in their accounts. Despite lack of value relevance, this measure provides a conservative view of a company’s residual value, which is less susceptible to manipulation by preparers of financial statements.

Market capitalisation was used as one of the measures of firm value in Chapter 5. It is a useful measure of firm value to stock market participants; thus, accounting standards setters can make it mandatory for firms to report either share prices or market capitalisation recorded on the first trading day after announcement of a company’s financial results. This information can be included in the annual report since the report is produced some months after announcement of results. This is not a weird suggestion because some companies already include their share prices in annual reports, but they only report share prices recorded on the last day of their fiscal year, and this is optional. Each company’s fiscal year end is known from the financial statements, so, share prices or market capitalisation as at the end of a company’s fiscal year end can easily be ascertained. What is difficult to determine is market capitalisation on the day or just after the day the results were announced. Market capitalisation on the first trading day after announcement of results is useful to various users of financial statements such as investors, analysts and academic researchers in their various analyses of firms’ stock market performance induced by announcement of results. This information is difficult to get because, when using archival data, one will never know the exact date when results were announced. Alternatively, this date has to be disclosed in the annual report. Disclosing this date can also be viewed as part of a company’s evidence that they are complying with the mandatory requirement of producing financial results within three months of their fiscal year end.

Value relevance of debt/equity ratio across risk categories that was found in Chapter 7 means that the ratio is a useful tool in an investment analyst’s toolbox. This debt ratio, however, is different from other ratios in that it incorporates total liabilities (as debt) and market capitalisation (as equity). If it is the goal of accounting standards developers for firms to produce financial statements that are relevant to the investment management community, then, they can include a clause in the standards, which requires firms to report this debt ratio in their annual reports. This advice is premised on the realisation that debt ratio, as defined in this study, is value relevant, regardless of whether a company is

classified as a low- or high-risk company. Investment analysts will find this handy because they will no longer have to do the calculation on their own, which makes the financial statements more user-friendly and relevant to them.

9.3.2 Recommendations to Company Executives

Since Chapter 5 revealed that operating income from continuing operations is value relevant; executives of companies listed on the JSE are advised to put in place operational strategies that boost their EBIT as a way of maximising shareholder value and increasing the value of their companies' shares[55]. This will help them in case they want to do a rights issue, where they will fetch higher prices for the issued shares because the shares will be highly valued.

Chapter 6 revealed that firm size is not value relevant. Pursuant to this, managers of large firms are advised not to rely on the reputation and size of their firms to do the job of maximising shareholder value for them. They have to continue working hard to grow revenue streams, which should ultimately increase EBIT from continuing operations, resulting in an increase in share prices of their firms. Investors are more concerned with EBIT from continuing operations (since this variable is value relevant). Managers of small firms should take solace in the knowledge that their efforts in growing EBIT will always be recognised by investors despite their small size. This stems from the fact that the information content of EBIT from continuing operations is not contingent upon a firm's size. Executives of small firms have to continue growing their business so that they escape from the possible effects of a "small firms discount"[56] that keeps share prices of small-cap companies below the shares' intrinsic values.

An examination of the usefulness of financial risk in explaining stock price movements that was done in Chapter 7 showed that for low-risk companies, both debt/equity ratio and total amount of debt are value relevant. For high-risk companies, debt/equity ratio is value relevant, but total debt on its own is not value relevant. This implies that, for financial risk introspection, company executives have to use the debt ratio instead of the

[55] Strategies must be operational, meaning that creative accounting is not part of this recommendation. An increase in share prices increases the net worth of each shareholder (other things constant). That is why this is taken as a way of maximising shareholder value.

[56] However, it is worth noting that the "small firms discount" is a theoretical concept that arose from an analysis of what other researchers found out. There is no empirical evidence in the current study that supports this concept.

total amount of debt. Management should also ensure that, at any point in time, they keep the sum of their current and non-current liabilities below their market capitalisation. Thus, market capitalisation should serve as an indicator of the maximum acceptable levels of total liabilities that they can incur. This ensures that a company will be classified as a low-risk company. For low-risk companies, any increases or decreases in any form of liabilities that they hold are factored in share prices, which is not the case with high-risk companies (since total liabilities are not value relevant in high-risk firms). Thus, low-risk companies are fairly valued than high-risk companies, meaning that it is advantageous to be classified as a low-risk company. Investors will correctly adjust their valuations for any changes in a firm's levels of debt. The good thing is that it is within the firm management's power to ensure that, at all times, their total liabilities are lower than their market capitalisation. Value relevance of total liabilities for low-risk firms implies that firm management should critically evaluate any form of firm indebtedness before they take it on board because investors will factor that in their firm valuations. Any attempt by managers of companies to substitute long-term debt with short-term debt securities like overdrafts in order to artificially keep debt ratios low is not helpful because the market will factor in those short-term debt securities into share prices. Investors consider all forms of indebtedness.

The analysis in Chapter 8 revealed that payment of cash dividends on the JSE has no bearing on firm value, thus, decisions on pay-out ratios should not be based on the notion that such actions will influence firm value. Management of firms listed on the JSE are advised not to pay much attention towards dividend pay-out policies because they have no influence on firm value, i.e. the decision on whether or not a company pays a cash dividend should not be driven by management's intention to positively influence firm value. That will not achieve the intended objective. By extension, company executives should also not aim to increase firm value through retention policies. This is because of the fact that the amount of retained earnings was also found to lack value relevance.

9.3.3 Recommendations to Equity Analysts and Investors

Analysis of the informativeness of tangible book value and EBIT from continuing operations in Chapter 5 revealed that EBIT is informative, while tangible book value is not informative in all the four scenarios considered. Based on these findings, investment analysts are advised to include operating income from continuing operations in their

equity valuation models. This will enable the analysts to have accurate forecasts of future share prices. One of the scenarios showed that operating income from continuing operations explains enterprise value, which is a company's purchase price. Pursuant to this, investors who wish to take over a company are recommended to use operating income from continuing operations when they value a takeover target. After the takeover, new owners are guaranteed value for their money because the enterprise value that they pay is linked to the company's earning capacity[57]. The correlation analysis showed that market capitalisation and enterprise value are not very good proxies for each other due to their relationship whose strength is fairly average. Analysts and investors are, therefore, advised not to use these variables as proxies for each other. As an example, they should not use market capitalisation in a company takeover valuation. They should just stick to using enterprise value to avoid measurement error implied by a correlation coefficient that is far less than unity. A perfect positive correlation between variables implies the variables can substitute for each other (perfect proxies). While tangible book value conveys valuable information about a firm's realisable residual value upon liquidation, its inclusion in valuation models lacks substantial empirical backing despite an assertion in literature that it reduces omitted correlated variable bias.

The study found out in Chapter 6 that firm size is not value relevant, neither are interaction effects between firm size and tangible book value and EBIT from continuing operations of any use in explaining share price movements on the JSE. Based on these findings, equity analysts and investors are advised not to disregard small firms on the pretext that the size of a company matters. EBIT from continuing operations is equally value relevant in small firms just like in large firms. Focus must therefore be on EBIT from continuing operations, rather than the size of a company. The results also imply that there is no need to include a firm size indicator variable in equity valuation models.

The results from Chapter 7 showed that debt/equity ratio is useful in explaining share price movements. Regardless of a company's risk category, debt/equity ratio possesses value relevance. Based on these findings, equity investors are advised to include debt/equity ratio in their share valuation models. Incorporating debt ratios into equity valuation models should enhance the quality of their valuations. In this instance, the

[57] Since the earnings are not transitory but from continuing operations, the potential to earn at least a similar income stream is quite high. Other things constant, potential for growth is also there, meaning a good return for the new owners.

quality of valuations is measured by the extent to which an analyst's forecasts of future equity prices deviate from observed prices, where minimal deviation means high quality forecasts. It is envisaged that the inclusion of debt/equity ratio will help in getting high quality forecasts because of its ability to explain equity price movements (shown by the level of statistical significance across risk categories) as well as the consistency of the observed significance levels. With quality forecasts, trading by equity investors and fund managers is most likely going to yield higher investment returns. The higher returns will benefit both fund managers and individual investors. Furthermore, investment analysts are also advised to use a debt measure that incorporates current and non-current liabilities. This recommendation is predicated on the realisation that total liabilities are value relevant. There is need to shift focus from long-term interest-bearing debt alone (or even adding short-term interest-bearing debt) as a risk measure towards total liabilities because total indebtedness is also crucial. All payables require a company to raise funds in the future to settle them, which affects a firm's ability to invest in profitable business opportunities that may arise in the interim as it pays off its debts.

The current study found out in Chapter 8 that retained earnings and cash dividend payments do not explain movements in firm value. Investment analysts and equity investors on the JSE should thus consider making use of equity valuation models that do not include retained earnings, since retained earnings are not linked to firm value. Likewise, investors and investment analysts should not focus on valuation models that are based on cash dividends because such models will also not perform well due to the disconnection between firm value and cash dividend payments. This brings into question the usefulness of the well-known dividend discount model in equity valuation on the JSE. The inclusion of variables that are not linked to firm value increases the "noise" in the equity valuation model, which affects performance of the model. Poor model performance translates into poor trading strategies, which leads to poor returns on an investor's equity portfolio. This is undesirable to any rational investor, hence the advice given to investment analysts and equity investors.

9.3.4 Recommendations to the Academic Community

Value relevance of earnings and book value has largely been motivated by the Ohlson model. A discussion of findings in Chapter 5 reveals that there are differences in findings regarding value relevance of these two variables. Notably, researchers tend to

predominantly use earnings figures that include income streams from discontinued operations. The source of this income is no longer available to the company, meaning that it is no longer an indicator of future revenue streams. Researchers are, therefore, advised to focus on earnings measures that exclude income from discontinued operations. Narrowing down in terms of how earnings are defined should help in the convergence of findings. This convergence will help other stakeholders like accounting standards developers and investment analysts. Similarly, adopting a uniform definition of book value should help in identifying the real source of differences in the results. At the present moment, some differences are simply due to differences in how variables are defined. The academic community can assist by classifying various definitions of the two variables according to expected users of the research findings. Researchers targeting a particular group would then simply use the universal definition of earnings and book value for that stakeholder group.

Based on the findings from Chapter 6, the academic community is recommended to examine value relevance of interaction effects between firm size and various financial statement variables. This is an area that has not gained much attention. Researchers prefer simply examining value relevance in large firms separately, and then, examine it in small firms separately again. Interaction effects are excluded in this approach but they provide a better way of determining the influence of firm size on value relevance. Specifically, they indicate whether or not the influence of a given variable differs depending on size, which provides more insights into value relevance research.

The analysis of the usefulness of financial risk indicators showed that debt/equity ratio is a superior measure of financial risk than total debt. Furthermore, the definitions of debt and equity used in this study are different from what the academic community has traditionally taken these variables to be. Considering that the debt ratio as defined in the current study is value relevant across risk categories, the academic community is advised to embrace the current study's definition of debt and equity. Defining debt as the sum of all liabilities is justified based on the fact that focusing on interest-bearing debt misses the fact that non-interest-bearing debt equally affects a company's cash flows and profitability. For instance, failure to pay utility bills like electricity and water means that such services may be cut. It is very difficult for a company to operate without electricity and water such that operations may be suspended. Imagine a manufacturing company

operating without electricity. No production will take place, customer orders will not be filled, which affects a company's reputation and market share. Loss of market share directly affects sales and profitability. Due to the importance of settling all payables on time, the focus of financial risk proxies should now shift from interest bearing liabilities to total liabilities. This should be incorporated in textbooks and teaching materials by the academic community.

9.4 Limitations of the Study

The limitations of the study arise from the analysis of each and every objective. They are, therefore, arranged according to the study's objectives so that they can easily be contextualised.

A conservative view of both earnings and book value was adopted in Chapter 5. Instead of simply focusing on net income like most researchers[58], the current study uses operating income from continuing operations. Furthermore, it also excludes intangible assets from the assets measure. Consequently, results obtained *may* be attributed to conservatism adopted in the variables used. The study does not explore the possible impact of accounting conservatism on the results as this was viewed as a different issue altogether from the objective that was set out initially.

The influence of firm size was analysed in Chapter 6, using dummy and interaction variables. The influence of firm size on value relevance was then inferred from statistical significance of dummy and interaction variables. The analysis did not separately run regressions for large-cap firms and small-cap firms. Running separate regressions is a method that has been used by some researchers as highlighted in the literature review as well as the discussion of results in Chapter 6.

The analysis done on value relevance of financial risk fits into the strand of capital structure studies. Ideally, capital structure encompasses primarily the split between debt and equity financing (but, at times, it also includes hybrid securities). However, the current study only focused on the debt aspect, leaving out equity in the analysis. While

[58] Worth noting is that further to this, a few other scholars use operating income and the onerous abnormal income measure.

the goal was to analyse information content of financial risk without controlling for equity, the study does not cover both facets of the capital structure.

While, in Chapter 8, the study traced the information content of value created during a particular year, one aspect related to dividends remained uncovered, i.e. changes in dividend pay-out ratios. This did not fall within the confines of the current study's research question, but it is equally useful to finance executives within companies as explained under areas for further study. The dividend signalling theory is linked to this issue (do changes in dividend pay-out ratios signal anything about a company's future?).

These limitations naturally lead to suggestions on areas for further study. This is the subject of the next section.

9.5 Areas for Further Study

Considering that there are four objectives in this study, there are areas for further study that arise from analysis of each objective. Hence, areas for further study are presented in line with the objectives.

