Signalling IPO readiness in a changing environment: The changing impact of listing standards and media coverage on IPO performance

BY

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ABSTRACT

The study responds to a call for further research into the impact of changes in the initial public offering (IPO) signalling environment, on IPO signalling and IPO performance, in particular the impact of changes in the regulatory and media environment of IPOs. The study makes a contribution to theory, practice and methodology. The study examines the impact of a major change in the IPO environment, the 2008 global financial crisis (GFC), on IPO signalling and IPO performance. The study is set in the South African IPO market, based on a survey of the population of IPOs on the Johannesburg Stock Exchange (JSE), and the Alternative Exchange (AltX, a division of JSE), from 2003 to 2019, the period over which the JSE and AltX have coexisted to date. The study confirms that there was an increase in the impact of listing standards and media coverage on IPO performance, comparing pre-GFC and post-GFC. The study makes three contributions to signalling theory. First, the study finds that major changes in the IPO environment, such as the GFC, have an impact on IPO signalling and IPO performance. Second, the study finds that there was an increase in the signalling impact of listings standards and media coverage on IPO performance, from pre-GFC to post-GFC. Third, the study tests the application of signalling theory in the smaller IPO market of South Africa, and demonstrates the effects and limitations of signalling theory in a smaller IPO market. The study contributes to practice by informing the decision-making of key IPO players, including listing companies, investors and stock exchanges. The study contributes to methodology in demonstrating the use of sample selection criteria, based on IPO signalling studies, in the South African IPO market, in which signalling theory has not previously been adopted as the primary theory base in IPO studies. Study limitations include the relatively small size of the IPO population surveyed, a consequence of the limited size of the IPO market in South Africa. The study has identified various opportunities for further research. One is to improve scholarly understanding of the relationship between cross-listings and IPO performance, as revealed by the study, suggesting the signalling impact of the increased globalisation of the exchange environment.

Keywords:

Key Words: AltX, GFC, global financial crisis, information asymmetry, initial public offering, IPO, IPO performance, IPO readiness, IPO signalling, IPO underpricing, JSE, listing, listing standards, media coverage, signal, signalling, signalling environment, strategic management, strategy

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

SIGNALLING IPO READINESS IN A CHANGING ENVIRONMENT: THE CHANGING IMPACT OF LISTING STANDARDS AND MEDIA COVERAGE ON IPO PERFORMANCE

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Motivation for the study

The study was motivated by a call for further research into the impact of changes in the initial public offering (IPO) signalling environment, on IPO signalling and IPO performance, in particular the impact of changes in the regulatory and media environment of IPOs (Park, Borah & Kotha, 2016). This study examines the impact of a major change in the IPO environment, the 2008 global financial crisis (GFC), on IPO signalling and IPO performance, focusing on the changing impact of listing standards and media coverage on IPO performance, comparing pre-GFC and post-GFC. An additional consideration was the contrast between the results of Park et al (2016) and an earlier study on signalling in IPOs, Butler, Keefe and Kieschnick (2014). The results of the two studies yield contrasting results in terms of the perceived stability of IPO signals, and the replicability of studies on IPO signals, before and after a period of major change in the IPO market and the signalling environment. One of the likely causes for the divergent results is the differing approaches in the treatment of a period of major change in the IPO signalling environment, namely the GFC. The GFC was a period of major change in global financial markets, impacting the international business environment (Aguilera, Henisz, Oxley & Shaver, 2019), including the IPO environment (Garanina & Dumay, 2014; Henry & Gregoriou, 2014; Jindal & Singla, 2017-2018; Leow & Lau, 2018; Li, Liu, Liu & Tsai, 2018; Mohohlo & Hall, 2018; van Heerden & Alagidede, 2012).

In the first of the two studies, Butler et al (2014), the sample timeframe was limited to the period before the GFC, to avoid distortions in the study data and results caused by GFC related changes in the IPO market. Butler et al (2014, p.374), does however recognise that there are changes in the influence of different explanatory variables on IPO performance, across different time periods distinguished by changes in the IPO environment, referred to

as structural breaks. In the second study, Park et al (2016), different sets of IPOs and IPO signals are compared before and after the GFC, but without explicit anticipation of changes in the signalling environment arising from the GFC. Results from Butler et al (2014) are interpreted as yielding stable or reliable signals of IPO readiness, or determinants of IPO performance. This suggests the replicability of the study results, although the sample timeframe is limited to the period before the GFC. Results from Park et al (2016) fail to yield similar results regarding various signals of IPO readiness, or determinants of IPO performance, across the two time periods, pre-GFC and post-GFC, despite expectations of the replicability of the results of pre-GFC studies in the post-GFC period.

The discussion in Park et al (2016) suggests that changes in the IPO environment, including regulatory requirements affecting IPOs, and changes in media coverage of IPOs, had an impact on the effectiveness of various signals of IPO readiness, and their impact on IPO performance. The authors identify the need for further research into the impact of changes in the IPO environment on IPO signalling and IPO performance. This study responds to the discussion in Park et al (2016). The study timeframe is aligned with the implicit delineation of the study timeframe in Park et al (2016) into two time periods, pre-GFC and post-GFC. The study is guided by the discussion in Park et al (2016) of changes in two key areas, namely regulatory requirements affecting IPOs, and media coverage of IPOs. The IPO regulatory environment is represented in this study by exchange listing standards, which regulate the quality and conduct of companies listing on an exchange, and determine the requirements for the initial and continued listing of companies on an exchange (Broom & Turner, 2016; Johan, 2010). This study focuses on the signalling impact of listing standards and media coverage on IPO performance on the Johannesburg Stock Exchange (JSE) and the Alternative Exchange (AltX), a junior exchange and a division of JSE, in South Africa, for the review period 2003 to 2019. This timeframe includes major changes in the JSE IPO market from pre-GFC to post-GFC (van Heerden & Alagidede, 2012). Based on the study objectives, the study period is divided into two sub-periods – pre-GFC (pre-2008) and post-GFC (post-2008).

Given the central role of the GFC in the study, including the delineation of the study timeframe into pre-GFC and post-GFC periods, it is important to place the GFC in the correct context as part of the introduction to the study. It is common cause that the phenomenon of change is a basic and ongoing feature in financial markets, in business, and in life in general.

However, certain periods of change represent major catalysts and accelerants of change, and result in significant, large scale and long-term changes, rather than temporary changes. The GFC is recognized as a period of change of this nature, scale and impact, in its role in causing major, long term changes in financial markets on a global scale. The causes and consequences of the GFC, and the nature, scale and long-term impact of the GFC, are widely documented and studied across a range of academic journals, conference publications, and the business media (for example, Avgouleas, 2009; Elder, 2014; McKibbin & Stoeckel, 2009; Taylor, 2009; van Heerden & Alagidede, 2012; Wray, 2011). The impact of the GFC includes significant changes in the regulation of financial markets, and in the behaviour of a range of market participants, toward increased regulation of market risks, improved management of business risks, and greater aversion to investment risks.

In this study, the GFC is regarded as a period of major change in the business environment, and as a catalyst for major, long term change in the period after the GFC. In the context of the South African IPO market, the impact of the GFC was evident in 2008, and in the ensuing years, in the decisions and behavior of various market participants. In the delineation of the study into pre-GFC and post-GFC periods, the study seeks to understand the nature and scale of the impact of the GFC on IPO signalling and IPO performance, in the South African IPO market, in IPOs on the JSE and AltX, based on the review timeframe of 2003 to 2019.

1.1.2 Objectives of the study

The primary objective of the study is to understand the impact of a period of major change in the IPO environment, namely the GFC, on the impact of signals of IPO readiness on IPO performance. The study focuses on the changing impact of two IPO signals – listing standards and media coverage – on IPO performance, from pre-GFC to post-GFC. The study is based on an entrepreneurship, strategic management and signalling theory perspective of IPO performance, in which underpricing is a key measure of IPO performance (Certo, Holcomb & Holmes, 2009; Connelly, Certo, Ireland & Reutzel, 2011; Daily, Certo, Dalton & Roengpitya, 2003; Park et al, 2016). The study builds on studies that have established the impact of listing standards on IPO performance (Ding, Nowak & Zhang, 2010; Johan, 2010), and the impact of media coverage on IPO performance (Guldiken, Tupper, Nair & Yu, 2017; Pollock & Rindova, 2003). The role of media coverage in IPO signalling is supported by agenda-setting theory (Bednar, Boivie & Prince, 2013; Zacharis &

Boguslavskaya, 2013), providing a complementary theoretical perspective, in support of strategic management and signalling theory as the primary theory base.

The secondary objective of the study is to identify and understand the impact of other explanatory variables on IPO performance. These variables are included in the study as control variables, to adjust for the impact of other explanatory variables on IPO performance, in order to identify the impact of the independent variables in the study, relating to listing standards and media coverage. The selection of control variables is guided by the primary focus of the study – the impact of listing standards and media coverage on IPO performance. The control variables in the study relate to IPO offer attributes, IPO company characteristics (including industry sector classification), market conditions, listing activity on the JSE and AltX, and media volume. The control variables create a more complete picture of changes in the IPO market, and provide context for understanding the changing impact of listing standards and media coverage on IPO performance, comparing pre-GFC to post-GFC.

1.1.3 Conceptual context – key terms used in the study

An overview of the conceptual context of the study provides a brief explanation of key terms used in the study, organised into different interrelated groups of terms: stock exchanges and listing standards; IPO, IPO performance, IPO underpricing, and IPO readiness; a changing environment in the context of strategic management; signalling theory and signalling in IPOs; and listing standards and media coverage as signals of IPO readiness. A definition of key terms is provided in Table 1, in section 1.5, and a list of acronyms in Appendix A.

Stock exchanges and listing standards: A stock exchange is a regulated entity, usually subject to oversight by a statutory body in its home country, that provides a public platform for companies to raise capital for their business, and for investors to trade in the shares of companies listed on the exchange (Certo, Holcolm and Holmes, 2009; World Federation of Exchanges, 2020). Exchanges have historically been established in countries around the world, and represent a ubiquitous phenomenon in the global financial services sector, as indicated by the World Federation of Exchanges, whose membership includes more than 250 exchanges and trade clearing entities (referred to as CCPs or central counterparties), which in turn serve over 51000 companies listed on the various exchanges around the world, representing total equity market capitalisation of $74.4 trillion (World Federation of Exchanges, 2020). In order to regulate the quality of individual companies listing on an

exchange, and by extension the quality of the overall market represented by the companies listed on the exchange, every exchange has a set of listing requirements, referred to as listing standards, for the initial and continued listing of companies on the exchange. These listing standards vary from one exchange to another, and form part of the competitive differentiation of each exchange in the international exchange market, in which individual exchanges need to balance the objectives of maximising access to firms seeking to list on an exchange, while ensuring a minimum level of quality of listing firms. More stringent or higher listing standards are designed to improve market quality, but also limit access and potentially result in fewer companies listed and trading on the exchange (Broom & Turner, 2016). The listing standards for the JSE and AltX are included in Appendix B.

IPO, IPO performance, IPO underpricing, and IPO readiness: A central term in the study, an IPO refers to the initial public offering of a company's shares, combined with the initial listing of the company's shares on a public stock exchange. An IPO facilitates the sale of the company's shares to public investors, together with listing the shares on a public platform aimed at the effective trading in the shares (Certo et al, 2009). Communicating (including signalling) the IPO-related quality of a company, referred to as its IPO readiness – a term used by advisory firms and practitioners (for example: Boston Consulting Group, 2017; Deloitte, 2014; Frey, 2015) – plays a key role in the strategic management of IPO performance (Bergh, Connelly, Ketchen & Shannon, 2014). Due to the unequal level of information, or information asymmetry, between an IPO company and the potential investors in the company, initial investors, such as underwriters and institutional investors, potentially undervalue the company relative to the value that the broader market places on the company, as reflected in the closing price at the end of the first day of trading. This is termed IPO underpricing, a key measure of IPO performance in a wide range of academic studies (Certo et al, 2009; Daily et al, 2003). Effective signalling in IPOs is conveying observable and credible information on the unobservable quality of the firm, reducing information asymmetry between the IPO company and initial investors, reducing IPO underpricing and improving IPO performance (Bergh et al, 2014). The effectiveness of different signals of IPO readiness is assessed in terms of their impact on IPO performance, based on IPO underpricing (Park et al, 2016).

A changing environment in the context of strategic management: An organisation's strategic management framework comprises three key dimensions – organisational environment,

organisational strategy and policy, and organisational performance (Durand, Grant & Madsen, 2017). Understanding the organisational environment, and changes in the environment, are relevant for both scholars and practitioners of strategic management. For scholars, the study of major changes in organisational environment contributes to the development of strategic management theory (Bettis, Gambardella, Helfat & Mitchell, 2014). For practitioners, the analysis of major changes in organizational environment informs strategic responses (Dogan, 2015). This study examines the changing environment and its implications, in terms of the impact of the GFC on signalling in the IPO environment. The GFC has been the focus of studies on IPOs on various stock exchanges, in both developed and developing markets (Garanina & Dumay, 2014; Henry & Gregoriou, 2014; Jindal & Singla, 2017-2018; Leow & Lau, 2018; Li et al, 2018; Mohohlo & Hall, 2018; van Heerden & Alagidede, 2012). This study focuses on the impact of the GFC on signalling in IPOs on the JSE and AltX exchanges in South Africa, adopting a strategic management and signaling theory perspective.

Signalling theory and signalling in IPOs: Signalling theory, ranked as one of the top ten theories used in strategic management research (Kenworthy & Verbeke, 2017), represents a major theory base in research on IPOs and IPO underpricing (Certo et al, 2009; Connelly et al, 2011; Daily et al, 2003). IPO underpricing refers to the phenomenon in which the issue price of an IPO company, or the price at which shares are offered to initial investors in the IPO, is set below the market price of the company, represented by the closing price on the day of the company's listing on the exchange (Daily et al, 2003). The higher the IPO underpricing, the lower the proceeds the issuing company receives from the IPO, relative to the market value of the shares listed. Using the explanatory framework of signalling theory, IPO underpricing is interpreted as the result of information asymmetry between the company and the initial investors in the company. The mechanics of the signaling process are as follows: the more effective the IPO company is in providing information on the intrinsic value of the company, the greater the understanding of initial investors of the real value of the company, the lower the information asymmetry between the IPO company and the initial investors, and the lower the IPO underpricing (Park et al, 2016). The term signalling refers to the role played by different items of information representing different observable and reliable indicators, or signals, of the unobservable drivers of the value of the company. There is a wide range of signals conveying information on different aspects of the company,

including its financial profile and its corporate governance, which assist investors to understand the risks and rewards of investing in the company (Daily et al, 2003).

Listing standards and media coverage as signals of IPO readiness: The study focuses on two signals of IPO readiness – listing standards and media coverage – and draws on four key studies, serving as benchmark studies, relating to these two signals: two studies on listing standards (Ding et al, 2010; Johan, 2010); and two on media coverage (Guldiken et al, 2017; Pollock & Rindova, 2003). Collectively, these studies are based on IPOs over a period of 15 years, from 1992 to 2006, on exchanges predominantly in developed markets (US, Canada, Hong Kong), as well as a large emerging market (China), as categorised in the MSCI market classification review (MSCI, 2017). Each of these two signals of IPO readiness is described briefly below, and in more detail in the Literature Review in Section 3. The listing standards of an exchange, established by the exchange as the requirement for initial and continued listing of companies on its public trading platform, influence the quality of companies listed on the exchange (Broom & Turner, 2016), and represent an established signal of the IPO readiness, or the IPO quality, of the listing firms (Ding et al, 2010; Johan, 2010). Media coverage of IPOs, for the purpose of the study, refers to the media coverage provided by independent media, including articles by independent journalists, on firms intending to list on an exchange, a form of information which should be distinguished from the press releases and related information provided by the listing firms themselves (Zacharakis & Boguslavskaya, 2013). Two trends are noteworthy with respect to these two signals in IPOs. First, exchange models are evolving, with new exchanges placing greater emphasis on lowering listing costs, expediting listings, and responding to regulatory calls for financial inclusivity, than on signalling IPO readiness through the mechanism of listing standards (Omarjee, 2017; Ziady, 2017). This raises the importance and signalling influence of listing standards of traditional exchanges such as the JSE and AltX. Secondly, the influence of media coverage, which affects IPO performance as a source of legitimacy of an IPO firm (Pollock & Rindova, 2003), and which itself serves as a signal of IPO readiness (Pollock & Rindova, 2003; Guldiken et al, 2017), is increasing in the new media environment, due to changes in information and communications technology, characterized by a significant increase in information availability from online media coverage (Valkenburg, Peter & Walther, 2016). Based on the changing environment in IPO signalling, changes are expected in the signalling influence of listing standards and media coverage and their impact on IPO performance.

1.1.4 Gaps addressed and contributions made

The setting of the study in the South African (SA) stock exchange and IPO environment is relevant as an introductory consideration of the gaps addressed and contributions made by the study. The extant literature in IPO signalling, for example the four benchmark studies indicated above, are based on IPOs and exchanges in large, developed markets, rather than smaller markets such as South Africa. By testing whether the findings in these studies are generalisable to the smaller market context of South Africa (MSCI, 2017), the study addresses a gap in the literature, based on the lack of previous signalling studies in smaller market settings such as South Africa. The size of companies listed on SA exchanges tend to be smaller than those listing on larger exchanges in developed markets. A comparison of the minimum earnings required for a company to list on different exchanges illustrates the varying scale of firms. The minimum pre-tax earnings for a firm to list on the NYSE is US$25 million (Johan, 2010), compared with a minimum pre-tax earnings of R15m (approximately US$1m, at exchange rates in early 2020) for a firm seeking a listing on the JSE (Fouchee, 2018), representing a difference in scale, comparing the NYSE to the JSE, of 25 times. The literature review has not identified any studies on IPO signalling in the SA IPO market, or other smaller markets. It is not thus clear whether findings in studies on IPO signalling, based on IPOs and exchanges in large, developed markets, such as the USA, are generalisable to IPOs and exchanges in smaller markets such as South Africa. Given this background, the study addresses three gaps in the literature. First, it is a study of signalling in the SA IPO market, in which there is a lack of evidence of IPO signaling studies, or studies that adhere to established sample selection criteria for IPO inclusions and exclusions. Second, the study examines the impact of the GFC on IPO signalling, in the period following the GFC, focusing on the changing impact of two signals of IPO readiness, namely listing standards and media coverage. Third, the study examines the changing impact of listing standards and media coverage on IPO signalling and performance in the SA IPO market.

The study makes several contributions. In the previously untested setting of the South African IPO market and JSE listing standards, the study confirms findings in previous studies that listing standards influence IPO underpricing (Broom & Turner, 2016; Johan, 2010). Second, the results indicate that the impact of listing standards and media coverage on IPO underpricing increased from pre-GFC to post-GFC. This demonstrates the role of listing standards as a signal of market quality, the increased importance placed by investors on

market quality post-GFC (van Heerden & Alagidede, 2012), and the increased information availability on IPOs linked to media coverage. Third, the study provides a different perspective to the discussion in Butler et al (2014) that a reliable set of determinants of IPO underpricing has been established. In Butler et al (2014), the study was limited to IPOs in the pre-GFC period. This overlooks the possibility that the GFC resulted in major changes in IPO signalling in the post-GFC environment, including changes in the impact of various signals on IPO performance. Fourth, the study supports the discussion in Park et al (2016), highlighting the changing impact of various IPO signals as a result of major changes in the IPO environment. The study also contributes to strategic management theory, by improving scholarly understanding of the impact of a major, market-wide change in the IPO signaling environment on signaling performance. The study contributes to strategic management practice, by informing anticipation of and responses to changes in the IPO environment. Limitations of the study include the small number of IPOs on the JSE and AltX, in particular in the post-GFC period, after exclusions of initial listings based on the study sample criteria.

The study makes a contribution in terms of new knowledge added, relative to previous studies in the field. Five areas of new knowledge are highlighted. First, the study shows that signalling theory is applicable to smaller IPO markets such as South Africa. Signalling theory was supported by the results from the analysis of IPO performance in the post-GFC period. Second, the study indicates that signalling theory has limitations in smaller IPO markets such as South Africa. A key limitation is the influence of a high volume of IPOs during so-called hot markets, such as the pre-GFC period before 2008. The study results for pre-GFC indicate that signalling theory was not supported by the relative levels of underpricing, comparing the JSE, as the senior exchange, and AltX, as the junior exchange. There was lower underpricing on AltX compared to JSE. This is not aligned with signalling theory, in which a senior exchange has lower underpricing than a junior exchange in the same market (Johan, 2010). Third, the study reveals that in a smaller IPO market such as South Africa, the influence of international cross listings on the local exchange has a negative impact on IPO performance of local IPOs. This suggests that when investors are faced with a choice of local and international new listings on an exchange such as the JSE, the local new listings are at a disadvantage. Fourth, the study indicates that media coverage has an influence of IPO performance, in particular in terms of the aggregate level of media coverage of the stock exchange in the year of listing. Fifth, the study indicates that the GFC had a major impact

on IPO signalling and IPO performance on the JSE, with increased emphasis on risk awareness and risk management after the GFC.

1.1.5 Summary

Signaling IPO readiness is a complex phenomenon: there are different types of signals, originating from different sources, and having different effects (Connelly et al, 2011). Due to changes in the IPO environment, including changes in the regulatory framework and listing standards affecting IPOs, and changes in the media coverage in IPOs, it is possible that the effectiveness of various signals changes over time (Park et al, 2016). This has raised questions regarding the replicability of research in strategic management, including IPO signalling (Bergh, Sharp, Aguinis & Li, 2017). Challenges encountered in replicating previous studies on IPO signalling (Park et al, 2017), together with the complex nature and changing environment of IPO signalling (Connelly et al, 2011), are part of the motivation for the study. One of the contributions is testing the generalisability of findings in previous studies on IPO signalling, set in large, developed markets, in the smaller IPO market of South Africa. The study responds to the discussion in Park et al (2016), regarding trends in different signals, by comparing the impact of IPO signals from the pre-GFC to post-GFC. The study timeframe spans the last two decades, a period of major change in the exchange, IPO and media environment (McMillan & Childers, 2017; Park et al, 2016). The study is relevant for both practitioners and scholars. For practitioners the study examines the impact of major changes in the business environment on IPO signalling and IPO performance. For scholars, the study contributes to signalling theory by understanding the impact of major changes in the environment on the impact of various signals on IPO performance (Certo et al, 2009; Park et al, 2017).

1.2 PROBLEM STATEMENT

The research problem is to understand the impact of a period of major change in the IPO environment, namely the GFC, on the signalling impact of listing standards and media coverage, on IPO performance, after adjusting for the influence of other explanatory variables which impact IPO performance. The setting is the IPO market in South Africa, based on IPOs on the JSE and AltX, in the period from 2003 to 2019, encompassing the pre-GFC and post-GFC periods in the IPO market.

1.3 PURPOSE STATEMENT

The purpose of the study is to contribute to theory and practice in the areas of strategic management and signalling theory, by understanding the impact of a period of major change in the IPO environment, the GFC, on the impact of listing standards and media coverage on IPO performance, after adjusting for the influence of other explanatory variables which impact IPO performance.

1.4 RESEARCH QUESTIONS

The study focuses on three research questions. The first two questions relate to the impact of the GFC on signalling in IPOs, focusing on the changing impact of listing standards and media coverage on IPO performance. The third question relates to the impact of other explanatory variables (included in the study as control variables) on IPO performance, to contextualise the impact of listing standards and media coverage on IPO performance.

On the changing impact of listing standards on IPO performance:

1. What was the change in the impact of listing standards on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?

On the changing impact of media coverage on IPO performance:

2. What was the change in the impact of media coverage on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?

On the impact of other explanatory variables on IPO performance:

3. What was the impact of other explanatory variables (included in the study as control variables) on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?

1.5 SCOPE AND DEFINITIONS

1.5.1 Scope of the research

The research scope is described in terms of inclusions and exclusions along five key dimensions: the study variables, the pair of exchanges selected, the types of media

coverage being analysed, the set of IPOs selected for the study, and the study review period. Additional detail is provided in the discussion of research methodology in Section 4.

Study variables: The dependent variable is IPO underpricing, representing IPO performance. The independent variables represent listing standards and media coverage. Control variables represent other explanatory variables that influence IPO performance, which need to be controlled for in the study, in order to identify the impact of the independent variables on IPO performance. Control variables in the study relate to the IPO offer, the IPO company, listed market conditions, exchange listing activity, and the media environment. The selection of control variables is guided by a range of studies on IPO signalling (Ding et al, 2010; Guldiken et al, 2017; Johan, 2010; Pollock & Rindova, 2003).

Pair of exchanges: An analysis of the signalling impact of listing standards on IPO performance requires a pair of exchanges, rather than a single exchange, in order to compare the influence of one exchange and its listing standards, with another (Ding et al, 2010; Johan, 2010). The pair of exchanges selected for the study is the Johannesburg Stock Exchange (JSE) and the JSE Alternative Exchange (AltX). There is a different set of listing standards for each exchange. The JSE, the senior exchange, represents a higher set of listing standards, comprising more stringent requirements for firms to qualify for a listing. Appendix B provides a comparison of the listing requirements on the JSE versus AltX, indicating the higher requirements, or higher standards, for firms listing on the JSE compared to AltX. These include the profit history of the firm, the minimum percentage of public shareholders, and minimum capital of the firm. Appendix 2 also provides a comparison of listing requirements in 2008 and 2018. Although there have been changes over the last 15 years, in some of the listing requirements, the requirements for listing on the JSE have consistently represented a higher set of standards than those for listing on AltX. This is by design, given the relative objectives for each of the two exchanges (JSE, 2020).

Types of media coverage: Two types of media are included in the study – print media and online media. Print media are based on digitised copies of articles published in print media, in major South African publications, and archived in the SABINET database. Online media are based on copies of online articles published on the Moneyweb website, and archived in the Moneyweb database, targeted at an investor-oriented online community. Print media represents a broad range of traditional print media. Online media represents a category in

which there have been significant changes in the last 10 to 15 years. Combining these two sources of media coverage represents the majority of independent media coverage on IPOs in the South African media environment. The different types of media are discussed in more detail in research design and methodology in Section 4. Several types of media are excluded from the study, due to limitations in data availability, such as broadcast media (radio, TV and online media channels), and social media (posts on sites such as Facebook, Twitter, and Linked In). The inclusion of online articles from the Moneyweb database serves as a proxy for the broader range of online media.

Set of IPOs selected: The criteria for inclusion and exclusion of IPOs are consistent with IPO signalling studies (Ding et al, 2010; Guldiken et al, 2017; Johan 2010; Park et al, 2016; Pollock & Rindova, 2003). Inclusions are based on IPOs in which a privately owned business is being transformed, via an IPO and an initial listing, into a publicly owned and listed business, which illustrates the influence of signalling factors on IPO performance. Exclusions include cross listings, investment company listings, real estate investment trusts, listings via unbundling and restructuring, and reverse listings. The set of IPOs were selected on the basis of a review of all initial listings on the JSE and AltX for the study review period. Sample selection criteria used in IPO signalling studies are discussed in section 4.8.

Study review period: The period reviewed for the study is the 17 year period from 2003 to 2019, inclusive. This is the full period for which the JSE and AltX have coexisted to date. AltX was established in 2003 (JSE, 2020; Gstraunthaler, 2010), although the first listing on AltX was only in 2004. The most recent year of listings is 2019, given the completion of the study in 2020. Within the study review period, the period for which there were IPOs that qualified for inclusion in the study sample, based on the sample selection criteria (discussed in section 4.8), was from 2004 to 2018. This set of IPOs was divided into two sub-periods, namely pre-GFC (2004 to 2007), and post-GFC (2009 to 2018), in order to compare pre-GFC and post-GFC IPO performance.

Exclusions: The research scope as described above is aligned with the objectives of the study. The research scope exclusions of different areas of analysis represent an opportunity for further research on underpricing of IPO on the JSE. Such additional areas, as indicated in Johan (2010), would include the analysis of withdrawn IPOs as an indicator of IPO readiness, the analysis of medium and long term performance of IPOs, such as one-year

returns, the analysis of time to delisting, where applicable, the analysis of time to a major corporate action, such as a merger or acquisition, the reputation of the underwriter and auditor, and the reputation of a venture capital or private equity firm investing in the IPO company, where applicable. It is noted that the information required to support these additional areas of analysis is not always available, or readily accessible, in financial services databases used for research in the local SA market, such as the IRESS database.

1.5.2 Definitions

The list of terms used in the document are described in Table 1 below.

Table 1. List of key terms

Terms	Description
Digital media	Media enabled through digital communication tools, platforms and methodologies (McMillan & Childers, 2017; Park et al, 2016)
GFC	Global financial crisis occurring in 2008
IPO	Initial public offering of shares on a public exchange (Certo et al, 2009)
IPO performance	Individual or collective measure of the success of an IPO (Certo et al, 2009)
IPO readiness	The overall quality and preparedness of a firm undertaking an IPO or listing on an exchange, on the basis of various underlying firm-specific causes, determinants or correlates of IPO performance (Certo et al, 2009; Daily et al, 2003; Johan, 2010; Sejjaaka, 2011)
IPO signalling	Communicating credible information about the unobservable characteristics or quality of an issuing firm to the potential investors in the IPO firm, and having the effect of reducing the information asymmetry between the parties (issuing firm and potential investors) (Park et al, 2016)
IPO underpricing	Change in share price on first day of trading, expressed as a percentage of the price at end of the first day of trading (Daily et al, 2003)
Listing	Listing shares for trading on a public exchange (Ding et al, 2010; Johan, 2010)
Listing standards	An exchange's requirements for a firm's initial and continued listing on the exchange (Broom & Turner, 2016; Johan , 2010)
Media coverage	Information reported in the media, including various types of media (Guldiken et al, 2017)
Signal	Information communicated by an individual or firm (the sender), such as a listing firm, to another individual or firm (the receiver), such as a potential investor, to indicate the underlying quality of the individual or firm, in a situation of information asymmetry (Connelly et al, 2011)

Terms	Description
Stock exchange	An organisation and trading platform which facilitates the listing and trading of shares in a firm (Ding et al, 2010; Johan, 2010); a stock exchange is a regulated entity, usually subject to oversight by a statutory body in its home country, that provides a public platform for companies to raise capital for their business, and for investors to trade in the shares of companies listed on the exchange (Certo et al, 2009; World Federation of Exchanges, 2020)

1.6 IMPORTANCE AND BENEFITS OF THE STUDY

1.6.1 Contribution to theory

The contribution to theory is in the area of strategic management, specifically signalling theory, the primary theory base for the study, and in agenda-setting theory, the supporting theory base for the study. Signalling theory is well-established (Connelly et al, 2011), originating in the field of economics (Spence, 1973), with extensive application in IPO related research (Park et al, 2016; Park & Patel, 2015; Reuer, Tong & Wu, 2012), as well as the broader fields of strategic management and entrepreneurship (Bergh et al, 2014). The study makes a contribution to signalling theory by improving the understanding of the impact of changes in the IPO environment on IPO signalling and IPO performance. Specifically, the study shows that the impact of the GFC, representing a major change in the IPO signalling environment, resulted in an increase in the impact of listing standards and media coverage on IPO performance. The study also provides a test of signalling theory in the previously untested setting of the IPO market in South Africa, a smaller IPO market than those in previous IPO signalling studies. The study shows that the impact of listing standards on IPO performance, indicated in Ding et al (2010) and Johan (2010), and the impact of media coverage on IPO performance, indicated in Guldiken et al (2017) and Pollock & Rindova (2003), are generalisable to the smaller IPO market setting of South Africa.

Agenda-setting theory plays a supporting role in the study as an explanatory framework for the influence of media coverage on IPO performance, in the context of changes in media coverage due to the newer media environment. The rationale for the introduction of Agenda-setting theory is explained in section 3.5.5 and 3.5.6 in the Literature Review. Agenda-setting theory is part of a broader set of media effects theories, comprising models that seek to explain the key features, sources, processes and outcomes of media effects in different

social and business contexts (Valkenburg et al, 2016). The study's contribution to agenda-setting theory is in testing for, and demonstrating the impact of, changes in agenda-setting effects of media coverage on IPO performance, over a period when there were significant changes in the media environment. The study shows the increased impact of media coverage on IPO performance, comparing pre-GFC and post-GFC. The contribution of the study to agenda-setting theory is in demonstrating the impact of changes in the business and media environment on the impact of external, independent media coverage of business organisations, as described in the literature on agenda-setting theory (Carrol & McCombs, 2003; McCombs & Shaw, 1972), on IPO performance. The changes analysed in the study are, first, the GFC, which was a change in the business environment associated with an increase in risk awareness and risk management behaviour by investors, and second, a change in the media environment, namely the increasing role of online media in the media environment, in the years coinciding with the post-GFC period. Combining the two types of changes, the study contributes to agenda-setting theory in improving scholarly understanding of the impact of changes in the business and media environment, on changes in the impact of media effects on business performance, in this case IPO performance.

1.6.2 Contribution to practice

The study makes a contribution to practice by assisting in the decision-making and strategic management of key practitioners in the IPO process. The contribution to six different sets of practitioners are briefly described. Depending on their respective objectives in the IPO process, the study has various implications for the decision-making and strategic management of these practitioners in the pursuit of their objectives.