One of the identified limitations is the fact that the study did not go further to find out the impact of accounting conservatism on the results of the study. Future studies can therefore determine whether or not the conservatism adopted in this study does indeed have an impact on the results. This can be done by comparing the results from two sets of models. One set will measure earnings as simply net income and book value as the book value of equity, inclusive of intangible assets. The other set will use model variables as measured in the current study. The results from these models will then be compared based on their explanatory power. Differences in the explanatory power will then be tested to find out if they are statistically significant. Where the difference is statistically significant, then the difference can be attributed to accounting conservatism. In a case where the difference in the explanatory power is not statistically significant, it can be concluded that such accounting conservatism has no effect on the results.

Scenario 4 in Chapter 5 used earnings per share figures that are derived from deflating operating income from continuing operations by the number of shares in issue. Considering that firms report various versions of EPS, future research can test value

relevance of reported figures like basic EPS, diluted EPS and other commonly used EPS figures. These earnings per share variants were not a subject of this research, but information on value relevance of reported EPS numbers can be useful to accounting standards setters in determining which forms of EPS should be disclosed by firms in their financial statements. Under the current JSE requirements, it is mandatory for firms to report headline earnings per share and diluted headline earnings per share[59] in their annual financial statements. Ideally, it would be worthwhile to legislate for inclusion of EPS figures that are value relevant.

One limitation identified from the analysis done in Chapter 6 is the fact that no separate regressions were run on the large-cap firms' sample and the small-cap firms' sample, and then, comparing the coefficients of determination for the two groups. While this approach is by no means a superior method to the one used in the current study, future studies can adopt both approaches and compare the results. However, when using the alternative approach, researchers should not just compare the explanatory power of large-cap and small-cap firms and conclude that the one with a higher explanatory power has more value relevance (this is done by most researchers at the moment). Instead, they should go further to test whether or not the difference in coefficients of determination is statistically significant. Further research can also focus on determining whether EBIT is more value relevant in large firms or in small firms through a comparison of the explanatory power under the two research samples, something this research did not deal with. This research simply determined that EBIT is value relevant in both large and small firms.

Financial risk assessments should also consider the worst-case scenario, i.e. the residual value if a firm liquidates. This was not considered in this research; hence, future research can focus on the information content of book value for low-risk and high-risk firms separately. Book value represents residual value for investors in case of liquidation. It would be helpful to know if investors pay attention to this residual value, based on firms' risk classification. Further studies can also include equity in the model and determine value relevance of the two financing decisions. This gives a complete picture of the value relevance of capital structure decisions. This total picture will equip firm management with full knowledge of the implications of their capital structure decisions. Also, further

[59] This is over and above the disclosures of IFRS earnings per share figures.

studies can focus on herding behaviour of equity investors when confronted with high risk levels.

While the research dwelt on the information content of cash dividend payments in Chapter 8, it did not cover the impact of changes in dividend pay-out ratios on firm value as indicated in the limitations of the study. Future research can thus focus on the information content of changes in dividend pay-out ratios. Such a study is akin to testing the dividend signalling theory. This information is relevant to those companies that make use of a constant dividend pay-out ratio. It will help them to know if any planned changes in the pay-out ratio can have an influence on the market value of their companies. To do this research, one will have to calculate dividend pay-out ratios for each year covered in the study. These become the explanatory variables. A researcher can choose to control for other variables deemed necessary. For instance, a change in the dividend pay-out ratio, by extension, means a change in the retention ratio. Therefore, changes in the retention ratios are a candidate for inclusion in such an analysis. A suitable measure of firm value, like market capitalisation or share prices, can be the dependent variable.

From a methodological perspective, further research into value relevance of financial statements can adopt a mixed methods approach. Firstly, questionnaires or interviews are used to find out what accounting variables are used by investment analysts when they value shares. Secondly, the most cited variables are then collected from financial statements. Regressions will then be run and conclusions drawn. This helps to find out if there is congruence between what statistical analysis says and the practical situation on ground. Lack of congruence may mean that the way current studies determine value relevance is flawed and needs to be changed.

9.5 Chapter Summary

This chapter summarised the findings of the study's four areas of investigation (objectives). The first area showed that tangible book value is not value relevant while EBIT from continuing operations is value relevant. An extension of this investigation to include firm size showed that whether a firm is big or small has no bearing on firm value. The third area of focus revealed that relative financial risk is value relevant for both low-risk and high-risk firms. On the other hand, value relevance of absolute financial risk is contingent upon the risk classification of a particular company. The analysis done under

the last objective determined that both cash dividends and retained earnings do not possess any information that is useful in explaining firm value movements. The study concluded that there is potentially a “small firms discount” placed on shares of small-cap companies which affects their value relevance. It also concluded that payment or non-payment of cash dividends does not create or destroy the value created during a trading year. Investment analysts were advised to incorporate EBIT from continuing operations and financial risk in their equity valuation models. Similarly, they were advised against reliance on valuation models that place emphasis on dividends (like the dividend discount model). Future studies can adopt a mixed-methods approach to evaluating value relevance of financial statement variables.

References

Adenugba, A.A., Ige, A.A., & Kesinro, O.R. (2016). Financial leverage and firms' value: A study of selected firms in Nigeria. *European Journal of Research and Reflection in Management Sciences*, *4*(1), 14-32.

Adom, D., Hussein, E.K., & Agyem, J.A. (2018). Theoretical and conceptual framework: Mandatory ingredients of a quality research. *International Journal of Scientific Research*, *7*(1), 438-441.

Ahmadi, A. (2017). The stock price valuation of earnings per share and book value: Evidence from Tunisian firms. *Journal of Internet Banking and Commerce*, *22*(1), 1-11.

Akhtar, M.W., Khan, F.A., Shahid, A., & Ahmad, J. (2016). Effects of debt on value of a firm. *Journal of Accounting and Marketing*, *5*(4), 1-4, DOI: https://doi:org/10.4172/2168-9601.1000202.

Alexander, D., Falta, M., & Willett, R. (2012). Using forecasting criteria to identify value relevance in the relationship between accounting numbers and market value. *Abacus*, *48*(3), 316–347.

Al-Hares, O.M., AbuGhazaleh, N.M., & Haddad, A.E. (2012). Value relevance of earnings, book value and dividends in an emerging capital market: Kuwait evidence. *Global Finance Journal*, *23*(3), 221–234.

Alkali, M.Y., Zuru, N.L., & Kegudu, D.S. (2018). Book value, earnings, dividends, and audit quality on the value relevance of accounting information among Nigerian listed firms. *Accounting*, *4*, 73-82.

Almujamed, H.I., & Alfraih, M.M. (2019). Value relevance of earnings and book values in the Qatari Stock Exchange. *EuroMed Journal of Business*, *14*(1), 62-75, DOI: https://doi.org/10.1108/EMJB-02-2018-0009

Al-Shattarat, W.K., Atmeh, M.A., & Al-Shattarat, B.K. (2013). Dividend signalling hypothesis in emerging markets: More empirical evidence. *The Journal of Applied Business Research*, *29*(2), 461-467.

Ames, D. (2013). IFRS adoption and accounting quality: The case of South Africa. *Journal of Applied Economics and Business Research, 3*(3), 154-165.

Amir, E., Harris, T.S., & Venuti, E.K. (1993). A comparison of the value-relevance of U.S. versus Non-U.S. GAAP accounting measures using form 20-F reconciliations. *Journal of Accounting Research*, *31*, 230–264.

Amorim, A.L.G.C., Lima, I.S., & Murcia, F.D. (2012). Analysis of the relationship between accounting information and systematic risk in the Brazilian market. *R. Cont. Fin. – USP*, *23*(60), 199-211.

Archibald, T.R. (1972). Stock market reaction to the depreciation switchback. *The Accounting Review*, *45*, 22-30.

Arellano, M., & Bond, S.R. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, *58*, 277-297.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, *68*, 29-51.

Ashley, J.W. (1962). Stock prices and changes in earnings and dividends: Some empirical results. *Journal of Political Economy*, *70*(1), 82-85.

Badu, B., & Appiah, K.O. (2018). Value relevance of accounting information: an emerging country perspective. *Journal of Accounting & Organizational Change*, *14*(4), 473-491, DOI: https://doi.org/10.1108/JAOC-07-2017-0064

Bae, K.H., & Jeong, S.W. (2007). The value relevance of earnings and book value, ownership structure, and business group affiliation: Evidence from Korean business groups. *Journal of Business Finance and Accounting*, *34*(5-6), 740-766.

Balachandran, S., & Mohanram, P. (2011). Is the decline in value relevance of accounting driven by increased conservatism? *Review of Accounting Studies*, *16*, 272–301.

Ball, R. (1972). Changes in accounting techniques and stock prices, empirical re- search in accounting: Selected studies. Supplement to Vol. 10, *Journal of Accounting Research*, 1-38.

Ball, R., & Brown, P. (1968). An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, *6*(2), 159-177.

Ball, R., Gerakos, J., Linnainmaa, J.T., & Nikolaev, V. (2017). Earnings, retained earnings, and book-to-market in the cross section of expected returns. *Journal of Financial Economics*, *forthcoming.*

Baltariu, C.A. (2015). The current state of knowledge in the value relevance research field. *SEA – Practical Application of Science*, *III*(I), 13-19.

Banz, R.W., & Breen, W.J. (1986). Sample-dependent results using accounting and market data: Some evidence. *The Journal of Finance, 41*(4), 779-793.

Barth, M.E. (2000). Valuation-based research implications for financial reporting and opportunities for future research. *Accounting and Finance*, *40*, 7-31.

Barth, M.E., Beaver, W.H. & Landsman, W.R. (1996). Value-relevance of banks' fair value disclosures under SFAS 107. *The Accounting Review*, *71*(4), 513–537.

Barth, M.E., Beaver, W.H., & Landsman, W.R. (2001). The relevance of the value relevance literature for financial accounting standard setting: another view. *Journal of Accounting and Economics*, *31*(1-3), 77-104.

Barth, M.E., Li, K.., & McClure, C.G. (2018). Evolution in value relevance of accounting information. *Stanford University Graduate School of Business Research Paper No. 17-24.* Retrieved from https://ssrn.com/abstract=2933197.

Basu, S. (1997). The conservatism principle and the asymmetric timeliness of earnings. *Journal of Accounting and Economics*, *24*(1), 3-37.

Beaver, W.H. (1968). The information content of annual earnings announcements. *Journal of Accounting Research*, *6*, 67-92.

Beaver, W. H. (1974). The information content of the magnitude of unexpected earnings. *Working paper, Stanford University*.

Beaver, W.H., Lambert, R.A., & Morse, D. (1980). The information content of security prices. *Journal of Accounting and Economics*, *2*, 3-28.

Beisland, L.A. (2009). A review of the value relevance literature. *The Open Business Journal*, *2*, 7-27.

Benston, G.J. (1967). Published corporate accounting data and stock prices. *Journal of Accounting Research*, 5, 22-54.

Benartzi, S., Michaely, R., & Thaler, R. (1997). Do changes in dividends signal the future or the past? *The Journal of Finance*, *52*(3), 1007-1034.

Biddle, G.C. & Choi, J.H. (2002). Is comprehensive income irrelevant. *Working Paper, Hong Kong University of Science and Technology.*

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*, 115-143.

Bolton, J., & von Boetticher, S.T. (2015). Momentum trading on the Johannesburg Stock Exchange after the Global Financial Crisis. *Procedia Economics and Finance, 24*, 83-92.

Bond, S. (2002) Dynamic panel data models: A guide to micro data methods and practice. *Working Paper 09/02, Institute for Fiscal Studies, London.*

Bouteska, A., & Regaieg, B. (2017). The association between accounting earnings, dividends, stock prices and stock returns: Value relevance of accounting standards in the Tunisian stock market. *International Journal of Accounting and Financial Reporting, 7*(1), 171-189, DOI: https://doi.org/10.5296/ijafr.v7i1.10821

Brimble, M., & Hodgson, A. (2007). On the intertemporal value relevance of conventional financial accounting in Australia. *Accounting and Finance, 47,* 599-622.

Brown, P., & Kennelly, J.W. (1972). The informational content of quarterly earnings: an extension and some further evidence. *The Journal of Business, 45*(3), 403-415.

Brown, S.J., & Warner, J.B. (1985). Using Daily Stock Returns; The Case of Event Studies. *Journal of Financial Economics, 14*(1), 3-31.

Budagaga, A. (2017). Dividend payment and its impact on the value of firms listed on Istanbul Stock Exchange: A residual income approach. *International Journal of Economics and Financial Issues, 7*(2), 370-376.

Bun, M.J.G. & Kleibergen, F. (2010). GMM based inference for panel data models. Retrieved from https://editorialexpress.com/cgi?bin/conference/download.cgi?dbname=paneldata2010& paper_id=72

Camodeca R., Almici, A., & Brivio, A.R. (2014). The value relevance of accounting information in the Italian and UK stock markets. *Problems and Perspectives in Management, 12*(4), 512-519.

Cassidy, D.B. (1976). Investor evaluation of accounting information: Some additional empirical evidence. *Journal of Accounting Research, 14*(2), 212-229.

Chandrapala, P. (2013). The value relevance of earnings and book value: The importance of ownership concentration and firm size. *Journal of Competitiveness*, *5*(2), 98-107.

Cheng, M., & Tzeng, Z. (2011). The effect of leverage on firm value and how the firm financial quality influence on this effect. *World Journal of Management*, *3*(2), 30-53.

Clout, V.J. (2007). Investigating the relationship between market values and accounting numbers for 30 selected listed companies. PhD thesis submitted to the *School of Accountancy, Faculty of Business, Queensland University of Technology, Australia.*

Clout, V.J., & Willett, R. (2016). Analysing the market–book value relation in large Australian and US firms: implications for fundamental analysis and the market–book ratio. *Accounting and Finance*, *56*, 1017–1040.

Cole, C., Yan, Y., & Hemley, D. (2016). Dividend policy: Determining the relevancy in three U.S. sectors. *Journal of Accounting and Finance*, *16*(8), 71-77.

Collins, D.W., Maydew, E.L., & Weiss, I.S. (1997). Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics*, *1*, 39-67.

Dahmash, F.N., & Qabajeh, M. (2012). Value relevance of Ohlson model with Jordanian data. *Interdisciplinary Journal of Contemporary Research in Business*, *3*(11), 551-560.

Davern, M., Gyles, N., Hanlon, D., & Pinnuck, M. (2019). Is financial reporting still useful? Australian evidence. *Abacus*, *55*(1), 237-272. DOI: doi.org/10.1111/abac.12152

Davies, S.D., & Macfubara, M.S. (2018). Financial risk and value relevance of accounting information: Evidence from Nigeria quoted insurance firms. *Journal of Accounting and Financial Management*, *4*(3), 45-63.

Dedman, E., Jiang, W., & Stark, A. (2017). The value relevance and information content of cash and stock dividends in China. *The European Journal of Finance*, *23* (7-9), 648-673, DOI: doi.org/10.1080/1351847X.2014.996658

Der, B.A., Polak, P., & Masri, M. (2016). Investigation on the value relevance of accounting information: evidence from incorporated companies in the Singapore capital market. *Investment Management and Financial Innovations*, *13*(3), 9-21, DOI: doi.org/10.21511/imfi.13(3).2016.01.

Easton, P.D., & Harris, T.S. (1991). Earnings as an explanatory variable for returns. *Journal of Accounting Research*, *29*(1), 19-36.

Edwards, E. O., & Bell, P. W. (1961). *The theory of and measurement of business income*. Berkeley, CA: University of California Press.

Enekwe, C.I., Agu, C.I., & Eziedo, K.N. (2014). The effect of financial leverage on financial performance: Evidence of quoted pharmaceutical companies in Nigeria. *IOSR Journal of Economics and Finance*, *5*(3), 17-25.

Eiteman, D.K., Stonehill, A.I. & Moffett, M.H. (2013). *Multinational business finance* (13th ed.). Upper Saddle River, NJ: Pearson Education.

Fama, E.F., & MacBeth, J. (1973). Risk, return and equilibrium: Empirical tests. *Journal of Political Economy, 71*, 607-636.

Fama, E.F., & French, K.R. (1992). The cross-section of expected stock returns. *Journal of Finance*, *47*, 427-464.

Feltham, G.A., & Ohlson, J.A. (1995). Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research*, *11*(2), 689-732.

Firth, M. (1976). The impact of earnings announcements on the share price behavior of similar type firms. *Economic Journal, 86*(342), 296-306.

Foster, G. (1977). Quarterly accounting data: Time-series properties and predictive-ability results. *The Accounting Review, 52*(1), 1-21.

Francis, J., & Schipper, K. (1999). Have financial statements lost their relevance? *Journal of Accounting Research, 37,* 319-352.

Fukui, Y. (2001). More stylized facts before theorizing: Toward a data acceptable Ohlson model. *Social Science Research Network.* Retrieved from https://dx.doi.org/10.2139/ssrn.289 039

Ghayoumi, A.F., Nayeri, M.D., Ansari, M., & Raeesi, T. (2011). Value-relevance of accounting information: Evidence from Iranian emerging stock exchange. *International Journal of Economics and Management Engineering, 5*(6), 830-835.

Glezakos, M., Mylonakis, J., & Kafouros, C. (2012). The impact of accounting information on stock prices: Evidence from the Athens Stock Exchange. *International Journal of Economics and Finance, 4*(2), 56-68.

Gonedes, N.J. (1973). Evidence on the information content of accounting numbers: Accounting-based and market-based estimates of systematic risk. *The Journal of Financial and Quantitative Analysis, 8*(3), 407-443.

Gordon, M.J. (1959). Dividends, Earnings, and Stock Prices, *Review of Economics and Statistics* 41, 99-105.

Göttsche, M., & Schauer, M. (2011). The value relevance of accounting figures in the European market reconsidered. *European Accounting Association (EAA), 34th Annual Congress*, Roma.

Greene, W.H. (2008). *Econometric analysis* (6th ed.). Upper Saddle River, NJ: Prentice Hall.

Gupta, P.K., Kumar, S., & Verma, P. (2016). Association between degree of leverages and firm value. *Asian Journal of Finance & Accounting*, *8*(1), 212-229. DOI: http://dx.doi.org/10. 5296/ajfa.v8i1.9455.

Habib, A. (2002). Changes in the value-relevance of accounting book values and earnings: Empirical evidence from Japan. *Hitotsubashi Journal of Commerce and Management*, *37*, 55-82.

Hai, T.T.T., Diem, N.N., & Binh, H.Q. (2015). The Relationship between accounting information reported in financial statements and stock returns- empirical evidence from Vietnam. *International Journal of Accounting and Financial Reporting*, *5*(1), 229-238.

Harkavy, O. (1953). The relation between retained earnings and common stock prices for large, listed corporations. *The Journal of Finance*, *8*(3), 283-297.

Harris, T., & Ohlson, J.A. (1990). Accounting disclosures and the market's valuation of oil and gas properties: Evaluation of market efficiency and functional fixation. *The Accounting Review*, *65*(4), 764-780.

Hirdinis, M. (2019). Capital structure and firm size on firm value moderated by profitability. *International Journal of Economics and Business Administration*, *VII*(1), 174-191.

Hodgson, A., & Stevenson-Clarke, P. (2000). Earnings, cash flows and returns: Functional relations and the impact of firm size. *Accounting and Finance*, *40*, 51-73.

Holthausen, R.W., & Watts, R.L. (2001). The relevance of the value-relevance literature for financial accounting standard setting. *Journal of Accounting and Economics*, *31(*1-3), 3-75.

Hsiao, C. (2007). Panel data analysis—advantages and challenges. *Test*, *16*, 1–22, DOI: doi.org/10.1007/s11749-007-0046-x

Isidro, H., O'Hanlon, J., & Young, S. (2004). Dirty surplus accounting flows: International evidence. *Accounting and Business Research*, *34*(4), 383-410, DOI: doi.org/10.1080/00014788.2004.9729979.

Jahmani, Y., Choi, H.Y., Park, Y., & Wu, G.J. (2017). The value relevance of other comprehensive income and its components. *Accounting and Taxation, 9*(1), 1-11.

Jalalian, T., Barzegari, J., & Mohammadi, H.R. (2016). Investigating the effect of firm size and financial leverage on the relationship between cost management and relevance of accounting information. *The Caspian Sea Journa*l, Supplement 4, *10*(1), 335-342.

Jeroh, E. (2016). Does book values and earnings affect equity values of corporate entities in Nigeria? *Trends Economics and Management*, *27*(3), 30–38, DOI: http://dx.doi.org/ 10.13164/ trends.2016.27.30

Kaplan, R., & Roll, R. (1972). Investor evaluation of accounting information: Some empirical evidence. *Journal of Business, 45*, 225-257.

Karamzadeh, M.S. (2013). Application and comparison of Altman and Ohlson models to predict bankruptcy of companies. *Research Journal of Applied Sciences, Engineering and Technology*, *5*(6), 2007-2011.

Khanagha, J.G. (2011). Value relevance of accounting information in the United Arab Emirates. *International Journal of Economics and Financial Issues*, *1*(2), 33-45.

Khanna, M. (2014). Value relevance of accounting information: An empirical study of selected of selected Indian firms. *International Journal of Scientific and Research Publications*, *4*(10), 364-369.

Kothari, S.P. (2001). Capital markets research in accounting. *Journal of Accounting and Economics*, *31*, 105-231.

Kothari S.P., & Zimmerman, J.L. (1995). Price and return models. *Journal of Accounting and Economics*, *20*, 155-192, DOI: https://doi.org/10.1016/0165-4101(95)00399-4

Kumari, P., & Mishra, C.S. (2018). Value relevance of earnings and book value in India: significance of accounting reforms and intangible-intensity in an emerging market. *International Journal of Accounting, Auditing and Performance Evaluation*, *14*(4), 364-387, DOI: https://doi.org/10.1504/IJAAPE.2018.095112.

Kwon, G. (2018). The role of accounting information in valuing administrative issues of Korea Exchange. *International Journal of Economics and Business Research*, *17*(1), 106-125, DOI: https://doi.org/10.1504/IJEBR.2019.096589.

Lam, K.C.K., Sami, H., & Zhou, H. (2013). Change in the value relevance of accounting information over time: Evidence from the emerging markets of China. *Journal of Contemporary Accounting and Economics*, *9*(2), 123-135, DOI: https://doi.org/10.1016/ j.jcae. 2013.06.001

Lambert, R. (1996). Financial reporting research and standard setting. *Working paper, Stanford University.*

Lee, S., Chen, J., & Tsai, M. (2014). An empirical investigation of the Ohlson model–a panel cointegration approach. *Australasian Accounting, Business and Finance Journal*, *8*(2), 35-51.

Lev, B., & Gu, F. (2016). *The end of accounting and the path forward for investors and managers*. Hoboken, NJ: John Wiley & Sons.

Lev, B., & Ohlson, J.A. (1982). Market-based empirical research in accounting: a review, interpretation, and extension. *Journal of Accounting Research*, Vol. 20 Supplement: Studies on Current Research Methodologies in Accounting: A Critical Evaluation, 249-322.

Lintner, J. (1956) Distribution of incomes of corporations among dividends, retained earnings, and taxes. *The American Economic Review*, *46*(2), 97-113.

Lintner, J. (1962). Dividends, Earnings, Leverage, Stock Prices and Supply of Capital to Corporations. *The Review of Economics and Statistics*, 64, 243-269.

Litzenberger, R.H., & Ramaswamy, K. (1979). The effect of personal taxes and dividends on capital asset prices: Theory and empirical evidence. *Journal of Financial Economics*, *7*(2), 163-195.

Lo, A.W., & MacKinlay, A.C. (1988). Stock market prices do not follow random walks: Evidence from a simple specification test. *The Review of Financial Studies, 1*(1), 41-66.

Lo, K., & Lys, T. (2000). The Ohlson model: Contribution to valuation theory, limitations, and empirical applications. *Journal of Accounting, Auditing and Finance, 15*, 337-367.

Loncan, T.R., & Caldeira, J.F. (2014). Capital structure, cash holdings and firm value: A study of Brazilian listed firms. R. Cont. Fin. – USP, São Paulo, 25(64), 46-59.

Lundholm, R.J. (1995). A tutorial on the Ohlson and Feltham/Ohlson models: Answers to some frequently asked questions. *Contemporary Accounting Research, 11*(2), 749-761.

Makombe, G. (2017). An expose of the relationship between paradigm, method and design in research. *The Qualitative Report*, *22*(12), 3363-3382.

Matson, J.E., & Huguenard, B.R. (2007). Evaluating aptness of a regression model. *Journal of Statistics Education*, 15(2), 1-15.

Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). CA: Sage Publications.

Miller, M.H**.,** & Modigliani, F. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, *48*(3), 261-297.

Miller, M.H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *Journal of Business*, *4*, 411–433.

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

Mirza, A., Malik, M., & Abdul-Hamid, M.A. (2018). Value relevance of earnings and book value of equity: Evidence from Malaysia. *Global Business Management Review*, *10*(2), 19-40.

Myers, C.S. (1984). The capital structure puzzle. *Journal of Finance*, *39*(3), 575-592.

Myers, C.S., & Majluf, S.N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*,*13*(2), 187-221.

Niresh, J.A., & Velnampy, T. (2014). Firm size and profitability: A study of listed manufacturing firms in Sri Lanka. *International Journal of Business and Management*, *9*(4), 57-64, DOI: http://dx.doi.org/10.5539/ijbm.v9n4p57

Nyabundi, M.A. (2013). Value relevance of financial statements information: Evidence from listed firms in Kenya. *Advances in Management and Applied Economics*, *3*(1), 115-134.

Obaidat, A.N. (2016). Accounting information: Which information attracts investors' attention first? *Accounting and Finance Research, 5*(3), 107-117, DOI: http:// dx.doi.org/ 10.5430/afr. v5n3p107

Oberholster, J. (1999). Financial accounting and reporting in developing countries: A South African perspective. *SAJEMS NS, 2*(2), 222-239.

Ogbulu, O.M., & Emeni, F.K. (2012). Capital structure and firm value: Empirical evidence from Nigeria. *International Journal of Business and Social Science*, *3*(19), 252-261.

Ohlson, J.A. (1995). Earnings, book values, and dividends in equity valuation. *Contemporary Accounting Research, 11*(2), 661-687.

Ohlson, J.A. (2000). Residual income valuation: The problems. Retrieved from http:// eamonn-biz.darlingtonadvisors.com/fsafiles/s2valuation/ohlson.pdf,

Ohlson, J.A., & Kim, S. (2015). Linear valuation without OLS: The Theil-Sen estimation approach. *Review of Accounting Studies*, *20*, 395–435.

Olugbenga, A.A., & Atanda, O.A. (2014). The relationship between financial accounting information and market values of quoted firms in Nigeria. *Global Journal of Contemporary Research in Accounting, Auditing and Business Ethics*, *1*(1), 22-39.

Omokhudu, O.O., & Ibadin, P.O. (2015). The value relevance of accounting information: Evidence from Nigeria. *Accounting and Finance Research, 4*(3), 20-30.

Onali, E., & Ginesti, G. (2015). Sins of omission in value relevance empirical studies. *Munich Personal RePEc Archive*, MPRA Paper No. 64265.1-36. Retrieved from https:// mpra.ub.uni-muenchen.de/64265/1/MPRA_paper_64265.pdf.