The first set of practitioners are the *IPO companies*. Their objectives include managing their IPO performance in an optimal manner. The study increases their awareness and understanding of the impact of changes in the business and media environment on IPO performance, in particular the impact of investor perceptions of their companies on IPO performance. The study enhances the decision-making and strategic management of IPO companies by improving their ability to anticipate the impact of various IPO signals on IPO performance. IPO signals include those associated with the profile of the IPO offering, the IPO company, the industry sector in which the IPO company is categorised, the market conditions in the year of listing, the listing activity in the year of listing, and the media coverage in the year of listing. IPO companies on a smaller exchange such as the JSE would

also be more aware of the negative impact of inward cross-listings, associated with other international stock exchanges, on the IPO performance of local IPOs on the smaller local exchange. The study enhances the strategic management of these IPO companies as they plan their IPOs, particularly on a smaller exchange such as the JSE, compared to larger international exchanges.

The second set of practitioners are *investors in IPO companies*. Their objectives include making sound investments in IPO companies. The study increases their awareness and understanding of different signals on IPO performance, and the changes in the influences of these signals, resulting from changes in the business and media environment. The contribution of the study to investors in a sense mirrors the contribution to IPO companies, as they represent the two key sides of the IPO process. To the extent that the study contributes to the decision-making of IPO companies, there is a similar contribution to investors in improving their ability to discern and respond to the decisions of the IPO companies.

The third set of practitioners are *stock exchanges*, in particular those which pursue and accept IPO companies for an initial listing on the exchange. Their objectives include seeking to design their listing standards in a manner that optimises the initial and continued listing of companies on their exchange. The study makes a contribution to exchanges in improving their decision-making in the design of listing standards, and in their strategic management of the type of IPOs or initial listings they pursue in the growth of their own business. In the case of smaller exchanges such as the JSE, the study increases their understanding that the strategic pursuit of inward or cross-listings has a negative impact on the IPO performance of local IPOs on their exchange. More generally, the study contributes to exchanges in improving their understanding of, and the decision-making in response to, the impact of listing standards on IPO performance after major changes in the business environment, such as the GFC.

Fourth, there are various *industry intermediaries* in the IPO process, such as underwriters and investment banks. Their objectives include making informed decisions on the IPO process. The study contributes to their decision-making and strategic management by improving their understanding of the role and impact of signals in the IPO process, including the signals represented by the choice of exchange and the associated listing standards, by

media coverage of IPO companies in the weeks preceding their listing, and by other factors such as those described above for IPO companies. The study contributes to these practitioners in improving their understanding of the changes in the impact of these signals after a period of major change in the business environment, such as the GFC, enabling them to anticipate and manage the impact on IPO performance of the companies which they are advising.

Fifth, there are *professional advisors and consulting firms* involved in the IPO process, whose objectives include seeking to provide sound advice to the companies undertaking an IPO, and potentially also to investors in these companies. The contribution to these practitioners, in terms of improving their decision-making and strategic management in the IPO process, is an aggregation of the points described for the preceding four sets of practitioners, in that advisory firms require an accurate and well-informed understanding of the IPO environment and of the various influences affecting IPO performance.

Sixth, there are *independent media commentators* providing media coverage on IPO companies. Their objectives include seeking to ensure that IPO companies are objectively and accurately assessed in their media coverage. The study contributes to their decision-making and strategic management in clarifying the impact of media coverage on IPO performance. The study contributes to their understanding of the impact of major changes in the business and media environment, characterised in the study by the GFC and the increasing influence of online media, on IPO performance. The study assists in making media players more aware of their own influence on IPO performance, and emphasises the importance of objective and accurate media coverage.

In summary, by improving practitioner understanding of the signalling impact of listing standards and media coverage on IPO performance, as well as the influence of various other explanatory variables included in the study, the decision-making and strategic management of these practitioners are enhanced in a changing signalling environment.

1.6.3 Contribution to methodology

The contribution to research methodology includes the use of a study design based on two time periods (pre-GFC and post-GFC) and two stock exchanges (JSE and AltX). Using this approach, the study examines the impact of the GFC on the impact of listing standards and

media coverage on IPO performance. The use of two time periods, across two stock exchanges, to assess the impact of major changes in the IPO environment on the impact of different signals on IPO performance, represents a novel approach in IPO signalling studies, while building on the approach in previous IPO signalling studies. Another contribution to methodology is the study's distinction between different types of media coverage (print media and online media), in order to separately assess the impact of online media coverage on IPO performance, in the context of a changing signalling environment. This is a new approach to the analysis of media coverage in IPO signalling studies. Finally, the study represents a contribution to IPO studies in the setting of the South African (SA) IPO market. There is a lack of evidence in the literature of studies on the SA IPO market, in which signalling theory is adopted as the primary theory base. One aspect of this contribution is indicated in the sample selection process for this study, in which different categories of listings in the SA IPO market were identified and quantified, as indicated in section 5.1 in results.

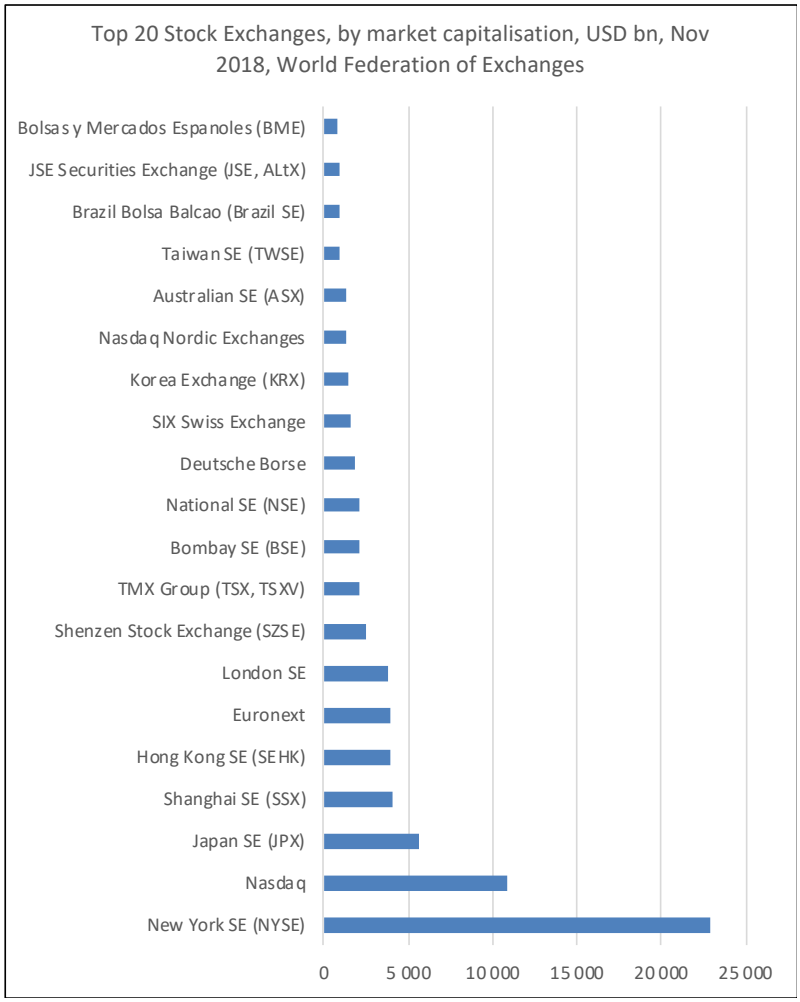
1.7 DOCUMENT CONTENTS

The remainder of the document is organised as follows. Section 2 provides a description of the setting for the study. Section 3 provides a literature review to develop the hypotheses that guide the study. Section 4 frames the research philosophy and describes the research design and methodology. Section 5 presents the results of the study, section 6 the discussion of the results, section 7 the conclusion, and section 8 the references, followed by various appendices.

2 SETTING

The study is profiled in terms of the institutional, time period and market setting. The institutional setting of the study is the Johannesburg Stock Exchange (JSE) and Alternative Exchange (AltX, a division of the JSE) in South Africa, for the period 2003 to 2019. The JSE is described here in terms of its relative size compared to other global exchanges, and in terms of its individual history and track record. The JSE is ranked at the lower end of the top 20 stock exchanges in the world, with the exact ranking at any time being dependent on the global economy and stock markets. Based on industry data as at November 2018 (World Federation of Exchanges, 2020), the JSE was ranked 19 out of 20 of the world's top stock exchanges (Figure 1).

Figure 1. Top 20 stock exchanges, by market capitalisation (USD) as at November 2018



Illustrating the large variance between exchanges, as at November 2018 the market capitalization of the JSE was USD894bn, or 3.9% of the NYSE market capitalization of USD 22 923bn, the world's largest stock exchange, and 42,7% of the market capitalization of USD2095bn for the TMX Group (TSX or Toronto Stock Exchange, and TSXV, the TSX venture board), the ninth largest stock exchange in the same period. At an individual level, the institutional profile of the JSE includes the following features (JSE, 2020): the JSE was established in 1887 following during the first gold rush in South Africa; the AltX, a division of the JSE, was established in 2003 as an alternative exchange focusing on the capital raising needs of small and medium sized businesses; the first listing on AltX was in 2004; in terms of its regulatory standards, the JSE was ranked the top exchange in the world in 2013-2014; the JSE is the oldest and largest exchange in Africa, and at the end of 2019 there were just under 400 companies listed on the JSE and AltX combined.

In terms of the period setting of the study, the study is based on a review of the initial listings on the JSE and AltX for the period 2003 to 2019. After applying established sample selection criteria used in IPO signalling studies, the study is based on a survey of the population of eligible IPOs for the period 2004 to 2018, with IPOs in 2008, the year of the GFC, being excluded from the study sample in order to compare pre-GFC and post-GFC periods. The process and results of the sample selection approach are described in section 3 and 4, in study methodology and results. Combining the exchanges and the time periods, the study is based on two sets of comparisons: the performance of IPOs on the JSE compared to AltX, and of IPOs in pre-GFC (2004 to 2007) compared to post-GFC (2009 to 2018).

Providing a broad overview of the market setting of the study, the trend in the month-end closing values of the JSE All-Share Index (J203) from end December 2002 to end December 2019, based on data accessed on the IRESS database, is provided in Figure 2 below. It shows the impact of the 2008 GFC, a year in which the market index dropped by 25,7%. The trend in the market index over the review period also provides context for the trend in the number of initial listings in the review period. In line with the significant decline in market conditions during the 2008 GFC, the number of initial listings on the JSE and AltX dropped from 62 in 2007, a very favorable or "hot" market for IPOs on the JSE and AltX (van Heerden and Alagidede, 2012), to 20 in 2008, a decrease of 67.7%, as indicated in Figure 3. The number of initial listings is before exclusions based on sample selection criteria.

Figure 2. JSE All Share Index (J203), Month Close, December 2002 to December 2019 (IRESS database)

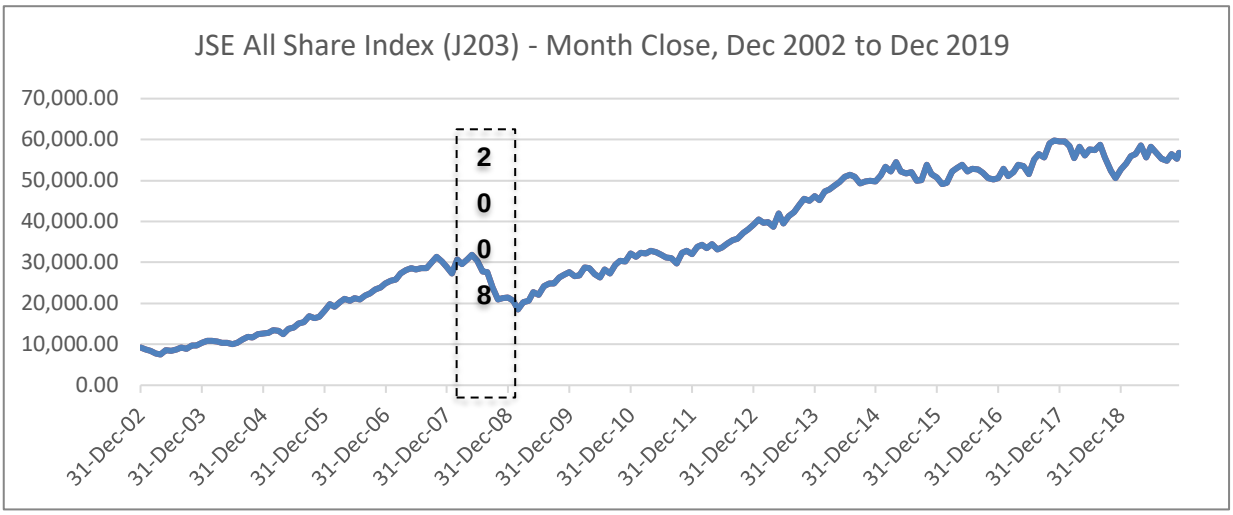
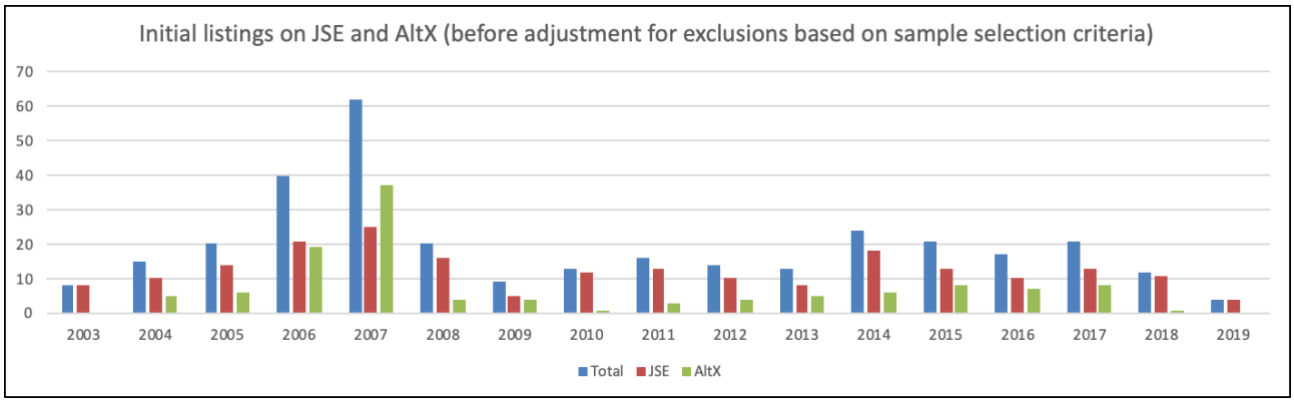


Figure 3. Initial listings on the JSE and AltX from 2003 to 2019 (IRESS database; JSE)



Figures 2 and 3 demonstrate the impact of the 2008 GFC on both the market index and the number of initial listings. In the period following the GFC, while the market index returned to pre-GFC levels, the number of initial listings has remained low, suggesting a more permanent, structural change in the IPO market. The smaller size of the South African IPO market compared to larger global exchanges, and a greater sensitivity to market changes, are possible factors for these trends. This resonates with the view in Barnard, Cuervo-Cazurra and Manning (2017) that various African markets provide an ideal setting for studies building or extending theory, given the increased incidence of extreme market conditions.

3 LITERATURE REVIEW

3.1 INTRODUCTION

The literature review is guided by the study objectives, problem statement, purpose statement and research questions. The objectives are to provide a critical review of relevant theory and research, to highlight the key insights, and to develop the hypotheses to be tested in the study. A central theme linking the different sections is the impact of the GFC on IPO signalling and IPO performance. The foundational concepts of IPO performance and IPO readiness are discussed in section 3.2, together with the impact of the GFC on IPO performance. Signalling theory, as the primary theory base for the study, is discussed in section 3.3, together with the impact of the GFC on IPO signalling. Each of the two signals examined in the study are discussed next, listing standards in section 3.4 and media coverage in section 3.5, together with the impact of the GFC on each of the two signals. The role of other explanatory variables and control variables in IPO signalling studies is discussed in section 3.6. A summary of the impact of the GFC on IPO performance and IPO signalling is presented in section 3.7, followed by a summary of the hypotheses in section 3.8, followed by a closing section.

3.2 IPO PERFORMANCE, IPO READINESS, AND THE GFC

3.2.1 Foundational concepts in IPO research

The purpose of this section is to review the relevant literature on IPO performance and IPO readiness, two foundational concepts in IPO research, and the impact of the GFC on IPO performance. The objectives are to describe the concept and measures of IPO performance, and the concept and attributes of IPO readiness. The overarching focus in IPO research is the antecedents, correlates, measures and consequences of IPO performance (Certo et al, 2009). The topics of IPO performance (based on measures of IPO performance), and IPO readiness (based on antecedents and correlates of IPO performance) feature prominently in the IPO research landscape. Despite the apparently narrow focus in research topics, IPO research is wide ranging, addressing different questions related to IPOs, comprising the work of scholars from different academic disciplines, representing different theory bases and explanatory perspectives, and informing

the decisions of different IPO stakeholders, with different business objectives, in different geographic contexts (Certo et al, 2009; Daily et al, 2003). This is reflected in the diversity of academic journals that publish studies relating to IPOs (Certo et al, 2009). Managing the focus and scope of this literature review is essential.

The motivation for the study is to contribute to the theory relating to, and to inform the practical decision-making involved in, the strategic management of IPO performance, focusing on signalling theory in a changing signalling environment, in the context of the impact of the GFC on IPO performance and IPO signalling. Given this objective, and to develop a sound theory base and research foundation for the study, the literature review includes academic journals in four areas: strategic management, general management, entrepreneurship and small business management, and finance. Building on a review of these areas, the literature review extends to additional academic journals, as well as information from IPO practitioners, articles in business media, and information from organisation websites. The review of the concept and measures of IPO performance, and of the concept and attributes of IPO readiness, are informed by a diverse range of literature.

3.2.2 Concept and measures of IPO performance

The concept of performance depends on the perspective of the stakeholder. A brief overview of three key stakeholders in an IPO assists in describing the concept and measures of IPO performance: the company undertaking an IPO, the investors in the IPO company, and the exchange on which the shares of the company are to be listed and traded. From the perspective of the IPO company, it is argued that an IPO represents two key objectives: to harvest or exit some of the investment in the firm by the founders in the company, or the pre-IPO shareholders, and to raise capital for investing in additional projects to grow the business (Daily et al, 2003). Taking this approach, IPO performance would be based on maximising the amount of capital raised in the IPO. Given the particular attributes or quality of the company, and the market conditions affecting the potential IPO performance, companies also manage the timing of the IPO in order to optimise IPO performance (Colak & Gunay, 2011). As outlined in Certo et al (2009), the IPO process involves the raising of capital, based on the IPO share offer price (multiplied by the number of shares sold), which is set as part of the pre-IPO process leading up to the listing. The share offer price is in turn dependent on negotiations between the listing company, the lead underwriter of the IPO, and the primary investors in the IPO, typically large institutional investors. The total capital

raised, or the proceeds of the IPO, is thus a key measure of IPO performance (Certo et al, 2009).

Beyond this measure of IPO performance, there are many questions the IPO company would want to address as part of the strategic management of the IPO, including the causes and consequences of IPO performance (Certo et al, 2009). For example, how can the IPO company obtain the best share price, and raise the highest amount possible, for a given number of shares being sold? Does the share offer price, set before the listing, compare favourably with the share price that the market determines after the company has listed? Addressing these questions involves an analysis of the change in share price after listing, and a comparison of the post-IPO market price to the IPO offer price. Thus, a key variable used to determine IPO performance is the change in share price for a specified time period (for example, one day, one week, one month, etc.) following the opening of trading on day one of the listing. The measure of the initial day's change in share price, from the offer price to the closing price on day one, is regarded with special significance in IPO research. The measure is IPO underpricing. It is the change in share price from the offer price (or the issue price if there were adjustments to the offer price) to the closing price on the first day of trading, expressed as a percentage of the offer price (Daily et al, 2003).

IPO underpricing is a well-established measure in studies on IPO performance (Daily et al, 2003), and in studies on the relationship between signals of IPO readiness and IPO performance, for example the impact of listing standards on IPO performance (Ding et al, 2010; Johan, 2010), or the impact of media coverage on IPO performance (Guldiken et al, 2017; Pollock & Rindova, 2003). From an academic study perspective, one advantage of using IPO underpricing, given its formulation as a percentage based measure, is that it facilitates the analysis and comparison of IPOs across different settings, for example different time periods, different exchanges, and different industry sectors. A practical interpretation of IPO underpricing is the extent to which the IPO company has "left money on the table" for the initial investors in the IPO, partly due to the inability of the IPO company to negotiate a higher offer price, as a result of information asymmetry (Certo et al, 2009). From the perspective of investors in the IPO company, whose objective is to obtain a risk-related return on their investment, IPO performance is based on the post-IPO change in share price for different time periods, depending on whether the measure is a short term or long term return on investment (Certo et al, 2009). The term initial return is based on the

change in price on the first day of trading, or the difference between the issue price and the closing price at the end of the first day of trading. The measure of initial return for investors is thus the same as the measure of IPO underpricing for the IPO company, although they have different objectives. IPO companies seek to minimise IPO underpricing, while investors seek to maximise initial returns. Beyond the initial return, the focus for investors is also on the medium and long term performance of the investment (Neneh & Smit, 2014).

From the perspective of the exchange, whose objectives include facilitating the initial and continued listing of sustainable companies, and attracting investors and traders in the shares of these companies, IPO performance is based on a combination of the successful initial listing of the company, combined with the sustained long term listing of the company, based on companies meeting initial and continuing listing requirements, and contributing to an acceptable quality in the exchange's market for listed securities (Broom & Turner, 2016).

Comparing the three stakeholder perspectives – IPO company, investors, and exchange – while they vary on the preferred measures of IPO performance, they have in common the objective of the IPO company being of high-quality, based on the antecedents and correlates of IPO performance. Certo et al (2009) provide a summary of key measures of IPO performance used in a range of IPO studies (103 in total), based on a review of top journals in management and entrepreneurship research.

The measures are organised into different categories, such as short-term versus long-term measures, and market-based versus accounting-based measures. There are measures that combine market-based and accounting-based measures, such as the short-term measure of price premium (market value less book value), and measures that are non-financial in nature, such as the long-term measure of firm survival. Table 2 provides a summary of different measures of IPO performance.

Table 2. Example of measures of IPO performance (Certo et al, 2009)

Short-term measures	Long-term measures
IPO proceeds	Market-based measures (share price)
IPO underpricing	Accounting-based measures (performance measures used in financial statements)
Price premium (market value less book value)	
Market valuation (end of first day)	Firm survival

In the review of various IPO studies which seek to determine the relationship between one or more determinants or correlates of IPO performance, and one or more measures of IPO performance, the selected measures of IPO performance represents the dependent variables in the study, with the determinants under review being the independent variables. For this study, the measure of IPO performance used as the dependent variable is IPO underpricing. The rationale for the selection of this variable is to ensure consistency with the approach used in comparative studies, in particular those relating to the impact on IPO performance of listing standards (Ding et al, 2010, Johan, 2010) and of media coverage (Guldiken et al, 2017; Pollock & Rindova, 2003). This is discussed further in section 4, on research design and methodology.

3.2.3 Concept and attributes of IPO readiness

The term IPO readiness is defined in the study as the overall quality and preparedness of a firm undertaking an IPO and listing on an exchange, on the basis of various underlying firm-specific causes, determinants or correlates of IPO performance. This approach is consistent with academic studies on IPO performance and signalling in IPOs (Daily et al, 2003; Guldiken et al, 2017; Johan, 2010; Park et al, 2016). It is well-established in the literature that a firm's IPO readiness is based primarily on the intrinsic characteristics of the firm, based on factors such as the size and age of the firm, the quality of its management, and the reputation of its investors, intermediaries and advisers, such as private equity firms, underwriters and auditors (Daily et al, 2003; Johan, 2010). It is also recognised that, in addition to the intrinsic quality of the firm, it is the perception of the firm's quality, from the perspective of investors in the IPO, that has an impact on IPO performance (Ding et al, 2010; Guldiken et al, 2017; Johan, 2010; Pollock & Rindova, 2003). Investor perception of quality is informed not only on the basis of the observable characteristics of the firm, but also by the influence of factors such as listing standards and media coverage, which provide additional information on the IPO readiness of the firm (Guldiken et al, 2017; Johan, 2010). This is discussed further in the sections below, dealing with signalling theory, and the role of listing standards and media coverage as signals of IPO readiness.

For the purpose of this section of the literature review, the sources of information on IPO readiness comprise two broad categories: first, academic literature, including top journals and other journals, and second, business media, including business publications and documents obtained from corporate websites. An initial observation is that there is a lack of

uniformity in the frequency of usage of the term IPO readiness across different sources of information. The term is widely used in business media, relative to academic literature, where the term is used less frequently. There is however broad consistency in the basic interpretation of the term IPO readiness, and in the underlying attributes of IPO readiness. In each case, the term IPO readiness is interpreted as a firm-specific precursor, cause, determinant, or correlate of IPO performance. A review of the concept and attributes of IPO readiness, based on the interpretation of the term in each of the two sources of information described above, is provided to develop an integrated perspective.

In the academic literature, based on reviews of empirical studies on IPO performance, the concept and attributes of IPO readiness are referred to either in similar terms, for example, as “companies’ readiness to go public” (Johan, 2010, p.128), or in related terms such as the correlates, influences, causes and determinants of IPO performance (Certo et al, 2009; Daily et al, 2003, Guldiken et al, 2017). Quantitative, empirical studies of IPOs tend to focus on one or more attributes of IPO readiness, or causes of IPO performance, clustered around themes such as governance, top management teams, social capital, and innovation, and analyse the relationship between the measures selected to represent these attributes, and one or more measure of IPO performance (Certo et al, 2009). Attributes of IPO readiness that are of interest in a study are represented as independent variables, while other relevant attributes of IPO readiness are included as control variables, subject to the objectives of the study and the data availability (Bruton, Chahine & Filatotchev, 2009; Guldiken et al, 2017; Johan, 2010). Control variables also include factors that are not firm-specific characteristics, such as external market influences, which are not related to the IPO readiness of the firm but which influence the analysis of one or more attributes being studied (Guldiken et al, 2017; Johan, 2010). In the quantitative, empirical studies of IPOs reviewed above, the term IPO readiness is referred to either in similar terms, such as the readiness of companies to go public, or in related terms, such as the causes, correlates and determinants of IPO performance. In one study the term IPO readiness is a key term (Sejjaaka, 2011), and in another there is a call for further research on the attributes of IPO readiness (Chaganti, Kumaraswamy, Maggitti & Arkles, 2016). The concept of IPO readiness, referred to in a range of terms, is as an established feature in the academic literature on IPOs.

Based on a review of the usage and relevance of the term IPO readiness in the academic literature, whether used explicitly or referred to in similar or related terms, the studies are

categorised into two groups, on the basis of the focus and objective of the study, and in terms of the type of research question being addressed. The metaphor of building a puzzle is useful. In the first group, which represents the majority of studies, the goal is to build the puzzle of IPO readiness, one piece of the puzzle at a time, based on a well-motivated set of hypotheses for each attribute, but without necessarily aiming to complete the overall puzzle (Bruton et al, 2009; Daily et al, 2003). The focus is on one or more firm-specific attributes of IPO readiness, and the objective is to establish the relationship between IPO readiness and IPO performance, based on the selected attributes of IPO readiness, such as retained equity (Bruton et al, 2009) and the selected measures of IPO performance, such as IPO underpricing (Daily et al, 2003).

In the second group, representing a small minority in the academic literature, the goal is to build the complete puzzle of IPO readiness, rather than working on just one piece at a time. The focus is on the collective set of attributes that constitute IPO readiness, and the objective is to develop the complete picture of IPO readiness, based on a model and measure of IPO readiness (Sejjaaka, 2011). Another study, although part of the first group in its examination of a subset of the attributes of IPO readiness, calls for further research on the complete and prioritised set of attributes of IPO readiness, and the process required to achieve a state of IPO readiness (Chaganti et al, 2016). Further review of the literature, including work to be published, indicates support for research on the process required to achieve a successful IPO, and on the determinants of IPO success, including studies based on surveys of key members of management, such as the CEOs and CFOs in IPO firms (van den Assem, van der Sar & Versijp, 2017). This second group within the academic literature, in its search for a more complete picture of the attributes of IPO readiness, and the process required to achieve a state of IPO readiness, appears to be aligned with the practitioner orientation towards IPO readiness, as reflected in business media, which is reviewed below.

A review of practitioner sources and business literature indicates a strong focus on the concept and attributes of, and the process required to work towards, IPO readiness, by the major accounting and advisory firms, as well as other practitioners, as part of their service offering to firms that are planning to undertake an IPO, and seeking to improve or maximise their IPO performance (Boston Consulting Group, 2017; Deloitte, 2014; EY, 2013; Frey, 2015; Kengelbach, Rodt, & Roos, 2011; KPMG, 2013; PwC, 2011, 2017). The set of attributes associated with IPO readiness include that of having the right strategy and

investment case, management team and board of directors, financial reporting systems, organisational capabilities, and legal and governance structures and systems, as well as compliance with the listing requirements of the exchange associated with the IPO or listing. The attributes mentioned in the business literature are aligned with those in the academic literature, although there is less emphasis in the business literature, compared to the academic literature, on analysing the relationship between specific attributes of IPO readiness, and specific measures of IPO performance, on a quantitative, empirical basis.

Further review of the business literature, based on the term IPO readiness or similar phrases, confirms the strong emphasis by business practitioners on assisting a company to achieve a state of IPO readiness, or to make itself "IPO-ready", as it considers undertaking an IPO or a listing (Cody, 2012; Gould, 2011; Kelley, Burke & Markham, 2011). Such is the importance attached to the state of IPO readiness, that one group of practitioners has applied for a patent for their process of assisting businesses to achieve the state of IPO readiness (Scotto, Boyer, Hope, Krezmien & Hopkins, 2003). The term IPO readiness is also relevant within a broader investment management context. The concept of IPO readiness is related to the term exit readiness, as used by investors in a privately held business. Exit readiness refers to the state of a business when investors, such as venture capital and private equity firms, consider the business to be in a suitable position to be sold, for example in a trade sale, as part of the investors' exit strategy (McKaskill, Weaver & Dickson, 2004). The two terms, IPO readiness and exit readiness, are comparable to the extent that in each case a business is seeking to attract new potential investors by positioning itself as an attractive, sustainable investment. (McKaskill, 2005).

3.2.4 Impact of the GFC on IPO performance

Building on the foundational concepts of IPO readiness and IPO performance reviewed above, the impact of the GFC on IPO performance is discussed next. As noted in section 1.1.1, the GFC plays a central role in the study. The study timeframe is divided into pre-GFC and post-GFC periods, to facilitate a comparison of the two periods, to understand the impact of the GFC on IPO signalling and IPO performance. The causes and consequences of the GFC, and the nature, scale and long-term impact of the GFC, are widely documented and studied across a range of publications (Avgouleas, 2009; Elder, 2014; McKibbin & Stoeckel, 2009; Taylor, 2009; van Heerden & Alagidede, 2012; Wray, 2011). The impact of the GFC on the South African IPO market is evident in 2008, in terms of market trends and

in the decline in the number of IPOs on the JSE and AltX, as discussed in the setting, in chapter 2. The impact of the GFC extends beyond 2008 into the years that follow, indicated in changes in the decision-making and behaviour of market participants, toward increased regulation of market risks, improved management of business risks, and greater aversion to investment risks. Given this background, the general impact of the GFC on the IPO market was to increase the emphasis on risk management, evident in the shift in investor preferences toward larger IPO offers, and larger, more established IPO companies, and a decrease in the level of IPO underpricing, corresponding to the perception of lower risks associated with the larger IPO offers and companies (Henry & Gregorious, 2014; Jindal & Singla, 2017-2018; Leow & Lau, 2018; van Heerden & Alagidede, 2012). The observation of this general trend, from pre-GFC to post-GFC, towards larger IPO offers, larger IPO companies, and lower underpricing (equating to higher IPO performance, adopting a strategic management perspective), provides an important starting point in addressing the research questions, and in developing the hypotheses for the study.

3.2.5 Summary

The concepts of IPO performance and IPO readiness are key elements in the study. There are established measures of IPO performance, one of the key measures being IPO underpricing, which is the change in share price from offer price, or issue price, to closing price on the first day of trading, expressed as a percentage of the offer price or issue price. The IPO performance of a listing firm is dependent on the intrinsic characteristics and quality of the firm, referred to as the IPO readiness of the firm, and the investor perceptions of the firm. In the review of academic literature, academic studies were split into two groups – studies in which the focus is on one or more individual attributes of IPO readiness, and studies in which the focus is on the overall state of IPO readiness, based on a collective set of attributes. While this is a simple approach to categorising different studies of IPO readiness, it is limiting in the way it positions IPO studies along a single dimension, from individual to collective, in the scope of attributes of IPO readiness. More significantly, this approach does not consider the theory base supporting academic studies of individual attributes of IPO readiness. Another way to examine the study of IPO readiness is based on the insight that individual attributes of IPO readiness provide a strong indication, or a signal, of the overall state of IPO readiness of a firm, thereby influencing investor perceptions of the quality of the firm, and impacting the IPO performance of the firm. This insight is based on the explanatory framework in signalling theory, and its application to the signalling of IPO

readiness. The use of signalling theory introduces a new dimension to the study of how information on IPO readiness is communicated by listing firms to potential investors. Signalling theory is the primary theory base used in academic studies adopting a strategic management perspective on IPO readiness and its impact on IPO performance. The next step is a review of signalling theory in strategic management and IPO research.