Ou, J. A., & Penman, S.H. (1989). Accounting measurement, price-earnings ratio, and the information content of security prices. *Journal of Accounting Research*, Vol. 27, Supplement, 111-144.

Park, C. (2015). The stock price relevance of accounting information according to business cycle and industries. *Scientific Cooperations International Journal of Finance, Business, Economics, Marketing and Information Systems, 1*(1), 41-50.

Patell, J.M. (1976). Corporate forecasts of earnings per share and stock price behavior: Empirical tests. *Journal of Accounting Research, 14*(2), 246-276.

Pavone, P. (2019). Market capitalization and financial variables: Evidence from Italian listed companies. *International Journal of Academic Research in Business and Social Sciences*, *9*(3), 1356–1371, DOI: http://dx.doi.org/10.6007/IJARBSS/v9-i3/5802

Peasnell, K. (1982). Some formal connections between economic values and yields and accounting numbers. *Journal of Business, Finance and Accounting*, *9*(3), 361–381.

Pervan, I., & Bartulovic, M. (2014). Value relevance of accounting information: Evidence from south eastern European countries. *Economic Research-Ekonomska Istrazivanja, 27(1), 181-190.*

Plenborg, T. (2002). Firm valuation: Comparing the residual income and discounted cash flow approaches. *Scandinavian Journal of Management, 18*, 303–318.

Preinreich, G.A.D. (1938). Annual survey of economic theory: The theory of depreciation. *Econometrica, 6*, 219-241.

Qu, X., & Zhang, G. (2015). Value-relevance of earnings and book value over the institutional transition in China: The suitability of fair value accounting in this emerging market. *The International Journal of Accounting*, *50*(2), 195-223, DOI: https://doi:10. 1016/j.intacc.2013. 01.009.

Rees, W., & Valentincic, A. (2013). Dividend irrelevance and accounting models of value. *Journal of Business Finance & Accounting, 40*(5-6), 646-672.

Rehman, A.A., & Alharthi, K. (2016). An introduction to research paradigms. *International Journal of Educational Investigations, 3*(8), 51-59.

Robu, Ioan-Bogdan, Robu, Mihaela-Alina, Mironiuc, M., & Balu, F.O. (2014). The value relevance of financial distress risk in the case of RASDAQ companies. *Accounting and Management Information Systems,13*(4), 623–642.

Roodman, D. (2009). How to do xtabond2: An introduction to "Difference" and "System" GMM in Stata. *Stata Journal*, *9*(1), 86-136.

Ross, S.A. (1977). The determination of financial structure: The incentive -signalling approach. *The Bell Journal of Economics*, *8*(1), 23-40.

Saunders, M.N.K., Lewis, P., & Thornhill, A. (2008). *Research methods for business students* (5th ed.). Harlow, UK: Pearson Education.

Schutte, D., & Buys, A. (2011). A Critical Analysis of the Contents of the IFRS for SMES - A South African Perspective. *South African Journal of Economic and Management Sciences, 14*(2), 188-209.

Sharif, T., Purohit, H., & Pillai, R. (2015). Analysis of factors affecting share prices: The case of Bahrain Stock Exchange. *International Journal of Economics and Finance, 7*(3), 207-216.

Skogsvik, K. (2002). A tutorial on residual income valuation and value added valuation. SSE/EFI Working Paper Series in Business Administration No 1999:10.

Sloan, R.G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? *The Accounting Review*, *71*(3), 289-315.

Wang, Y., Buijink, W., & Eken, R. (2006). The value relevance of dirty surplus accounting flows in the Netherlands. *The International Journal of Accounting, 41*(4), 387-405, DOI: https://doi.org/10.1016/j.intacc.2006.09.005

Wang, J., Fu, G., & Luo, C. (2013). Accounting information and stock price reaction of listed companies – empirical evidence from 60 listed companies in Shanghai Stock Exchange. *Journal of Business and Management, 2*(2), 11-21.

Walter, J.E. (1963). Dividend policy: Its influence on the value of the enterprise. *The Journal of Finance*, *18*(2), 280-291.

Yemi, A.E., & Seriki, A.I. (2018). Retained earnings and firms' market value: Nigeria experience. *The Business and Management Review*, *9*(3), 482-496.

Yokoyama, K.Y., Baioco, V.G., Sobrinho, W.B.R., & Neto, A.S. (2015). The influence of company size on accounting information: Evidence in large caps and small caps companies listed on BM & FBovespa. *Journal of Education and Research in Accounting*, *9*(3), 302-319.

Žukauskas, P., Vveinhardt, J., & Andriukaitienė, R. (2018). Philosophy and paradigm of scientific research. IntechOpen, 121-139, DOI: http://dx.doi.org/10.5772/intechopen.706 28

Zulu, M., De Klerk, M., & Oberholster, J.G.I. (2017). A comparison of the value relevance of interim and annual financial statements. *South African Journal of Economic and Management Sciences*, *20*(1), 1-11.

Annexure 1: Ethical Clearance

UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

Mr. Atanas Sixpence
(217071595) School Of Acc
Economics & Fin Westville

Dear Mr. Atanas Sixpence,

Protocol reference number: 00003331
Project title: Value Relevance of Financial Statements of Non-Financial Firms Listed on the Johannesburg Stock Exchange

Exemption from Ethics Review

In response to your application received on 26 August 2019, your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

in case you have further queries, please quote the above reference number.

PLEASE NOTE:
Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

Prof Josue Mbonigaba
Academic Leader Research
School Of Acc Economics &Fin

ANNEXURE 2

TURNITIN REPORT

Turnitin Originality Report

Final Submission by Atanas Sixpence

From Research (Research Dissertation)

Processed on 27-Jan-2020 11:09 AM CAT

Submission ID: 1247038214

Word Count: 81107

Similarity Index
9%

Similarity by Source
Internet Sources:
2%

Publications:
4%

Student Papers:
8%

Annexure 3: Raw Data

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
AFRICAN MEDIA	**1**	2010	293352000	34.00	52529000	36104000	8628000	52060000	0.14	1	43988000	0	5.584572331	249247000
AFRICAN MEDIA	**1**	2011	409830000	47.50	74191000	36585000	8628000	57732000	0.14	1	70237000	0	5.523985389	364752000
AFRICAN MEDIA	**1**	2012	430976000	52.00	94311000	49987000	8288000	71257000	0.14	0	105030000	0	4.569732057	381213000
AFRICAN MEDIA	**1**	2013	578088000	69.75	121227000	53374000	8288000	80859000	0.14	1	134663000	0	4.768640649	503850000
AFRICAN MEDIA	**1**	2014	703545000	85.00	136062000	60565000	8277000	87568000	0.14	1	152749000	0	5.170767738	599278000
AFRICAN MEDIA	**1**	2015	835876000	101.00	162078000	70156000	8276000	109650000	0.14	1	179760000	0	5.157245277	731109000
AFRICAN MEDIA	**1**	2016	658960000	80.00	179189000	64433000	8237000	81175000	0.14	1	199342000	0	3.67745788	658960000
AFRICAN MEDIA	**1**	2017	531564000	66.00	191439000	64117000	8054000	75413000	0.14	1	218678000	0	2.776675599	416619000
ARCELORMITTAL	**2**	2010	39047886763	87.60	3394000000	293000000	445752132	1384000000	2.21	1	24994000000	1	11.50497548	35853886763
ARCELORMITTAL	**2**	2011	24944289307	55.96	22543000000	297000000	445752132	9753000000	2.21	1	24863000000	1	1.106520397	24853289307
ARCELORMITTAL	**2**	2012	12543464994	28.14	22121000000	-477000000	445752132	8656000000	2.21	0	24383000000	1	0.567038786	11669464994
ARCELORMITTAL	**2**	2013	16688959822	37.44	20548000000	47000000	445752132	12021000000	2.21	0	22271000000	1	0.812193879	16403959822
ARCELORMITTAL	**2**	2014	9160206313	20.55	20587000000	-301000000	445752132	12304000000	2.21	0	21979000000	1	0.444951004	9717206313
ARCELORMITTAL	**2**	2015	3570474577	8.01	13360000000	-4736000000	445752132	17490000000	2.21	0	13260000000	1	0.267251091	6449474577
ARCELORMITTAL	**2**	2016	11152986285	9.80	13440000000	-1092000000	1138059825	17103000000	2.21	0	8425000000	1	0.829835289	11963986285
ARCELORMITTAL	**2**	2017	2856530161	2.51	7976000000	-1220000000	1138059825	23138000000	2.21	0	3158000000	1	0.358140692	7024530161
ARGENT	**3**	2010	935958859	9.70	961159000	49447000	96490604	719399000	1.09	1	658647000	0	0.973781506	1385026859
ARGENT	**3**	2011	791222953	8.20	1003240000	101963000	96490604	757534000	1.09	1	708946000	0	0.78866767	1242108953
ARGENT	**3**	2012	651311577	6.75	1020005000	121416000	96490604	685749000	1.09	1	795116000	0	0.638537632	1016286577
ARGENT	**3**	2013	540347382	5.60	1064204000	126233000	96490604	702911000	1.09	1	860225000	0	0.507747934	866637382
ARGENT	**3**	2014	545171913	5.65	974218000	79303000	96490604	597931000	1.09	1	655323000	0	0.559599507	856232913
ARGENT	**3**	2015	397541288	4.12	987857000	58136000	96490604	520046000	1.09	1	667847000	0	0.402427971	622264288
ARGENT	**3**	2016	373951605	3.90	1022565000	91245000	95885027	386565000	1.09	1	706216000	0	0.365699594	513100605
ARGENT	**3**	2017	400364160	4.20	1024459000	105985000	95324800	488625000	1.09	1	750923000	0	0.39080545	552645160
ASPEN	**4**	2010	40825044000	94.59	1820200000	2614900000	431600000	8914700000	0.34	1	5719600000	1	22.42887815	44448244000
ASPEN	**4**	2011	39072695000	90.05	-256000000	3149000000	433900000	13510100000	0.34	1	8363600000	1	-152.6277148	45996195000
ASPEN	**4**	2012	57186351000	142.29	184400000	3940600000	401900000	14320400000	0.34	1	12686300000	1	310.1212093	64262751000
ASPEN	**4**	2013	107829770000	268.30	-2107300000	5043300000	401900000	22622800000	0.34	1	18804600000	1	-51.16963413	118892470000
ASPEN	**4**	2014	154069860912	337.62	-13464600000	7424800000	456341037	53671300000	0.34	1	25996300000	1	-11.4425873	183836960912
ASPEN	**4**	2015	134166469878	294.00	-11400000000	8400000000	456348537	54300000000	0.34	1	31131900000	1	-11.76898859	164237469878
ASPEN	**4**	2016	141925296596	311.00	-12600000000	9000000000	456351436	61800000000	0.34	1	40600000000	1	-11.26391243	174625296596
ASPEN	**4**	2017	138569157814	303.59	-22800000000	8300000000	456435185	73200000000	0.34	1	41200000000	1	-6.077594641	175669157814

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
BIDVEST	**5**	2010	51457271872	146.96	11032674000	5463343000	350144746	25951983000	0.50	0	18619202000	1	4.664079794	57057171872
BIDVEST	**5**	2011	46647171510	142.50	11430062000	5847911000	327348572	29372926000	0.50	1	19101358000	1	4.08109523	53741065510
BIDVEST	**5**	2012	68743200120	210.00	14288499000	7140299000	327348572	33295693000	0.50	1	21948681000	1	4.811086183	75009612120
BIDVEST	**5**	2013	83900141824	256.00	17670978000	7438920000	327734929	39127700000	0.50	1	24592164000	1	4.747905963	91648876824
BIDVEST	**5**	2014	93138989473	284.19	19640933000	7881985000	327734929	47964355000	0.50	1	27420045000	1	4.7420858	104348266473
BIDVEST	**5**	2015	106135029712	320.42	22049722000	3973377000	331237219	52150972000	0.50	1	31558166000	1	4.813440719	117893164712
BIDVEST	**5**	2016	54155661939	161.58	16279084000	4147751000	335163151	25315164000	0.50	1	17108032000	1	3.326702039	68113544939
BIDVEST	**5**	2017	61364091244	172.66	18208913000	6877150000	355404212	28346875000	0.50	1	20279261000	1	3.370002989	72707104244
BOWLER METCALF	**6**	2010	599431142	7.46	332149000	97615000	80352700	77328000	0.14	1	352593000	0	1.804705545	533245142
BOWLER METCALF	**6**	2011	675999240	8.40	391624000	113376000	80476100	82028000	0.14	1	405709000	0	1.726143546	580810240
BOWLER METCALF	**6**	2012	600672800	7.40	418287000	78266000	81172000	79249000	0.14	1	434869000	0	1.436030285	588005800
BOWLER METCALF	**6**	2013	663882700	8.15	408423000	69924000	81458000	89536000	0.14	1	436836000	0	1.625478242	614063700
BOWLER METCALF	**6**	2014	657432000	8.00	443933000	75267000	82179000	93661000	0.14	1	469614000	0	1.480926176	546840000
BOWLER METCALF	**6**	2015	741504190	8.99	662890000	88011000	82481000	102841000	0.14	1	676352000	0	1.118593115	603058190
BOWLER METCALF	**6**	2016	728631200	8.80	721344000	79319000	82799000	124453000	0.14	1	707646000	0	1.010102254	570448200
BOWLER METCALF	**6**	2017	587844500	7.10	656385000	48389000	82795000	97293000	0.14	1	675341000	0	0.895578814	435871500
COMAIR	**7**	2010	1100647060	2.25	725275000	143993000	489176471	1297298000	1.71	1	582650000	0	1.51755825	1157508060
COMAIR	**7**	2011	1076188236	2.20	800521000	117772000	489176471	1303100000	1.71	1	654615000	0	1.344359781	1246008236
COMAIR	**7**	2012	709305883	1.45	762946000	20787000	489176471	1391306000	1.71	0	664684000	0	0.929693429	893654883
COMAIR	**7**	2013	1418611766	2.90	976057000	373810000	489176471	2584656000	1.71	1	867995000	0	1.45341078	1910554766
COMAIR	**7**	2014	1893131326	4.30	1033196000	416774000	440263099	2955378000	1.71	1	1035452000	0	1.832306093	2345170326
COMAIR	**7**	2015	1459618990	3.11	1132085000	327057000	469330865	2869193000	1.71	1	1201045000	0	1.289319256	2103248990
COMAIR	**7**	2016	1811617139	3.86	1300947000	415855000	469330865	4280903000	1.71	1	1325964000	0	1.392537235	3412625139
COMAIR	**7**	2017	2651719387	5.65	1520210000	637790000	469330865	4375723000	1.71	1	1538211000	0	1.744311238	4414742387
EOH Ltd	**8**	2010	1020720540	13.89	139791000	147899000	73486000	641199000	0.38	1	315083000	0	7.301761487	873041540
EOH Ltd	**8**	2011	1967133100	23.05	160702000	232879000	85342000	926989000	0.38	1	437121000	0	12.24087504	1961567100
EOH Ltd	**8**	2012	3228797760	36.98	328341000	356622000	87312000	1381220000	0.38	1	618562000	0	9.833672188	3259929760
EOH Ltd	**8**	2013	7825231890	81.13	588782000	495723000	96453000	1836225000	0.38	1	883170000	0	13.29054198	7741820890
EOH Ltd	**8**	2014	12427008330	106.59	627629000	719514000	116587000	3057251000	0.38	1	1270985000	0	19.79992692	12730341330
EOH Ltd	**8**	2015	19685387880	152.28	1519042000	1046605000	129271000	3864083000	0.38	1	1813023000	0	12.95908071	19968203880
EOH Ltd	**8**	2016	22366838822	158.91	1441603000	1372421000	140751613	6602776000	0.38	1	2544975000	0	15.51525546	24042798822
EOH Ltd	**8**	2017	15477844557	103.12	2486905000	1781746000	150095467	8158379000	0.38	1	3491764000	0	6.223737761	15062250557