3.3 SIGNALLING THEORY, IPO RESEARCH, AND THE GFC

3.3.1 Primary theory base for the study

Building on the foundation concepts discussed in section 3.2, this section reviews the relevant literature on signalling theory, the primary theory base for the study. The objectives are to describe the explanatory framework of signalling theory, the role of signalling theory in the context of strategic management research, and the application of signalling theory to IPO research, focusing on signals of IPO readiness and their relationship to IPO performance. The review seeks to understand the impact of the GFC on the IPO signalling environment, including changes related to exchange models, listing standards, and media coverage of IPOs, and the impact on different signals on IPO performance. Signalling theory represents an explanatory framework for the impact of different types of information on decision-making and related performance, under conditions of information asymmetry, in a given decision-making environment, or signalling environment (Connelly et al, 2011). Despite the significant body of knowledge on signalling, based on previous research, there are still areas that would benefit from further research, including research on the implications of changes in the signalling environment (Connelly et al, 2010), and research on the implications of an increase in information availability, linked to a corresponding reduction in information asymmetry (Park et al, 2016).

3.3.2 The explanatory framework of signalling theory

Signalling theory has its origins as a Harvard University doctoral dissertation in economics (Spence, 1973). The study was on the structure, influence and impact of certain types of information, regarding prospective employees in job markets that are characterised by an information gap, or an information asymmetry, between job candidates and their potential employers. The dissertation was published as a study on job market signalling (Spence, 1973). Spence frames the hiring decision as one relating to investment under conditions of

uncertainty, in which the job applicant has to make a decision on how best to convey information on his or her potential future productivity in the job, in a manner that maximises the net gain to the job applicant (Spence, 1973). In this framework, signals are certain types of information, such as those provided by job candidates, in particular those relating to observable characteristics that are subject to change by the signaller, or the sender of the information, such as his or her level of education. Signals entail a cost to the signaller (both financial and other costs, such as personal effort), and are therefore not likely to be used in an indiscriminate manner by all potential signallers seeking to maximise their net gain.

The value of a signal is that it communicates reliable information to the recipient, in this case the employer, on the unobservable potential of the signaller, the job applicant, in a manner that separates the signaller from other competing job applicants with lower potential. The explanatory model makes a reasonable assumption that the thinking and beliefs of the recipient are informed over the course of time, on the basis of similar signals from a series of senders, and on the basis of relationships between signals and observed results. This informs the decisions of the recipient who then responds appropriately to signals from future senders (Spence, 1973). Thus, as an employer develops knowledge over time, of the relationship between a certain educational qualification and the productive capability of the holder of that qualification, the employer is in a position to act, in an informed manner, on future signals of a similar type, in order to make effective and appropriate decisions regarding whom to employ, for a given level of remuneration.

Beyond the context of the original study by Spence (1973), and taking a broader perspective, signalling theory is described as a model for explaining and predicting how an economic and informational system, comprising senders, signals, recipients and decisions, results in the allocation of economic resources in an optimal manner, maximising net gains for all key players (Connelly et al, 2011). For example, on the assumption of *rational and informed decisions* by key players in the system, job applicants with an inherent capability will obtain certain educational qualifications, at a certain cost, while other job applicants, with a lower inherent capability, will not pursue the same costly qualifications, as this would not maximise their net gain. Employers, on the basis of the observed relationship between a certain qualification and the productive capability of the holder of the qualification, will employ the holders of those qualifications at a level of remuneration that results in job applicants maximising their net gain, based on the level of remuneration less the costs of obtaining the

qualification. Signalling theory, as conceptualised by Spence, thus explains how, under conditions of information asymmetry between key parties to a transaction, signals inform the decisions of the parties, in terms of both senders and recipients, in a manner that maximises the net economic benefits for both parties.

The explanatory framework provided by signalling theory, based on the structure, influence and impact of certain types of information on decision-making under conditions of information asymmetry, has evolved through the work of scholars in fields such as strategic management (Bergh et al, 2014), entrepreneurship (Certo et al, 2009), and human resource management (Suazo, Martinez & Sandoval, 2009), and has been applied in a wide range of decision-making contexts in which there is information asymmetry between two parties in a transaction, including that of IPOs (Connelly et al, 2011; Ding et al, 2010; Guldiken et al, 2017; Johan, 2010; Park et al, 2016; Pollock & Rindova, 2003). The pervasive acceptance of signalling theory is attributed to its intuitive appeal, based on a model of information exchange and performance-optimising decision-making impact, in which the key constructs are the signaller, the informational signal, the receiver of the information, the feedback from the receiver back to the signaller, and the signalling environment, or context (Connelly et al, 2011). The key concepts in signalling theory, in providing an explanatory and predictive framework, and connecting information exchange, decision-making, and performance maximisation in different business environments, have found strong resonance with scholars in the field of strategic management. As discussed below, there is a natural fit between strategic management and signalling theory.

3.3.3 Signalling theory in strategic management research

An initial observation, in describing the role of signalling theory in strategic management research, is related to the similar timeframes in their respective origins, suggesting a shared research and business environment. The formal, academic study of strategic management originated between the late 1960s and the early 1980s, a key milestone being the inclusion of a Business Policy course in the curricula of U.S. business school programs in 1969, demonstrating the support of the American Assembly of Collegiate Schools of Business for the new academic area (Durand et al, 2017). The Business Policy course was designed as an integrative course aimed at general managers. Just over a decade later, the Strategic Management Journal (SMJ) was founded in 1980, and the Strategic Management Society

(SMS) was founded in 1981, indicating academic and practitioner acceptance of strategic management as a key discipline.

The linkages between context, strategy and performance represent another common point. The academic study of strategic management initially focused on the relationships between three key aspects of business: context or the external business environment, including industry structure; strategy and policy, including corporate, business and functional level strategy; and firm performance, regarded as a fundamental domain of strategy and strategic management (Durand et al, 2017). The scope of strategic management as a field of study grew from the early years of its establishment as it borrowed from, and extended into, other field of research in business and management, resulting in a current theory base which is extensive (Durand et al, 2017). Based on a review of research in strategic management studies, signalling theory was ranked as one of the top ten theories most frequently used in strategic management research, out of a total of 194 theories used in strategic management studies (Kenworthy & Verbeke, 2017). This is a further indication of the shared perspective of signalling theory and strategic management research.

In assessing the role of signalling theory in strategic management research, a common focus is the objective of making informed decisions, aimed at maximising performance, within a particular environment or context (Connelly et al, 2011; Durand et al, 2017). Signalling theory is regarded as a major contributor to strategic management research (Bergh et al, 2014), which in turn informs the development of signalling theory by identifying research gaps, and motivating opportunities and directions for future research. One example is the role of the *signalling environment* in signalling theory. The business context or environment is a key dimension in strategic management (Durand et al, 2017). A change in the business environment of an organisation prompts a consideration of changes required in the strategy of the organisation. In a review of IPO research, how have changes in the signalling environment been considered in applying signalling theory to IPO research? In their review of signalling theory, Connelly et al (2011) identify the signalling environment as an area that has not been adequately researched. They also highlight the role of information asymmetry as an area that would benefit from further study in management research. Both these issues – a change in the signalling environment and the role of information asymmetry, need to be considered in the application of signalling theory to IPO research, and are addressed in the study.

3.3.4 Signalling theory in IPO research

A key challenge in the strategic management of IPOs is how to manage decision-making in an environment characterised by the information asymmetry between firms or companies undertaking an IPO (referred to herein as the IPO company), and potential investors, and in which the IPO performance of the IPO company is influenced by the decision-making of potential investors (Daily et al, 2003). The implications for decision-making dynamics are as follows: the greater the level of information asymmetry between the IPO company and potential investors, the greater the uncertainty facing potential investors, the lower the price they would be willing to pay for the shares, and the lower the level of IPO performance the IPO company is likely to achieve, indicated for example in a higher level of IPO underpricing (Daily et al, 2003). Given these dynamics, the more an IPO company is able to improve the communication to potential investors of its investment attractiveness and its level of IPO readiness, the more the company would be able to inform investor perceptions of the company, and the better the level of IPO performance the company is likely to achieve, given the reduction of investor uncertainty.

Signals of IPO readiness provide a mechanism for an IPO company to communicate its potential investment performance to potential investors. Signalling theory contributes to academic research on IPOs by providing a framework, in the context of information asymmetry, that assists in explaining the behaviour of IPO companies and investors, in the communication and interpretation of information on different attributes of IPO readiness, and in predicting outcomes reflected in IPO performance. In practice, this assists in informing the decisions of key stakeholders in IPOs, including IPO companies, investors, and exchanges, and the decisions of IPO practitioners, including advisers and underwriters. Signalling theory represents a major theory base in IPO research (Connelly et al, 2011; Daily et al, 2003), including a wide range of studies on the relationship between different attributes of IPO readiness (such as retained equity, governance, and top management team composition), and different measures of IPO performance (including change in share price, and IPO underpricing, a key measure used in IPO research) (Bergh et al, 2014; Bruton et al, 2009; Cohen & Dean, 2005; Daily et al, 2003; Reuer et al, 2012).

There are two key premises of signalling theory: first, the signal is observable in advance of the decision-making of the signal recipient; second, signals are costly or difficult to imitate

by non-qualifying candidates (Daily et al, 2003). These key premises, and the application of signalling theory to IPO studies, are outlined in a meta-analysis on IPO underpricing (Daily et al, 2003). The study explains the key signals included in the IPO prospectus, a document in which the listing firm provides key information to potential investors. Ten signals are identified that have been empirically tested as signals of IPO company quality, or IPO readiness. A brief description of these signals, together with the interpretation of the potential or risk of the IPO company, and the relationship with IPO performance, are summarised in Table 3, as an example of the types of information that represent signals of IPO readiness.

Table 3. Examples of empirically researched signals of IPO readiness (Daily et al, 2003).

Information contained in the IPO prospectus	*Description of the information; Signalling role of the information; Expected association with IPO performance; selected references.*
Retained equity	- Percentage of equity retained by firm owners and executives post-IPO - The higher the retained equity, the better the perceived potential of the firm - Expected negative association with IPO underpricing - Positive association with IPO performance - Jensen & Meckling, 1976; Leyland & Pyle, 1977
Underwriter prestige	- Reputation and experience of underwriter or investment banker for the IPO - The better the underwriter reputation, the lower the perceived risk of the firm - Expected negative association with IPO underpricing (certain exceptions) - Positive association with IPO performance - Beatty & Ritter, 1986; Carter, Dark, & Singh, 1998
Auditor reputation	- Reputation and experience of auditor of the listing firm - The better the auditor reputation, the lower the perceived risk of the firm - Expected negative association with IPO underpricing - Positive association with IPO performance - Feltham, Hughes, & Simunic, 1991; Michaely & Shaw, 1995
Number of risk factors	- Number of risk factors included in the IPO prospectus document (based on list of factors firms are expected to declare in the prospectus, per SEC rules) - The higher the number of risk factors, the higher the perceived risk of the firm - Expected positive association with IPO underpricing - Negative association with IPO performance - Beatty & Zajac, 1994; Welbourne & Cyr, 1999
Firm size	- Firm size, for example in terms of size of assets, sales, net income, etc. - The larger the firm, the lower the perceived risk of the firm - Expected negative association with IPO underpricing - Positive association with IPO performance - Finkle, 1998; Ibbotson, Sindelar, & Ritter, 1994
Firm age	- Firm age, from date of founding to IPO - The older the firm, the lower the perceived risk of the firm - Expected negative association with IPO underpricing - Positive association with IPO performance

	- Mikkelson, Partch, & Shah, 1997; Ritter, 1998
Information contained in the IPO prospectus	*Description of the information; Signalling role of the information;* - *Expected association with IPO performance; selected references.*
Number of uses	- Number of intended uses of the IPO proceeds listed in the prospectus - The greater the number of uses, the higher the perceived risk of the firm - Expected positive association with IPO underpricing - Negative association with IPO performance - Beatty & Ritter, 1986; Rasheed, Datta, & Chinta, 1997
Venture capital equity	- Extent of capital from venture capital / private equity investors - The greater the VC/PE investment, the lower the perceived risk of the firm - Expected negative association with IPO underpricing - Positive association with IPO performance - Cyr, Johnson, & Welbourne, 2000; Fried & Hisrich, 1995
Offer price	- Initial price of the IPO - The higher the price, the lower the perceived risk of the firm (higher quality) - Expected negative association with IPO underpricing - Positive association with IPO performance - Aggarwal, Prabhala, & Puri, 2002; Ibbotson, Sindelar, & Ritter, 1988
IPO gross proceeds	- Initial gross proceeds of the IPO (number of shares x offer price) - The higher the proceeds, the lower the perceived risk of the firm - Expected negative association with IPO underpricing - Positive association with IPO performance - Dunbar, 2000; Jain & Kini, 2000

Extending the set of IPO signals analysed by Daily et al (2003), described in Table 3, Certo et al (2009) identify four broad themes in IPO studies, representing different signals of IPO company quality, or IPO readiness. Three of these themes are positively associated with IPO performance, namely governance (representing the level of risk management and protection of shareholder interests), upper echelons (representing the capabilities of the top management team), and social influence (representing the social capital of the firm, based on its relationships with key players, such as VC/PE firms). The fourth theme, innovation (representing the firm's investment in research and development expenditures, combined with the firm's management capabilities) has a mixed association with IPO performance, positive in some studies, negative in others, depending on the link between three factors: first, investment in innovation, second, the perceived capabilities of management to convert investment into positive returns, and third, the transparency and availability of information, or conversely the level of information asymmetry, to allow investors to assess the overall risks and potential benefits of the investment in innovation.

Building on the foundation of key IPO signals and themes described above, two additional signals of IPO readiness are noteworthy. Both have been subject to changes in the signalling environment, which, as suggested by Connelly et al (2011), represents an under-researched area in signalling theory. The two signals are listing standards and media coverage of IPOs. These two signals of IPO readiness are discussed in section 3.4 and 3.5, focusing on understanding, first, the impact of each signal on IPO performance, and secondly, the impact of the GFC on the signalling impact of these two signals, in line with the study objectives.

3.3.5 Impact of the GFC on IPO signalling

Building on the discussion of signalling theory in IPO research, the impact of the GFC on signalling in IPOs follows, in line with a key theme in the study, the impact of the GFC on key IPO signals, and on the impact of these signals on IPO performance. As discussed in section 3.2.4, on the impact of the GFC on IPO performance, the key trends from pre-GFC to post-GFC are towards increased awareness of, sensitivity to, and management of, risks represented by companies undertaking an IPO. Given the increased emphasis on managing risks, and a greater preference for higher quality, and adopting a signalling theory perspective, it is theorised that, in the post-GFC period, signals of the quality or IPO readiness of an IPO company, such as listing standards, would result in an increased impact on IPO performance (reflected in lower IPO underpricing), compared with the pre-GFC period. Extending the rationale, it is theorised that the increased provision of information on the IPO company, including information provided by the company itself (in the IPO prospectus), or in media coverage by external commentators, results in a greater impact on IPO performance, given greater investor sensitivity to information on the IPO company. These points, and the related literature, are discussed further in section 3.4, 3.5, and 3.6, on the impact of listing standards, media coverage, and other explanatory variables on IPO performance, and the impact of the GFC on the signalling impact of key signals.

3.4 IMPACT OF LISTING STANDARDS ON IPO PERFORMANCE

3.4.1 Listing standards as a signal of IPO readiness

Listing standards are designed by an exchange as the set of requirements for companies listing on the exchange's trading platform, divided into requirements or standards first for the initial listing and second for the continued listing, and are associated with the quality of the

companies trading on the exchange (Broom & Turner, 2016). An example of the type of items included in an exchange's listing requirements, in this case referring to the NASDAQ exchange, is provided in Table 4.

Given the intrinsic link between an exchange and its set of listing standards, it is evident that listing standards have existed for as long as there have been exchanges for companies to list on. Yet, the analysis of listing standards as a signal in IPO markets is a relatively recent topic in academic studies of IPO signalling (Ding et al, 2010; Johan 2010). A literature review of the conceptual and empirical assessment of listing standards as a signal of IPO readiness provides strong support for the inclusion of listing standards in the set of IPO signals.

In a conceptual consideration of the role of listing standards as a signal of IPO readiness, the two criteria for a signal as identified by Daily et al (2003), as outlined in section 3.3.4 above, provide a useful starting point. First, a signal should be observable in advance of the recipient's decision-making. Second, a signal should be costly or difficult to imitate by non-qualifying candidates. Listing standards, referring here to the initial listing requirements set by an exchange for a company to list on its platform, meet these criteria. For a company undertaking an IPO or a listing, the listing standards are known in advance by potential investors. Secondly, given the stringent listing requirements set by different exchanges, for example NASDAQ (Broom & Turner, 2016), compliance with the requirements would be costly and difficult (if not impossible) to imitate for non-qualifying companies.

Table 4. Example of items included in listing requirements (NASDAQ) (Broom & Turner, 2016)

Type of standards	Type of requirements	Specific items included (requirement levels not indicated)
Initial listing standards	Financial requirements	- Pre-tax earnings - Cash flows - Market capitalisation - Revenue - Maximum bid price - Minimum market makers - Stockholders' equity - Operating history - Corporate governance
	Liquidity requirements	- Beneficial shareholders, or, Beneficial shareholders and average monthly volume over past 12 months

		- Publicly held shares - Market value of public shares, or, Market value of public shares and shareholders' equity - Market value of listed securities, or, Total assets and total revenue
Continued listing standards	Combined requirements	- Stockholders' equity - Market value of listed securities, or, total assets and total revenue - Publicly held shares - Market value of publicly held shares - Bid price - Shareholders (round lot holders) - Number of market makers - Corporate governance

The explanatory framework for signalling theory, developed initially by Spence (1973), serves as a further conceptual basis for assessing whether listing standards fit the requirements of a signal. According to this framework, as described earlier, a signal communicates reliable information to the recipient, in this case the potential investor, on the unobservable potential of the signaller, in this case the IPO company, in a manner that separates the signaller from other competing signallers with lower potential, such as companies that do not qualify to list. Listing standards in the IPO market serve as a signal in a similar manner to educational qualifications in the job market, the economic setting used by Spence (1973) to conceptualise and illustrate the signalling theory framework. There is a potential benefit to job candidates with a higher productivity potential, to signal their higher potential (to potential employers) by obtaining a higher educational qualification. Similarly, there is a potential benefit to firms with a higher earnings and performance potential, to signal their higher potential (to potential investors) by qualifying for higher listing standards.

Building on the conceptual approach above, empirical studies provide further support for the signalling role of listing standards. The analysis of listing standards as a signal of IPO readiness is relatively recent, two key studies being those by Johan (2010) and by Ding et al (2010). An observation, in terms of the research methodology used in these studies, is that the analysis is based on a comparison of the IPO performance of companies on two different but comparable exchanges, over the same time period, and operating under comparable economic and market conditions. Johan (2010) compares the Toronto Stock Exchange's senior board (TSX) and junior board (TSX-V), while Ding et al (2010) compare the Hong Kong (HK) second board market and the Shenzhen (SZ) second board market.

The methodology differs between the studies in terms of how they differentiate between the two exchanges.

In Johan (2010), the methodology makes use of a dummy variable to distinguish IPOs on one exchange versus the other, assessing the impact of different sets of listing standards on a composite basis, rather than on the basis of different variables for individual requirements in listing standards. In Ding et al (2010), the characteristics and statistical analyses of IPOs on each of the two boards are compared, as a means of testing various hypotheses on the difference in quality being signalled by the IPOs on each exchange. The findings in these studies support the view that listing standards serve as a signal of IPO readiness. IPOs on TSX have a lower level of IPO underpricing, equating to a higher level of IPO performance (Johan, 2010). The studies indicate that listing standards are a form of entrepreneurial signalling by the IPO company, indicating to potential investors the quality and long term potential of the company. The higher quality and better prospects associated with IPOs on HK are reflected in the comparison of company characteristics for each set of IPOs (Ding et al, 2010).

3.4.2 Listing standards in a changing environment

Beyond a review of studies on listing standards as a signal of IPO readiness, a relatively recent topic in IPO signalling studies, the literature review on listing standards needs to be set within the broader context of a changing global stock exchange environment. Some of the changes are part of the longer-term impact of the GFC, in which there has been increased emphasis on the regulation of financial markets and the management of risk (Avgouleas, 2009; Elder, 2014). Other changes are part of the ongoing development and globalisation of capital markets and stock exchanges, which commenced before the GFC (Pagano, Randl, Roell & Zechner, 2001), and the resulting competition between stock exchanges (Chemmanur & Fulghieri, 2006). There are indications of significant changes in the stock exchange environment, with implications for the signalling environment of IPOs, including possible changes in the role of listing standards as a signal of IPO readiness. The essential role played by stock exchanges in the global economy is reflected in the range of academic studies of stock exchanges. Studies of interest, which provide context for an examination of the signalling role of listing standards, include the analysis of cross-listings and the requirements for stock exchange success (Pagano et al, 2001), the analysis of

cross-listings and listing standards on different exchanges, linked to stock exchange competitive environment (Chemmanur & Fulghieri, 2006), a cross-country analysis of stock exchange development and the link to policy formation in different countries (Bayraktar, 2014), the analysis of why there is a disproportionately lower level of listings on US stock exchanges, relative to the size of the economy (Doidge, Karolyi & Stulz, 2015), the effect on a firm's trading-related market quality as a result of a switch in listing from a junior or growth market to the main board of an exchange (Park, Binh & Eom, 2016), as well as a landmark essay questioning the usefulness of the very concept of a public corporation (Jensen, 1989).

These studies indicate that listing standards serve not only as a signal of market quality, they are also the basis for managing competitive and cooperative relationships between exchanges, both within countries (for example between the junior and senior board of an exchange), and between different countries (for example, between less and more developed economies and exchange markets). Listing standards represent a type of index that help investors to differentiate between, and to calibrate the positioning of, different listing markets and trading platforms, based on the different levels of market quality associated with (and signalled by) different sets of listing requirements (Broom & Turner, 2016). While these studies describe an already complex and dynamic landscape for stock exchanges and listing standards, the environment appears set to change even more.

The global stock exchange market is part of a larger global market for entrepreneurial finance. This is not only attracting new forms of finance and new players, including venture capital and private equity, corporate venture capital, government venture capital, and crowdfunding, but also challenging the role of traditional stock exchanges, to the point of disintermediation, due to factors relating to both supply and demand (Block, Colombo, Cumming & Vismara, 2017). Developments in the entrepreneurial finance market include new online platforms connecting providers and seekers of capital, bypassing traditional intermediaries such as stock exchanges. The threat of disintermediation faced by established exchanges, based on deregulation of exchange markets and the growth of alternative trading platforms, is highlighted in Dombalagian (2015), which positions the development of tiered exchanges, such as NASDAQ, and experimental markets, such as London's Alternative Investment Market (AIM), as examples of the trend toward a new generation of exchanges. The development of new exchanges is encouraged and facilitated

by the government and regulatory authorities in different countries as a means of developing the market for entrepreneurial financing (Block et al, 2017; Dombalagian, 2015).

In the South African market, the establishment of AltX in 2003, as an alternative to the JSE main board, is an example of the development of new exchanges, in line with the global trend (Gstraunthaler, 2010). A more recent development in the exchange environment in South Africa, has been the licensing and establishment of new exchanges, including ZARX and 2AX, intended by the government and the Financial Services Board (FSB) regulatory authority to encourage competition in the exchange market, and a greater degree of financial inclusivity (Omarjee, 2017; ZARX, 2017). The listing standards of the new stock exchanges, while reflecting compliance with basic regulatory requirements, appear to emphasize ease of listing and trading, rather than the quality of the listed firms, as has been the case with for the JSE and AltX, the more established exchanges in South Africa (ZARX, 2017). The South African exchange market and IPO environment, characterised by an evolving and diverse set of exchange models and listing standards, is resonant of the global exchange market and IPO environment, in which listing standards of different exchanges are a form of competitive differentiation across different IPO markets (Broom & Turner, 2016). This suggests that the signalling role of listing standards in developed markets, as indicated in Johan (2010), would extend to the exchange market and IPO environment in smaller markets such as South Africa, in which there is a lack of previous IPO signalling studies.

3.4.3 Impact of the GFC on the signalling impact of listing standards

Set against the background of these broad changes in the IPO environment, characterised by evolving financial markets, exchange models and listing standards, the GFC represented a more specific, accentuated and significant change in global financial markets, with implications for strategic management across a range of markets and organisations (Aguilera et al, 2019), including financial markets (Avgouleas, 2009). Studies of the GFC, in the context of its impact on the IPO market and on IPO signaling, indicate marked changes in the IPO market and the IPO environment. There is a split in the literature between studies that focus on the impact of the GFC on various accounting and finance related characteristics of IPO companies and their performance, before and after the GFC (Henry & Gregoriou, 2014; Jindal & Singla, 2017-2018; Leow & Lau, 2018; Mohohlo & Hall, 2018; van Heerden & Alagidede, 2012), and a smaller set of studies that focus on the impact of the GFC on the impact of various IPO signals, limited to company-level variables such as

information disclosure, company size, and offer pricing, on IPO underpricing (Garanina & Dumay, 2014; Li et al, 2018).

In terms of the changes from pre-GFC to post-GFC, the findings in these studies are summarised as follows: there was a decrease in the number of IPOs; there was a change in the characteristics of IPO companies, with post-GFC companies being larger in size, with more established track records, and providing greater information disclosure; there was a decrease in the level of IPO underpricing; and the impact of underpricing has differed across different industries. The interpretation is that the experience of the GFC has made investors more sensitive to the quality of IPO companies, with a preference for larger companies (although the results are varied in terms of impact of size of the companies), and investors have been more responsive to information disclosures. Further research on the impact of the GFC on the IPO market in different geographic regions and industries is identified as an opportunity for scholars in this field (Li et al, 2018). Studies of the impact of the GFC on the IPO signaling environment, indicating the increased emphasis placed by investors on the IPO readiness of individual companies and on the quality of the overall market, suggest that the signaling influence of listing standards would increase after the GFC, with an increased impact on IPO performance.

In developing an hypothesis on the changing impact of listing standards on IPO performance, the key points in the literature review are summarised as follows. First, a review of the concept and measures of IPO performance has highlighted IPO underpricing as one of the key measures in scholarly studies of IPO performance. Second, a review of the concept and attributes of IPO readiness has highlighted the accepted usage of IPO readiness in both theory and practice, with a range of attributes being empirically tested, in their impact on IPO performance, across various IPO studies. Third, a review of the explanatory and predictive framework represented by signalling theory has highlighted the well-established application of signalling theory to strategic management and to IPOs, for example the testing of various attributes as signals of IPO readiness. Fourth, a review of the role of listing standards as a signal of IPO readiness has highlighted the positive impact of listing standards on IPO performance, in which higher listing standards (for example, the standards of a senior board relative to a junior board) is associated with lower IPO underpricing or higher IPO performance. Fifth, a review of the changing signalling environment of exchanges and listing standards has highlighted the changing role of listing

standards, with new generation exchanges appearing to place lower emphasis on the use of listing standards as a signal of IPO readiness, and instead emphasising lower listing costs and greater financial inclusivity. Sixth, based on the review of studies on the impact of the GFC on the IPO market, the GFC serves as a valid point of delineation in the study, dividing the study timeframe into pre-GFC and post-GFC periods, and facilitating the assessment of the changing impact of IPO signals on IPO performance, based on a comparison of pre-GFC and post-GFC IPOs. Finally, studies of the impact of the GFC on the IPO signaling environment suggest that the signaling influence of listing standards would increase after the GFC, as a result of increased investor sensitivity to risks. Based on these points, the hypothesis relating to the first research question, on the change in the impact of listing standards on IPO performance, comparing pre-GFC and post-GFC, is as follows:

Hypothesis on the changing impact of listing standards on IPO performance:

H1. The impact of listing standards on IPO performance increased from pre-GFC to post-GFC

3.5 IMPACT OF MEDIA COVERAGE ON IPO PERFORMANCE

3.5.1 Media coverage as a signal of IPO readiness

Signalling theory was conceptualised as a framework to explain decision-making in the context of an economic and information system distinguished by certain characteristics, including information asymmetry between two parties in a transaction (Spence, 1973; Connelly et al, 2011). Taking a simplified approach, signalling is described as the communication of information in a manner that influences the decision-making of the recipient. Expressed in this way, it is possible to apply the explanatory framework of signalling theory to the phenomenon of media coverage.

Media coverage is described as information communicated via a range of media, including printed media (such as newspapers), broadcast media (such as radio and television broadcasts), online media (such as websites, blogs, and discussion forums), and social media (such as Facebook, Twitter and LinkedIn) (Valkenburg et al, 2016). Media coverage of a particular event communicates information and influences the decision-making of the recipient (Valkenburg et al, 2016). This suggests that signalling theory is applicable to media

coverage, even if the media coverage does not originate from the traditional sender as envisaged in the signalling theory framework. For scholars in signalling theory and IPO research, several questions arise from combining the framework of signalling theory to the phenomenon of media coverage, and applying this integrated approach to IPO studies. One question is whether media coverage, in the context of the IPO market, affects the IPO performance of listing firms. Another is whether media coverage serves as a signal in the IPO market, as a signal of IPO readiness. The literature review explores these questions, and examines the changing signalling environment represented by changes in the media environment.

The study by Park et al (2016) raises the possibility of the role of media coverage in IPO-related signalling, but leaves open the questions of whether media coverage has an impact on IPO performance, and whether media coverage is regarded as a signal of IPO readiness in itself. The study, based on an unsuccessful attempt to replicate the empirical findings of earlier studies on signalling in IPOs, suggests that increased information availability on IPOs has changed the signalling environment by reducing information asymmetry, thus causing a change in the signalling effectiveness of certain types of information that had previously been shown, empirically, to provide a signal of IPO readiness. The study calls for future research on signalling in the context of the changing, more information-intensive signalling environment.

In their study on the role on the impact of media coverage on IPO performance, Guldiken et al (2017) more directly address the questions raised above, regarding the role of media coverage in IPO signalling. The study provides empirical support for the impact of media coverage on IPO performance, specifically the impact of the volume of media coverage (measured by the percentage of total articles in a selected database, for the period of one week prior to the IPO), and the uncertainty of tone (measured in the use of a list of words that connote uncertainty of tone), on change in stock price one week after the IPO. It is notable that the variables selected by the study do not include IPO underpricing. The dependent variables are change in price one week after the IPO, and trading volume, in the week following the IPO. However, the change of price after one week provides support for the relationship between media coverage and change in share price. It is also noted that the selection of one week prior to the IPO as the period for analysing articles is based on practical considerations. The authors suggest that future studies should extend the period

of media coverage prior to an IPO, for example to *one month prior to an IPO*, a guideline for this study. Guldiken et al (2017) argue the case for the application of signalling theory to media coverage, the view being that media coverage should be regarded as a signal in IPO markets, and as a signal of the quality of a firm undertaking an IPO.

Although the study of media coverage on the basis of signalling theory is relatively recent, including the study by Guldiken et al (2017), the broader topic of media effects in the IPO market is well established, as illustrated in the study by Pollock & Rindova (2003), which analyses media coverage in IPOs on the basis of legitimacy theory and social structures as the primary theory base. The findings in Pollock & Rindova (2003) provide empirical support for the impact of media coverage on IPO performance, specifically the impact of the *volume of media coverage* (measured by the *number of articles*) on *IPO underpricing,* a guideline for this study. Interestingly, the findings of the study by Pollock & Rindova (2003) do not provide support for the impact of tenor of media coverage (positive versus negative tone of articles) on IPO performance, measured in terms of both IPO underpricing, and turnover of the share's trading on the first day of trading. The findings also did not provide support for the impact of volume of articles, on volume of trading in the week after the IPO. The key relationship was between *volume of media coverage* and *IPO underpricing*, which is used as a guideline for the selection of variables in this study, discussed in section 3.5.3.

The argument for regarding media coverage as a signal in an IPO context suggests a degree of change, or evolution, in the definition and interpretation of a signal, when compared to how a signal was initially envisaged by Spence (1973). In the initial signalling theory framework, one criterion for a particular type of information to be regarded as a signal was that the characteristic, to which the informational signal related, could be changed by the signaller to provide a signal of the signaller's level of quality. For example, in the case of a job applicant, the individual could improve his or her educational qualifications in order to send a signal of higher productivity potential. On this narrow basis, if a firm controlled or largely influenced the media coverage of its IPO, and where the media coverage provided information on the quality of the firm, then the media coverage would be a signal. Guldiken et al (2017) expand the concept of a signal by arguing that a signal should also be considered from the perspective of the recipient, or investors in the case of IPOs. Taking this broader approach, media coverage generated from sources *external* to the firm, and *independent* of the firm, particularly by credible sources of media coverage, such as

reputable financial media, should be regarded as a signal. This is supported by empirical studies on the relationship between media coverage and IPO performance.

3.5.2 Media coverage in a changing environment

The case for including media coverage within the signalling theory framework is further strengthened when one considers the changes in the media environment over the last decade, and the impact of these changes on the signalling environment. The discussion on the more information-intensive media environment, in the study by Park et al (2016), is supported by their brief review of the emergence and growth of different sources of online financial media and information platforms, including social media such as Twitter. The commentary in Park et al (2016) conveys the sense that the changing media environment is common cause, so pervasive that the change in the media environment and its effects in the business environment should be regarded as general knowledge. Beyond this reliance on general knowledge, a review of the literature in the area of media and communication indicates there is empirical support for the view that there have been significant changes in the media environment, in particular due to changes in digital media, which have impacted on spending patterns in media coverage (McMillan & Childers (2017). This study, which examines changes in trade press coverage in the decade from 2005 to 2014, highlights the rate of growth of media coverage via online media. The effect of changing trends in the information environment, in particular due to changes in online media, suggest that the view expressed by Park et al (2016) is warranted. There have been significant changes in the media environment in the last 10 to 15 years, in particular in the impact of online media. The literature review provides support for the view that the effect of the changing signalling environment on signalling theory, linked to the growing influence of online media, over the last 10 to 15 years, would benefit from further research. Based on this point, the guidance suggested for the current study is to ensure the inclusion of online media coverage in the overall measure of media coverage. The literature review supports the selection of the time period of the last 15-20 years as a significant period for analysing the change in the media environment as a result of the growth in online media. This time period coincides with the study review timeframe – from 2003 to 2019. The time period for the assessment of the changing impact of media coverage on IPO performance is delineated into pre-GFC and post-GFC, in line with the delineation for the assessment of the changing impact of listing standards on IPO performance. Although there is no indication in the literature of a specific point in time in which there was a change in the media environment, the period of change

corresponds broadly with that of pre-GFC versus post-GFC, which also corresponds with the two time periods implicit in Park et al (2016).

3.5.3 Choice of variables in the analysis of media coverage

The literature review provides guidance on the choice of variables to be used in the analysis of media coverage in an IPO signalling study. Key variables that have been used, in previous studies, to measure media coverage are: the *volume (total number)* of articles (Guldiken et al, 2017; Pollock & Rindova, 2003)*; the uncertainty of tone* of media coverage (Guldiken et al, 2017)*;* and the *tenor (positive versus negative) of media coverage* (Pollock & Rindova, 2003). Findings support the hypothesized relationship of *volume of media coverage* with IPO performance (Guldiken et al, 2017; Pollock & Rindova, 2003). Key measures for analysing the impact on IPO performance include *IPO underpricing*, and *change in price one week after the IPO*. The literature review also highlights and supports the consideration of media coverage based on online media, as a key influence within the broader concept of media coverage. The literature review provides guidance for the choice of dependent variable(s), and independent variable(s), for the impact on media coverage on IPO performance. Aligned with the support in the literature for *IPO underpricing* as the choice of measure of IPO performance in the impact of listing standards (Johan, 2010), there is support for IPO underpricing as the measure of IPO performance in the impact of media coverage (Pollock & Rindova, 2003), making a strong case for the selection of *IPO underpricing* as the measure of IPO performance for the dependent variable in the study. Given this choice of dependent variable, there is correspondingly a strong case for the choice of *volume of media coverage*, measured by the *number of articles* as the choice of independent variable for media coverage in the study, given the empirical evidence for the relationship between the two variables (Pollock & Rindova, 2003).

3.5.4 Introducing a complementary theoretical perspective

At this point in the literature review, the complementary perspective of agenda-setting theory is introduced, to assist in building a strong theory base for the formation of the hypothesis related to the changing impact of media coverage on IPO performance. The addition of agenda-setting theory to the study responds to the possible perception that signalling theory provides only limited support for the inclusion of media coverage as a signal of IPO readiness. As discussed in the review of Guldiken et at (2017), widening the definition of a signal to include information from sources other than the IPO firm, or the entity considered

the sender or signaller in the initial signalling theory framework, is a relatively recent development in signalling theory. In support of the inclusion of signals from different sources, one of the questions listed for future research in signalling theory, in Connelly et al (2011, p.57-58), refers to the impact of signals from different signallers, including situations of both similar signals and conflicting signals, from different signallers. The literature review on signalling theory thus provides some support for the inclusion of signals from various sources. In order to overcome the possible limitations of signalling theory, we consider whether the complementary perspective of agenda-setting theory assists in addressing the question of signal from sources other than the sender of the signal envisaged in signalling theory, or in the case of IPO signalling, from sources other than the IPO company.

Going beyond the boundaries of signalling theory, agenda-setting theory offers a complementary perspective and additional theoretical support for the inclusion in the study of signals from sources other than the IPO firm. Two recent studies, both related to the effects of media coverage on business performance, provide support. The first study, using signalling theory as the primary theory base, uses an agenda-setting perspective to support its arguments on the role of media in sending tailored information to a targeted audience (Zacharis & Boguslavskaya, 2013). The other study, in an examination of the relationship between media coverage and strategic decision-making in a firm, while not based on signalling theory, illustrates the agenda-setting perspective as an explanatory framework for analysing the association between media coverage and business performance (Bednar et al, 2013). Other studies that illustrate the contribution of agenda-setting theory, in terms of analysing the impact of media coverage on business and institutional performance, include Carroll and McCombs (2003) and Schweinsberg, Darcy and Cheng (2017).

Before describing the explanatory framework of agenda-setting theory, it is useful to consciously consider and motivate the introduction and inclusion of an additional, or complementary, theory into the study. Taking a contrarian approach initially, to test the argument for inclusion, it is noted that the literature review confirms the established role that signalling theory has in strategic management research, as well as its extensive application in IPO research. Given the broad context of the study, namely the strategic management of IPO performance, it could be argued that signalling theory would serve as an appropriate and sufficient theory base. Against this background, what reasons should be considered, and what criteria should be applied, in deciding to use an additional theory base in the study?

The question's relevance is highlighted in a study on the widening boundaries of strategic management research. Concerns are raised regarding the fragmentation of the field of strategic management (Durand et al, 2017). The study argues for a move away from fragmentation and towards integration of the field. What then are the key reasons and criteria for using agenda-setting theory as an additional theory base in the study?

As discussed in the earlier sections of the literature review, there is a sound foundation, on the basis of signalling theory in strategic management research, and in studies applying signalling theory to IPO research, to address the research questions, and to formulate the corresponding hypotheses to be tested in the study. Previous studies in each area – listing standards and media coverage – support the view that each one acts as a signal of IPO readiness and has a signalling impact on IPO performance. As discussed above, the literature review also provides support for the hypothesis that there have been changes in the signalling impact of listing standards on IPO performance. Similarly, the literature review provides support for the view that there have been changes in the media environment, and changes in the signalling impact of media coverage on IPO performance (Park et al, 2016).

In considering whether independent media coverage serves as a valid signal of IPO readiness, and has an impact on IPO performance, issues include the possibility of competing sources of influence in a signalling environment, and the nature and intent of additional sources of signalling influence. It is possible to address the question of the impact of media coverage on IPO performance solely on the basis of signalling theory, but this approach does not fully address issues regarding the nature and intent of competing sources of influence. The study by Guldiken et al (2017), based on signalling theory, takes the approach that media coverage is a signal of IPO readiness, and empirically supports the view that the impact of media coverage on IPO performance is associated with the extent and credibility of media coverage. In this sense the study by Guldiken et al (2017) positions media coverage as an complementary and additive signal, rather than a competing and detracting signal, in the IPO context.

Based on a literature review of theory and research on the effect of media coverage in the business environment, there is strong support for the selection and application of agenda-setting theory to assist in deciding on the inclusion of media coverage as a signal of IPO readiness, and in motivating a corresponding hypothesis. The assessment of the suitability

of agenda-setting theory, as an additional theory in the study in which signalling theory is the primary theory, is based on applying an assessment framework developed by Kenworthy and Verbeke (2015). The framework comprises seven tests or criteria by which to gauge the quality or suitability of theories to be used in strategic management research, in a situation in which there is a primary theory and a borrowed or additional theory. The seven tests of quality are the predictive power of the theory, the explanatory power of the theory, the absence of competing theories to address the same issue, the fit or match of the theory with the issue being addressed, the consistency of concepts between the primary theory and the additional theory, the matching of assumptions between the two theories (primary and additional), and the fit in the knowledge bases of the primary theory and the additional theory. The combination of signalling theory, as the primary theory base, and agenda-setting theory as the additional theory base, meets each of the seven tests outlined above. The study by Zacharis and Boguslavskaya (2013), while it does not use the seven-test analytical framework outlined above, does provide support for the compatibility and complementarity of the two theory bases in its discussion of the theory supporting the study. The explanatory framework of agenda-setting theory is described next.

3.5.5 The explanatory framework of agenda-setting theory

Agenda-setting theory is one of a broader group of media effects theories that have their collective origin in the 1920s, the early years of research on the extensive audience reach of different forms of mass media, such as newspapers, radio and film (Valkenburg et al, 2016). More specifically, agenda-setting theory has its origins in a 1972 study on how the public's political views are shaped, in part, by the "agenda-setting" role of news staff, such as editors, journalists and broadcasters, and the institutions they represent, in the way they decide on the prominence and presentation of various topics in the public media, with the intention of influencing decisions by the target audience (McCombs and Shaw, 1972, p.176). Agenda-setting theory has since been further developed and extensively included in studies on media effects, with the study by McCombs and Shaw (1972) becoming one of the top three theories cited in micro-level media effects studies (Valkenburg et al, 2016). Agenda-setting theory explains the effect of media through the choice-making mechanism of individuals and institutions, engaged in news-making and media coverage activities, that determine the content, prominence and presentation of topics in the public media, with the intention of influencing decision-making of a target public audience.

3.5.6 Agenda-setting theory in IPO signalling

Describing the agenda-setting role and process of media organisations as a choice-making and decision-influencing mechanism, supports the introduction of agenda-setting theory as a complement to signalling theory. In the area of IPO research, agenda-setting theory assists in studying signals from different sources, in cases where one signaller is the IPO firm and the other is based on external sources of media coverage. Two arguments are given for including agenda-setting theory in the study. First, agenda-setting theory supports the case for classifying media coverage as signal, by positioning the signal as a deliberate communication of specific information intending to influence the decision making of the recipient. Second, given the different sources or origins of the different signals, including the possibility of competing sources of influence, agenda-setting theory provides an explanatory framework for including signals from external sources, such as that of media coverage, and assessing their impact on decision-making outcomes and performance measures, such as the impact of media coverage on IPO underpricing as a measure of IPO performance.

3.5.7 Impact of the GFC on the signalling impact of media coverage

The literature review, involving the combination of signalling theory and agenda-setting theory, provides support for the inclusion of media coverage as a signal of IPO readiness. The literature review indicates that the relationship between media coverage and IPO performance is as follows. An increase in the volume of media coverage in the period leading up to the IPO, is associated with a decrease in IPO underpricing, which equates to an increase in IPO performance, from a strategic management perspective. The underlying explanatory framework and mechanism is that an increase in credible media coverage, whether positive or negative in tone, results in a decrease in information asymmetry between the IPO company and potential investors, and thus a decrease in IPO underpricing. Extending the rationale and building on the review of the impact of the GFC on the signalling environment in sections 3.3.5 and section 3.4.3 above, the impact of the GFC on the signalling impact of media coverage is theorised as follows. The increased investor awareness of and sensitivity to risks related to an IPO company, and the increased emphasis on obtaining information to assist in managing these risks, would increase the signalling impact of media coverage on IPO performance, comparing pre-GFC to post-GFC.

The relationship between increased information, based on IPO company disclosures on intellectual capital to investors in their prospectus documents, and decreased underpricing, in a comparison or pre-GFC and post-GFC periods, is supported in Garanina and Dumay, 2014). Beyond the study of company disclosures on intellectual capital, the literature review has not identified studies specifically on the impact of media coverage on underpricing, comparing pre-GFC and post-GFC. Based on the literature review and the underlying rationale, the hypothesis relating to research question two, on the change in the impact of media coverage on IPO performance, comparing pre-GFC and post-GFC, is as follows:

Hypothesis on the changing impact of media coverage on IPO performance:

H2. The impact of media coverage on IPO performance increased from pre-GFC to post-GFC

3.6 ROLE OF OTHER EXPLANATORY VARIABLES IN IPO SIGNALLING STUDIES

3.6.1 Other explanatory variables included as control variables in IPO studies

This study focuses on the signalling impact of listing standards and media coverage, the independent variables in the study, on IPO performance, the dependent variable. The literature review has discussed these variables in detail. However, it is important also to understand the role of other explanatory variables in IPO signalling studies. Academic studies on IPO signalling, in which the focus is on improving understanding of the relationship between different attributes of IPO readiness, and different measures of IPO performance, are predominantly quantitative in their approach, rather than qualitative, as illustrated in the majority of studies reviewed above (for example, Guldiken et al, 2017; Johan, 2010; Park et al, 2016). The selection and analysis of dependent variables, representing different measures of IPO performance, and independent variables, representing different attributes of IPO readiness, are key features that define and guide quantitative analysis in IPO studies. Another key feature is the selection and use of control variables. Control variables, which are effectively other explanatory variables, assist to control for variances in the dependent variables that are not explained by the independent variables in the study (Park et al, 2016). The range of control variables vary from one study to the next, depending on factors such as the choice of dependent and independent variables, the theory supporting the selection of different control variables, and the research

findings in previous studies supporting the selection and use of different control variables in a study (for example, Johan, 2010; Park et al, 2016). In addition to the guidance based on IPO signalling studies, further guidance in the selection and use of control variables is found in other areas of business research, including leadership research and international business research (Bernerth, Cole, Taylor & Walker, 2018; Nielsen & Raswant, 2018). Key points include adopting the principle of parsimony, and ensuring an appropriate theoretical justification, for selecting control variable in a study. The selection and definition of control variables is discussed further in section 4 in methodology.

3.6.2 Other explanatory variables in a changing environment

Other explanatory variables, included as control variables in IPO signalling studies, play an essential and well-established role in adjusting for variances in the dependent variable(s) which are not explained by the independent variables in the study. The literature includes guidance for the selection and use of control variables. A limitation is that this guidance is based on single-period IPO signalling studies, in which the IPO environment is relatively stable, and not significantly affected by major changes, such as those associated with the GFC. There is a paucity of studies on the selection and use of control variables in an IPO signalling study in which the environment is characterised by major changes, such as the GFC, or in a multi-period study spanning major change, such as the comparison of IPO signalling in pre-GFC and post-GFC periods in this study. Park et al (2016) tests the replicability of a set of IPO signalling studies from one period to another period. These two periods coincide with pre-GFC and post-GFC, although this delineation of the study timeframe does not appear to be deliberate, and is not explicit in the design of the study. Possibly due to the lack of intention in the study to compare two periods, before and after major changes in the IPO signalling environment, the discussion in Park et al (2016) seeks to identify reasons for the lack of replicability. The discussion indicates various changes in the IPO environment, such as those relating to the regulatory requirements and media coverage of IPOs. In the analysis and discussion of the control variables in the study, the changes in the influence of control variables, from one period to the next, are highlighted, although the implication is that the changes in the influence of control variables on IPO performance were unexpected rather than expected, appearing to confirm the unintended spanning of the two periods in the study of a major change in the IPO environment.

In contrast with Park et al (2016), in the current study there is a clear objective to understand the impact of the changing environment, specifically the impact of the GFC, on IPO signalling and IPO performance. The study focuses on the changing impact of listing standards and media coverage of IPO performance, based on a comparison of pre-GFC and post-GFC periods in the study. Given the essential role of control variables in IPO signalling studies, the question arises whether the impact of control variables on IPO performance would also change in a changing environment, such as in a comparison of pre-GFC and post-GFC. This enquiry is reflected in research question 3 (section 1.4). In addressing the enquiry, the study seeks to understand the impact of other explanatory variables, included in the study as control variables, on IPO signalling and IPO performance in a changing environment. This serves to provide context for the primary objective of the study, to understand the changing impact of listing standards and media coverage on IPO performance, comparing pre-GFC to post-GFC.

3.6.3 Impact of the GFC on other explanatory variables

In sections 3.4.3 and 3.5.7 above, the impact of the GFC on the signalling impact of listing standards and media coverage was discussed, in the context of role of the GFC in the study. Similarly, a discussion of the impact of the GFC on other explanatory variables provides important context for the study. The literature review includes Park et al (2016), IPO studies comparing pre-GFC and post-GFC periods (for example, van Heerden & Alagidede, 2012), as well as the literature discussed in the development of the hypotheses for the changing impact of listing standards and media coverage, on IPO performance. Based on the literature review, the impact of the GFC was to increase awareness of, and sensitivity to, the risks associated with different investments, and to increase emphasis on risk management. Together, these trends resulted in an increase in the impact of a range of informational signals on IPO performance, including other explanatory variables in various studies.

Building on the literature review, and in addressing research question 3, there is an emphasis in the study on identifying, analysing and understanding the impact of the GFC on other explanatory variables, included in the study as control variables. The control variables are relevant at *two stages of analysis* in the study. First, the control variables serve to control for variances in the dependent variable that are not explained by the independent variables, listing standards and media coverage, in *each of the periods* in the study – pre-GFC and post-GFC. Control variables thus serve to quantify the impact of listing standards and media

coverage on IPO performance, *in each of the two periods* in the study. Second, to the extent that there are *changes* in the impact of control variables on IPO performance, comparing pre-GFC to post-GFC, the analysis of these changes provides important context for understanding the *changes* in the impact of listing standards and media coverage on IPO performance, *comparing pre-GFC and post-GFC*. Control variables therefore provide analytical structure and context for testing the two hypotheses, H1 and H2.

Given this background, and in response to *research question 3*, the analysis of other explanatory variables, included in the study as control variables, is an integral part of the study. This is reflected in the presentation of the study results in section 4, and in the discussion of results in section 5. The results and the discussion include analysis of the impact of control variables on IPO performance in each period, pre-GFC and post-GFC, and analysis of the changes in the impact of control variables from pre-GFC to post-GFC.

3.7 SUMMARY OF THE IMPACT OF THE GFC ON IPO PERFORMANCE AND IPO SIGNALLING

As discussed in various sections in the document, including the introduction, setting and literature review, the impact of the GFC plays a key role in the study. The GFC represents a period of major change in the IPO signalling environment. The study timeframe is divided into pre-GFC and post-GFC periods, and the focus is on understanding the impact of the GFC on IPO performance and IPO signalling. The literature review indicates the long term impact of the GFC, including structural changes in the regulation of financial markets, and major changes in the decision-making and behaviour of various market participants, including investors, stock exchanges, and listing companies, towards increased awareness of risks, increased sensitivity and aversion to risk, and increased emphasis on risk management. The literature review supports the rationale that in the post-GFC period, there was an increase in the impact of various IPO signals on IPO performance. This rationale applies to the signals in this study, namely listing standards and media coverage, and is reflected in the two hypotheses developed on the basis of the literature review. The literature review indicates the impact of the GFC on other explanatory variables as well. This addresses research question 3 (section 1.4), and is highlighted in the analysis of results (section 5) and the discussion (section 6) in the study.

3.8 SUMMARY OF HYPOTHESES

The two hypotheses that guide the study, developed in the literature review, are summarised below and represented in the conceptual model in Figure 4.

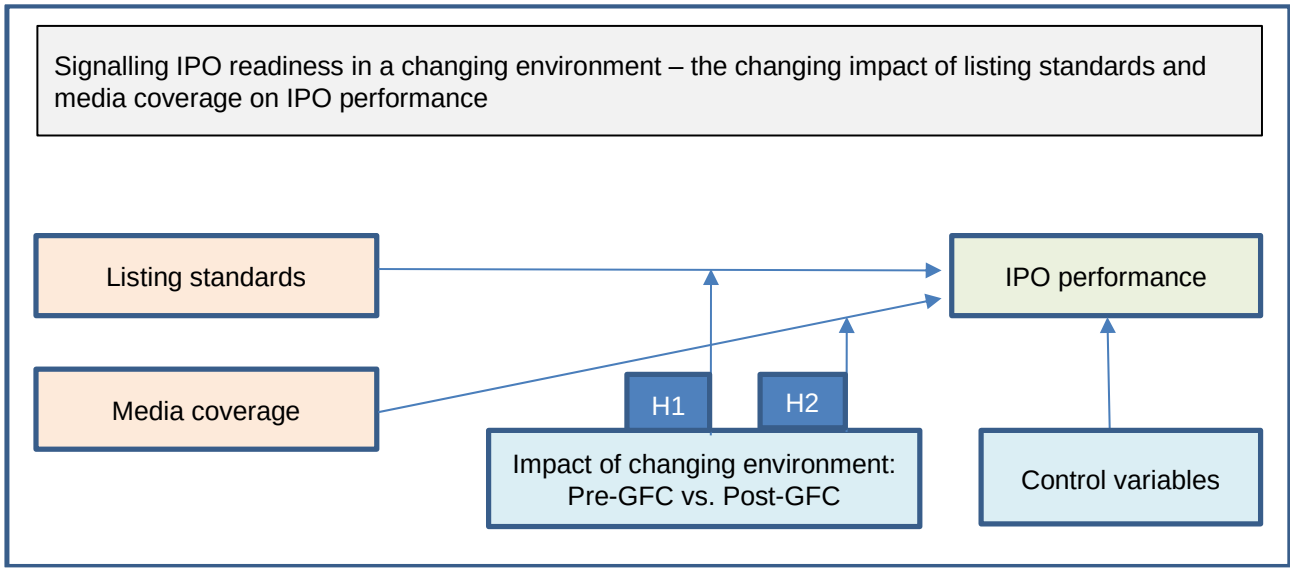
Hypothesis on the changing impact of listing standards on IPO performance:

H1. The impact of listing standards on IPO performance increased from pre-GFC to post-GFC

Hypothesis on the changing impact of media coverage on IPO performance:

H2. The impact of media coverage on IPO performance increased from pre-GFC to post-GFC

Figure 4: Conceptual model of the study



3.9 LITERATURE CLOSING

A key theme in the literature review is the changing signalling environment in IPO markets, and the impact of the GFC, as a major change in the signalling environment, on IPO performance and IPO signalling. In their review of signalling theory, Connelly et al (2011) identify the signalling environment as an area that requires further research. Features of the changing signalling environment, and the impact of the GFC, are indicated in the literature on listing standards and media coverage, and in the literature on control variables.

In the literature on listing standards, there are changes in the global market for entrepreneurial finance, with exchanges facing increased competition, across global markets and in local country markets. Listing standards are no longer considered a uniform, non-differentiating feature for all listing firms in a particular market, as they were in an era when there was just one exchange in a narrowly defined local market for entrepreneurial finance. Instead, in a new era in which firms have a choice of cross listings, international listings, and different types of stock exchanges, listing standards are seen as a deliberate choice for entrepreneurial firms, as indicated in Ding et al (2010), and as a differentiating signal of the level of IPO readiness, as indicated in Johan (2010). In the South African IPO market, the increased competition between exchanges is further indicated in the changed design of listing standards in new exchanges, in which the signalling role and effectiveness of listing standards is an increasing point of differentiation between exchanges. The literature review supports the hypothesis that in the post-GFC period, there is an increase in the signalling impact of listing standards on IPO performance, compared to pre-GFC.

The literature also indicates changes in the media environment. The influence of media coverage in IPOs appear to be increasing, especially given the rapid growth of information availability as a result of the development of new online media platforms. Viewed from the perspective of agenda-setting theory, it is argued that there is a growing level of influence from competing signals, originating in the media, with emphasis on online media, resulting in media coverage having an increased impact on IPO performance. The literature review supports the hypothesis that in the post-GFC period, there is an increase in the signalling impact of media coverage on IPO performance, compared to pre-GFC.

Extending the literature review and discussion on listing standards and media coverage, in the literature on other explanatory variables, which are included in IPO studies as control variables, the indication is that there was an increase in the impact of other explanatory variables on IPO performance, comparing pre-GFC to post-GFC, based on the widespread impact of the GFC on risk awareness, risk aversion, and risk management, of various participants in the IPO market, including IPO companies, investors and stock exchanges.

The insights from the literature review have been used to develop the two hypotheses for testing in the study, in response to the first two research questions (section 1.4). In response

to the third research question, on the impact of other explanatory variables on IPO performance, the results in section 5, and the discussion in section 6, include analysis of the impact of control variables in each period, pre-GFC and post-GFC, and also on the change in the impact of control variables, comparing pre-GFC to post-GFC. The role of other explanatory variables, included as control variables in the study, are therefore an integral feature of the study. The research design and methodology for the study are discussed next, in section 4.

4 RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

The purpose of this section is to describe, and to explain the reasons behind the choice of, the research design and methodology. In sections 1 and 3 respectively, the introduction and the literature review provide a frame of reference for the research design and methodology of the study, in their description of previous IPO signalling studies. These include several meta-analyses of relevant studies, such as Certo et al (2009) on IPO research by scholars in management and entrepreneurship, Daily et al (2003) on IPO underpricing and signalling, and Connelly et al (2011) on signalling theory. What does the literature indicate regarding the research design and methodology in IPO studies?

In their review of 103 IPO studies in top journals in management and entrepreneurship, Certo et al (2009) determined that 86% (89 studies) were empirical studies. Empirical IPO signalling studies are commonly based on the *empirical, quantitative analysis of archival data*, representing a combination of pre-IPO attributes and post-IPO performance, of firms undertaking an IPO, on one or more exchanges, over an extended period of time, typically several years. In the empirical studies discussed in the literature review in section 3, the research is similarly based on *empirical, quantitative analysis of archival data* relating to the pre-IPO attributes, and the post-IPO performance, of the listing firms.

Beyond the meta-studies which provide the broad background, there are studies which are similar, in various respects, to this study, and which have served as *benchmark studies* in developing the research design and methodology for the study. There are four benchmark studies which are referred to in this section on research design and methodology: two studies on the impact of listing standards on IPO performance (Ding et al, 2010; Johan, 2010), and two studies on the impact of media coverage on IPO performance (Guldiken et al, 2017; Pollock & Rindova, 2003). A summary of each of the four benchmark studies is presented in Appendix C, highlighting the sources of data, the variables used, the methodologies, and the key findings.

The benchmark studies provide useful guidance on research design and methodology. There are differences in the market settings of the benchmark studies, which are in large, developed markets, compared to the smaller market setting of this study, which is based on IPOs on the JSE and the AltX in South Africa. Conversely, the smaller market setting of the South African IPO market represents an opportunity to test signalling theory in a smaller market, including assessing the effects and limitations of signalling theory in this market. The sources of data used for the study need to be relevant to the local South African market, and also available in the databases used for the study. Thus similar but different sources of data were required for the study. A degree of innovation was required to identify appropriate sources of data, in particular for the analysis of online media coverage for IPOs on the JSE and AltX over the study timeframe. Databases available in markets such as North America and Western Europe, are either not available in South Africa, or not available on a cost-effective basis. The sources of data for the study are described in section 4.5. Before describing the detailed research design and methodology, it is useful to describe the research philosophy that motivates and guides the overall approach and choices.

4.2 RESEARCH PHILOSOPHY

As outlined above, choices regarding the research design and methodology for the study are guided and motivated by similar, comparative studies in IPO signalling. While these studies, as well as other less comparative studies, vary in the specific choice of methodology, they are uniform in terms of the broader philosophical framework, which is based on the *empirical, quantitative analysis of archival data* on IPOs. The dominant focus in IPO research is identifying and analysing the antecedents, correlates, measures, and consequences of IPO performance, and the majority of IPO studies are based on empirical analysis of the relationships between different variables in these areas, using a range of statistical tools and techniques (Certo et al, 2009).

The sources of data for IPO studies are usually archives and databases of information on past IPOs, for a selected period, for one or more selected exchanges. The data usually includes pre-IPO attributes of IPO firms, based on published prospectus documents, also referred to as pre-listing statements, and measures of post-IPO performance, based on exchange or market trading data. In the case of studies on media coverage, data sources

include well-established databases of articles in various business media, for the selected markets and timeframe. Given this profile of IPO studies, the research philosophy in IPO studies is usually associated with the external, independent, quantitative analysis of measurable, observable facts, using a sample of IPOs on a given exchange, for a selected time period, aimed at finding support for various hypotheses, typically framed as explanatory and predictive relationships between different variables in the study. In line with this background, the research philosophy of this study was guided by and aligned with the approach in the majority of IPO studies, which are empirical studies on IPO signalling.

Expressed more technically, the study is based on a positivist research philosophy. The interpretation of this research paradigm is consistent with the key characteristics of a positivist research philosophy. The ontology is based on a real, independent, external environment. The epistemology reflects a view of knowledge and knowledge development in which a scientific process is followed, using observable and measurable data, supporting the intended research contribution which is based on improving causal explanations and predictions in the relationships between different variables. The axiology reflects an objective, independent and value-free stance by the researcher. The research methodology is based on deductive, quantitative analysis of various measurable data, in which large samples of data are analysed to test theory. This approach is similar to those in benchmark studies such as Johan (2010), and Pollock and Rindova (2003). Given this background on the research philosophy, the research design is described in more detail below.

4.3 RESEARCH DESIGN, APPROACH AND STRATEGY OF ENQUIRY

4.3.1 Research design in comparable studies on IPO signalling

The research design and methodology choices for the study were guided by four comparable studies on IPO signalling, referred to here as benchmark studies: two studies on the impact of listing standards on IPO performance (Ding et al, 2010; Johan, 2010), and two studies on the impact of media coverage on IPO performance (Guldiken et al, 2017; and Pollock & Rindova, 2003). To obtain a profile of each benchmark study, the following information is summarised for each study, and presented in Appendix C: types and sources of data, dependent variables, independent variables, control variables, analytical techniques, and key findings. The research design and methodology in the four benchmark

studies indicate the following choices: a multivariate, multi-method quantitative research methodology, based on archival data on IPOs for selected exchanges, for a selected period, focusing on price movements post-IPO.

Based on a review of the first two of the four benchmark studies (Ding et al, 2010; Johan, 2010), on the impact of listing standards on IPO performance, the choice of dependent variable for the current study was based on the study by Johan (2010), namely *IPO underpricing*. This approach in the current study, using *regression analysis*, results in a more focused analysis of the extent of the impact of listing standards on IPO performance, and assists in the comparison of this impact across the two time periods used in the study – pre-GFC and post-GFC. The study by Johan (2010) demonstrates a comprehensive approach to the selection of *control variables*, providing useful guidance for the study.

The last two of the four benchmark studies (Guldiken et al, 2017; and Pollock & Rindova, 2003), relate to the impact of media coverage on IPO performance. Based on a review of these studies, the choice of independent variable for the current study was guided by the findings in the two studies, which support a relationship between *volume of media coverage*, measured by the *number of articles*, and IPO underpricing (Pollock & Rindova, 2003). An alternative independent variable considered, but not selected, was the *uncertainty of tone* of media coverage, which is based on the use of a list of key words that connote uncertainty. This was the approach used in Guldiken et al (2017), which tests the relationship between uncertainty of tone and the one week post-IPO change in price, but not the relationship between uncertainty of tone and IPO underpricing. The common link, between the studies on the impact of listing standards and the studies on the impact of media coverage, is the dependent variable of IPO underpricing. This supported the choice of *IPO underpricing* as the dependent variable for the study. Based on this review for choices of research design, the research design for the study is described next.

4.3.2 Research design for the study

A review of the research design choices in the selected benchmark studies, as provided in section 4.3.1 above, assisted in guiding and motivating the research design choices for the study, which are summarised in Table 5 below, using the same format as used in the summaries of the benchmark studies (Appendix C). The methodology for the study is quantitative in approach, combining descriptive analysis, comparative analysis, correlation

analysis and multiple regression analysis for profiling the different subsets of IPOs in the study (pre-GFC and post-GFC, and JSE and AltX), and for testing hypotheses 1 and 2.