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
EQSTRA	**9**	2010	1912085038	7.40	1817000000	888000000	258389870	8407000000	4.15	0	334000000	0	1.052330786	7181085038
EQSTRA	**9**	2011	2474779132	5.99	2371000000	714000000	413151775	7282000000	4.14	0	278000000	0	1.043770195	7873779132
EQSTRA	**9**	2012	3036445583	7.10	2666000000	770000000	427668392	7953000000	4.14	0	-297647000	0	1.138951832	9593445583
EQSTRA	**9**	2013	2908145066	6.80	2929000000	969000000	427668392	9609000000	4.14	0	-78008000	0	0.992879845	10224145066
EQSTRA	**9**	2014	3249806734	7.90	3184000000	1029000000	411367941	10026000000	4.14	1	1222000000	0	1.020667944	11158806734
EQSTRA	**9**	2015	2316001508	5.63	3284000000	872000000	411367941	10425000000	4.14	1	1314000000	0	0.705237974	9664001508
EQSTRA	**9**	2016	1127298332	2.78	478521000	297440000	405502997	6869088000	4.14	1	1569000000	0	2.35579699	1260535332
EQSTRA	**9**	2017	1115133242	2.75	1135432000	673103000	405502997	6935614000	4.14	1	-688000000	0	0.982122436	5667718242
NORTHAM PLAT.	**10**	2010	16611170520	46.06	8833154000	784975000	360642000	1256153000	0.30	1	1081862000	1	1.880548049	15424461520
NORTHAM PLAT.	**10**	2011	11633100500	30.42	10115352000	385294000	382416190	1814219000	0.30	1	1363194000	1	1.150044062	9935247500
NORTHAM PLAT.	**10**	2012	11115336375	29.06	10413247000	338689000	382496090	1830605000	0.30	1	1622833000	1	1.067422714	11045640375
NORTHAM PLAT.	**10**	2013	15104498833	39.48	10815635000	607676000	382586090	3542029000	0.30	1	2220477000	1	1.396542952	15116799833
NORTHAM PLAT.	**10**	2014	14030813116	35.29	11391872000	61482000	397586090	3349124000	0.30	1	2223135000	1	1.231651226	13417710116
NORTHAM PLAT.	**10**	2015	14110743948	27.68	9216425000	595813000	509781212	9934911000	0.30	1	1139808000	1	1.531043105	10016318948
NORTHAM PLAT.	**10**	2016	26325101788	51.64	8727984000	383348000	509781212	10249879000	0.30	0	631545000	1	3.016172095	23508735788
NORTHAM PLAT.	**10**	2017	24510280673	48.08	8092041000	613985000	509781212	11544071000	0.30	0	-4398000	1	3.028936788	22986277673
GRINDROD	**11**	2010	6672491413	14.35	5101461000	963663000	464981980	8280947000	1.40	1	5582864000	1	1.307956958	8964461413
GRINDROD	**11**	2011	9082511313	15.17	8763174000	642558000	598715314	11210012000	1.40	1	6104046000	1	1.036440828	10571954313
GRINDROD	**11**	2012	12353105468	20.60	9561246000	541395000	599665314	11832612000	1.40	1	7079678000	1	1.291997452	12269061468
GRINDROD	**11**	2013	15679974695	26.10	11572904000	423578000	600765314	16289460000	1.40	1	8055520000	1	1.354886785	12800363695
GRINDROD	**11**	2014	13343553528	17.51	15928042000	618868000	762053314	15310539000	1.40	1	8853554000	1	0.837739725	9482539528
GRINDROD	**11**	2015	8776988644	11.51	17535741000	423418000	762553314	17316874000	1.40	1	7174992000	1	0.500519975	3778242644
GRINDROD	**11**	2016	10904512390	14.30	14740549000	456714000	762553314	20374884000	1.40	1	5217482000	1	0.739762976	3807734390
GRINDROD	**11**	2017	10492733601	13.76	13486573000	426137000	762553314	20751488000	1.40	0	4639988000	1	0.778013332	2212428601
HULAMIN	**12**	2010	3373761539	10.65	4576188000	218233000	316785121	1031310000	1.17	0	2575959000	0	0.737242775	4332158539
HULAMIN	**12**	2011	2425882213	7.65	4622126000	169945000	317108786	2849470000	1.17	0	2653224000	0	0.524841212	3234591213
HULAMIN	**12**	2012	1682966155	5.29	4713308000	244552000	318141050	2704549000	1.17	0	2663276000	0	0.357066874	2425449155
HULAMIN	**12**	2013	2129520842	6.67	3364717000	-1805371000	319268492	2327062000	1.17	0	1412163000	0	0.63289746	2741202842
HULAMIN	**12**	2014	2735748916	8.56	3774040000	585133000	319596836	2435561000	1.17	0	1968212000	0	0.724886042	3172786916
HULAMIN	**12**	2015	2045419750	6.40	3787600000	295480000	319596836	2802023000	1.17	1	2032128000	0	0.54003056	2804878750
HULAMIN	**12**	2016	2061399592	6.45	4277602000	621514000	319596836	2609750000	1.17	0	2405974000	0	0.481905421	2476378592
HULAMIN	**12**	2017	1572416433	4.92	4584533000	537966000	319596836	2581389000	1.17	1	2696590000	0	0.342982902	1889643433

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	Share Price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
IMPERIAL	**13**	2010	23186921800	109.90	10940000000	3537000	210982000	22277000000	1.09	1	12513000000	1	2.119462687	28626921800
IMPERIAL	**13**	2011	22503150000	106.65	11193000000	4700000	211000000	23517000000	1.09	1	12073000000	1	2.010466363	26338150000
IMPERIAL	**13**	2012	39189590000	187.51	11655000000	5405000	209000000	29809000000	1.09	1	14361000000	1	3.362470184	46614590000
IMPERIAL	**13**	2013	45745774000	218.00	12330000000	5751000	209843000	34180000000	1.09	1	15219000000	1	3.710119546	55769774000
IMPERIAL	**13**	2014	35491338300	169.95	11343000000	5807000	208834000	40912000000	1.09	1	16229000000	1	3.128919889	48501338300
IMPERIAL	**13**	2015	34472940000	170.00	12040000000	5205000	202782000	46497000000	1.09	1	18065000000	1	2.863200997	50803940000
IMPERIAL	**13**	2016	34864814040	167.48	12301000000	5231000	208173000	50028000000	1.09	1	19366000000	1	2.834307295	51848814040
IMPERIAL	**13**	2017	37733864000	187.60	10732000000	4764000	201140000	48592000000	1.09	1	20262000000	1	3.516014163	53047864000
INSIMBI	**14**	2010	106600000	0.41	32998000	26797000	260000000	178825000	1.45	1	28598000	0	3.230498818	153819000
INSIMBI	**14**	2011	104000000	0.40	41311000	24581000	260000000	210339000	1.45	1	35391000	0	2.517489289	160375000
INSIMBI	**14**	2012	153400000	0.59	48257000	29200000	260000000	222743000	1.45	1	45826000	0	3.178813436	163098000
INSIMBI	**14**	2013	153400000	0.59	65280000	19394000	260000000	215376000	1.45	1	46169000	0	2.349877451	185021000
INSIMBI	**14**	2014	195000000	0.75	78309000	35383000	260000000	265041000	1.45	1	65061000	0	2.490135233	149534000
INSIMBI	**14**	2015	156000000	0.60	87111000	40222000	260000000	251412000	1.45	1	81492000	0	1.790818611	129762000
INSIMBI	**14**	2016	286000000	1.10	94616000	44388000	260000000	277543000	1.45	1	100251000	0	3.022744568	281392000
INSIMBI	**14**	2017	467400000	1.14	197866000	54433000	410000000	510860000	1.45	1	116579000	0	2.362204724	472628000
ISA HOLDINGS	**15**	2010	115555556	0.60	41780000	17896000	192592593	14063000	0.11	1	29543000	0	2.765810335	76392556
ISA HOLDINGS	**15**	2011	150222223	0.78	38504000	18819000	192592593	11163000	0.11	1	31970000	0	3.901470563	112789223
ISA HOLDINGS	**15**	2012	148296297	0.77	42471000	18302000	192592593	5422000	0.11	1	33578000	0	3.491707203	105563297
ISA HOLDINGS	**15**	2013	107851852	0.56	39678000	13091000	192592593	7040000	0.11	1	30181000	0	2.718177632	83601852
ISA HOLDINGS	**15**	2014	119414815	0.70	34540000	16388000	170592593	16127000	0.11	1	33498000	0	3.457290536	115714815
ISA HOLDINGS	**15**	2015	143297778	0.84	49310000	18450000	170592593	27070000	0.11	0	48080000	0	2.906059179	121712778
ISA HOLDINGS	**15**	2016	194475556	1.14	58817000	23851000	170592593	23121000	0.11	1	58991000	0	3.306451468	175181556
ISA HOLDINGS	**15**	2017	272948149	1.60	79540000	43775000	170592593	32637000	0.11	1	79380000	0	3.431583465	236833149
KAP	**16**	2010	870170997	2.05	1298000000	194500000	424473657	1145500000	1.63	1	396500000	1	0.67039368	1233470997
KAP	**16**	2011	1018736777	2.40	3816000000	872000000	424473657	6948000000	1.63	1	527500000	1	0.266964564	1195436777
KAP	**16**	2012	6848156177	2.93	5500000000	1187000000	2337254668	8757000000	1.63	1	-1405000000	1	1.245119305	10507156177
KAP	**16**	2013	8563585791	3.65	6096000000	1329000000	2346187888	8819000000	1.63	1	-804000000	1	1.404787695	11777585791
KAP	**16**	2014	9971298524	4.25	6654000000	1458000000	2346187888	8698000000	1.63	1	-261000000	1	1.498542008	12803298524
KAP	**16**	2015	15530225933	6.41	7411000000	1631000000	2422812158	7994000000	1.63	1	443000000	1	2.095564152	17794225933
KAP	**16**	2016	18258203561	7.48	7951000000	1964000000	2440936305	10077000000	1.63	1	1349000000	1	2.296340531	20524203561
KAP	**16**	2017	22548828655	8.47	10097000000	2465000000	2662199369	15628000000	1.63	1	2261000000	1	2.233220625	28690828655