Table 5. Research design for the study

Study title	Signalling IPO readiness in a changing environment: The changing impact of listing standards and media coverage on IPO performance

Types and sources of data	• IRESS (formerly BFA McGregor) database of South African companies
	  • Access to pre-listing statement for each company listing on JSE and AltX
	  • Access to data on post-IPO market performance for each company
	• Sabinet database
	  • Archive of digitalized print articles in the South African media
	  • Media articles published in one month leading up to the date of listing
	• Moneyweb article archive
	  • Archive of online articles published by Moneyweb
	  • Media articles published in the month preceding the date of listing
	• IPOs on the JSE and AltX
	• Analysis of initial listings in the study timeframe (2003 to 2019), and a comparison of two sets of IPOs on each exchange, corresponding to pre-GFC and post-GFC:
	  • 2003 to 2019
	  • JSE: 211 initial listings (before exclusions)
	  • AltX: 118 initial listings (before exclusions)
	  • Total: 329 initial listings (before exclusions)
	• Note: The number of initial listings for JSE, AltX and Total are *before exclusions* based on IPO signalling study sample criteria (discussed in section 4.8)

Dependent variable	• Choice of dependent variable guided and motivated by the approach in Johan (2010), and by choice of dependent variable in numerous studies on IPO signaling
	  • IPO underpricing
	  • Change in share price from offer price to closing price on day one of trading, expressed as a percentage of the offer price

Independent variables	• Choice of independent variables is based on key studies as indicated below:
	  • Listing on the JSE vs. AltX
	  • Based on the approach in Johan (2010)
	  • Dummy variable (1 = JSE; 0 = AltX)
	  • Volume of media coverage in month preceding date of listing
	  • Based on the approach in Pollock & Rindova (2003)

	• Number of articles in selected databases (SABINET; Moneyweb)

Control variables	• Choice of control variables were guided by the approach in Johan (2010) and other IPO studies, with selection of variables subject to availability of information in pre-listing statements (PLS), or prospectus documents.
	• The selection of control variables (discussed in detail in section 4.9.4) comprises:
	  • Offer profile characteristics
	  • Company profile characteristics
	  • Financial
	  • Non-financial
	  • Industry sector classification
	  • Market conditions in listing year
	  • Listing activity in listing year
	  • Media volume in listing year

Analytical techniques	• The choice of analytical techniques is based on the techniques in Johan (2010), Ding et al (2010), and Pollock & Rindova (2003)
	  o Descriptive analysis
	  o Comparative analysis
	  o Correlation analysis
	  o Regression analysis
	• The study is based on two sets of comparisons:
	  o Comparison of IPO performance across two exchanges
	  ▪ JSE and AltX
	  o Comparison of IPO performance across two time periods
	  ▪ pre-GFC (2003 to 2007) and post-GFC (2009 to 2019)

Hypotheses to be tested	On the changing impact of listing standards on IPO performance: H1. The impact of listing standards on IPO performance increased from pre-GFC to post-GFC On the changing impact of media coverage on IPO performance: H2. The impact of media coverage on IPO performance increased from pre-GFC to post-GFC

4.4 RESEARCH TYPE

As motivated and explained in detail in sections 4.1 to 4.3 above, the study is an empirical, quantitative study based on the analysis of archival data on IPOs on the JSE and AltX.

4.5 DATA COLLECTION METHODS

The sources of data for the study were from three databases, namely:

- IRESS (formerly called McGregors BFA) database, providing data on offer and pre-IPO firm profiles, based on pre-listing statements, and on post-IPO share price performance in the market
- SABINET database, providing digitised copies of articles in the print media, selected for the one-month period leading up to the listing date of each IPO
- Moneyweb database, providing copies of online articles published by Moneyweb, targeted at its online community of investor-oriented subscribers, selected for the one-month period leading up to the listing date of each IPO

4.6 UNIT OF ANALYSIS

The unit of analysis is an individual company undertaking an IPO and initial listing on the JSE and AltX, subject to exclusions for non-qualifying listings as discussed in section 4.8.

4.7 POPULATION AND SAMPLING

In studies on IPO signalling, the population is the entire set of IPOs of companies on one or more exchanges. As indicated in the four benchmark studies discussed in section 4.3.1 (presented in Appendix C), the distinction between the total population of IPOs, across *all* time periods (starting from the beginning of the establishment of the particular exchanges selected, up to the date of the study), versus the sample used for any particular study, is usually based on a selection of the time period(s) for the study. This study is based on a comparison of two exchanges, JSE and AltX, over the same time period. Further, AltX was established in 2003 (the first year in which it was possible to list on AltX, although the first IPO on AltX was in 2004). The *total population* for the study is therefore the set all IPOs (after exclusions) in the period from 2003 to end of 2019 (the most recent year as at the study completion date in 2020). This was used as the study review period. Within this study review period, from 2003 to 2019, the two sub-periods in the study are pre-GFC (2003 to

2007) and post-GFC (2009 to 2019). Table 6 summarises the number of initial listings for each exchange, for the full period reviewed, and for each of the sub-periods periods, pre-GFC and post-GFC. The IPOs in 2008, the year of the GFC, are included in the study review timeframe for purpose of completeness, and are reviewed to identify the number and type of listings that occurred during the GFC. The number of initial listings summarised in table 6 is before exclusions for non-qualifying listings based on study sample selection criteria used in IPO signalling studies (discussed in section 4.8).

Table 6: Initial listings on the JSE and AltX in the study review period (before exclusions)

Year	Total	Initial listings on JSE	Initial listings on AltX
2003	8	8	0
2004	15	10	5
2005	20	14	6
2006	40	21	19
2007	62	25	37
Pre--GFC total	*145*	*78*	*67*
GFC: 2008	20	16	4
2009	9	5	4
2010	13	12	1
2011	16	13	3
2012	14	10	4
2013	13	8	5
2014	24	18	6
2015	21	13	8
2016	17	10	7
2017	21	13	8
2018	12	11	1
2019	4	4	0
Post-GFC total	*164*	*117*	*47*
Total from 2003 to 2019	*329*	*211*	*118*

Source of data: JSE; IRESS

4.8 SAMPLE SELECTION CRITERIA USED IN IPO SIGNALLING STUDIES

4.8.1 Explanation of sample selection criteria

The application of sample selection criteria used in IPO signalling studies play a key role in the study. An explanation of these criteria assists in understanding their application in this

study. The logic and relevance of sample selection criteria in IPO signaling studies are related to the underlying assumptions and mechanics of information asymmetry in an IPO, and how the information asymmetry between the IPO company and initial investors influences IPO underpricing, based on the explanatory framework of signaling theory, as outlined in various IPO signalling studies (for example, Johan, 2010; Park et al, 2016). An IPO company profile that matches information asymmetry assumptions and mechanics reflects various attributes. Three key attributes are highlighted for the purpose of understanding sample selection criteria used in IPO signalling studies. First, there is an information asymmetry between the IPO company and initial investors, for example due to the private ownership of the pre-IPO company, and a relative lack of information in the public domain available to initial local investors. Second, there are observable and reliable indicators, which are difficult or costly to imitate, of the unobservable quality, intrinsic value and likely prospects of the IPO company, that are communicated by means of various choices or characteristics of the company, such as the size of the share offer, the size of the company, and the company's governance standards. Third, the company is a business entity with operating assets, in which the value of the company is based on management's ability to generate revenue and profits from the operating assets, rather than a company which is primarily an investment portfolio, in which the market value and perceived prospects of the company are primarily based on the valuation of the underlying investment assets.

4.8.2 Key categories of exclusion from study samples

Applying these sample selection criteria, study sample exclusions in IPO signaling studies comprise various categories, listed here in the order of importance in the current study, based on a review of the initial listings included in the IRESS database (as summarised in Table 6). These categories of exclusion are consistent with the sample selection approach in IPO signalling studies such as Johan (2010) and Park et al (2016).

The first category is cross-listings. This category represents companies previously listed, or concurrently listing, on another exchange, usually in another country, and doing an additional, secondary or dual listing on the exchange in the study. This type of listing is also referred to as secondary listings, inward listings, or dual listings, from the perspective of the exchange in the study. The reason for the exclusion of these listings from IPO signalling studies is that there exists other publicly available information on the company, based on information disclosed on the other exchange. The assumption of information asymmetry

between the IPO company and potential investors, is either not valid, or comparable to other companies in the sample. Given the key premise of information asymmetry in signalling theory, this category of listings is excluded from the sample for an IPO signalling study.

The second category is investment company listings. This represents companies which are primarily investment pools and portfolios, including business investment portfolios and real estate investment trusts (REITs). This category of exclusion is based on the absence of an operating business undergoing a transition from private to public, in an environment of information asymmetry between the IPO company and potential investors. The listings in this category include pools of investment funds in which there are no actual existing investments, only the intention of investing in certain types of businesses. This category of listings is not suitable for IPO signalling studies as the listings are not comparable with other companies in the IPO signalling study sample.

The third category is listings based on unbundling or restructuring, of holding companies or corporate groups already listed on the exchange. These listings are usually business units or operating divisions of a larger, holding company already listed on the exchange. The business unit is then unbundled from the holding company and given a listing on the exchange as a stand-alone company. The listing involves shareholders of the holding company being issued shares in the new, separately listed company. Given the information already available on the company, due to its previous inclusion in an already listed company, the assumption of information asymmetry is note applicable. These listings are not comparable with other companies in the IPO signalling study sample.

The fourth category is listings on the exchange in which there is no new offer of shares, and which is instead based on a listing of all existing shares already held by current shareholders. This type of listing is referred to at the JSE as a listing by introduction. Given the absence of an offer of shares to new investors, there is no information asymmetry between the IPO company and new potential investors. This type of listing is not suitable for an IPO signalling study.

The fifth category is listings referred to as reverse listings, based on takeovers of companies already listed on the exchange, by an existing privately held business, which thus obtains a listing by “reversing” its business into the existing listed company. This category has similar

characteristics to listings via unbundling and listings by introduction, in that there is an absence of a new offer of shares, and there already exists information of the company already listed on the exchange. This type of listing is not suitable for an IPO signalling study.

The sixth category is listings of non-equity issues, such as preference shares, or debentures. These listings are included in the database as new listings on the stock exchange. However, they are not IPOs involving the issue of new equity shares to new shareholders. These listings are not suitable for inclusion in an IPO signalling study. The seventh category is listings that are not new listings of the kind that would be included in an IPO signalling study as they are the result of other types of corporate actions, including name changes, and transfers from one exchange to another, for example from the AltX to the JSE. They are included in the database of initial listings but are not IPOs.

As explained in section 4.8.1, these categories of exclusion from an IPO signalling study are based on the explanatory model and underlying assumptions of signalling theory. A key premise is the existence of information asymmetry between the IPO company and new potential investors, in which there is an offer of equity shares to the new potential investors. In the literature review of previous studies of underpricing of IPOs on the JSE and AltX, there is no indication of the application of these categories of exclusion in the sample selection process. This study makes a contribution to the methodology in studies of IPOs on the JSE and AltX, based on adopting a signalling theory perspective. Based on the application of the sample selection criteria, the set of IPOs selected for this study is a subset of the 329 initial listings (Table 6) on the JSE and AltX, for the period 2003 to 2019. The resulting selection of IPOs is however the *total population*, rather than a sample, of the initial listings eligible for the study. This is discussed further in section 5.1, in which study dataset is described.

4.9 SELECTION AND DEFINITION OF VARIABLES

4.9.1 Introduction

The selection of the dependent variable, the independent variables, and the control variables, are discussed in sections 4.9.2 to 4.9.10. The definition of variables is summarised in section 4.9.11. The relationship between each of the explanatory variables and underpricing is discussed and summarised in section 4.9.12.

4.9.2 Dependent variable

The dependent variable is *UP*, for underpricing. Also referred to as IPO underpricing, this variable is extensively used as a dependent variable in IPO signalling studies, as discussed in the literature review, and as indicated in the benchmark studies.

4.9.3 Independent variables

There are four independent variables. The first is *JSE*, a dummy variable representing the choice of exchange for the IPO. The approach is consistent with Johan (2010), in which a dummy variable (TSX) is used to distinguish between the senior exchange (TSX) and the junior exchange (TSX-V). The variable JSE is relevant to Hypothesis 1, relating to the changing impact of listing standards on IPO performance (measured in terms of underpricing or UP).

There are three independent variables relating to media coverage of the IPO company – *PMCO*, *OMCO* and *CMCO*, for print media coverage, online media coverage, and combined media coverage, of the IPO company. These variables are relevant to Hypothesis 2, relating to the changing impact of media coverage on IPO performance (measured on the basis of underpricing, or UP).

A distinction is made between print media and online media to assess separately the influence of each type of media, in line with the discussion in Park et al (2016), in which the specific influence of online media was highlighted as an area of potential influence in a changing environment. The variable on combined media coverage, comprising both print media and online media, is included to represent the overall influence of media coverage on the IPO company. In each case media coverage is based on the volume of media coverage, which is in turn based on the number of articles published in particular media during a selected period, consistent with the approach used in Pollock and Rindova (2003). Media coverage is based on the one-month period leading up to and including the listing date.

It is noted that the literature indicates different variables that have been used to measure media coverage. As indicated in the summaries of benchmark studies on the impact of media coverage on IPO performance (Tables 19.3 and 19.4 in Appendix C), variables that have been used to measure media coverage include *tenor of media content*, that is, positive

versus negative coverage (Pollock & Rindova, 2003), and *uncertainty of tone* of media coverage (Guldiken et al, 2017). In the current study, the choice of *volume of media coverage* as the only variable for media coverage is motivated by the findings in the above studies, which provide support for the relationship between volume of media coverage and IPO underpricing, but do not provide support for the relationship between the other variables relating to media coverage (such as tenor and uncertainty), and IPO underpricing. Given the choice of IPO underpricing as the dependent variable for the study, the choice of volume of media coverage was further motivated as the independent variable for media coverage.

A potential limitation of this choice of variable for media coverage, namely volume of media coverage as measured by number of articles, is that there may be varying degrees of focus of subject matter in different articles. For example, one article may have as its primary focus the topic of the IPO company under consideration, while another article may mention the IPO company only in passing, as a point of minor focus. As indicated in Bednar et al (2013), this is a consideration in the use of volume of media coverage in the study of the impact of media coverage. This limitation is addressed in part by extending the total period of media coverage being analysed for each IPO company, from a one-week period pre-IPO (Guldiken et al, 2017) to a full month in the current study. By using the period of one-month pre-IPO for all the IPO companies, the relative impact of varying levels of focus (primary focus versus minor focus) is less pronounced than if the period was much shorter. Offsetting the potential limitation of volume of media coverage, as the singular choice of independent variable in the study, is the distinction, and the separate measurement in the study, between print media and online media. This makes a methodological contribution to previous studies of media coverage in which there is no distinction between these two forms of media coverage.

4.9.4 Control variables

There is a total of 25 control variables. They are relevant to research question 3, related to the changing impact of explanatory variables on IPO performance (measured on the basis of underpricing, or UP). The selection of control variables was guided by the research objectives guiding the study, within the practical constraints based on information availability. In terms of research objectives, the selection of control variables was guided by the study objectives, hypotheses, and the dependent and independent variables, and justified by supporting logic and theory, adhering to the principle of parsimony (Berneth et al, 2018; Nielsen & Raswant, 2018). The selection of control variables included the analytical

objective of considering all key sources of influence on the dependent variables, in line with the literature (Johan, 2010). There were practical constraints related to information availability. The information was limited to the information available in the three databases used in the study, namely the IRESS database on South African companies, the Sabinet database on print media, and the Moneyweb database on online media. Within the source documents obtained from the IRESS database, referred to as the pre-listing statement (PLS), or the prospectus document, there were constraints in terms of the range of information available for each company. There were variances in the range and level of detail of information for different companies. Within the context of the research objectives discussed above, the selection of control variables was guided by the types of information that were available across the study sample. The 25 control variables are divided into two broad groups. The first group relates to the individual IPO offer and company (comprising the offer profile, company profile, and industry sector). The second group relates to the IPO environment (comprising market conditions, listing activity, and media volume, in the year of listing). Section 4.9.11 provides a definition of the control variables, and section 4.9.12 provides a summary of the expected relationship between each control variable and the dependent variable (UP or underpricing), based on guidance in the literature on the selection and use of control variables in research studies (Nielsen and Raswant, 2018). The control variables in each of the six sub-groups are discussed below.

4.9.5 Control variables – offer profile

There are three control variables relating to the offer profile. The first is *PLS*, for the number of pages in the PLS, or pre-listing statement, the term used at the JSE and AltX, equivalent to the IPO prospectus document, the term used at other exchanges. This variable is a proxy for the extent of disclosure by the IPO company to prospective investors. The selection of the variable is motivated and supported by the discussion in Park et al (2016), in which the changing extent of disclosure by IPO companies is considered a potential feature of the changing IPO environment, and of potential significance for the changing influence of various IPO signals. The variable of PLS, or the number of pages in the PLS, is expected to have a positive relationship with IPO performance, or a negative relationship with underpricing, based on the argument in signalling theory that increased disclosure reduces information asymmetry (Park et al, 2016), resulting in improved IPO performance for the IPO company. The second variable is *IP*, for the issue price. This is the same as the offer price indicated in the PLS, or prospectus (except in circumstances where there are unusual or

unexpected developments after the publication of the PLS, such as a lower than expected demand for the share offer, which result in a renegotiated issue price, lower than the initial offer price, and which would then be reflected in the IRESS database). The selection of issue price as a control variable is supported by the literature on South African IPO studies (van Heerden & Alagidede, 2012), which indicates that lower issue prices are associated with higher underpricing, or lower IPO performance. The third variable is *LOGOFF*, for the log of the offer amount, or the logarithm of the offer size, expressed in South African Rands. The selection of this variable is supported by the literature (Guldiken et al, 2017; Park et al, 2016; Pollock & Rindova, 2003), and is a commonly used variable in IPO signalling studies, representing the quality of the offer. In this study, the issue price and the offer amount are expected to have a positive relationship with IPO performance, or a negative relationship with underpricing, as larger issue prices, and larger offer amounts, are associated with larger, more established, and less risky, IPO companies.

4.9.6 Control variables – company profile

There are seven control variables relating to the company profile. As indicated in Table 10 and Table 11, the variables are: *AGE*, for the age of the company; *LOGNA*, for log of net assets; *LOGTA*, for log of total assets; *LEV*, for leverage, or total liabilities divided by total assets; *LOGREV*, for log of total revenue; *NETINC*, for net income; and *BOARD*, for size of board, based on number of board members. Together, these variables are proxies for the underlying characteristics of the company in terms of longevity (age), size (net assets, total assets, total revenue, net income), financial management (leverage), and governance (board size), and as indicated in the literature (section 4.9.12), are expected to have a positive relationship with IPO performance, or a negative relationship with underpricing.

4.9.7 Control variables – industry sector

There are three control variables relating to the classification of the company by industry sector: *RESSEC*, for resources sector, including all mining related companies; *FINSEC*, for finance sector, including all banks and financial services related companies; and *INDSEC*, for all other companies, described broadly in this study as the industrial sector. The split into three broad industry sector categories is guided by the industry sector classification in van Heerden & Alagidede (2012). Each variable is expressed as a dummy variable, equal to 1 if the company is classified in that sector, and 0 if not. For the purpose of the regression analysis in this study, the resources sector is the reference sector, meaning that it is not

reflected as one of the dummy variables in the regression analysis, which is limited to the other two industry sector variables. There is not a fixed relationship expected between these variables and IPO performance, or underpricing. Instead, they are expected to vary based on market conditions in the listing year. However, the inclusion of these variables in the study is expected to provide useful information on the influence of industry sectors on the IPO performance in each of the two periods in the study, and on each of the two exchanges, assisting in comparing pre-GFC and post-GFC IPO performance, and JSE and AltX IPO performance.

4.9.8 Control variables – market conditions in listing year

There is one control variable for market conditions in the year of listing: *LYMI*, for the change in the market index in the listing year, reflecting market conditions, in particular the market for trading in listed shares on the JSE, for the listing year. The choice of this variable is guided by the literature (Johan, 2010; van Heerden & Alagidede, 2012), in which market conditions are expected to have a positive relationship with underpricing, based on high demand for new listings and bidding up of prices, which, while positive from the perspective of IPO investors, translates into a negative relationship with IPO performance, from the perspective of the IPO company.

4.9.9 Control variables – listing activity in listing year

There are five control variables relating to listing activity in the year of listing*: LYTL*, for listing year total listings, *LYSSL*, for listing year signalling study listings, *LYCL*, for listing year cross-listings, *LYICL*, for listing year investment company listings, and *LYAOL*, for listing year all other listings. The selection of these variables is guided by the use of a control variable to represent "hot vs cold" markets in IPO studies, for example Guldiken et al (2017), usually by means of a dummy variable (for example, 1 = hot market, or high number of IPOs in the listing year; 0 = cold market). Given the objective of understanding signalling IPO readiness in a changing environment in the current study the objective of assessing the changing impact of listing standards on IPO performance, and the large number of listings excluded from the study sample due to sample selection criteria, the use of a single dummy variable to represent the change in listing activity in the listing year appears limited and inadequate. This was the motivation to use the control variables as indicated in Table 10 and Table 11. LYTL comprises all listings or IPOs in the listing year, including those that have been excluded in the study sample (the two largest categories of exclusions being

cross-listings and investment company listings, as indicated in Table 9), in order to provide a proxy for the total volume of listing activity in each year. The second variable, LYSSL, corresponds with the total number of listings in each year that are included in the study sample. The third variable, LYCL, for cross-listings in the listing year, represents listings on either JSE or AltX which are concurrently subject to listing standards of another exchange in another country, thus representing a competing influence, in terms of listing standards, with the local exchange in South Africa. The argument for the inclusion of this control variable is that it would assist to control for the separate influence of the listing standards from international exchanges, based on their influence on investor expectations in any listing year, resulting from the volume of cross-listings on the local exchanges, which represents competing IPO investment opportunities. The rationale is that, depending on the number of cross-listings in a listing year, there is an influence on the expectations of investors in local IPOs (included in the study sample), and these expectations influence underpricing and IPO performance. The fourth variable, LYICL, for investment company listings in the listing year, similarly represents competing IPO investment opportunities on the local exchange, which could influence expectations of investors in the IPOs included in the study. The final variable, LYAOL, for listing year all other listings, is added for completeness of the various subsets of listing activity. This variable includes listings which are not associated by the offer of equity shares to new investors, but which represent the broad spectrum of listing activity and investment opportunities for a range of investors. Based on the rationale, all five variables are expected to have a negative relationship with the IPO performance in the study sample, or a positive relationship with underpricing. This is in line with the relationship that a variable for "hot markets" is expected to have with IPO performance (Guldiken et al, 2017).

4.9.10 Control variables – media volume in listing year

There are six control variables for media volume: *LYPMJSE*, for listing year print media on JSE (number of articles that mention of JSE), *LYPMALT*, for listing year print media on AltX (number of articles that mention AltX), *LYPMALL*, for listing year print media counting all articles in the database, *LYOMJSE*, for listing year online media on JSE (number of articles that mention of JSE), *LYOMALT*, for listing year online media on AltX (number of articles that mention AltX), *LYOMALL*, for listing year online media counting all articles in the database. Print media refers to the number of articles in the Sabinet database, while online media volume refers to the number of articles in the Moneyweb database. The selection of these variables is guided by the approach in Guldiken et al (2017), with further detail

included to provide a breakdown into print media and online media, in line with Park et al (2016), and between JSE and AltX, in line with the focus on the two exchanges in the study. These control variables are expected to have a positive relationship with IPO performance, or a negative relationship with underpricing, based on signalling theory in which increased information results in reduced information asymmetry and improved IPO performance.

4.9.11 Definition of variables

Definitions of the variables discussed in sections 4.9.2 to 4.9.10 are provided in table 7.1.

Table 7.1 Definition of variables

Variable name	**Definition**
Dependent variable	
UP	Underpricing - difference between trading price at end of first day of trading and issue price, divided by issue price, net of market returns on first day of trading (equivalent to market-adjusted one-day initial return for investors)
Variable name	**Definition**
Independent variables	
JSE (H1)	Dummy variable equal to 1 if IPO was on the JSE as the senior exchange (0 if on AltX as the junior exchange)
PMCO (H2)	Print media coverage of company - number of articles on Sabinet database, published in one-month period up to and including day of listing
OMCO (H2)	Online media coverage of company - number of articles on Moneyweb database, published in one-month period up to and including day of listing
CMCO (H2)	Combined media coverage (print + online) of company – no. of articles on Sabinet and Moneyweb, published in one-month period up to and including day of listing
Control variables	
Offer profile	
PLS	No of pages in the pre-listing statement (PLS)
IP	Issue price of IPO shares, in cents (1/100 of a South African Rand)
LOGOFF	Log of the offer amount, in ZAR (South African Rand)
Company profile	
AGE	Age of the company in years, at the time of the IPO
LOGNA	Log of net assets in ZAR, for most recent year reported
LOGTA	Log of total assets, in ZAR, for most recent year reported
LEV	Total liabilities divided by total assets, for most recent year reported
LOGREV	Log of total revenue, in ZAR, for most recent year reported
NETINC	Net income in ZAR, for most recent year reported

BOARD	Number of board directors
Industry sector	
RESSEC	Dummy variable equal to 1 if company in the resources sector, 0 if not
FINSEC	Dummy variable equal to 1 if company in the finance sector, 0 if not
INDSEC	Dummy variable equal to 1 if company in the industrial sector, 0 if not
Market conditions	
LYMI	Listing year, percentage change in market index (JSE All Share Index)
Listing activity	
LYTL	Listing year, total listings on JSE and AltX
LYSSL	Listing year, signalling study listings
LYCL	Listing year, cross listings on JSE and AltX
LYICL	Listing year, investment company listings on JSE and AltX
LYAOL	Listing year, all other listings
Media volume	
LYPMJSE	Listing year, print media, number of articles that mention JSE (Sabinet)
LYPMALT	Listing year, print media, number of articles that mention AltX (Sabinet)
Variable name	**Definition**
Media volume – cont.	
LYPMALL	Listing year, print media, all articles (Sabinet)
LYOMJSE	Listing year, online media, number of articles that mention JSE (Moneyweb)
LYOMALT	Listing year, online media, number of articles that mention AltX (Moneyweb)
LYOMALL	Listing year, online media, all articles (Moneyweb)

4.9.12 Expected relationship between explanatory variables and underpricing

The relationships between each explanatory variable (independent variables and control variables) and underpricing are summarised in table 7.2.

Table 7.2. Expected relationship between explanatory variables and underpricing

Variable	**Expected relationship with**		**Reference**
	IPO performance	*Underpricing*	
Listing standards			
JSE	Positive	Negative	Johan (2010)
Media coverage			
PMCO	Positive	Negative	Guldiken et al (2017); Park et al (2016). Variables for media coverage broken down into print media and online media, and then combined.
OMCO	Positive	Negative	
CMCO	Positive	Negative	
Control variables			
Offer profile			

PLS	Positive	Negative	Park et al (2016)
IP	Positive	Negative	van Heerden & Alagidede (2012)
LOGOFF	Positive	Negative	Johan (2010); Park et al (2016)
Company profile			
AGE	Positive	Negative	Ding et al (2010); Pollock & Rindova (2003)
LOGNA	Positive	Negative	Johan (2010); variation of total assets variable
LOGTA	Positive	Negative	Johan (2010); Park et al (2010)
LEV	Positive	Negative	Johan (2010); Ding et al (2010)
LOGREV	Positive	Negative	Johan (2010)
NETINC	Positive	Negative	Johan (2010); Park et al (2016)
BOARD	Positive	Negative	Ding et al (2010)
Industry sector			
RESSEC	Varies with year of listing and related market conditions		Johan (2010); van Heerden & Alagidede (2012). Three broad industry sectors used for this study.
FINSEC			
INDSEC			
Variable	**Expected relationship with**		**Reference**
	IPO performance	*Underpricing*	*IPO performance*
Market conditions			
LYMI	Negative	Positive	Van Heerden & Alagidede (2012)
Listing activity			
LYTL	Negative	Positive	Guldiken et al (2017). Van Heerden & Alagidede (2012). "Hot vs. cold IPO market"; variable for total listings and for two key sub-totals
LYSSL	Negative	Positive	
LYCL	Negative	Positive	
LYICL	Negative	Positive	
LYAOL	Negative	Positive	
Media volume			
LYPMJSE	Positive	Negative	Guldiken et al (2017). Control variable for media volume broken down to represent separately media volume for print media versus online media, and within each type of media, JSE versus AltX, for the listing year
LYPMALT	Positive	Negative	
LYPMALL	Positive	Negative	
LYOMJSE	Positive	Negative	
LYOMALT	Positive	Negative	
LYOMALL	Positive	Negative	

4.10 DATA ANALYSIS METHODS

The data analysis methods comprise four areas: descriptive analysis; comparative analysis; correlation analysis; and hierarchical multiple regression analysis. The study data set,

consisting of 95 cases, was divided into different sub-sets, according to the requirements of each area of analysis, as summarised in Appendix C.

4.11 QUALITY ASSURANCE AND ETHICS

The approach to quality assurance of the study was based on regular reviews of study progress by the study supervisor and doctoral programme faculty at the Gordon Institute of Business Science, at the University of Pretoria. The research involved previously published, archival data obtained from various databases in the public domain. There were no personal or confidential data that required a consideration of ethical issues or confidentiality constraints. No ethical issues were encountered during the course of the study.

4.12 RESEARCH DESIGN AND METHODOLOGY CLOSING

The research design was guided by comparable studies in IPO signalling. Research methods comprised descriptive analysis, comparative analysis, correlation analysis, and regression analysis (hierarchical multiple regression analysis). The combination of methods was consistent with the literature on IPO signalling studies, and was guided by the four benchmark studies used for the study. The approach was used to profile and compare the IPO performance in each of the data sub-sets in the study, based on the split between JSE and AltX, and between pre-GFC and post-GFC, to test the two hypotheses on the changing impact of listing standards and media coverage on IPO performance, and to analyse the impact of other explanatory variables (included as control variables in the study) on IPO performance, in response to research question 3.

5 RESULTS

5.1 DESCRIPTION OF STUDY DATASET

Information was gathered from the IRESS research database for the 329 initial listings on the JSE and AltX, for the 17 years in the study review period, from 2003 to 2019, the full set of calendar years for which the two exchanges have coexisted as at the completion of the study in 2020. Exclusions were identified based on the criteria discussed in section 4.8. Table 8 describes the final study dataset, noting the number of IPOs included in the dataset for in each year, for JSE and AltX, after adjusting for the exclusions for each year.

Table 8. Description of the study dataset

	Initial listings - 2004 to 2018			Exclusions			Study dataset		
Year	JSE + ALtX	JSE	AltX	JSE + ALtX	JSE	AltX	JSE + ALtX	JSE	AltX
2003	8	8		8	8	0	0	0	0
2004	15	10	5	13	9	4	2	1	1
2005	20	14	6	15	14	1	5	0	5
2006	40	21	19	26	20	6	14	1	13
2007	62	25	37	16	12	4	46	13	33
2008	20	16	4	17	16	1	3	0	3
2009	9	5	4	8	4	4	1	1	0
2010	13	12	1	9	8	1	4	4	0
2011	16	13	3	15	12	3	1	1	0
2012	14	10	4	11	8	3	3	2	1
2013	13	8	5	12	7	5	1	1	0
2014	24	18	6	18	15	3	6	3	3
2015	21	13	8	17	9	8	4	4	0
2016	17	10	7	16	9	7	1	1	0
2017	21	13	8	15	9	6	6	4	2
2018	12	11	1	11	10	1	1	1	0
2019	4	4	0	4	4	0	0	0	0
Total	329	211	118	231	174	57	98	37	61
					Exclude: 2008 GFC		3	0	3
					Final study dataset		**95**	**37**	**58**
					Pre-GFC (2004-2007)		67	15	52
					Post-GFC (2009-2018)		28	22	6
					Final study dataset		**95**	**37**	**58**

Based on sample selection criteria, there was a total of 98 IPOs remaining after exclusions. This was reduced to 95 IPOs after excluding three IPOs in 2008, the year of the GFC, in line with the study's objectives of comparing pre-GFC and post-GFC IPO performance. As

indicated in Table 8, the final study dataset comprised 67 IPOs in the pre-GFC period (15 on JSE, 52 on AltX), and 28 IPOs in the post-GFC period (22 on JSE, 6 on AltX).

The sample selection process resulted in the majority of the 329 initial listings in the study review period being excluded from the study dataset. A total of 231 initial listings, or 70.2% of the total of 329, was excluded from the sample (before exclusions of the three IPOs in 2008). This contrasts with the results of sample selection in studies such as Johan (2010) in which the final study dataset represented the "majority of IPOs" (Johan, 2010, p.132) in the study review period. This difference between the two studies appears to be related to the setting of previous IPO signalling studies being in large, developed markets, compared to the setting of the current study in the smaller IPO market of South Africa.

Table 9 provides a breakdown of the 231 exclusions as a result of applying the sample exclusion criteria to the 329 initial listings for the study review period from 2003 to 2019.

Table 9. Breakdown of exclusions from the study dataset

Exclusion type	Number	%
Cross-listings (aka secondary listings, dual listings, inward listings)	73	31,60%
Investment companies, incl. prop inv.; REITs; SPACs	67	29,00%
Listing via unbundling, or restructuring	29	12,55%
Listing by introduction,; no offer of shares	26	11,26%
Reverse listings	11	4,76%
Non-equity listings incl.: prefs, debentures, corporate bonds	14	6,06%
Other, incl. name changes, transfers between exchanges, etc.	11	4,76%
Total	231	100,00%

The category with the highest number of exclusions comprises *cross-listings*, the internationally oriented set of listings (also referred to as secondary listings, dual listings and inward listings), with 73 listings in total from 2003 to 2019, representing 31.6% of the total IPO exclusions. The second highest category comprises *investment companies*, with 67 listings, representing 29.0% of the total IPO exclusions. The remaining 91 exclusions, representing 39.4% of exclusions, fall into various smaller categories. The sample selection process has highlighted the high proportion of initial listings on the JSE and AltX which fall into categories such as cross-listings and investment companies, relative to studies of IPOs on exchanges in developed markets. The result of the sample selection process is a relatively small study dataset. It is emphasized that the study dataset is however the *total*

population of IPOs on the JSE and AltX, based on sample selection criteria used IPO signalling studies, for the study review period from 2003 to 2019, the full period for which the two exchanges have coexisted up to the study completion date in 2020.

As noted in section 4.8.2, there is no indication in the literature review of previous studies of underpricing of IPOs on the JSE and AltX, in which these categories of exclusion have been applied in the sampling selection process. The primary theory base in previous studies is that of finance and investment management (for example, Chipeta & Jardine, 2014; Neneh & Smit, 2013; Neneh & Smit, 2014; van Heerden & Alagidede, 2012), rather than strategic management and signalling theory. In previous studies, underpricing is framed as the initial return to investors who buy shares at the offer price, rather than as the outcome of the strategic management efforts of the IPO company. Underpricing is regarded as an anomaly from a finance and investment management perspective (for example, van Heerden and Alagidede, 2012), rather than as a rational outcome based on the explanatory framework of signalling theory. The methodology in this study represents a contribution made by the study, in demonstrating the application of strategic management and signalling theory to the study of underpricing of IPOs on the JSE and AltX.

In addition to the exclusion categories based on sample selection criteria, discussed in section 4.8, IPOs are also be excluded from a study dataset due to practical constraints, such as the lack of availability of data, or inadvertent omissions in a database. This was not the case for this study, due to the efforts of the researcher. Significant time and effort were invested to obtain sufficient information to categorise all initial listings, and to obtain relevant source documents for all IPOs eligible for inclusion in the study. The data management team at IRESS (South Africa) is acknowledged for the committed and generous assistance to the researcher in responding to numerous requests to assist in accessing various data and documents that were not initially available or accessible on the IRESS database.

5.2 DESCRIPTION OF STUDY DATA – LISTING YEAR VARIABLES

The study focuses on understanding the impact of a major change in the IPO environment, namely the GFC, on IPO signalling. The initial profile of the changing environment was presented in chapter 2, indicating the monthly trend in market closing value, and the annual

number of IPOs on the JSE and AltX, in the study review period from 2003 to 2019. To develop a more detailed profile of the changing environment, it is useful to summarise, by listing year, the results of the data gathered for the three groups of control variables that relate to the IPO environment, namely market conditions, listing activity, and media volume. The results are indicated in Table 10.1 to 10.3, showing the results for the study review period (2003 to 2019), highlighting the two periods in the study timeframe – pre-GFC (2004 to 2007) and post-GFC (2009 to 2018).

Table 10.1 Control variable by listing year – market conditions

Listing Year		*LYMI*
	2003	0,120
Study data: pre-GFC	*2004*	0,219
	2005	0,430
	2006	0,377
	2007	0,162
	2008	-0,257
Study data: post-GFC	*2009*	0,286
	2010	0,161
	2011	-0,004
	2012	0,227
	2013	0,178
	2014	0,076
	2015	0,019
	2016	-0,001
	2017	0,175
	2018	-0,114
	2019	0,082
Study data (excl. 2008)		
Mean: pre-GFC (2004-2007)		0,297
Mean: post-GFC (2009-2018)		0,100

The results for listing year market conditions, based on the change in market index in each listing year (LYMI), are shown in Table 10.1, which indicates 2005 as the year with the highest annual increase in the market index, and 2008 the year with the largest decrease. Comparing pre-GFC and post-GFC, there is a decrease in the mean of 0.297 for pre-GFC to 0.100 for post-GFC.

Table 10.2. Control variables by listing year – listing activity

Listing Year		*LYTL*	*LYSSL*	*LYCL*	*LYICL*	*LYAOL*
	2003	8	0	1	3	4
Study data: pre-GFC	*2004*	15	2	0	4	9
	2005	20	5	3	5	7
	2006	40	14	7	5	14
	2007	62	46	7	0	9
	2008	20	3	9	0	8
Study data: post-GFC	*2009*	9	1	3	1	4
	2010	13	4	2	3	4
	2011	16	1	3	7	5
	2012	14	3	2	5	4
	2013	13	1	6	4	2
	2014	24	6	6	6	6
	2015	21	4	7	9	1
	2016	17	1	7	6	3
	2017	21	6	3	8	4
	2018	12	1	5	1	5
	2019	4	0	2	0	2
	Total	***329***	***98***	***73***	***67***	***91***
Study data (excl. 2008)		297	95	61	64	77
Total: pre-GFC (2004-2007)		137	67	17	14	39
Total: post-GFC (2009-2018)		160	28	44	50	38
Mean: pre-GFC (2004-2007)		34,25	16,75	4,25	3,50	9,75
Mean: post-GFC (2009-2018)		16,00	2,80	4,40	5,00	3,80

The results for total listings by listing year (LYTL) indicate the annual increase from 2004 rising to a peak in 2007, and then a large decline in 2008, the year of the GFC, and a lower number of initial listings after 2008. The trend for the listings includes in the study dataset– labelled LYSSL (for listing year signalling study listings) – indicates a similar pattern. There is an annual increase from 2004 to 2007, a peak in 2007, and then a large decline in 2008, and a lower number of listings after 2008. Comparing the mean number of listings for each category, there is a decline in the mean number of listings from pre-GFC to post-GFC, for total listings (LYTL), signalling study listings (LYSSL), and all other listings (LYAOL), while there is an increase in the mean number of listings from pre-GFC to post-GFC, for cross-listings (LYCL) and investment company listings (LYICL). These results provide a more detailed profile of the changing IPO environment.

Table 10.3 Control variables by listing year – media volume

Listing Year		*LYPMJSE*	*LYPMALT*	*LYPMALL*	*LYOMJSE*	*LYOMALT*	*LYOMALL*
	2003	2 295,00	101,00	129 013,00	0,00	0,00	0,00
Study data: pre-GFC	*2004*	3 110,00	213,00	131 327,00	0,00	0,00	0,00
	2005	3 219,00	212,00	126 353,00	5,00	0,00	12,00
	2006	3 369,00	276,00	125 852,00	19,00	6,00	45,00
	2007	3 362,00	479,00	118 563,00	1 463,00	147,00	8 114,00
	2008	3 279,00	371,00	125 712,00	1 608,00	90,00	11 017,00
Study data: post-GFC	*2009*	2 794,00	212,00	125 488,00	1 906,00	50,00	8 450,00
	2010	2 644,00	190,00	113 756,00	2 185,00	44,00	9 998,00
	2011	2 274,00	187,00	109 047,00	2 030,00	57,00	14 671,00
	2012	1 513,00	94,00	109 249,00	3 452,00	58,00	20 560,00
	2013	1 796,00	56,00	111 055,00	2 656,00	12,00	18 978,00
	2014	809,00	23,00	49 401,00	2 305,00	56,00	11 687,00
	2015	2 372,00	89,00	132 349,00	1 282,00	40,00	12 447,00
	2016	5 773,00	216,00	137 731,00	1 227,00	27,00	12 062,00
	2017	6 303,00	137,00	132 953,00	1 041,00	21,00	11 390,00
	2018	4 962,00	27,00	142 850,00	741,00	2,00	10 727,00
	2019	3 993,00	14,00	89 585,00	704,00	4,00	8 961,00
Study data (excl. 2008)							
Mean: pre-GFC (2004-2007)		3 265,00	295,00	125 523,75	371,75	38,25	2 042,75
Mean: post-GFC (2009-2018)		3 124,00	123,10	116 387,90	1 882,50	36,70	13 097,00

Table 10.3 indicates the pattern of media volume by listing year, for six control variables. The mean number of articles by listing year decreases from pre-GFC to post-GFC for print media volume, while there are large increases for online media volume for JSE and all articles, and a small decrease in online media volume for AltX. Online media coverage has a large increase in 2007, and a lower increase in the years after that. This pattern corresponds with the discussion in Park et al (2016), which identifies growth of online media as one of the changes in the IPO environment, and a possible influence in IPO signalling.

5.3 DESCRIPTIVE ANALYSIS

5.3.1 Introduction

Each of the four areas of analysis (descriptive, comparative, correlation, and regression) served a different purpose in the study. As the study progressed from the first to the fourth area of analysis, there was a progression of analytical detail, results and insights. Each stage of analysis contributed towards assessing the extent to which the results were in alignment with, or in support of, each of the two hypotheses in the study. In line with the stage-by-stage progression of the analysis, the presentation of results correspondingly

adopted a stage-by-stage sequencing of the four areas of analysis. Based on the range of variables included the study, combined with the analysis of two time periods and two exchanges, the choice to separate the four stages of analysis assisted in *simplifying* the presentation of results at each stage of analysis. For the purpose of reviewing the results, the series of tables are however intended to be reviewed on a *cumulative and integrated* basis. For example, table 11.1 presents the descriptive analysis of means of variables, while table 12 presents the comparative analysis of the means. The sequential presentation of information in the two tables corresponds to the sequence of analysis, and assists in simplifying the presentation of results. The two tables are however part of a *cumulative and integrated* series of analysis, and are intended to be reviewed in that manner. As the first stage of analysis, the descriptive analysis contributed to developing an initial profile of the IPOs and the underlying study variables, in the various subsets of the study dataset, for example, pre-GFC and post-GFC, and JSE and AltX. The scope of the descriptive analysis focused on the analysis of mean values of variables, an analysis which is central to the study objectives. Further analysis, including an analysis of median values and a determination of the influence of outliers, while not central to the current study, represents an opportunity for future research, to develop a more complete profile of underpricing on the JSE.

There were three objectives of the descriptive analysis. The first objective was to develop an initial profile of the study variables and IPO profiles, for pre-GFC and post-GFC, and within each period, for JSE and AltX. The second objective was to facilitate an initial comparison of the mean values for each variable, comparing IPOs in pre-GFC with post-GFC, and IPOs on JSE with AltX. On the basis of the mean values for each variable, the third objective was to develop an initial assessment of the degree of alignment with, or support for, each of the two hypotheses in the study. For example, given the rationale supporting the two hypotheses, the focus would be on assessing whether the results indicated a decrease in mean underpricing from pre-GFC to post-GFC, and at the same time, an increase in the difference in mean underpricing between JSE and AltX, with JSE having a lower mean underpricing in each period. These results would be in alignment with, and provide support for, the expectation that the increase in risk awareness, risk aversion and risk management in post-GFC would result in decreased mean underpricing (as discussed in the literature review in section 3). An increase in the difference between JSE and AltX mean underpricing would also be in alignment with, and provide support for, the expectation that there was an increase in the impact of listing standards on IPO

performance, from pre-GFC to post-GFC (H1). While the results of the descriptive analysis would not be able to provide a definitive test of the two hypotheses, the results would provide an initial indication of the likely direction of change in the key variables, and the likely relationship between the independent variables (listing standards and media coverage), as well as control variables, and underpricing, the dependent variable. Using SPSS, descriptive statistics were obtained for the 26 continuous variables in the study, and frequency tables for the four categorical variables, for each of the data sets as indicated in Appendix D. The full set of descriptive statistics comprise minimum and maximum, mean, standard deviation, skewness, and kurtosis. The full set of results of the descriptive analysis is presented in the tables in Appendix E. For ease of reference, Tables 11.1 and 11.2 provide a summary of the results for the mean values for continuous variables, and the frequencies for categorical variables. The description of the results is structured into three sections for each area of analysis – key results, additional results, and summary.

5.3.2 Key results

For ease of reference, the definitions of variables, provided in Table 7.1, are replicated in abridged form in each section of analysis. Refer Table 11A below.

Table 11A. Definition of variables

Variable	Definition
UP	Underpricing
JSE	1 = JSE; 0 = AltX
PMCO	Print media coverage of company
OMCO	Online media coverage of company
CMCO	Combined media coverage (print + online) of company
PLS	No of pages in the pre-listing statement (PLS)
IP	Issue price of IPO shares, in cents (1/100 of a South African Rand)
LOGOFF	Log of the offer amount, in ZAR (South African Rand)
AGE	Age of the company in years, at the time of the IPO
LOGNA	Log of net assets in ZAR, for most recent year reported
LOGTA	Log of total assets, in ZAR, for most recent year reported
LEV	Total liabilities divided by total assets, for most recent year reported
LOGREV	Log of total revenue, in ZAR, for most recent year reported
NETINC	Net income in ZAR, for most recent year reported
BOARD	Number of board directors
RESSEC	Dummy variable equal to 1 if company in the resources sector, 0 if not
FINSEC	Dummy variable equal to 1 if company in the finance sector, 0 if not
INDSEC	Dummy variable equal to 1 if company in the industrial sector, 0 if not
LYMI	Listing year, percentage change in market index (JSE All Share Index)
LYTL	Listing year, total listings on JSE and AltX
LYSSL	Listing year, signalling study listings

LYCL	Listing year, cross listings on JSE and AltX
LYICL	Listing year, investment company listings on JSE and AltX
LYAOL	Listing year, all other listings
LYPMJSE	Listing year, print media, number of articles that mention JSE (Sabinet)
LYPMALT	Listing year, print media, number of articles that mention AltX (Sabinet)
LYPMALL	Listing year, print media, all articles (Sabinet)
LYOMJSE	Listing year, online media, number of articles that mention JSE (Moneyweb)
LYOMALT	Listing year, online media, number of articles that mention AltX (Moneyweb)
LYOMALL	Listing year, online media, all articles (Moneyweb)

To provide context for highlighting key results, and based on the insights from the literature review, mean underpricing for a senior exchange (JSE) would be expected to be lower than a junior exchange (AltX), and mean underpricing would be expected to decrease from pre-GFC to post-GFC.

Table 11.1 Descriptive statistics: summary – continuous variables – mean

	Mean					
Period	Pre-GFC			Post-GFC		
Exchange	JSE	AltX	Total	JSE	AltX	Total
Dataset	PREJSE	PREALT	PRETOT	POSTJSE	POSTALT	POSTTOT
UP	0,297	0,231	0,245	0,091	0,298	0,135
PMCO	4,333	2,385	2,821	11,182	0,667	8,929
OMCO	3,267	2,577	2,731	9,773	4,167	8,571
CMCO	7,600	4,962	5,552	20,955	4,833	17,500
PLS	131,800	103,500	109,836	226,136	166,167	213,286
IP	708,000	150,865	275,597	1619,909	141,667	1303,143
LOGOFF	8,321	7,595	7,757	9,055	7,778	8,782
AGE	27,467	24,058	24,821	38,682	13,833	33,357
LOGNA	8,025	6,892	7,146	8,866	5,235	8,088
LOGTA	8,522	7,911	8,047	9,290	7,965	9,006
LEV	0,641	0,626	0,629	0,533	0,668	0,562
LOGREV	8,814	8,013	8,192	9,205	7,625	8,866
NETINC	66,360	15,696	27,039	260,848	-7,033	203,445
BOARD	6,867	6,423	6,522	9,591	7,000	9,036
LYMI	0,180	0,243	0,229	0,111	0,134	0,116
LYTL	57,400	51,558	52,866	17,591	21,333	18,393
LYSSL	40,933	33,212	34,940	3,864	5,500	4,214
LYCL	6,533	6,481	6,493	4,273	4,333	4,286
LYICL	0,600	1,808	1,537	5,773	6,500	5,929
LYAOL	9,333	10,058	9,896	3,682	5,000	3,964
LYPMJSE	3345,667	3289,442	3302,030	3105,818	2757,667	3031,214
LYPMALT	447,733	397,462	408,716	119,045	72,833	109,143
LYPMALL	119899,867	121379,750	121048,433	114050,182	87226,333	108302,214
LYOMJSE	1269,200	933,673	1008,791	1836,864	2074,833	1887,857
LYOMALT	127,800	94,788	102,179	38,727	44,667	40,000
LYOMALL	7035,133	5161,673	5581,104	12564,045	13066,833	12671,786
N	15	52	67	22	6	28

At a high level, the results indicate a decrease in mean underpricing from pre-GFC to post-GFC for JSE, but not for AltX, with an increase in the extent to which JSE mean underpricing is lower than AltX mean underpricing. The mean underpricing for AltX in pre-GFC, which is lower than mean underpricing for JSE in pre-GFC, is an unexpected result.

Focusing on the changes in mean values, and the comparison between JSE and AltX, the key results are as follows. In pre-GFC, JSE mean underpricing is higher than AltX by 6,6 percentage points, while in post-GFC, JSE mean underpricing is lower than AltX by 20,7 percentage points. JSE mean underpricing decreased by 20,6 percentage points from pre-GFC to post-GFC, while AltX mean underpricing increased by 6,7 percentage points from pre-GFC to post-GFC. For JSE IPOs, mean media coverage for both print and online media increased from pre-GFC to post-GFC. For AltX IPOs, mean media coverage increased for online media, but decreased for print media, with a small increase in combined media coverage, from pre-GFC to post-GFC. In post-GFC, mean media coverage is higher for JSE, which also has higher IPO performance (lower underpricing), compared to AltX. A comparison of control variables relating to the offer and the company, between JSE and AltX, and between pre-GFC and post-GFC, indicate a widening of the differences between JSE and AltX, from pre-GFC to post-GFC, for example in terms of mean age, size and profitability, with post-GFC JSE companies on average being larger, older, and more profitable than post-GFC AltX companies, combined with a much greater change in IPO performance, of JSE relative to AltX, from pre-GFC to post-GFC. A comparison of control variables relating to the IPO environment, between pre-GFC and post-GFC, indicate a decrease in average market index growth, a decrease in number of listings, a decrease in print media volumes, and an increase in online media volumes.

Table 11.2 Descriptive statistics: summary – categorical variables

		Frequency					
Period		Pre-GFC			Post-GFC		
Exchange		JSE	AltX	Total	JSE	AltX	Total
Dataset		PREJSE	PREALT	PRETOT	POSTJSE	POSTALT	POSTTOT
RESSEC	N		**6**	**6**	**2**		**2**
	%		*11,54*	*8,96*	*9,09*		*7,14*
FINSEC	N		**5**	**5**	**4**	**2**	**6**
	%		*9,62*	*7,46*	*18,18*	*33,33*	*21,43*
INDSEC	N	**15**	**41**	**56**	**16**	**4**	**20**
	%	*100,00*	*78,85*	*83,58*	*72,73*	*66,67*	*71,43*
Total	N	**15**	**52**	**67**	**22**	**6**	**28**
	%	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,00*

The summary of the frequencies for the categorical variables, presented in table 11.2, indicates a large increase in the percentage of total IPOs in the financial sector, from pre-GFC (7.46%) to post-GFC (21.43%). There were small to moderate sized decreases in the percentage of total IPOs in the other two sectors – resources and industrial. It is noted that given the relatively small size of the total study sample (95 cases), and the division into smaller subsets for each of the three different sectors, for each period, and for each of the two exchanges, the size of the resulting subsets do not support detailed statistical analysis of differences. This is relevant in the next stage of the analysis, the comparative analysis.

5.3.3 Additional results

Beyond a description of the key results, a description of additional results is intended to highlight other features of the results, and provide a more complete picture of the study variables. There was a large increase in the average number of pages in pre-listing statements (PLS), for both JSE (71,6% increase) and AltX (60,5% increase), from pre-GFC to post-GFC. There was an increase in the percentage of finance sector IPOs, and a decrease in the percentage of industrial sector IPOs, from pre-GFC to post-GFC; and the percentage of resource sector IPOs was similar between the two periods.

5.3.4 Summary

As indicated in section 5.3.1, the descriptive analysis represents the start of a progression of analysis. It provides an initial indication of the extent to which the results are in alignment with, or provide support for, the two hypotheses in the study. In this context, and subject to the review of the results of the comparative, correlation and regression areas of analysis, the results of the descriptive analysis appear to be in alignment with, and in support of, both of the hypotheses. First, there is a widening of the difference in mean underpricing between JSE and AltX (with lower mean underpricing for JSE in post-GFC), from pre-GFC to post-GFC, which suggests an increase in the impact of listing standards. Second, there is an increase in mean values for media coverage from pre-GFC to post-GFC, particularly for JSE, which, combined with the decrease in mean underpricing for JSE, suggests an increase in the impact of media coverage on underpricing. In addition, there is an increase in mean values for control variables related to offer and company for JSE, from pre-GFC to post-GFC, which combined with the decrease in mean underpricing for JSE, suggests an increase in the impact of control variables on underpricing, from pre-GFC to post-GFC.

The results for IPO performance for AltX in pre-GFC were unexpected and appear to be an anomaly. The results were not aligned with signalling theory, in that there was a higher IPO performance (lower mean underpricing) for AltX, the junior exchange, compared to JSE, the exchange with higher listing standards. The results in post-GFC were in line with the theory – JSE has a higher level of IPO performance (lower mean underpricing) compared to AltX. The anomalous IPO performance of AltX in pre-GFC coincides with the very high number of IPOs on AltX in 2007. As indicated in Table 8, there are 33 IPOs on AltX included in the study dataset (net of exclusions based on sample selection criteria). This was the highest number of IPOs for any year of the review period (from 2003 to 2019), for both JSE and AltX. This suggests very favourable conditions for IPOs on AltX in 2007, and a less stringent assessment of risks by the underwriters and initial investors in the AltX IPOs. This would explain the lower level of underpricing, and the higher level of IPO performance.

5.4 COMPARATIVE ANALYSIS

5.4.1 Introduction

Building on the results of the descriptive analysis, the comparative analysis takes the analysis one step further in the four-stage progression of analysis. The first objective of the comparative analysis was to assess, on a statistical basis, the difference in the mean values of variables between the different sets of IPO, focusing on the statistically significant differences between pre-GFC and post-GFC, and between JSE and AltX. The framework used for defining and labelling the four datasets (PRETOT, POSTTOT, JSETOT, and ALTTOT) is indicated in Appendix D (execution of study). The second objective was to assess the extent to which the results are in alignment with, or in support of, the two hypotheses, and to determine the impact of control variables, based on the nature and direction of differences in mean values for different sets of variables.

Using SPSS, comparative statistics were obtained for the study variables, based on independent-samples t-tests for the 26 continuous variables, and Pearson Chi-square tests for the three sector-related categorical variables. The Chi-Square tests were based on crosstabulations between the sector variables (designated as 1 for resources sector, 2 for financial sector, and 3 for industrial sector, for the purpose of the Chi-Square tests), and each of two other categorical variables – JSE, used to distinguish JSE from AltX, and

POSTGFC, used to distinguish pre-GFC from post-GFC. For each variable in both the independent-samples t-tests and the Chi-Square tests, there were four sets of comparisons – first between JSE and AltX in pre-GFC (PRETOT data set), second between JSE and AltX in post-GFC (POSTTOT data set), third between pre-GFC JSE and post-GFC JSE (JSETOT data set, with POSTGFC as the variable used to split pre-GFC and post-GFC), and fourth between pre-GFC AltX and post-GFC AltX (ALTTOT data set, with POSTGFC as the variable used to split pre-GFC and post-GFC). The full set of results of the comparative analysis is presented in Appendix F.

Appendix F includes the results for the Chi-Square tests for the sector related variables, comparing counts for JSE and AltX for each period (pre-GFC and post-GFC), and comparing these two periods for each exchange (JSE and AltX). As noted in the descriptive analysis, the size of the different sub-sets for the different industry sectors was not sufficiently large to support the statistical analysis of differences in frequencies for different subsets. A brief note on the calculations for the Pearson Chi-Square tests assists in explaining the limitations based on the small size of subsets. A key assumption in the use of Chi-Square tests is that the count should be 5 or greater for 80% or more of the cells in each crosstabulation, for example, JSE and Sector (Pallant, 2016, p220). Due to the limited number of cases in the various crosstabulations, this assumption was not met, as indicated in the SPSS notes for each Chi-Square test. The results are included in Appendix F for completeness of analysis.

The remainder of this section focuses on the results of the independent-samples t-tests, describing key results, additional results, and a summary. For ease of reference, a summary of the results of the independent-samples t-tests is presented in table 12.

5.4.2 Key results

For ease of reference, definitions of variables are provided in Table 12A (an abridged version of the definition of variables provided in Table 7.1).

Table 12A. Definition of variables

Variable	Definition
UP	Underpricing
JSE	1 = JSE; 0 = AltX
PMCO	Print media coverage of company
OMCO	Online media coverage of company
CMCO	Combined media coverage (print + online) of company

PLS	No of pages in the pre-listing statement (PLS)
IP	Issue price of IPO shares, in cents (1/100 of a South African Rand)
LOGOFF	Log of the offer amount, in ZAR (South African Rand)
AGE	Age of the company in years, at the time of the IPO
LOGNA	Log of net assets in ZAR, for most recent year reported
LOGTA	Log of total assets, in ZAR, for most recent year reported
LEV	Total liabilities divided by total assets, for most recent year reported
LOGREV	Log of total revenue, in ZAR, for most recent year reported
NETINC	Net income in ZAR, for most recent year reported
BOARD	Number of board directors
RESSEC	Dummy variable equal to 1 if company in the resources sector, 0 if not
FINSEC	Dummy variable equal to 1 if company in the finance sector, 0 if not
INDSEC	Dummy variable equal to 1 if company in the industrial sector, 0 if not
LYMI	Listing year, percentage change in market index (JSE All Share Index)
LYTL	Listing year, total listings on JSE and AltX
LYSSL	Listing year, signalling study listings
LYCL	Listing year, cross listings on JSE and AltX
LYICL	Listing year, investment company listings on JSE and AltX
LYAOL	Listing year, all other listings
LYPMJSE	Listing year, print media, number of articles that mention JSE (Sabinet)
LYPMALT	Listing year, print media, number of articles that mention AltX (Sabinet)
LYPMALL	Listing year, print media, all articles (Sabinet)
LYOMJSE	Listing year, online media, number of articles that mention JSE (Moneyweb)
LYOMALT	Listing year, online media, number of articles that mention AltX (Moneyweb)
LYOMALL	Listing year, online media, all articles (Moneyweb)

Based on guidance in Pallant (2016, p.246-247), the identification of the relevant significance statistic (based on result of Levene's test), and the significance level, (based on p = 0,05 or less), the statistically significant mean differences are highlighted in Table 12.

Table 12. Summary of comparative analysis - independent-samples t-tests

Period	Pre-GFC		Post-GFC		Pre + Post		Pre + Post	
Comparison	JSE vs. AltX		JSE vs. ALtX		JSE - Pre vs Post		AltX - Pre vs. Post	
Dataset	PRETOT		POSTTOT		JSETOT		ALTTOT	
	Sig. (2-tailed)	Mean Difference	Sig. (2-tailed)	Mean Difference	Sig. (2-tailed)	Mean Difference	Sig. (2-tailed)	Mean Difference
UP	0,420	-0,066	0,038	0,207	0,018	0,206	0,560	-0,067
	0,477	-0,066	0,143	0,207	0,037	0,206	0,603	-0,067
PMCO	0,016	-1,949	0,068	-10,515	0,061	-6,848	0,096	1,718
	0,058	-1,949	0,001	-10,515	0,030	-6,848	0,016	1,718
OMCO	0,669	-0,690	0,090	-5,606	0,003	-6,506	0,528	-1,590
	0,569	-0,690	0,037	-5,606	0,001	-6,506	0,454	-1,590
CMCO	0,194	-2,638	0,047	-16,121	0,010	-13,355	0,967	0,128
	0,136	-2,638	0,002	-16,121	0,004	-13,355	0,961	0,128
PLS	0,002	-28,300	0,108	-59,970	0,000	-94,336	0,000	-62,667
	0,008	-28,300	0,027	-59,970	0,000	-94,336	0,013	-62,667
IP	0,000	-557,135	0,016	-1478,242	0,025	-911,909	0,853	9,199
	0,009	-557,135	0,000	-1478,242	0,013	-911,909	0,778	9,199
LOGOFF	0,000	-0,726	0,000	-1,277	0,000	-0,734	0,365	-0,183
	0,000	-0,726	0,001	-1,277	0,001	-0,734	0,471	-0,183
AGE	0,588	-3,409	0,071	-24,848	0,216	-11,215	0,278	10,224
	0,525	-3,409	0,004	-24,848	0,169	-11,215	0,060	10,224
LOGNA	0,116	-1,132	0,007	-3,630	0,001	-0,841	0,226	1,657
	0,006	-1,132	0,192	-3,630	0,000	-0,841	0,525	1,657
LOGTA	0,000	-0,611	0,002	-1,325	0,005	-0,768	0,783	-0,054
	0,000	-0,611	0,000	-1,325	0,002	-0,768	0,816	-0,054
LEV	0,819	-0,016	0,244	0,136	0,120	0,109	0,698	-0,043
	0,769	-0,016	0,349	0,136	0,095	0,109	0,755	-0,043
LOGREV	0,000	-0,801	0,000	-1,580	0,061	-0,391	0,149	0,388
	0,000	-0,801	0,001	-1,580	0,046	-0,391	0,201	0,388
NETINC	0,000	-50,664	0,035	-267,881	0,016	-194,488	0,050	22,729
	0,013	-50,664	0,000	-267,881	0,006	-194,488	0,174	22,729
BOARD	0,542	-0,444	0,048	-2,591	0,006	-2,724	0,578	-0,577
	0,540	-0,444	0,003	-2,591	0,004	-2,724	0,327	-0,577
LYMI	0,040	0,062	0,597	0,023	0,019	0,069	0,022	0,109
	0,005	0,062	0,516	0,023	0,010	0,069	0,007	0,109
LYTL	0,179	-5,842	0,084	3,742	0,000	39,809	0,000	30,224
	0,152	-5,842	0,075	3,742	0,000	39,809	0,000	30,224
LYSSL	0,115	-7,722	0,056	1,636	0,000	37,070	0,000	27,712
	0,079	-7,722	0,025	1,636	0,000	37,070	0,000	27,712
LYCL	0,910	-0,053	0,949	0,061	0,002	2,261	0,002	2,147
	0,919	-0,053	0,947	0,061	0,001	2,261	0,036	2,147
LYICL	0,073	1,208	0,519	0,727	0,000	-5,173	0,000	-4,692
	0,029	1,208	0,344	0,727	0,000	-5,173	0,000	-4,692
LYAOL	0,262	0,724	0,068	1,318	0,000	5,652	0,000	5,058
	0,129	0,724	0,038	1,318	0,000	5,652	0,000	5,058
LYPMJSE	0,623	-56,224	0,723	-348,152	0,634	239,848	0,187	531,776
	0,375	-56,224	0,781	-348,152	0,566	239,848	0,657	531,776
LYPMALT	0,107	-50,272	0,127	-46,212	0,000	328,688	0,000	324,628
	0,066	-50,272	0,122	-46,212	0,000	328,688	0,000	324,628
LYPMALL	0,187	1479,883	0,076	-26823,848	0,435	5849,685	0,000	34153,417
	0,186	1479,883	0,191	-26823,848	0,350	5849,685	0,105	34153,417
LYOMJSE	0,091	-335,527	0,524	237,970	0,017	-567,664	0,001	-1141,160
	0,050	-335,527	0,578	237,970	0,011	-567,664	0,027	-1141,160
LYOMALT	0,092	-33,012	0,450	5,939	0,000	89,073	0,086	50,122
	0,051	-33,012	0,495	5,939	0,000	89,073	0,000	50,122
LYOMALL	0,091	-1873,460	0,749	502,788	0,000	-5528,912	0,000	-7905,160
	0,049	-1873,460	0,770	502,788	0,000	-5528,912	0,002	-7905,160
		t-test sig. (2-tailed)						
		t-test sig. = or < 0,05						

The description below of the key results is organised into the four sets of comparison, as indicated in table 12: first, comparing JSE and AltX in pre-GFC; second, comparing JSE and AltX in post-GFC; third, comparing JSE in pre-GFC with JSE in post-GFC; and fourth, comparing AltX in pre-GFC with AltX in post-GFC. The description of key results indicate differences that are statistically significant (as highlighted in Table 12). The comments indicate (in brackets) which of the two cases in a pair (e.g. JSE or AltX; pre-GFC JSE or post-GFC JSE) has the higher mean.

Pre-GFC: JSE vs. AltX

There were 11 variables for which there were statistically significant differences between JSE and AltX, in pre-GFC. They were as follows: Print media coverage (JSE higher); Number of pages in PLS (JSE higher); Issue price (JSE higher); Log of offer value (JSE higher); Age of company (JSE higher); Log of total assets (JSE higher); Log of revenue (JSE higher); Net income (JSE higher); Listing year – change in market index (AltX higher); Listing year – online media volume for JSE (AltX higher); and Listing year – online media volume, all ((JSE higher). The results highlight that in pre-GFC, the size of JSE IPO offers and IPO companies were on average higher than the size of AltX IPOs and IPO companies.

Post-GFC: JSE vs. AltX

There were 10 variables for which there were statistically significant differences between JSE and AltX, in post-GFC. They were as follows: Underpricing (AltX higher); Print media coverage of the company (JSE higher); Combined media coverage of the company (JSE higher); Issue price (JSE higher); Log of offer (JSE higher); Log of total assets (JSE higher); Log of revenues (JSE higher); Net income (JSE higher); Number of board members (JSE higher); and Listing year – print media volume – all (JSE higher). The results highlight that in post-GFC, mean underpricing is higher for AltX than for JSE, and that the difference is statistically significant. Further, in post-GFC, JSE has higher mean media coverage, higher mean offer sizes, and larger mean sizes of IPO companies.