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
MASSMART	**17**	2010	30022830096	149.00	1496000000	1866700000	201495504	10697600000	0.72	1	2861100000	1	20.0687367	29643330096
MASSMART	**17**	2011	29665635902	138.70	1696300000	1366300000	213883460	14610100000	0.72	1	2775600000	1	17.48843713	30153035902
MASSMART	**17**	2012	36564551571	168.57	1970000000	1126100000	216910195	18104500000	0.72	1	785800000	1	18.56068608	36077751571
MASSMART	**17**	2013	36466941983	168.12	2440800000	2152500000	216910195	20778300000	0.72	1	3909900000	1	14.94056948	37092841983
MASSMART	**17**	2014	32567710800	150.00	2568500000	2061700000	217118072	23379200000	0.72	1	4048300000	1	12.67966159	33716610800
MASSMART	**17**	2015	23207531378	106.88	2792000000	2150400000	217136334	24939200000	0.72	1	4223400000	1	8.312153072	24829831378
MASSMART	**17**	2016	26599200915	122.50	3024700000	2483400000	217136334	25699900000	0.72	1	4672400000	1	8.793996401	28378400915
MASSMART	**17**	2017	24223729421	111.56	3012500000	2737100000	217136334	25924700000	0.72	1	5491400000	1	8.041072007	25775829421
MAZOR	**18**	2010	262443354	2.16	226145253	42611623	121501553	34897518	0.35	1	154261505	0	1.160507908	134354184
MAZOR	**18**	2011	168887159	1.39	214099429	1687187	121501553	38817148	0.35	1	142215681	0	0.788825825	103647127
MAZOR	**18**	2012	170102174	1.40	213191760	2510483	121501553	35998517	0.35	1	144642173	0	0.797883437	133680457
MAZOR	**18**	2013	212627718	1.75	221274154	37301433	121501553	114554780	0.35	1	172724567	0	0.960924328	194439966
MAZOR	**18**	2014	263658370	2.17	247186841	39826042	121501553	83299870	0.35	1	198382254	0	1.066635946	222450257
MAZOR	**18**	2015	159167034	1.31	201586368	-28010000	121501553	80284357	0.35	1	148722620	0	0.78957241	133305074
MAZOR	**18**	2016	180429879	1.65	222701602	40944595	109351442	103192660	0.35	0	177069358	0	0.810186715	125822054
MAZOR	**18**	2017	229638028	2.10	261316617	55594041	109351442	66025388	0.35	1	214843423	0	0.878773156	127129586
MTN	**19**	2010	224177160000	118.99	43808000000	32137000000	1884000000	80712000000	0.45	1	48977000000	1	5.11726534	225492160000
MTN	**19**	2011	258414650000	137.09	58159000000	39260000000	1885000000	88709000000	0.45	1	56567000000	1	4.443244382	259880650000
MTN	**19**	2012	304066840000	161.48	58952000000	41318000000	1883000000	88497000000	0.45	1	62247000000	1	5.157871489	312051840000
MTN	**19**	2013	408314000000	218.00	84061000000	41152000000	1873000000	107844000000	0.45	1	77831000000	1	4.857353588	417850000000
MTN	**19**	2014	382536000000	207.00	96824000000	49645000000	1848000000	120243000000	0.45	1	91305000000	1	3.950838635	396749000000
MTN	**19**	2015	249444000000	135.20	95951000000	35238000000	1845000000	162029000000	0.45	1	87526000000	1	2.599701931	294172000000
MTN	**19**	2016	229880910476	122.00	58758000000	14142000000	1884269758	163469000000	0.45	1	1.0238E+11	1	3.912333818	291290910476
MTN	**19**	2017	213932618020	119.02	56297000000	20557000000	1797451000	148148000000	0.45	1	92773000000	1	3.800071372	276761618020
SANTOVA	**20**	2010	37681456	0.03	40750000	12418000	1256048523	160485000	2.13	0	-67633000	0	0.924698299	97738456
SANTOVA	**20**	2011	96328890	0.07	43425000	31701000	1376127003	244461000	2.13	0	-50718000	0	2.21828187	193980890
SANTOVA	**20**	2012	114135608	0.85	63343000	39425000	134277186	294680000	2.13	0	-27053000	0	1.801866159	242269608
SANTOVA	**20**	2013	150105349	1.10	38130000	40810000	136459408	410122000	2.13	0	-2155000	0	3.936673192	302247349
SANTOVA	**20**	2014	259272875	1.90	74583000	51771000	136459408	498031000	2.13	1	25000000	0	3.476299897	470097875
SANTOVA	**20**	2015	514451968	3.77	108025000	54134000	136459408	503557000	2.13	1	59090000	0	4.762341756	781147968
SANTOVA	**20**	2016	642997784	4.08	163534000	70786000	157597496	636750000	2.13	1	102027000	0	3.931890516	864159784
SANTOVA	**20**	2017	504311987	3.20	187073000	96783000	157597496	530505000	2.13	1	156117000	0	2.695803174	705176987

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
SHOPRITE	**21**	2010	52445767890	96.50	5360979000	3387037000	543479460	12019681000	0.23	1	5332583000	1	9.782871354	51208812890
SHOPRITE	**21**	2011	62103397894	114.27	6424345000	3907718000	543479460	13560307000	0.23	1	6512451000	1	9.666884001	62292451894
SHOPRITE	**21**	2012	97340910260	170.63	11913421000	4563104000	570479460	18097801000	0.23	1	8745805000	1	8.170693394	93522544260
SHOPRITE	**21**	2013	94357302684	165.40	14211000000	5357000000	570479460	18228000000	0.23	1	11184825000	1	6.639737012	92445518684
SHOPRITE	**21**	2014	80184888241	139.97	16058000000	5708000000	572871960	23250000000	0.23	1	13218000000	1	4.993454243	76834888241
SHOPRITE	**21**	2015	87437447255	152.63	17702000000	6183000000	572871960	24760000000	0.23	1	15172000000	1	4.939410646	85319447255
SHOPRITE	**21**	2016	109641964424	191.39	19546000000	7221000000	572871960	26864000000	0.23	1	17155000000	1	5.609432335	111011964424
SHOPRITE	**21**	2017	122176444821	203.62	25394000000	7725000000	600021829	27974000000	0.23	1	18838000000	1	4.811232764	122832444821
TIGER BRANDS	**22**	2010	36707037665	193.00	6615600000	2827500000	190191905	4382500000	0.14	1	9366500000	1	5.548557601	36951037665
TIGER BRANDS	**22**	2011	47664314090	250.02	6419800000	3371300000	190642005	5950600000	0.14	1	10978600000	1	7.424579284	49720914090
TIGER BRANDS	**22**	2012	62521104426	327.00	7683400000	3479100000	191196038	6157900000	0.14	1	12142500000	1	8.137166414	64095504426
TIGER BRANDS	**22**	2013	51129765633	266.93	8390900000	3080400000	191547468	11425500000	0.14	1	13081200000	1	6.093478129	56628165633
TIGER BRANDS	**22**	2014	70648479520	368.06	9420500000	2500500000	191948268	10904800000	0.14	1	13198800000	1	7.499440531	74907479520
TIGER BRANDS	**22**	2015	60502008420	315.00	9544600000	3687200000	192069868	11076700000	0.14	1	13152900000	1	6.338873124	64342708420
TIGER BRANDS	**22**	2016	76411155586	397.83	12093400000	3830300000	192069868	8495000000	0.14	1	14373400000	1	6.318417946	78925455586
TIGER BRANDS	**22**	2017	88352139280	460.00	13464200000	4524000000	192069868	6744900000	0.14	1	15544500000	1	6.562004373	88178739280
VALUE	**23**	2010	729135124	3.75	459290000	142372000	194436033	579219000	0.88	1	512389000	0	1.587526669	795878124
VALUE	**23**	2011	797187735	4.10	471163000	154223000	194436033	732187000	0.88	1	578625000	0	1.691957423	996016735
VALUE	**23**	2012	1070601611	5.39	545366000	176987000	198627386	796725000	0.88	1	656808000	0	1.963088294	1320719611
VALUE	**23**	2013	1122244731	5.65	612053000	166411000	198627386	758338000	0.88	1	722239000	0	1.83357443	1264607731
VALUE	**23**	2014	1132176100	5.70	677728000	166857000	198627386	789856000	0.88	1	793694000	0	1.670546444	1214725100
VALUE	**23**	2015	764715436	3.85	700833000	108697000	198627386	700833000	0.88	1	826385000	0	1.091152152	920876436
VALUE	**23**	2016	592839380	3.18	723836000	88306000	186427478	723836000	0.88	1	800794000	0	0.819024448	772569380
VALUE	**23**	2017	682324569	3.66	786943000	135414000	186427478	741940000	0.88	1	861345000	0	0.867057169	776262569
VERIMARK	**24**	2010	123414114	1.08	42613545	28266364	114272328	80596102	0.65	0	31438696	0	2.89612409	128529169
VERIMARK	**24**	2011	219402870	1.92	66284042	57737534	114272328	90546256	0.65	1	58508962	0	3.310040594	229793010
VERIMARK	**24**	2012	141697687	1.24	77583485	48982878	114272328	63196248	0.65	1	69734032	0	1.826389814	159071980
VERIMARK	**24**	2013	102845095	0.90	73022152	16586645	114272328	115874793	0.65	1	64586833	0	1.408409536	156290695
VERIMARK	**24**	2014	86846969	0.76	100284101	29643967	114272328	45201696	0.65	0	82248227	0	0.866009352	100808706
VERIMARK	**24**	2015	73134290	0.64	111345299	18108223	114272328	52553662	0.65	0	93505890	0	0.656824227	91482275
VERIMARK	**24**	2016	45708931	0.40	114310206	17829811	114272328	41142541	0.65	1	96340362	0	0.399867455	44055971
VERIMARK	**24**	2017	98274202	0.86	136180494	35832585	114272328	41236844	0.65	1	118170490	0	0.721646685	70030435

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
WINHOLD	**25**	2010	186798394	1.48	224960000	50470000	126215131	397026000	2.89	1	114910000	0	0.830362704	425503394
WINHOLD	**25**	2011	201944210	1.60	240822000	51227000	126215131	435313000	2.89	1	126979000	0	0.838562131	432174210
WINHOLD	**25**	2012	153982460	1.22	247858000	35682000	126215131	424289000	2.89	1	132915000	0	0.621252733	396784460
WINHOLD	**25**	2013	94661348	0.75	231453000	23474000	126215131	403235000	2.89	1	121452000	0	0.408987346	315414348
WINHOLD	**25**	2014	93399197	0.74	243034000	17471000	126215131	305646000	2.89	1	134046000	0	0.384305064	241128197
WINHOLD	**25**	2015	76991230	0.61	254794000	21408000	126215131	332412000	2.89	0	148400000	0	0.302170498	179066230
WINHOLD	**25**	2016	131263736	1.04	285902000	39610000	126215131	293137000	2.89	0	175802000	0	0.459121434	208710736
WINHOLD	**25**	2017	104758559	0.83	296527000	28241000	126215131	209344000	2.89	1	183649000	0	0.353285059	125426559
WOOLWORTHS	**26**	2010	21296404567	25.12	3004000000	1654000000	847786806	5614000000	0.38	1	3396000000	1	7.089349057	19991404567
WOOLWORTHS	**26**	2011	30522318372	36.00	3400000000	2122000000	847842177	4972000000	0.37	1	4008000000	1	8.977152462	28844318372
WOOLWORTHS	**26**	2012	49930562963	59.77	3353000000	2687000000	835378333	5473000000	0.37	1	5363000000	1	14.89131016	48427562963
WOOLWORTHS	**26**	2013	62515723120	74.19	3212000000	3469000000	842643525	6551000000	0.37	1	6115000000	1	19.46317656	62070723120
WOOLWORTHS	**26**	2014	59214117802	69.91	4006000000	3943000000	847004975	15317000000	0.37	1	6692000000	1	14.78135741	58657117802
WOOLWORTHS	**26**	2015	97876019888	96.28	-1403000000	5587000000	1016576858	27158000000	0.37	1	5830100000	1	-69.76195288	112149019888
WOOLWORTHS	**26**	2016	80847414773	77.29	2191300000	1494900000	1046026844	14720300000	0.37	1	3124500000	1	36.89472677	95240414773
WOOLWORTHS	**26**	2017	77522602987	59.89	3343300000	23260000000	1294416480	1.30397E+11	0.37	1	3797200000	1	23.18745042	77522602987
AFRICAN OXY.	**27**	2010	6200000000	18.00	2572000000	2.20E+08	340000000	2.56E+09	0.05	1	1952000000	0	2.410575428	7074000000
AFRICAN OXY.	**27**	2011	6500000000	19.10	2736000000	3.40E+08	340000000	2.49E+09	0.05	1	2041000000	0	2.375730994	7254000000
AFRICAN OXY.	**27**	2012	7800000000	22.80	2725000000	4.40E+08	340000000	2.56E+09	0.05	1	2157000000	0	2.862385321	8442000000
AFRICAN OXY.	**27**	2013	6800000000	19.80	3239000000	5.10E+08	340000000	2.77E+09	0.05	1	2307000000	0	2.099413399	7486000000
AFRICAN OXY.	**27**	2014	4700000000	13.60	3047000000	2.00E+08	340000000	2.86E+09	0.05	1	2254000000	0	1.54250082	5231000000
AFRICAN OXY.	**27**	2015	5900000000	17.26	3437000000	5.10E+08	340000000	2.83E+09	0.05	1	2612000000	0	1.716613326	6085000000
AFRICAN OXY.	**27**	2016	6800000000	19.80	3655000000	8.50E+08	340000000	2.76E+09	0.05	1	3202000000	0	1.860465116	6674000000
AFRICAN OXY.	**27**	2017	11000000000	31.00	4017000000	8.60E+08	340000000	2.92E+09	0.05	1	3536000000	0	2.738361962	10689000000
ADVTECH	28	2010	21320582847	53.19	534100000	202900000	400838181	306800000	0.07	0	620000000	1	39.91870969	21283082847
ADVTECH	28	2011	27929602772	66.36	616800000	230000000	420880090	403800000	0.07	1	728400000	1	45.28145715	27953502772
ADVTECH	28	2012	28777802247	68.31	663800000	200000000	421282422	542600000	0.07	1	759400000	1	43.35312179	28840002247
ADVTECH	28	2013	32025889720	76.02	727800000	221700000	421282422	779700000	0.07	1	815500000	1	44.00369569	32228289720
ADVTECH	28	2014	37207663511	88.32	799700000	256400000	421282422	1031400000	0.07	1	876900000	1	46.52702702	37148863511
ADVTECH	28	2015	7308555795	13.77	1864800000	448300000	530759317	1149100000	0.07	1	984700000	1	3.919216964	8476955795
ADVTECH	28	2016	10583172000	19.73	2152700000	608100000	536400000	1116000000	0.07	1	1196300000	1	4.916231709	11667272000
ADVTECH	28	2017	8634184000	15.86	2267100000	640100000	544400000	1778100000	0.07	1	1383300000	1	3.808470734	10282684000

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	Share Price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
ASSORE	29	2010	21918299000	157.00	7966731000	2297966000	139607000	4380521000	0.12	1	9697261000	1	2.751228703	21146803000
ASSORE	29	2011	28591513600	204.80	10877244000	4503066000	139607000	4152143000	0.12	1	12390460000	1	2.628562309	26525213600
ASSORE	29	2012	46070310000	330.00	11300558000	5610123000	139607000	6134247000	0.12	1	15907437000	1	4.076817269	44660850000
ASSORE	29	2013	60170617000	431.00	14124899000	5697373000	139607000	6097326000	0.12	1	18765442000	1	4.25989715	57029295000
ASSORE	29	2014	29433343810	210.83	17426521000	119111000	139607000	1504783000	0.12	1	21935592000	1	1.688997122	28323704810
ASSORE	29	2015	10889346000	78.00	17798559000	149269000	139607000	1688347000	0.12	1	22461703000	1	0.61181054	9340882000
ASSORE	29	2016	19558940700	140.10	18909942000	109571000	139607000	1916927000	0.12	1	23485031000	1	1.034320502	16924138700
ASSORE	29	2017	40374344400	289.20	21913841000	1744574000	139607000	2696579000	0.12	1	27370925000	1	1.842412948	35351633400
EXXARO	30	2010	60875169100	170.00	17391000000	2488000000	358089230	11143000000	0.37	1	12946000000	1	3.50038348	63118169100
EXXARO	30	2011	70846909600	200.00	26045000000	2808000000	354234548	10747000000	0.37	1	18027000000	1	2.720173146	72869909600
EXXARO	30	2012	58426745291	163.30	27844000000	1738000000	357787785	13611000000	0.37	1	24784000000	1	2.098360339	60637745291
EXXARO	30	2013	51070852168	142.61	35321000000	992000000	358115505	13009000000	0.37	1	29668000000	1	1.44590618	54473852168
EXXARO	30	2014	34737203985	97.00	34623000000	1204000000	358115505	12772000000	0.37	1	25985000000	1	1.003298501	35808203985
EXXARO	30	2015	26045740679	72.73	35214000000	4922000000	358115505	17356000000	0.37	1	25670000000	1	0.739641639	28257740679
EXXARO	30	2016	43070551786	120.27	36157000000	4484000000	358115505	23743000000	0.37	1	31281000000	1	1.191209221	43604551786
EXXARO	30	2017	37987045249	105.90	40999000000	5220000000	358706754	21536000000	0.37	1	30962000000	1	0.926535897	37179045249
IMPLATS	31	2010	115129876500	182.25	44715000000	7031000000	631714000	16838000000	0.51	1	30017000000	1	2.57474844	115340876500
IMPLATS	31	2011	100203062700	166.73	48592000000	10193000000	600990000	17994000000	0.51	1	34136000000	1	2.062130859	99550062700
IMPLATS	31	2012	85405056000	140.80	51457000000	5592000000	606570000	19771000000	0.51	1	34869000000	1	1.659736401	90028056000
IMPLATS	31	2013	73982329000	121.90	54616000000	2214000000	606910000	25686000000	0.51	1	35300000000	1	1.354590761	79927329000
IMPLATS	31	2014	51435346500	84.73	54917000000	-21000000	607050000	24950000000	0.51	1	34936000000	1	0.936601535	57467346500
IMPLATS	31	2015	23299730400	38.38	52362000000	-4029000000	607080000	24853000000	0.51	0	31271000000	1	0.444974035	31036730400
IMPLATS	31	2016	48556305600	68.42	58456000000	-370000000	709680000	26560000000	0.51	0	31200000000	1	0.830647078	53595305600
IMPLATS	31	2017	22663892000	31.40	49232000000	-10453000000	721780000	24249000000	0.51	0	22982000000	1	0.460348798	26710892000
MERAFE	32	2010	3739832091	1.50	2575005000	416280000	2476656043	1242603000	0.71	1	1272279000	0	1.452359157	3732725091
MERAFE	32	2011	2144170399	0.86	2658668000	226712000	2493221394	1263470000	0.71	1	1339496000	0	0.806482945	2236997399
MERAFE	32	2012	1820051618	0.73	2709629000	96009000	2493221394	1582483000	0.71	0	1388369000	0	0.671697719	2261916618
MERAFE	32	2013	2693705106	1.08	2925837000	304660000	2494171394	2077773000	0.71	0	1598985000	0	0.920661372	3300233106
MERAFE	32	2014	2054390179	0.82	3123502000	351930000	2505353877	2277645000	0.71	1	1804220000	0	0.657720142	2847545179
MERAFE	32	2015	1933242271	0.77	3414689000	542239000	2510704248	1942916000	0.71	1	2120007000	0	0.566154713	2197603271
MERAFE	32	2016	4343518349	1.73	3897156000	803304000	2510704248	2374380000	0.71	1	2602474000	0	1.114535407	4457155349
MERAFE	32	2017	3740949330	1.49	4635525000	1297047000	2510704248	1719922000	0.71	1	3340843000	0	0.807017399	3081432330

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	Share Price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
METAIR	33	2010	2135446250	14.00	1343552000	402949000	152531875	718277000	0.55	1	1297256000	0	1.589403499	2013868250
METAIR	33	2011	3691271375	24.20	1678690000	576223000	152531875	780718000	0.55	1	1599664000	0	2.198899961	3465596375
METAIR	33	2012	5704692125	37.40	1968236000	569809000	152531875	1241139000	0.55	1	1755168000	0	2.898378104	5824542125
METAIR	33	2013	8546443804	42.95	2545221000	445614000	198985886	3660574000	0.55	1	1897909000	0	3.357839576	9443101804
METAIR	33	2014	6670006899	33.52	2968736000	829381000	198985886	3696020000	0.55	1	2266646000	0	2.246749761	8036911899
METAIR	33	2015	3939920543	19.80	3617453000	789618000	198985886	4065916000	0.55	1	2630982000	0	1.089142151	5435294543
METAIR	33	2016	4815458441	24.20	3178112000	731436000	198985886	3851577000	0.55	1	2904386000	0	1.515194695	6199074441
METAIR	33	2017	4576675378	23.00	3360965000	847513000	198985886	3909681000	0.55	1	3275935000	0	1.36171468	5900258378
MR PRICE	34	2010	13549002138	51.20	2000853000	991518000	264628948	1539421000	0.06	1	2412561000	1	6.771612976	12378259138
MR PRICE	34	2011	19709564047	74.48	2315020000	1433768000	264628948	1466953000	0.06	1	2909725000	1	8.513777007	18341052047
MR PRICE	34	2012	32215928130	121.74	2679000000	1741000000	264628948	1515000000	0.06	1	3537000000	1	12.02535578	31065928130
MR PRICE	34	2013	34399116951	129.99	3211000000	2072000000	264628948	1581000000	0.06	1	4223000000	1	10.71289846	32147116951
MR PRICE	34	2014	53719676444	203.00	3706000000	2537000000	264628948	2641000000	0.06	1	5048000000	1	14.49532554	51466676444
MR PRICE	34	2015	67258093424	254.16	4693000000	3076000000	264628948	2846000000	0.06	1	6048000000	1	14.33157755	64485093424
MR PRICE	34	2016	60216317117	227.55	5247000000	3603000000	264628948	2443000000	0.06	1	7184000000	1	11.47633259	58785317117
MR PRICE	34	2017	46099727214	174.00	6373000000	3048000000	264940961	2186000000	0.06	1	7845000000	1	7.233599123	44303727214
MUSTEK	35	2010	426138472	3.89	1651192000	128031000	109547165	1081555000	2.86	1	492818000	0	0.258079298	486592472
MUSTEK	35	2011	602509408	5.50	644861000	155137000	109547165	956865000	2.86	1	576181000	0	0.934324463	602706408
MUSTEK	35	2012	648645607	5.98	713918000	136929000	108469165	1343041000	2.86	1	639655000	0	0.908571582	610585607
MUSTEK	35	2013	569274116	5.25	781422000	137249000	108433165	1394408000	2.86	1	706140000	0	0.72851048	349855116
MUSTEK	35	2014	832125528	7.80	874481000	181459000	106682760	1766667000	2.86	1	791787000	0	0.951565017	960991528
MUSTEK	35	2015	906705371	8.75	950173000	233501000	103623471	2445167000	2.86	1	894636000	0	0.954252932	853704371
MUSTEK	35	2016	470400000	4.80	920278000	188828000	98000000	2098221000	2.86	1	927669000	0	0.511149892	464418000
MUSTEK	35	2017	403380000	4.86	884945000	173692000	83000000	2001738000	2.86	1	969164000	0	0.455824938	426052000
NETCARE	36	2010	121280990285	95.00	31195000000	3708000000	1276642003	38321000000	0.22	0	4518000000	1	3.887834277	147766990285
NETCARE	36	2011	123672652991	95.50	35264000000	3701000000	1295001602	42979000000	0.22	1	5537000000	1	3.507051185	151891652991
NETCARE	36	2012	116926719623	88.81	38796000000	3812000000	1316594073	45242000000	0.22	1	427000000	1	3.013885958	141388719623
NETCARE	36	2013	122425000000	83.00	20046000000	3060000000	1475000000	13487000000	0.22	1	4846000000	1	6.107203432	130568000000
NETCARE	36	2014	115298780000	78.01	22401000000	3253000000	1478000000	14545000000	0.22	1	5859000000	1	5.147037186	123796780000
NETCARE	36	2015	112840000000	77.50	26785000000	3728000000	1456000000	17383000000	0.22	1	6902000000	1	4.212805675	122599000000
NETCARE	36	2016	125001000000	85.50	26403000000	4128000000	1462000000	17650000000	0.22	1	7283000000	1	4.73434837	133376000000
NETCARE	36	2017	98015119620	72.05	26075000000	2966000000	1360376400	19250000000	0.22	1	5316000000	1	3.758969113	104980119620

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
NU-WORLD	37	2010	634101020	28.00	598620000	103459000	22646465	239496000	0.46	1	585041000	0	1.059271357	604717020
NU-WORLD	37	2011	396313138	17.50	595253000	51205000	22646465	212665000	0.46	1	603313000	0	0.6657894	344294138
NU-WORLD	37	2012	509318998	22.49	634255000	84581000	22646465	267138000	0.46	1	641708000	0	0.803019287	627771998
NU-WORLD	37	2013	475575765	21.00	649895000	70303000	22646465	191588000	0.46	1	660373000	0	0.731773233	398525765
NU-WORLD	37	2014	588808090	26.00	735083000	108542000	22646465	260391000	0.46	1	724645000	0	0.801008988	560814090
NU-WORLD	37	2015	629571727	27.80	811966000	130953000	22646465	362176000	0.46	1	790983000	0	0.775367105	699700727
NU-WORLD	37	2016	679393950	30.00	860011000	113062000	22646465	305542000	0.46	1	856084000	0	0.789982861	682774950
NU-WORLD	37	2017	939828298	41.50	951018000	237117000	22646465	356142000	0.46	1	980922000	0	0.988233974	901452298
OCEANA	38	2010	3877913029	38.80	1230287000	484474000	99939000	596759000	0.22	1	1162803000	1	3.152039345	3767137029
OCEANA	38	2011	4653499633	46.56	1381250000	512689000	99939000	623645000	0.22	1	1283031000	1	3.369049508	4309878633
OCEANA	38	2012	8082350573	67.73	1617013000	663070000	119331386	935486000	0.22	1	1496895000	1	4.998321333	7899448573
OCEANA	38	2013	9506849230	79.55	1770502000	748679000	119514157	1106031000	0.22	1	1620682000	1	5.369578362	9737586230
OCEANA	38	2014	12158439742	101.72	1649281000	879566000	119526157	1228391000	0.22	1	1563243000	1	7.371963748	12183972742
OCEANA	38	2015	15856560018	117.00	3536656000	1025601000	135526154	2448778000	0.22	1	1755638000	1	4.483489493	19130142018
OCEANA	38	2016	16263138480	120.00	3296706000	1729678000	135526154	7099102000	0.22	1	2215919000	1	4.93314796	19782624480
OCEANA	38	2017	11521078352	85.01	3185425000	1010129000	135526154	6286596000	0.22	1	2134148000	1	3.616810426	14554876352
PSV	39	2010	74388501	0.30	97581860	-71641962	247961670	128927656	2.04	0	-119155318	0	0.762318949	115996662
PSV	39	2011	34714634	0.14	91710874	-3029704	247961670	147228469	2.04	0	-125220735	0	0.378522549	79505671
PSV	39	2012	49058586	0.18	78361366	-25425847	272547699	165045300	2.04	0	-142844627	0	0.626055776	73079093
PSV	39	2013	49058586	0.18	56121604	13735906	272547699	116660289	2.04	1	-175955326	0	0.874147963	40113546
PSV	39	2014	51784063	0.19	59203470	-2537570	272547699	90052944	2.04	0	-174102672	0	0.874679521	50549210
PSV	39	2015	58493565	0.22	36693053	-25049143	265879842	81981406	2.04	0	-201037780	0	1.594131871	76373522
PSV	39	2016	116987130	0.44	13623732	-25310732	265879842	82546770	2.04	0	-241606579	0	8.587010555	133539867
PSV	39	2017	103693138	0.39	13059347	4130362	265879842	75023332	2.04	0	-242753977	0	7.940147266	126339836
RANDGOLD	40	2010	216958071	2.90	173981000	758140000	74813128	394618000	0.34	0	111696000	0	1.247021636	216958071
RANDGOLD	40	2011	203617227	2.73	168552000	37870000	74585065	44966000	0.34	1	168280000	0	1.208038038	203617227
RANDGOLD	40	2012	223755195	3.00	175404000	-1996000	74585065	42094000	0.34	0	175132000	0	1.275656171	223755195
RANDGOLD	40	2013	149170130	2.00	186863000	-4458000	74585065	17572000	0.34	0	186166000	0	0.798286071	149170130
RANDGOLD	40	2014	161103740	2.16	169405000	124111000	74585065	15004000	0.34	1	168659000	0	0.950997553	161103740
RANDGOLD	40	2015	186462663	2.50	172171000	-9175000	74585065	14125000	0.34	0	171425000	0	1.083008535	186462663
RANDGOLD	40	2016	157374487	2.11	159775000	-22465000	74585065	17090000	0.34	0	159060000	0	0.984975667	157374487
RANDGOLD	40	2017	133507266	1.79	152717000	-20022000	74585065	13961000	0.34	0	152001000	0	0.874213521	133507266