JSE: pre-GFC vs. post-GFC

There were 21 variables for which there were statistically significant differences between pre-GFC and post-GFC, for JSE. They were as follows: Underpricing (pre-GFC higher); Print media coverage of the company (post-GFC higher); Online media coverage of the company (post-GFC higher); Combined media of the company (post-GFC higher); Number of pages

in PLS (post-GFC higher); Issue price (post-GFC higher); Log of offer value (post-GFC higher); Log of net assets (post-GFC higher); Log of total assets (post-GFC higher); Net income (post-GFC higher); Number of board members (post-GFC higher); Listing year – change in market index (pre-GFC higher); Listing year – total listings (pre-GFC higher); Listing year – signalling study listings (pre-GFC higher); Listing year – cross listings (pre-GFC higher); Listing year – investment company listings (pre-GFC higher); Listing year – all other listings (pre-GFC higher); Listing year – print media volume for AltX (pre-GFC higher); Listing year – online media volume for JSE (post-GFC higher); Listing year – online media volume for AltX (pre-GFC higher); and Listing year – online media volume – all (post-GFC higher). The results highlight the decrease in underpricing from pre-GFC to post-GFC, combined with an increase in media coverage, size of IPO offers, and size of IPO companies.

AltX: pre-GFC vs. post-GFC

There were 12 variables for which there were statistically significant differences between pre-GFC and post-GFC, for AltX. They were as follows: Number of pages in PLS (post-GFC higher); Net income (pre-GFC higher); Listing year – change in market index (pre-GFC higher); Listing year – total listings (pre-GFC higher); Listing year – signalling study listings (pre-GFC higher); Listing year – cross listings (pre-GFC higher); Listing year – investment company listings (post-GFC higher); Listing year – all other listings (pre-GFC higher); Listing year – print media volume for AltX (pre-GFC higher); Listing year – online media volume for JSE (post-GFC higher); Listing year – online media volume for AltX (pre-GFC higher); and Listing year – online media – all (post-GFC higher). The results highlight the anomalous mixture of changes from pre-GFC to post-GFC for AltX, with an absence of statistically significant differences in underpricing and media coverage.

5.4.3 Additional results

In assessing the alignment of the results with the literature and with signalling theory, three points are highlighted. First, the pair of independent samples with the highest number of variables (21) with statistically significant mean differences is pre-GFC JSE and post-GFC JSE. There are significant changes in IPO performance, media coverage, offer and company profiles, and IPO environment. Changes are aligned with the literature and with signalling theory. In the change from pre-GFC to post-GFC, there is an improvement in IPO performance (lower underpricing), which is combined with higher media coverage of

companies, and larger sized IPO offers and companies. Second, the results of the pre-GFC comparison between JSE and AltX indicate that although the IPOs on the JSE have statistically higher means for variables relating to issue price, offer size, age of company, total assets, and revenue, all of which would align with a higher IPO performance by JSE IPOs, based on signalling theory and the literature on previous studies, there is however a lower IPO performance by the JSE compared to AltX. As with the results of the descriptive analysis, it suggests that the IPO performance for pre-GFC AltX represents an anomaly, potentially related to the very high number of IPOs on AltX in pre-GFC, particularly in 2007. Third, the results of the post-GFC comparison between JSE and AltX are aligned with the literature and with signalling theory. There is a statistically significant mean difference for underpricing (higher underpricing for AltX, or lower IPO performance), which is aligned with the statistically significant mean differences for issue price, size of offer, total assets and total revenues, for which JSE has the higher value.

5.4.4 Summary

The comparative analysis builds on the descriptive analysis, and takes the study one step further in testing the two hypotheses. It provides further indication of the extent to which the results are in alignment with, or provide support for, the two hypotheses. In this context, and subject to the results of the correlation and regression areas of analysis, the results of the comparative analysis appear to be in alignment with, and in support of, both hypotheses. The results support H1: there was an increase in the impact of listing standards on IPO performance, comparing pre-GFC to post-GFC. The results support H2: there was a statistically significant increase in media coverage, (print, online and combined) for JSE, from pre-GFC to post-GFC, and a statistically significant increase in IPO performance, for JSE, from pre-GFC to post-GFC, while for AltX, there is a decrease in media coverage (print and combined) and in IPO performance, from pre-GFC to post-GFC (although the latter changes are not statistically significant). Regarding the impact of control variables, in particular for JSE, there is a statistically significant change in various control variables for both JSE and AltX, and a change in IPO performance, from pre-GFC to post-GFC. It is notable that the IPO performance for AltX in pre-GFC, which is higher than for JSE, do not align with expectations, potentially due to market conditions for pre-GFC AltX IPOs.

5.5 CORRELATION ANALYSIS

5.5.1 Introduction

The correlation analysis builds on the preceding two areas of descriptive and comparative analysis. The first objective of the correlation analysis was to assess, on a statistical basis, the direction and strength of the relationship between each pair of variables, for each of the two periods in the study, pre-GFC and post-GFC, and to compare pre-GFC and post-GFC, focusing on the dependent and independent variables in the study, and highlighting the statistically significant relationships. The second objective was to assess the extent to which the results are in alignment with, or in support of, the two hypotheses, and to identify the influence of control variables, based on the direction and strength of the relationships between the key variables, and the changes from pre-GFC to post-GFC.

Using SPSS, correlation analysis statistics were obtained, first for the full set of study variables for the pre-GFC data set, and then for the full set of study variables for the post-GFC data set. Due to the size of the SPSS output table for each data set, the results were divided into three sub-tables for inclusion in Appendix G. The results of the correlation analysis were compared for the two data sets, focusing on the correlations between the dependent and independent variables on one side, and the full set of study variables on the other. This approach facilitated the comparison between pre-GFC and post-GFC, for the key correlations for the dependent and independent variables. For ease of reference, table 13 provides a summary of the correlation analysis, focusing on the dependent and independent variables and their correlations with each other, and with the control variables in the study.

5.5.2 Key results

For ease of reference, definitions of variables are provided in Table 13A (an abridged version of the definition of variables provided in Table 7.1).

Table 13A. Definition of variables

Variable	Definition
UP	Underpricing
JSE	1 = JSE; 0 = AltX
PMCO	Print media coverage of company
OMCO	Online media coverage of company
CMCO	Combined media coverage (print + online) of company
PLS	No of pages in the pre-listing statement (PLS)

IP	Issue price of IPO shares, in cents (1/100 of a South African Rand)
LOGOFF	Log of the offer amount, in ZAR (South African Rand)
AGE	Age of the company in years, at the time of the IPO
LOGNA	Log of net assets in ZAR, for most recent year reported
LOGTA	Log of total assets, in ZAR, for most recent year reported
LEV	Total liabilities divided by total assets, for most recent year reported
LOGREV	Log of total revenue, in ZAR, for most recent year reported
NETINC	Net income in ZAR, for most recent year reported
BOARD	Number of board directors
RESSEC	Dummy variable equal to 1 if company in the resources sector, 0 if not
FINSEC	Dummy variable equal to 1 if company in the finance sector, 0 if not
INDSEC	Dummy variable equal to 1 if company in the industrial sector, 0 if not
LYMI	Listing year, percentage change in market index (JSE All Share Index)
LYTL	Listing year, total listings on JSE and AltX
LYSSL	Listing year, signalling study listings
LYCL	Listing year, cross listings on JSE and AltX
LYICL	Listing year, investment company listings on JSE and AltX
LYAOL	Listing year, all other listings
LYPMJSE	Listing year, print media, number of articles that mention JSE (Sabinet)
LYPMALT	Listing year, print media, number of articles that mention AltX (Sabinet)
LYPMALL	Listing year, print media, all articles (Sabinet)
LYOMJSE	Listing year, online media, number of articles that mention JSE (Moneyweb)
LYOMALT	Listing year, online media, number of articles that mention AltX (Moneyweb)
LYOMALL	Listing year, online media, all articles (Moneyweb)

The results for the correlation analysis indicate the Pearson correlations and the significance levels. In Table 13, correlations which are significant at either the 0.05 level, or the 0.01 level, indicated in the SPSS output as * or ** respectively, are highlighted for ease of reference. The full set of correlations are presented (for pre-GFC and post-GFC) in Appendix G, and from these the correlations relating to dependent and independent variables were extracted and summarised in Table 13.

Table 13. Summary of correlation analysis – Pearson correlations for selected variables

	Pearson correlations		Pre-GFC (PRETOT; N=67)					Post-GFC (POSTTOT; N=28)				
	Variable		1	2	3	4	5	1	2	3	4	5
1	UP	Pearson Corr.										
		Sig. (2-tailed)										
2	JSE	Pearson Corr.	0,100					-.394*				
		Sig. (2-tailed)	0,420					0,038				
3	PMCO	Pearson Corr.	0,048	.292*				-0,139	0,350			
		Sig. (2-tailed)	0,697	0,016				0,482	0,068			
4	OMCO	Pearson Corr.	0,064	0,053	.333**			-0,034	0,327	.598**		
		Sig. (2-tailed)	0,606	0,669	0,006			0,862	0,090	0,001		
5	CMCO	Pearson Corr.	0,070	0,161	.669**	.924**		-0,112	.378*	.947**	.825**	
		Sig. (2-tailed)	0,572	0,194	0,000	0,000		0,572	0,047	0,000	0,000	
6	PLS	Pearson Corr.	-0,053	.373**	0,158	0,102	0,145	-0,220	0,310	0,239	0,325	0,300
		Sig. (2-tailed)	0,668	0,002	0,201	0,412	0,243	0,260	0,108	0,220	0,091	0,121
7	IP	Pearson Corr.	-0,173	.562**	.350**	0,029	0,165	-0,294	.451*	.468*	.513**	.536**
		Sig. (2-tailed)	0,161	0,000	0,004	0,818	0,183	0,129	0,016	0,012	0,005	0,003
8	LOGOFF	Pearson Corr.	-0,175	.531**	.343**	0,219	.312*	-.409*	.701**	.617**	.608**	.680**
		Sig. (2-tailed)	0,156	0,000	0,005	0,075	0,010	0,031	0,000	0,000	0,001	0,000
9	AGE	Pearson Corr.	-0,003	0,067	0,086	-0,071	-0,022	-0,340	0,346	0,043	0,070	0,058
		Sig. (2-tailed)	0,979	0,588	0,490	0,566	0,863	0,077	0,071	0,828	0,724	0,768
10	LOGNA	Pearson Corr.	0,082	0,194	0,040	0,097	0,092	-0,010	.500**	0,282	0,267	0,307
		Sig. (2-tailed)	0,507	0,116	0,750	0,436	0,457	0,961	0,007	0,145	0,170	0,113
11	LOGTA	Pearson Corr.	-0,036	.493**	.242*	0,084	0,164	-.464*	.555**	.477*	.504**	.540**
		Sig. (2-tailed)	0,770	0,000	0,049	0,500	0,184	0,013	0,002	0,010	0,006	0,003
12	LEV	Pearson Corr.	0,157	0,029	0,225	0,080	0,154	-0,237	-0,228	-0,229	0,014	-0,156
		Sig. (2-tailed)	0,203	0,819	0,067	0,522	0,213	0,224	0,244	0,240	0,942	0,428
13	LOGREV	Pearson Corr.	0,062	.501**	.250*	0,186	.248*	-.455*	.711**	.556**	.450*	.574**
		Sig. (2-tailed)	0,617	0,000	0,042	0,131	0,043	0,015	0,000	0,002	0,016	0,001
14	NETINC	Pearson Corr.	-0,089	.483**	.280*	0,040	0,145	-0,225	.401*	.748**	.613**	.775**
		Sig. (2-tailed)	0,476	0,000	0,022	0,745	0,240	0,250	0,035	0,000	0,001	0,000
15	BOARD	Pearson Corr.	-0,029	0,076	.269*	0,235	.295*	-0,265	.377*	0,173	0,265	0,229
		Sig. (2-tailed)	0,815	0,542	0,028	0,056	0,016	0,173	0,048	0,378	0,173	0,241
16	RESSEC	Pearson Corr.	-0,169	-0,168	-0,224	-0,130	-0,193	-0,138	0,145	0,226	0,234	0,254
		Sig. (2-tailed)	0,171	0,173	0,068	0,296	0,117	0,483	0,462	0,247	0,231	0,193
17	FINSEC	Pearson Corr.	-0,138	-0,153	0,018	-0,028	-0,015	.427*	-0,152	-0,258	0,032	-0,169
		Sig. (2-tailed)	0,265	0,218	0,883	0,822	0,907	0,024	0,442	0,185	0,872	0,389
18	INDSEC	Pearson Corr.	0,228	0,238	0,160	0,120	0,159	-0,309	0,055	0,105	-0,162	0,009
		Sig. (2-tailed)	0,063	0,052	0,196	0,335	0,198	0,110	0,781	0,594	0,410	0,964
19	LYMI	Pearson Corr.	0,096	-.252*	-0,072	-.320**	-.282*	-0,234	-0,105	-0,085	-0,112	-0,105
		Sig. (2-tailed)	0,440	0,040	0,563	0,008	0,021	0,230	0,597	0,667	0,572	0,595
20	LYTL	Pearson Corr.	-0,024	0,166	-0,012	.311*	0,240	.402*	-0,333	-0,137	0,004	-0,095
		Sig. (2-tailed)	0,845	0,179	0,926	0,010	0,050	0,034	0,084	0,488	0,984	0,631
21	LYSSL	Pearson Corr.	-0,058	0,194	-0,004	.332**	.260*	0,218	-0,365	-0,058	0,062	-0,016
		Sig. (2-tailed)	0,641	0,115	0,972	0,006	0,034	0,265	0,056	0,771	0,753	0,937
22	LYCL	Pearson Corr.	0,077	0,014	-0,070	0,166	0,102	.447*	-0,013	-0,132	-0,009	-0,097
		Sig. (2-tailed)	0,537	0,910	0,576	0,180	0,409	0,017	0,949	0,503	0,963	0,624
23	LYICL	Pearson Corr.	0,087	-0,221	-0,018	-.335**	-.271*	0,245	-0,127	-0,009	-0,030	-0,018
		Sig. (2-tailed)	0,485	0,073	0,886	0,006	0,026	0,210	0,519	0,964	0,880	0,926
24	LYAOL	Pearson Corr.	0,133	-0,139	0,024	-0,202	-0,150	0,002	-0,350	-0,159	-0,005	-0,114
		Sig. (2-tailed)	0,285	0,262	0,847	0,101	0,227	0,992	0,068	0,419	0,981	0,563
25	LYPMJSE	Pearson Corr.	0,049	0,061	-0,139	0,079	0,006	-0,275	0,070	.487**	0,002	0,345
		Sig. (2-tailed)	0,691	0,623	0,261	0,524	0,962	0,157	0,723	0,009	0,994	0,072
26	LYPMALT	Pearson Corr.	-0,059	0,199	0,002	.332**	.263*	-0,339	0,296	.417*	0,164	0,360
		Sig. (2-tailed)	0,633	0,107	0,987	0,006	0,032	0,078	0,127	0,027	0,406	0,060
27	LYPMALL	Pearson Corr.	0,049	-0,163	0,043	-.327**	-.241*	-0,307	0,340	.406*	-0,016	0,280
		Sig. (2-tailed)	0,691	0,187	0,732	0,007	0,050	0,112	0,076	0,032	0,937	0,149
28	LYOMJSE	Pearson Corr.	-0,078	0,208	0,002	.336**	.266*	-0,003	-0,126	-.388*	-0,028	-0,285
		Sig. (2-tailed)	0,528	0,091	0,984	0,005	0,030	0,989	0,524	0,041	0,888	0,141
29	LYOMALT	Pearson Corr.	-0,076	0,207	0,003	.336**	.266*	0,242	-0,149	-.403*	0,054	-0,263
		Sig. (2-tailed)	0,539	0,092	0,983	0,005	0,030	0,215	0,450	0,033	0,784	0,177
30	LYOMALL	Pearson Corr.	-0,079	0,208	0,003	.336**	.266*	-0,079	-0,063	-0,279	-0,173	-0,266
		Sig. (2-tailed)	0,526	0,091	0,983	0,005	0,030	0,690	0,749	0,151	0,380	0,171
	*. Correlation is significant at the 0.05 level (2-tailed).											
	**. Correlation is significant at the 0.01 level (2-tailed).											

The description of the results for Pearson correlations is organised into six areas, corresponding to different variables: underpricing, listing standards, print media coverage, online media coverage, combined media coverage, and control variables. In each case, the statistically significant correlations are described, first for pre-GFC and second for post-GFC.

Underpricing – statistically significant correlations with other variables

In pre-GFC, it is notable that there are no statistically significant correlations between underpricing, the dependent variable in the study, and any other variable, either independent variable or control variable. Subject to the results of the regression analysis, this suggests that IPO performance in pre-GFC is related to, or influenced by, variables which are external to the study, including variables related to unusual patterns of decision-making and market behaviour, and that these extraneous factors and influences are not aligned with the explanatory framework of signalling theory. In post-GFC, there are statistically significant correlations between underpricing and seven variables, namely: JSE (negative correlation: higher listing standards are associated with lower underpricing); Log of offer value (negative correlation); Log of total assets (negative correlation); Log of revenue (negative correlation); Finance sector (positive correlation); Listing year – total listings (positive correlation); Listing year – cross listings (positive correlation), which also has the lowest significance value for the correlation with underpricing in post-GFC.

The distinction between pre-GFC and post-GFC correlations with underpricing suggests a major shift in the explanatory model of underpricing, or IPO performance, including the changing impact and influence of listing standards, media coverage, and control variables. In post-GFC, the statistically significant positive correlation between underpricing and listing year total listings, and listing year cross-listings, supports the decision to include control variables related to listing activity in the study, and confirms the influence of different variables in the broader IPO environment on IPO performance. In post-GFC, the influence of listing year cross-listings, the variable with the statistically most significant correlation with underpricing, is particularly noteworthy, as it represents the influence of listing standards from other countries (inherent in a cross-listing on a local exchange), on the local exchange environment; the positive correlation indicates that cross-listings are associated with an increase in underpricing, or a decrease in IPO performance, of IPOs on the local exchange.

JSE (listing standards): statistically significant correlations with other variables

In pre-GFC, there are statistically significant correlations between the variable JSE (1 for JSE, 0 for AltX), and eight variables, namely: Print media coverage of the company (positive correlation with JSE-listed IPOs); Number of pages in the PLS (positive correlation); Issue price (positive correlation); Log of offer value (positive correlation); Log of total assets (positive correlation); Log of revenue (positive correlation); Net income (positive correlation); and Listing year – change in market index (negative correlation).

In post-GFC, there are statistically significant correlations between the variable JSE (1 for JSE, 0 for AltX), and nine variables, namely: Underpricing (negative correlation with JSE-listed IPOs); Combined media coverage of the company (positive correlation); Issue price (positive correlation); Log of offer value (positive correlation); Log of net assets (positive correlation); Log of total assets (positive correlation); Log of revenue (positive correlation); Net income (positive correlation); and Number of board members (positive correlation).

For both pre-GFC and post-GFC, the results are aligned with signalling theory, with the exception of the lack of a statistically significant (negative) correlation between JSE and underpricing in pre-GFC, as would be expected from the explanatory framework of signalling theory. Other than for this exception, the results indicate that the IPOs on JSE (relative to AltX) are associated with larger offers, larger companies, and in post-GFC, larger sized boards as well. In the case of post-GFC, the offer and company profiles associated with JSE listings are also associated with lower underpricing, or higher IPO performance, which aligns with the explanatory framework of signalling theory

In pre-GFC, the statistically significant negative correlation between JSE and listing year change in market index indicates that an increase in the market index (increased market value of companies listed on the JSE) was associated with a statistically significant lower number of IPOs on the JSE, relative to the number of IPOs on AltX. In other words, the strong growth in the market pre-GFC favoured the number of IPOs on AltX, suggesting an explanation for the unexpected lower underpricing of AltX IPOs relative to JSE IPOs in pre-GFC. This is relevant to the understanding of the impact of market dynamics in pre-GFC on the IPO performance of IPOs on AltX in pre-GFC, and discussed further in section 6.

Print media coverage: statistically significant correlations with other variables

In pre-GFC, there are statistically significant correlations between print media coverage of companies and nine variables, namely: JSE (positive correlation with JSE as the listing exchange); Online media coverage of companies (positive correlation); Combined media coverage of companies (positive correlation); Issue price (positive correlation); Log of offer value (positive correlation); Log of total assets (positive correlation); Log of revenue (positive correlation); Net income (positive correlation); and Number of board members (positive correlation).

In post-GFC, there are statistically significant correlations between print media coverage of companies and 12 variables, namely: Online media coverage (positive correlation); Combined media coverage (positive correlation); Issue price (positive correlation); Log of offer value (positive correlation); Log of total assets (positive correlation); Log of revenue (positive correlation); Net income (positive correlation); Listing year – print media volume – JSE (positive correlation); Listing year – print media volume – AltX (positive correlation); Listing year – online media volume – JSE (positive correlation); and Listing year – online media volume – AltX (negative correlation).

The direct relationship between the level of media coverage and variables relating to the size of the offer and the size of the company, indicates that larger companies receive more extensive media coverage (more articles per company in the weeks leading up to a listing). In pre-GFC, there is a positive relationship (although not a statistically significant relationship) between print media coverage and underpricing. In post-GFC, there is a negative relationship (but not a statistically significant correlation) between print media coverage and underpricing, or a positive relation between media coverage and IPO performance. The post-GFC relationship between media coverage and underpricing is aligned with signalling theory.

Online media coverage: statistically significant correlations with other variables

In pre-GFC, there are statistically significant correlations between online media coverage of companies and 11 variables, namely: Print media coverage of companies (positive correlation); Combined media coverage of companies (positive correlation); Listing year – change in market index (negative correlation); Listing year – total listings (positive

correlation); Listing year – signalling study listings (positive correlation); Listing year – investment company listings (negative correlation); Listing year – print media volume – AltX (positive correlation); Listing year – print media volume – All (negative correlation); Listing year – online media volume – JSE (positive correlation); Listing year – online media volume – AltX (positive correlation); and Listing year – online media volume – All (positive correlation). In post-GFC, there are statistically significant correlations between online media coverage of companies and six variables, namely: Combined media coverage (positive correlation); Issue price (positive correlation); Log of offer value (positive correlation); Log of total assets (positive correlation); Log of revenue (positive correlation); Net income (positive correlation).

There are notable differences between pre-GFC and post-GFC. There is a lack of any statistically significant correlations in pre-GFC between online media coverage and variables related to offer size and company size, and instead many statistically significant correlations with listing year variables. In contrast, in post-GFC there are five statistically significant correlations with variables relating to offer and company size (with the size of offers and companies being positively related to online media coverage), and none with listing year variables. This suggests that online media coverage in pre-GFC was related more to the IPO environment (market trends, listing activity and media volume), whereas in post-GFC online media coverage was related more to offer and company profiles. This suggests an evolution of online media into a more focused type of media in post-GFC, with potentially a greater influence on IPO performance. Comparing online media and print media, there are a similar set of statistically significant correlations in post-GFC, and less so in pre-GFC. This appears to confirm that in post-GFC online media had evolved to become a more focused media channel, with a greater alignment with company profiles, in a manner similar to print media.

Combined media coverage: statistically significant correlations with other variables

In pre-GFC, there are statistically significant correlations between combined media coverage of companies and 13 variables, of which four are included in the set above for print media coverage, and the other nine for online media coverage. In post-GFC, there are statistically significant correlations between combined media coverage of companies and five variables, all of which are found in the sets for both print and online media coverage. The set of statistically significant correlations, between combined media coverage and other

variables, is largely similar (but not identical) to those for print and online media coverage, suggesting similar sets of relationships. This was not necessarily the case. It was possible to have a decline in one type of media coverage, for example, print media coverage, and an increase in the other, with combined media coverage reflecting a more holistic metric for media coverage. The variable for combined media was included in the study in anticipation of this possible combination of trends.

Control variables: statistically significant correlations with other variables

This section of the results review has focused on the statistically significant correlations relating to the dependent and independent variables in the study, including the correlations between these variables and each of the control variables in the study. There are however correlations of interest within the set of control variables themselves. In particular, there are pairs of variables for which the correlations have a significance level of 0.000, implying a very high degree of covariance between two variables. This is relevant for the regression analysis in the next section. These variables affect the selection of variables in the SPPS based regression analysis. For example, the correlation between different sector variables – financial sector and industrial sector in post-GFC, has a significance level of 0,000, indicating that one of these variables would be excluded in SPSS in the regression analysis due to multicollinearity. These sets of variables are automatically identified and excluded in the regression analysis using SPSS.

5.5.3 Additional results

Building on the comment above, another example of multicollinearity is the correlation between combined media coverage and online media coverage in both pre-GFC and post-GFC. One of these variables would be excluded in the SPSS regression analysis.

5.5.4 Summary

The correlation analysis assisted in further developing the understanding of the changes from pre-GFC to post-GFC, in the trends of each variable, and in the relationships between different variables, in particular the correlation between underpricing and other variables. The correlation analysis provides further indication of the extent to which the results are in alignment with, or provide support for, the two hypotheses. In this context, and subject to the results of the regression analysis, the results of the correlation analysis appear to be in

alignment with, and in support of, both hypotheses. The results support H1: there is a shift from a positive correlation, to a statistically significant negative correlation, between higher listing standards (JSE relative to AltX) and underpricing, from pre-GFC to post-GFC. This indicates an increase, from pre-GFC to post-GFC, in the impact of listing standards on IPO performance. The results also support H2: there is a shift in the direction of the correlation (although not statistically significant) between media coverage and underpricing, from positive to negative, from pre-GFC to post-GFC. This suggests an increase, from pre-GFC to post-GFC, in the impact of media coverage on IPO performance. Regarding the impact of control variables, there is an increase in the number of statistically significant correlations between control variables and underpricing, from pre-GFC to post-GFC. This indicates an increase, from pre-GFC to post-GFC, in the impact of control variables on IPO performance.

5.6 REGRESSION ANALYSIS

5.6.1 Introduction

The regression analysis builds on the three preceding areas of analysis, and completes the study analysis. The objective of the regression analysis was to assess, on a statistical basis, the relationship between underpricing, as the dependent variable in the study, and each of the explanatory variables in the study (independent variables and control variables), for each of the two periods, pre-GFC and post-GFC, and to compare pre-GFC and post-GFC, focusing on the direction of change in the relationships. The second objective was to assess the support for the two hypotheses, and to identify the impact of control variables, based on the relationships between underpricing and each of the explanatory variables, and the direction of the changes from pre-GFC to post-GFC.

The analysis of regression on underpricing (UP) was conducted using hierarchical multiple regression on SPSS, for each of the two time periods in the study – pre-GFC (dataset: PRETOT; N = 67), and post-GFC (data set: POSTTOT; N = 28). Multiple hierarchical regression was selected as the regression method in order to indicate sequentially the explanatory influence of different sets of variables, separating control variables from the independent variables in the study, in the initial steps in the sequence of analysis, and combining the two types of variables in the later steps in the sequence. The structuring of the regression analysis was guided by comparative IPO signalling studies, for example

Johan (2010), in which different sets of variables are separately analysed in a sequence of models in regression analysis, to indicate the influence of different sets of variables.

The regression analysis was further guided by literature on the use of control variables in business research, in particular the recommendations for good standard of practice in Nielsen and Raswant (2018). Following their recommendations, the regression analysis was structured to include two sets of models – the first including control variables only, without independent variables, and then adding independent variables (sequence 1 in this study), and the second including independent models only, without control variables, and then adding control variables (sequence 2 in this study). In each of the two sequences, the regression analysis comprised four models, introducing different sets of variables, with model 4 in each sequence being the full set of both control variables and independent variables, to illustrate the equivalence of the final model in the two sequences. The set of variables in each model in each sequence is indicated in table 24 in Appendix H.

Both sequence 1 and 2 were used in the datasets for pre-GFC (PRETOT) and post-GFC (POSTTOT), producing four sets of regression results for the study. For each of the four sets of results, there are three outputs – the model summary, the ANOVA results, and the regression coefficiencies. The final stage of the regression results provides a high level comparison of the different model results, showing four sets of statistics for each model, namely R square, adjusted R square, F statistic, and significance F, to highlight the explanatory power of each of the four models, in each of the two sequences, for each of the two time periods. The full set of results for the regression analysis is presented in Appendix H. For ease of reference, table 14 provides a summary of the sequencing of variables for models 1 to 4, for sequence 1 and 2.

5.6.2 Key results

For ease of reference, definitions of variables are provided in Table 14A (an abridged version of the definition of variables provided in Table 7.1).

Table 14A. Definition of variables

Variable	Definition
UP	Underpricing
JSE	1 = JSE; 0 = AltX
PMCO	Print media coverage of company
OMCO	Online media coverage of company

CMCO	Combined media coverage (print + online) of company
PLS	No of pages in the pre-listing statement (PLS)
IP	Issue price of IPO shares, in cents (1/100 of a South African Rand)
LOGOFF	Log of the offer amount, in ZAR (South African Rand)
AGE	Age of the company in years, at the time of the IPO
LOGNA	Log of net assets in ZAR, for most recent year reported
LOGTA	Log of total assets, in ZAR, for most recent year reported
LEV	Total liabilities divided by total assets, for most recent year reported
LOGREV	Log of total revenue, in ZAR, for most recent year reported
NETINC	Net income in ZAR, for most recent year reported
BOARD	Number of board directors
RESSEC	Dummy variable equal to 1 if company in the resources sector, 0 if not
FINSEC	Dummy variable equal to 1 if company in the finance sector, 0 if not
INDSEC	Dummy variable equal to 1 if company in the industrial sector, 0 if not
LYMI	Listing year, percentage change in market index (JSE All Share Index)
LYTL	Listing year, total listings on JSE and AltX
LYSSL	Listing year, signalling study listings
LYCL	Listing year, cross listings on JSE and AltX
LYICL	Listing year, investment company listings on JSE and AltX
LYAOL	Listing year, all other listings
LYPMJSE	Listing year, print media, number of articles that mention JSE (Sabinet)
LYPMALT	Listing year, print media, number of articles that mention AltX (Sabinet)
LYPMALL	Listing year, print media, all articles (Sabinet)
LYOMJSE	Listing year, online media, number of articles that mention JSE (Moneyweb)
LYOMALT	Listing year, online media, number of articles that mention AltX (Moneyweb)
LYOMALL	Listing year, online media, all articles (Moneyweb)

In table 14, the summary of results for the regression analysis indicates the statistics for R square, adjusted R square, F value, and model significance, for each of the four models, in sequence 1 and 2, for pre-GFC and post-GFC. As indicated in Table 14, there are 16 models in total (eight for pre-GFC and eight for post-GFC). Table 14 includes the model predictors for each of the 16 models. For purpose of continuity, clarity and coherence of presentation, the detail of each of the 16 models, including the set of model variables and their coefficients, are provided on a self-contained basis in Appendix H, which comprises all the regression analysis tables – 17 tables in total, from Table 24 to Table 30. The contents of each table are listed in Table 25 in Appendix H, effectively providing a mini table of contents for the tables comprising the regression analysis.

Table 14. Summary of regression analysis – summary of model summaries

PRETOT (pre-GFC) - Regression - analysis sequence 1
(Control variables first, then independent variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	67	0,174	-0,009	0,949	.507
2	67	0,181	-0,081	0,690	.790
3	67	0,235	-0,031	0,885	.594
4	67	0,244	-0,061	0,800	.696

POSTTOT (post-GFC) - Regression - analysis sequence 1
(Control variables first, then independent variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	28	0,564	0,215	1,616	.188
2	28	0,967	0,851	8,329	.007
3	28	0,977	0,873	9,467	.010
4	28	0,984	0,857	7,728	.058

PRETOT (pre-GFC) - Regression - analysis sequence 2
(Independent variables first, then control variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	67	0,010	-0,005	0,658	.420
2	67	0,013	-0,033	0,287	.835
3	67	0,220	-0,009	0,959	.509
4	67	0,244	-0,061	0,800	.696

POSTTOT (post-GFC) - Regression - analysis sequence 2
(Independent variables first, then control variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	28	0,155	0,123	4,781	.038
2	28	0,170	0,066	1,635	.208
3	28	0,659	0,234	1,548	.225
4	28	0,984	0,857	7,728	.058

Dependent variable: UP.

Model predictors

Pre-GFC - analysis sequence 1 (control variables first, then independent variables)

Model no.

1 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA

2 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

3 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE

4 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE, OMCO, PMCO

Pre-GFC - analysis sequence 2 (independent variables first, then control variables)

Model no.

1 (Constant), JSE

2 (Constant), JSE, OMCO, PMCO

3 (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA

4 (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

Post-GFC - analysis sequence 1 (control variables first, then independent variables)

Model no.

1 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV

2 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT

3 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE

4 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE, OMCO, PMCO

Post-GFC - analysis sequence 2 (independent variables first, then control variables)

Model no.

1 (Constant), JSE

2 (Constant), JSE, OMCO, PMCO

3 (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA

4 (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA, LYMI, LYAOL, LYOMALL, LYSSL, LYCL, LYOMALT, LYICL, LYPMALT, LYPMJSE

The description of the summary of results is organised into three sections: first, to set the context, a high-level comparison of model results for pre-GFC versus post-GFC; second, key findings from pre-GFC results; and third, key findings from post-GFC results.