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	Share Price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
RAUBEX	41	2010	3942843157	21.59	1545872000	887263000	182623583	1556714000	0.59	1	1263340000	0	2.550562503	3986095157
RAUBEX	41	2011	3419451079	18.53	1783168000	662558000	184535946	1466519000	0.59	1	1510726000	0	1.917626987	3311372079
RAUBEX	41	2012	2474627036	13.41	1971251000	531462000	184535946	1657674000	0.59	1	1670355000	0	1.255358671	2347978036
RAUBEX	41	2013	3939842447	21.35	2194639000	483805000	184535946	1899391000	0.59	1	1850616000	0	1.795212081	3725692447
RAUBEX	41	2014	3857428818	20.75	2477366000	539875000	185900184	2112925000	0.59	1	2109193000	0	1.557068604	3758341818
RAUBEX	41	2015	4104403915	21.91	2738319000	622171000	187330165	2739965000	0.59	1	2381905000	0	1.4988772	4377856915
RAUBEX	41	2016	3591965683	18.98	3003559000	710563000	189250036	2893787000	0.59	1	2718123000	0	1.195903155	3844431683
RAUBEX	41	2017	4427430877	24.36	3098623000	661675000	181750036	3044057000	0.59	1	2938678000	0	1.428838189	4426912877
REUNERT	42	2010	11972900000	67.00	3978900000	1262800000	178700000	3481800000	0.23	1	3641300000	1	3.009097992	11536600000
REUNERT	42	2011	10413900000	63.00	3280700000	1391400000	165300000	2170700000	0.23	1	4493000000	1	3.174292072	9913000000
REUNERT	42	2012	12206700000	75.35	3791500000	1524600000	162000000	2089500000	0.23	1	4996200000	1	3.219490967	11668600000
REUNERT	42	2013	11172350000	68.50	4134300000	1329500000	163100000	2505700000	0.23	1	6117400000	1	2.702355901	10927450000
REUNERT	42	2014	11389392662	60.70	5605000000	1017000000	187634146	3250000000	0.23	1	6561000000	1	2.032005827	11523392662
REUNERT	42	2015	12531537375	68.28	6001000000	1167000000	183531596	2674000000	0.23	1	6615000000	1	2.088241522	10381537375
REUNERT	42	2016	12528954650	68.09	6240000000	1315000000	184005796	2817000000	0.23	1	6843000000	1	2.007845296	11569954650
REUNERT	42	2017	13306378147	72.19	6117000000	1497000000	184324396	2846000000	0.23	1	7225000000	1	2.175311124	12170378147
SASOL	43	2010	200327593363	311.75	95311000000	23937000000	642590516	59242000000	0.43	1	85463000000	1	2.101830779	201900593363
SASOL	43	2011	215267822860	335.00	108328000000	29950000000	642590516	67632000000	0.43	1	98590000000	1	1.987185426	216106822860
SASOL	43	2012	242983037893	376.82	126313000000	37237000000	644825216	75439000000	0.43	1	1.12547E+11	1	1.923658197	244125037893
SASOL	43	2013	312202904539	481.20	150884000000	41073000000	648800716	96220000000	0.43	1	1.28038E+11	1	2.069158456	307944904539
SASOL	43	2014	396367205140	609.28	172244000000	45818000000	650550166	1.05495E+11	0.43	1	1.44126E+11	1	2.301196008	388194205140
SASOL	43	2015	258595288354	397.17	194190000000	46549000000	651094716	1.27116E+11	0.43	1	1.61078E+11	1	1.3316612	253036288354
SASOL	43	2016	243619678984	374.00	209738000000	24239000000	651389516	1.78296E+11	0.43	1	1.64917E+11	1	1.161542872	276875678984
SASOL	43	2017	241298702495	370.41	214873000000	31705000000	651436793	1.81705E+11	0.43	1	1.76714E+11	1	1.12298289	301528702495
SEPHAKU	44	2010	568689571	3.65	388349429	3869309	155805362	134501132	0.27	0	149208601	0	1.464375969	700159560
SEPHAKU	44	2011	457084976	2.70	687583374	372720976	169290732	4924244	0.27	0	161265964	0	0.664770257	451250335
SEPHAKU	44	2012	481014050	2.80	672623160	-21323098	171790732	981915	0.27	0	162292622	0	0.71513156	456384914
SEPHAKU	44	2013	1061645413	5.65	502386804	-19848727	187901843	354025075	0.27	0	146365124	0	2.113203222	1039307589
SEPHAKU	44	2014	1276213622	6.70	509963989	51152576	190479645	359088703	0.27	0	144525951	0	2.502556355	1250212354
SEPHAKU	44	2015	1410583801	7.01	610401026	59288082	201224508	374769517	0.27	0	197907280	0	2.310913221	1339669535
SEPHAKU	44	2016	767252885	3.80	679714151	84249475	201908654	352369257	0.27	0	258730837	0	1.128787571	676021453
SEPHAKU	44	2017	608908461	3.00	755296036	84749834	202969487	327326057	0.27	0	329214333	0	0.806185167	564151628

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
TELEMASTER	45	2010	56700000	1.35	24537973	12434404	42000000	34794707	0.63	1	30019324	0	2.310704311	36627975
TELEMASTER	45	2011	67200000	1.60	28328874	14420228	42000000	30086594	0.63	1	32879675	0	2.372138053	46844739
TELEMASTER	45	2012	25200000	0.60	27006088	-5518715	42000000	17155478	0.63	1	31222381	0	0.933122931	16812787
TELEMASTER	45	2013	27300000	0.65	26917853	654351	42000000	18399861	0.63	1	30639461	0	1.014196786	22749173
TELEMASTER	45	2014	46200000	1.10	28166229	3981452	42000000	13738344	0.63	1	32046891	0	1.640262174	39163246
TELEMASTER	45	2015	19320000	0.46	28791167	3518395	42000000	11847041	0.63	1	32279057	0	0.671039142	12198850
TELEMASTER	45	2016	29400000	0.70	29431062	2738303	42000000	18324438	0.63	1	33032314	0	0.998944584	25856528
TELEMASTER	45	2017	18900000	0.45	51169261	4189469	42000000	20072036	0.63	1	34649707	0	0.369362379	14715522
WORKFORCE	46	2010	108000000	0.45	122959000	28846000	240000000	219442000	1.83	0	173794000	0	0.878341561	230272000
WORKFORCE	46	2011	100800000	0.42	143042000	33307000	240000000	250755000	1.83	0	93395000	0	0.704688134	84936000
WORKFORCE	46	2012	115200000	0.48	161848000	34442000	240000000	300141000	1.83	0	116580000	0	0.711778953	101391000
WORKFORCE	46	2013	108000000	0.45	151029000	20710000	240000000	320240000	1.83	0	109056000	0	0.715094452	94166000
WORKFORCE	46	2014	384000000	1.60	207339000	69267000	240000000	290584000	1.83	0	168265000	0	1.852039414	373309000
WORKFORCE	46	2015	316850746	1.30	258835000	93676000	243731343	333260000	1.83	1	245050000	0	1.224141812	303758746
WORKFORCE	46	2016	499649253	2.05	305351000	120414000	243731343	440382000	1.83	1	211155000	0	1.636311174	424797253
WORKFORCE	46	2017	246168656	1.01	363618000	107859000	243731343	453813000	1.83	0	309697000	0	0.676997994	219159656
COGNITION	47	2010	135746020	1.01	78905330	25288139	134402000	30099496	0.16	1	47212075	0	1.720365658	71181078
COGNITION	47	2011	133281960	0.98	91007459	24489010	136002000	30378913	0.16	1	60616201	0	1.464516881	61096012
COGNITION	47	2012	306004500	2.25	105478550	28599401	136002000	28566854	0.16	1	75597691	0	2.901106433	215782941
COGNITION	47	2013	337284960	2.48	117749107	31350361	136002000	33110400	0.16	1	73946903	0	2.86443752	234333241
COGNITION	47	2014	378085560	2.78	127820986	33350550	136002000	29834149	0.16	1	85107940	0	2.957930242	263854723
COGNITION	47	2015	275232000	2.00	123507892	29318323	137616000	31306543	0.16	1	94200852	0	2.228456786	185791896
COGNITION	47	2016	192537800	1.40	101836212	17517803	137527000	41582131	0.16	1	95171136	0	1.890661448	119412999
COGNITION	47	2017	211325450	1.55	99045941	22081888	136339000	55675661	0.16	1	102774161	0	2.133610402	132716526
BELL EQUIPMENT	48	2010	1234454000	13.00	1347934000	124637000	94958000	1226571000	1.35	0	1087162000	0	0.915811902	1394325000
BELL EQUIPMENT	48	2011	2468908000	26.00	1694567000	435640000	94958000	2092673000	1.35	0	1371285000	0	1.456955081	2908757000
BELL EQUIPMENT	48	2012	2078980860	21.89	1955408000	364874000	94974000	1415768000	1.35	0	1596095000	0	1.063195435	2309989860
BELL EQUIPMENT	48	2013	1792520213	18.84	2339444000	340075000	95144385	2267672000	1.35	1	1766067000	0	0.766216337	2425990213
BELL EQUIPMENT	48	2014	837292588	8.80	2333253000	185091000	95146885	1958173000	1.35	0	1831459000	0	0.358852035	847217588
BELL EQUIPMENT	48	2015	1189336063	12.50	2790986000	291764000	95146885	1848769000	1.35	0	2001086000	0	0.426134729	1565873063
BELL EQUIPMENT	48	2016	1210270440	12.70	2541828000	148248000	95296885	1748701000	1.35	1	1972810000	0	0.476141753	1626806440
BELL EQUIPMENT	48	2017	1426744068	14.97	2763836000	433246000	95306885	2369012000	1.35	1	2214236000	0	0.516218787	2022279068

Annexure 3 (cont'd)

Company	Firm	Year	market cap.	share price	book value	EBIT	shares no.	total debt	average debt ratio	div	retained earnings	size	Q-ratio	enterprise value
AFRICAN RAINBOW	49	2010	36157703920	170.00	18317000000	2920000000	212692376	9704000000	0.38	1	13223000000	1	1.973997048	37228703920
AFRICAN RAINBOW	49	2011	36978495690	173.50	21913000000	5322000000	213132540	10194000000	0.38	1	16105000000	1	1.687514064	37337495690
AFRICAN RAINBOW	49	2012	35798622912	166.62	24214000000	5216000000	214851896	10911000000	0.38	1	18681000000	1	1.47842665	36676622912
AFRICAN RAINBOW	49	2013	43079713156	199.79	25284000000	5537000000	215624972	12658000000	0.38	1	19294000000	1	1.703832984	43832713156
AFRICAN RAINBOW	49	2014	30187496080	140.00	28033000000	1671000000	215624972	8259000000	0.38	1	21311000000	1	1.076855709	33050496080
AFRICAN RAINBOW	49	2015	11531394664	53.02	26756000000	1040000000	217491412	8378000000	0.38	1	20113000000	1	0.430983505	14542394664
AFRICAN RAINBOW	49	2016	17855990252	81.90	24444000000	653000000	218021859	10546000000	0.38	1	18601000000	1	0.73048561	22852990252
AFRICAN RAINBOW	49	2017	22992189304	105.13	25082000000	214000000	218702457	7034000000	0.38	1	19556000000	1	0.916680859	24806189304
SPUR CORPORATION	50	2010	1269226829	13.00	123686000	118549000	97632833	127430000	0.08	1	434015000	0	10.26168547	1199687829
SPUR CORPORATION	50	2011	1264345187	12.95	126759000	111969000	97632833	147727000	0.08	1	450507000	0	9.974401718	1154491187
SPUR CORPORATION	50	2012	2103987551	21.55	104620000	168936000	97632833	178408000	0.08	1	490815000	0	20.11075847	2027488551
SPUR CORPORATION	50	2013	3002209615	30.75	149160000	189186000	97632833	217631000	0.08	1	535248000	0	20.12744445	2972326615
SPUR CORPORATION	50	2014	3036381106	31.10	159878000	194999000	97632833	218351000	0.08	1	575670000	0	18.99186321	2970743106
SPUR CORPORATION	50	2015	3623262928	33.40	469485000	182438000	108480926	252189000	0.08	1	618675000	0	7.717526499	3347850928
SPUR CORPORATION	50	2016	3498509864	32.25	499246000	220566000	108480926	202059000	0.08	1	622054000	0	7.007587168	3253198864
SPUR CORPORATION	50	2017	3145946854	29.00	475075000	174145000	108480926	153993000	0.08	1	605388000	0	6.622000429	2903415854