High-level comparison of model summary results – pre-GFC versus post-GFC

The comparison of the regression model summary results, for pre-GFC versus post-GFC, indicated notable differences in the values for explanatory power (Adjusted R Squared levels) and significance of the two models. The models for *pre-GFC*, for both sequence 1 (Table 26.1, Appendix H) and sequence 2 (Table 27.1, Appendix H), have negative values for Adjusted R Square, and there are no models with a significance level below 0,05. By contrast, in the set of models for *post-GFC*, in particular the models in sequence 1 (Table 28.1, Appendix H), in which control variables are analysed first, followed by independent variables, there are three models (model 2, 3 and 4) with an R Square above 0.95, and an Adjusted R Squared of above 0.85. Of these, there are two models with Significance levels of 0.01 or below (model 3 and model 2, respectively, in sequence 1, as indicated in Table 28.2, Appendix H).

Thus, based on the same set of variables, and the same set of analysis sequences in the regression analysis, the models for post-GFC have a much higher level of explanatory power for underpricing (or IPO performance), at a statistically significant level. The comparison of the regression results for the two periods, pre-GFC and post-GFC, are consistent with the description of results in the preceding areas of analysis, for descriptive, comparative, and correlation analysis. The key point is that, in explaining IPO performance for JSE relative to AltX, the results for post-GFC are aligned with the literature and explanatory framework of signalling theory, whereas the results for pre-GFC do not appear to be aligned with the explanatory framework of signalling theory.

Key findings from pre-GFC model summary results

None of the models for pre-GFC have a positive value for Adjusted R Square (Table 26.1 and Table 27.1, Appendix H). The model with the highest value for R Square is model 4 in each analysis sequence, with R Square of 0.244, and Adjusted R Square of -0.061, and significance level of 0.696 (Table 26.2 and Table 27.1, Appendix H). In model 4, the beta value for JSE is 0.386, with a significance level of 0.066 (Table 26.3(b), Appendix H). Underpricing for IPOs on JSE would be predicted to be 38.6% higher than IPOs on AltX, all

else being equal. A regression model which indicates an underpricing for JSE that is higher than AltX is contrary to the explanatory framework of signalling theory.

Key findings from post-GFC model summary results

For post-GFC, model 1 in analysis sequence 1 (Table 28.1, Appendix H), in which only offer and company related control variables are included, has an Adjusted R Square of 0.215, and a significance level of 0.188 (Table 28.2, Appendix H). In sequence 1, the addition of control variables relating to the IPO environment (listing year variables) in model 2, the explanatory power of the model, as indicated by Adjusted R Square, increases from 0.215 to 0.851 (Table 28.1, Appendix H), and the significance level improves from 0.188 to 0.007 (Table 28.2, Appendix H). Model 2, which is based on control variables only, has an Adjusted R Square of 85.1%, at the significance level of 1%. Comparing pre-GFC and post-GFC results for Model 2 in Sequence 1 in each period, in which the model includes control variables only, the results indicate an increase in the impact of control variables, from pre-GFC to post-GFC, on IPO performance.

The addition of the independent variable JSE in model 3 (Sequence 1) increases Adjusted R Squared from 0.851 to 0.873 (Table 28.1, Appendix H), a much smaller increase than the increase from model 1 to model 2, with a relatively small deterioration in the significance level from 0.007 to 0.010 (Table 28.2, Appendix H). In other words, model 3, which is based on control variables plus JSE, the variable for the listing standards, has an Adjusted R Square of 87.3% (the highest level for Adjusted R Squared for any of the models in the study), at a significance level of 1%. In the post-GFC results for model 3 in sequence 1, the beta for JSE is -0.311, with a significance level of 0.209 (Table 28.3(b), Appendix H). The interpretation is that, based on model 3, underpricing in the post-GFC period is 31.1% lower on the JSE, the senior exchange, relative to AltX, the junior exchange.

Comparing pre-GFC and post-GFC results for Model 3 in sequence 1 in each period, in which the model adds the variable JSE to control variables in model 2, the results support H1, regarding the increase in the impact of listing standards on IPO performance. The addition of independent variable in model 4 (sequence 1) decreases Adjusted R Square from 0.873 to 0.857 (Table 28.1, Appendix H) and changes the significance level from 0.010 to 0.058 (Table 28.2, Appendix H). The results indicate that the addition of variables related to media coverage do not improve the model. There is also a reduction in the beta value for

JSE, from -0.311 to -0.084, going from model 3 to model 4 (Table 28.3(b)). The interpretation is that with the inclusion of media coverage in model 4, underpricing on the JSE is 8.4% lower than AltX, versus 31.1% lower in model 3, when media coverage is not included. These results do not support findings in previous studies that media coverage has a positive impact on IPO performance.

In sequence 2 for post-GFC, in which the independent variables are included first, there is an Adjusted R Square for JSE of 0.123 (Table 29.1, Appendix H), with a significance level of 0.038, in model 1 (Table 29.2, Appendix H). In comparison to the equivalent model in pre-GFC, the results provide support for H1, regarding the increase in the impact of listing standards on IPO performance, from pre-GFC to post-GFC. In sequence 2, the addition of variables for media coverage reduces the Adjusted R Square of the model, from 0.123 to 0.066 (Table 29.1, Appendix H), and changes the significance level from 0.038 to 0.208 (Table 29.2, Appendix H). There is a deterioration in the model with the addition of media coverage as a variable.

5.6.3 Additional results

The regression results from post-GFC are aligned with the literature and the explanatory framework of signalling theory. The results for model 4 for post-GFC is based on the full set of variables in the study, with exclusion by SPSS of five variables with high covariance – CMCO, FINSEC, LYTL, LYPMALL, LYOMJSE (Table 28.2, Appendix H). In model 4 for post-GFC, reviewing the beta and significance value for each of the *independent* variables, none of the variables have a beta with significance level equal to or less than 0.05 (model 4 in Table 28.3(b), Appendix H). The beta for print media coverage for companies (PMCO) and online media coverage for companies (OMCO) of -0.653 and 0.156 respectively, and significance values of 0.343 and 0.568 respectively. The results are mixed (positive and negative betas).

Moving on to the review of the *control* variables in model 4, in Table 28.3(b), Appendix H, there are seven control variables which have a beta with significance level equal to or less than 0.05, namely: number of pages in pre-listing statement (PLS, beta = 0.915; Sig. = 0.017); log of total assets (LOGTA, beta = -1.786; Sig. = 0.017); leverage (LEV, beta = -0.798; Sig. = 0.044); industrial sector (INDSEC, beta = -0.841; Sig. = 0.016); listing year –

cross listings (LYCL, beta = 1.149; Sig. = 0.024); listing year – print media – AltX (LYPMALT, beta = 1.586; Sig. = 0.047); and listing year – online media – all (LYOMALL, beta = 1.349; Sig. = 0.048).

In model 4, Table 28.3(b), Appendix H, comparing the two independent variables for media coverage at company level (PMCO and OMCO), neither of which has a beta with significance level equal to or less than 0.05, and the four control variables for media volume in the year of listing, two of which have a beta with significance level equal to or less than 0.05, the results suggest that the overall media environment has a greater influence on IPO performance than the media coverage of the individual companies. This suggests that media coverage at an aggregate industry level, in the year of listing, has a significant influence on IPO performance, even if the company-specific media coverage in the month leading up to a listing does not have a significant influence.

The statistical significance of the variable for listing year-cross-listings is notable, indicating that cross-listings, which represent the competing listing standards from other exchanges and other countries, have a negative impact on IPO performance (positive impact on underpricing) of local IPOs. In model 4, Table 28.3(b), Appendix H, based on the beta of 1.149, the interpretation is that the influence of the number of cross listings in the year of listing is to increase underpricing by 114.9%. The number of cross-listings in the year of listing has a large negative economic impact on IPO performance on the JSE.

5.6.4 Summary

Building of the preceding areas of analysis, the results of the regression analysis assist in providing a final indication of the extent to which the study results support the two hypotheses. The results of the regression analysis support both hypotheses. The results indicate an increase in the impact of both listing standards and media coverage on IPO performance, comparing pre-GFC and post-GFC.

The scope and focus of the regression analysis (and the three preceding stages of analysis) were based on the study objectives. There are different additional potential areas of analysis, outside the scope of the study, which represent opportunities for further research. One area of analysis would be the review of withdrawn IPOs, or intended listings which are cancelled. Withdrawn IPOs represent a potential indicator of IPO readiness (Johan, 2010).

Another area of analysis would be medium-to-long term post-IPO performance, such as the analysis of one year returns, and the analysis of time to delisting (where applicable). In addition to these areas of analysis being beyond the scope of the study, the information required for the analysis were not readily available from the IRESS database.

5.7 RESULTS SUMMARY

The study has undertaken a journey through four areas of analysis (descriptive, comparative, correlation and regression), across two time periods (pre-GFC and post-GFC), comparing the determinants and levels of IPO performance for two exchanges (JSE and AltX), aimed at addressing the primary and secondary study objectives, answering the research questions, and coming to a conclusion on the two hypotheses. For ease of reference, table 15 provides a summary of the study framework, comprising the study title, primary and secondary objectives, and the three sets of research questions and hypotheses.

Table 15.1 Summary of study framework

Study title	***Signalling IPO readiness in a changing environment: the changing impact of listing standards and media coverage on IPO performance***
Primary objective	• To understand the impact of a period of major change in the IPO environment, namely the GFC, on the impact of signals of IPO readiness on IPO performance, focusing on the changing impact of two IPO signals – listing standards and media coverage – from pre-GFC to post-GFC.
Secondary objective	• To understand the impact of a period of major change in the IPO environment, namely the GFC, on the impact of other explanatory variables on IPO performance, included in the study as control variables, from pre-GFC to post-GFC.
Area 1	***On the changing impact of listing standards on IPO performance***
Research question 1	• What was the change in the impact of listing standards on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?
H1	• The impact of listing standards on IPO performance increased from pre-GFC to post-GFC
Area 2	***On the changing impact of media coverage on IPO performance***
Research question 2	• What was the change in the impact of media coverage on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?
H2	• The impact of media coverage on IPO performance increased from pre-GFC to post-GFC.

Area 3	*On the changing impact of control variables on IPO performance*
Research question 3	• What was the impact of other explanatory variables (included as control variables) on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?

The results of the study provide support for the two hypotheses, as noted in the summary for each area of analysis, and indicate that there was an increase in the impact of control variables on IPO performance. An additional aspect of the results is reviewed at this point. In chapter 3, table 7.2 provides the expected relationships between explanatory relationships and underpricing, based on the literature. In table 15.2, the expected versus actual relationship between explanatory variables and underpricing is indicated, comparing the results for pre-GFC and post-GFC, based on the results of the correlation analysis.

Table 15.2. Expected versus actual relationship between explanatory variables and underpricing

Variable	**Expected relationship with underpricing**		
	Expected relationship (Table 11)	Actual - Pre-GFC results of correlation analysis (Table 16.3)	Actual Post-GFC results of correlation analysis (Table 16.3)
Indepen. variables			
JSE	Negative	Positive	Negative
PMCO	Negative	Positive	Negative
OMCO	Negative	Positive	Negative
CMCO	Negative	Positive	Negative
Control variables			
Offer profile			
PLS	Negative	Negative	Negative
IP	Negative	Negative	Negative
LOGOFF	Negative	Negative	Negative
Company profile			
AGE	Negative	Negative	Negative
LOGNA	Negative	Positive	Negative
LOGTA	Negative	Negative	Negative
LEV	Negative	Positive	Negative
LOGREV	Negative	Positive	Negative
NETINC	Negative	Negative	Negative
BOARD	Negative	Negative	Negative
Industry sector			
RESSEC	Potentially vary with year of listing and market conditions	Negative	Negative
FINSEC		Negative	Positive
INDSEC		Positive	Negative
Market conditions			

LYMI	Positive	Positive	Negative
Listing activity			
LYTL	Positive	Negative	Positive
LYSSL	Positive	Negative	Positive
LYCL	Positive	Positive	Positive
LYICL	Positive	Positive	Positive
LYAOL	Positive	Positive	Positive
Media volume			
LYPMJSE	Negative	Positive	Negative
LYPMALT	Negative	Negative	Negative
LYPMALL	Negative	Positive	Negative
LYOMJSE	Negative	Negative	Negative
LYOMALT	Negative	Negative	Positive
LYOMALL	Negative	Negative	Negative

The results indicate that in pre-GFC, there are a number of differences between expected versus actual relationships, in contrast with post-GFC, in which the expected and actual relationship are predominantly consistent. This appears to be consistent with the overall results for pre-GFC, in which many of the results were not aligned with signalling theory, the most notable being the lower mean underpricing on AltX compared to JSE.

The review of results in each area included additional results. Taking an aggregate perspective, and combining them with the key findings of the study, three points are noted in closing the summary of results, to be discussed further in next section. First, one of the most notable features of the results is the IPO performance for AltX in pre-GFC, which is superior to JSE, despite AltX being the junior exchange of the two. The results for each area of analysis highlight this feature. It appears to be related to market conditions in pre-GFC favouring IPOs on AltX, particularly in 2007, the year before the GFC in 2008. Second, the results for post-GFC indicate alignment with signalling theory. JSE, the exchange with higher listing standards, has a higher level of media coverage, and a superior IPO performance (lower underpricing) compared to AltX. The changes from pre-GFC to post-GFC support the hypotheses regarding the increase in impact of listing standards and media coverage on IPO performance. There was also an increase in the impact of control variables on IPO performance, from pre-GFC to post-GFC. Third, in post-GFC, listing standards have a lower impact on IPO performance than the two sets of control variables in the study, the first relating to the IPO offer and company, and the second relating to the IPO environment in the year of listing. This suggests that IPO performance in post-GFC is influenced primarily

by the attributes of the offer and the company, and by the conditions in the IPO environment. It suggests that the signal of IPO readiness or quality, provided by the exchange listing standards, is a secondary influence. Two aspects in the IPO environment, relating to the year of listing, play a significant role, first the number of cross-listings, and second the overall volume of media articles.

6. DISCUSSION

6.1 INTRODUCTION

The purpose of this section is to discuss the results of the study, in the context of the motivation for the study and the study framework (table 15.1), including the study objectives, research questions and hypotheses. The section starts with a framing of the discussion, discusses key results, and additional results and observations. The contributions of the study are discussed, organised into contributions to theory, practice and methodology. Limitations to the study are discussed, and opportunities for further research are identified.

6.2 FRAMING THE DISCUSSION

A review of the motivation for the study, its key objectives, research questions and hypotheses, as well as the setting of the study, assists in framing the discussion of results. This is a study of the phenomenon of the determinants of the IPO performance of companies, listing on public stock exchanges, from a strategic management and signalling theory perspective. The study was motivated by a call for further research into changes in the IPO signalling environment and their effect on IPO signalling and IPO performance (Park et al, 2016). The setting of the study is the JSE and AltX stock exchanges in South Africa, for the review period 2003 to 2019. This is an IPO environment in which there were major changes from pre-GFC to post-GFC (van Heerden & Alagidede, 2012). In line with the study objectives, the study period is divided into two sub-periods – pre-GFC (pre-2008) and post-GFC (post-2008).

The study was guided by two objectives. The primary objective of the study was to understand the impact of a changing environment on IPO signalling. The changing IPO environment is characterised in this study by the GFC, in comparing pre-GFC and post-GFC. The study examines the impact of the GFC on two IPO signals, listing standards and media coverage, in terms of the changing impact of these signals on IPO performance, from a strategic management and signalling theory perspective. The secondary and supporting objective was to understand the impact of the GFC on other explanatory variables, included in the study as control variables, in terms of their changing impact of IPO performance,

comparing pre-GFC and post-GFC. The research questions and the hypotheses reflect the study's focus on understanding the changing impact on IPO performance of these three sets of variables (listing standards, media coverage and control variables), based on a comparison of pre-GFC and post-GFC.

The review period of the study was from 2003 to 2019, which spans the full set of calendar years from the establishment of AltX in 2003, to the year prior the completion of the study in 2020. All IPOs on both the JSE and AltX were reviewed for this period. There were a total of 329 IPOs for this period. Based on the application of sample selection criteria used in IPO signalling studies, a large number of IPOs were excluded, the largest categories of exclusions being cross-listings and investment company listings. From the initial total or 329 IPOs, 231 IPOs were excluded on the basis of sample selection criteria, leaving a total of 98 IPOs. An additional three IPOs which occurred in 2008 were excluded from the study sample, due to the study objectives of comparing pre-GFC (or pre-2008) and post-GFC (post-2008). The final sample size was 95. This was a relatively small number of IPOs for the purpose of the signalling study. It is just below the lower end of the range of IPOs for the four IPO signalling studies which served as benchmarks in guiding the design of the study, as summarised in Appendix C (in which the sample sizes were 411, 120, 225 and 97). The sample selection was based on established methodology in IPO signalling studies, and after excluding IPOs based on established sample selection criteria, the study sample was effectively the full population of IPOs for the study review period.

The results of the sample selection process provide context for the decision to include as control variables different types of IPOs in the year of listing. Given the study objectives of understanding the key features of the changing IPO environment and their impact on IPO performance, combined with the large number of IPOs in excluded categories, it was reasonable to include the number of IPOs in key categories of exclusion, as control variables in the study. The exclusion categories were represented in the variables for listing activity in the year of listing. This approach extended established precedent in previous IPO studies in which the volume of listing activity in the year of listing is represented by a variable to distinguish "hot" versus "cold" IPO markets. Based on a review of the literature, the current study is the first IPO signalling study based on a smaller market setting. It is suggested that in this smaller market setting, the nature and volume of listing activity play a key role, and are linked to the impact of listing standards on IPO performance. Based on the results of the

study, the inclusion of variables representing different types of listing activity in the year of listing assisted in understanding the influence of the changing IPO environment, as discussed in the review of the results of regression analysis. For example, the results identified the number of cross-listings, in the year of listing, as having a negative impact on IPO performance (positive impact on underpricing) of local IPOs.

The framing of the discussion requires an observation on the large differences between the two periods in the study, pre-GFC and post-GFC. In chapter 2 on setting, based on the review of trends in the market index and the number of IPOs over the review period, the difference between the two periods was evident. The review of control variables by listing year, presented in results, confirmed the difference in the two periods. Each stage of the analysis confirmed the contrast between the two periods, in particular the finding that underpricing on AltX in pre-GFC was below that of JSE. This means that AltX had a better IPO performance (lower underpricing) in pre-GFC despite being the junior exchange. This was not aligned with the explanatory framework of signalling theory. In post-GFC the relative position was totally reversed. Underpricing on JSE was much lower than AltX, in alignment with signalling theory. The study results are characterised by this contrast between the two periods, effectively presenting a tale of two periods. In the context of this framing of the study and the results, the discussion of the three hypotheses and additional results follows.

6.3 KEY RESULTS

6.3.1 Introduction

Key results are discussed first in the context of the two hypotheses, H1 and H2, which correspond to the first two research questions. The results are then discussed in the context of the third research question, relating to other explanatory variables.

6.3.2 Changing impact of listing standards on IPO performance

The rationale for H1, on the increase in the impact of listing standards on IPO performance, from pre-GFC to post-GFC, is explained in section 3.4. The literature indicates that in a comparison of two exchanges in a given market, the exchange with the higher listing standards provides a signal of a higher level of IPO readiness or quality, compared to the exchange with the lower level of listing standards (Johan, 2010). Based on the explanatory

framework of signalling theory, a signal of a higher level of IPO readiness has a positive impact on IPO performance, indicated by a lower level of underpricing. The JSE and AltX in South Africa represent a new setting for the testing of signalling theory, given the lack of previous signalling studies in the South African IPO market. Due to the smaller size of the JSE (including AltX as a division), relative to other top 20 global exchanges, the study provides an opportunity to test the explanatory framework of IPO signalling theory in a different market setting.

The results for pre-GFC were not aligned with signalling theory, while the results for post-GFC were aligned with signalling theory. The direction and scale of the change from pre-GFC to post-GFC provides support for H1. If one interprets the relationship between listing standards and IPO performance in pre-GFC as an anomaly, or as being temporarily not aligned with signalling theory due to unusual market conditions that strongly favoured IPOs on AltX in pre-GFC, then the relationship between listing standards and IPO performance in post-GFC is more typical of relative IPO performance on the JSE and AltX. Given this interpretation, the JSE has a higher level of listing standards as well as a higher level of IPO performance, which aligns with signalling theory. Based on the change from pre-GFC to post-GFC, it is apparent that the GFC had a major impact on the South African IPO signalling environment. There was an end to the high number of IPOs on AltX, and a shift toward the exchange with higher listing standards having a higher level of IPO performance. Based on the profile of IPOs on the JSE, there was also a shift towards larger offer sizes and larger companies, suggesting IPO investor preference for higher levels of quality and lower levels of risk. These changes align with the literature review, in which the impact of the changing IPO environment were discussed. Weighing the various results and their interpretation, the study supports H1: there was an increase in the impact of listing standards on IPO performance, comparing pre-GFC to post-GFC. More broadly, the GFC had a major impact on IPO signalling and IPO performance in the South African IPO market. The results therefore support the discussion in Park et al (2016), that changes in the regulatory environment, which include exchange listing standards, had an impact on IPO signalling and performance.

6.3.3 Changing impact of media coverage on IPO performance

The rationale for H2, on the increase in the impact of media coverage on IPO performance, from pre-GFC to post-GFC, is explained in section 3.5. The literature indicates that the

extent of media coverage of a company in the period leading up to the IPO, as measured by the number of articles in the weeks preceding the IPO, serves as a signal of the IPO readiness or quality of the company. Based on previous studies, the signal of IPO readiness is positively related to IPO performance, or negatively related to underpricing. Two explanatory frameworks were used in the development of H2, namely signalling theory as the primary theory base, and agenda-setting theory as the complementary theory base. The major change in the media environment which occurs during the study period, and which coincides approximately with the split of the study period into pre-GFC and post-GFC, is the growth of online media, including the online media coverage of IPO companies. Two databases were used in the study, the first, SABINET, represented print media in South Africa, and the second, Moneyweb, represented online media. Given the increase in the impact of media coverage on IPO performance, from pre-GFC to post-GFC, the results provide support for H2. The results therefore support the discussion in Park et al (2016), that changes in the media environment, in particular online media coverage, had an impact on IPO signalling and performance.

6.3.4 Impact of other explanatory variables on IPO performance

The third research question relates to the impact of other explanatory variables (included as control variables in the study) on IPO performance, from pre-GFC to post-GFC, is discussed in section 3.6. The literature indicates that control variables, in the context on an IPO signalling study examining the impact of a set of determinants (independent variables in the study) on IPO performance (dependent variable in the study), represent explanatory variables in other IPO studies, included to assess the impact of the independent variables in the study more accurately. Control variables are included in a study in order to control for their influence, as a means of identifying separately the influence of the independent variables in the study. This value of this approach is illustrated in the hierarchical multiple regression analysis for this study, in particular sequence 1 in post-GFC, in which first control variables are included, and then independent variables. The literature indicates that there was an increase in the impact of control variables on IPO performance, in a changing environment, such as the GFC. The results of the study indicate first the impact of other explanatory variables in post-GFC, and second the increase in impact from pre-GFC to post-GFC. The results are relevant to the consideration of the broader impact of the GFC on the IPO environment, beyond the two signals which are the primary focus of the study, namely listing standards and media coverage. In this sense, the change in the impact of other

explanatory variables is aligned with the discussion in Park et al (2016), in which the *change in the influence of various control variables*, from one period to the next (coinciding with pre-GFC and post-GFC), are noted. The results are also relevant to Butler et al (2014), in suggesting the need to re-assess the *reliability and replicability* of determinants of IPO performance, *after a major change in the IPO environment*, such as the GFC.

6.3.5 Summary

The results of the study support H1 and H2, and indicate an increase in the impact of other explanatory variables from pre-GFC to post-GFC. The study responds affirmatively to the discussion in Park et al (2016), confirming the impact of major changes in the signalling environment, on IPO signalling and performance. The results are in alignment with the explanatory framework of signalling theory, with the noted exception of the results for pre-GFC. The results raise questions about the results for pre-GFC, in which AltX, a junior exchange with a lower set of listing standards, has a higher level of IPO performance than JSE, indicated by lower underpricing. Is there a different explanatory framework which would provide guidance? Are the results for pre-GFC due to the cycle of boom-and-bust associated with stock markets? The answers are relevant for both scholars and practitioners, to understand the limitations of signalling theory during high volumes of listing activity, which characterise AltX listing activity in pre-GFC. This is discussed in section 6.4 below.

6.4 ADDITIONAL RESULTS AND OBSERVATIONS

6.4.1 Introduction

The key results of the study have been discussed in the context of the three research questions, the first two corresponding to the two hypotheses. Beyond the key results, the additional results, as well as observations made during data gathering and analysis of results, provide further insights relevant to the objectives of the study, and suggest potential implications for players in the IPO process. Five points are discussed: framing and explaining the results for pre-GFC; effectiveness of JSE listing standards as a signal of IPO readiness; effectiveness of media coverage as a signal of IPO readiness; influence of control variables on IPO performance; and strategic management implications for key IPO players.

6.4.2 Framing and explaining the results for pre-GFC

The results for pre-GFC, a key feature of which is the lower underpricing of AltX relative to the JSE, are not in alignment with the explanatory framework of signalling theory. The explanation suggested is that the boom market in pre-GFC, characterised in part by the high growth of listings on AltX in 2007, influenced the decision-making dynamics in the IPO market. These dynamics resulted in distortions in the valuation of companies undertaking IPOs, one of the underlying causes for AltX having lower underpricing than JSE.

A brief review of the explanatory framework of signalling theory provides context for framing and explaining the results for pre-GFC. As described in section 3.3.2: “the pervasive acceptance of signalling theory is attributed to its intuitive appeal”; further, the underlying logic of signalling theory provides “an explanatory and predictive framework”, “connecting information exchange, decision-making, and performance maximisation in different business environments”. As discussed in section 3.3.4, “signalling theory represents a major theory base in IPO research”. In summary, signalling theory has been established as a reliable explanatory framework in IPO research, assisting to explain the relationship between determinants and measures of IPO performance, in an intuitive and logical manner. Implicit in the literature is that signalling theory is based on an assumption of *rational decision-making* by key players in the IPO process, including the stock exchange, IPO companies, underwriters and bankers, advisors, pre-IPO investors (mainly institutional investors), and post-IPO investors (the market of investors). It is not clear, however, what happens if the assumption of rational decision-making no longer holds, or if there is a *temporary disruption* in rational decision-making.

The boom listings market of 2007, evidenced by the high number of IPOs on both the JSE and AltX, provides an example of what happens when there is a disruption in rational decision-making. An article published in Moneyweb on 8 October 2008, titled “Worst new listings of 2007” (Carte, 2008), provides a summary of the share price performance of 60 companies that listed on the JSE and AltX in 2007. It indicates that, as at 6 October 2008, only seven of the 60 companies had shown an increase in their share price relative to their closing prices on their respective day of listing in 2007. The worst performer had a decrease of 88,57% in its share price. The article includes comments by a manager at the JSE who had responsibility for new listings on AltX. The manager defends the decisions of the JSE and AltX to approve the listing of the companies in 2007. The manager acknowledges

however that several companies had benefited from market sentiment, described as "*irrational exuberance*", at the time of their initial listing. One sector that benefitted from the positive market sentiment in 2007 was that of construction, which was boosted by tenders and contracts in preparation for the hosting by South Africa of the Soccer World Cup in 2010. Based on this perspective of IPO market dynamics in South Africa in pre-GFC, in particular 2007, it is argued that rational decision-making was replaced by irrational exuberance, resulting in IPO performance outcomes that were not aligned with signalling theory, which is premised on an assumption of rational decision-making.

Two additional points assist in framing and explaining IPO performance on the JSE and AltX in pre-GFC, in particular 2007. First, the AltX was established in 2003, and had its first listing in October 2004; second, in 2005 the JSE demutualised as an organisation, and in June 2006 the JSE became a listed company on its own stock exchange (JSE, 2020). The relevance is that in 2007, AltX was a relatively new exchange and a division of a newly incorporated and recently listed public company. The JSE, including AltX, was seeking profitable growth for its own shareholders, in which new listings would be a contributor to increased earnings. In 2007, the internal organizational environment of AltX, in which there was a profit-seeking motive inclined toward new listings, was combined with the external business environment, in which there were favourable market conditions favouring new listings on the JSE and AltX. It is suggested that the combination of the internal organisational context at the JSE, and the external market context in 2007, had a significant influence on both the number of IPOs, and the pricing of shares in the IPO process. This suggests why the study results are not in alignment with signalling theory. The implication is that explanatory framework of signalling theory, which is noted for its intuitive appeal based on rational decision-making, has limitations in a market characterised by "irrational exuberance". Given the losses experienced as a result of the GFC in 2008, it appears that rational decision-making was restored to the IPO market after 2008. This is reflected in the results of post-GFC, which are more aligned with signalling theory.

6.4.3 Effectiveness of JSE listing standards as a signal of IPO readiness

The study focuses on two signals of IPO readiness – listing standards and media coverage. As discussed in section 3.4, the literature review supports the role of listing standards as a signal of IPO readiness at the level of both the company listing on an exchange, and the

overall market associated with a particular exchange. The literature is based on studies of exchanges in large, developed markets, rather than smaller markets such as South Africa. Implicit in the rationale of the study framework, indicated in the research questions and hypotheses (H1 and H2), is that the two signals of IPO readiness have an impact on IPO performance in the smaller market setting of South Africa. The results for post-GFC support this assumption, and indicate that the higher listing standards of the JSE, relative to AltX, do have a positive impact on IPO performance. The interpretation of the *degree of effectiveness* of listing standards as a signal of IPO readiness and quality varies however by the area of analysis, for the results of post-GFC.

Based on the results of the descriptive analysis, there is a large difference in underpricing between the JSE and AltX in post-GFC (0.091 versus 0.298, respectively). Based on the results of the comparative analysis, the difference in underpricing between JSE and AltX in post-GFC is significant at the 0.05 level. Based on the results of the correlation analysis, the relationship between listing standards (JSE) and underpricing (UP) is significant at the 0.05 level. In the results of the regression analysis, the relationship between listing standards and underpricing is shown to be significant at the 0.05 level in analysis sequence 2, model 1, for post-GFC. However, the explanatory power of this model (with an adjusted R Square of 0.123), is low. In analysis sequence 1, model 3, the addition of listing standards results in an increase of Adjusted R Square from 0.851 to 0.873, an increase of only 0.022. Reviewing the betas for listing standards in the models for post-GFC, for which the beta is significant at the 0.05 level, the two values are -0.394 and -0.414 (sequence 2, models 1 and 2, respectively). This means that, depending on the model used in post-GFC, the underpricing on JSE would be 39.4% to 41.4% lower than underpricing on AltX.

A review of the results of the study by Johan (2010), comparing the impact of listing standards on underpricing on TSX (Toronto Stock Exchange) with those of its junior exchange, TSX-V (Toronto Venture Exchange) provides a benchmark to assess the results of this study. In the case of TSX, the higher listing standards had an impact on underpricing, ranging from 44.8% to 94.8% (depending on the regression model used), which was significant at the 0.01 level (Johan, 2010, p.136). The comparison between Johan (2010) and the current study, based on impact on of listing standards on underpricing and IPO performance, is summarised in Table 16. The comparison between the two studies, Johan (2010) based on the TSX and TSX-V exchanges in Canada, and the current study based on

the JSE and AltX exchanges in South Africa, indicate similarities and differences. There are similar results in terms of the positive impact of higher listing standards on IPO performance (negative impact on underpricing). The difference is that the signal of listing standards was *less effective* as a signal of IPO readiness and quality, in the case of the JSE, for the respective periods on which the two studies were based.

Table 16. Comparison of study results – Johan (2010) and current study

Comparison criteria	**TSX vs TSX-V (Johan, 2010, p.136)**	**JSE vs. AltX (Table 29.3)**
Maximum negative impact on underpricing of higher listing standards (maximum positive impact on IPO performance)	94,8%	41,4%
Significance level	1%	5%
Minimum negative impact on underpricing of higher listing standards (minimum positive impact on IPO performance)	44,8%	39,4%
Significance level	1%	5%

It is suggested that differences in signal effectiveness of listing standards is related to the relative size of the two exchanges, TSX and JSE, as depicted in Figure 1. Based on industry data available as at November 2018, the TSX was ranked the ninth largest stock exchange in the world, with a market capitalisation of USD2095bn, while the JSE was ranked 19th in the world, with a market capitalisation of USD894bn. The JSE, set in a smaller market, was 42.7% of the size of TSX, set in a developed market. Given the difference in the relative sizes of the two exchanges, and the differences in their respective market settings, it is reasonable to expect that the listing standards of the JSE would have a *lower level of effectiveness* as a signal of IPO readiness. The rationale is that a stock exchange in a more developed market, such as Canada, has a stronger reputation for the quality of individual companies and of the overall market, and thus the signal of IPO readiness associated with its listing standards would have a higher impact on IPO performance. IPO readiness includes the quality of individual companies listing on the exchange, as well as the quality of the overall market of companies listed on the exchange. The results have strategic management implications for players in the IPO process, including the exchange, listing companies, investors in these companies, and various other advisers and intermediaries. The current study builds on Johan (2010), first in confirming the signalling impact of listing standards in the smaller market setting of South Africa, and second in indicating the lower effectiveness of listing standards as a signal of IPO readiness, in a smaller exchange. This

suggests the possibility of indexing the signalling effectiveness of different sets of listing standards, representing different exchanges, on a global basis, extending the analysis of Nasdaq's tiered structure of listing requirements (Broom & Turner, 2016).

6.4.4 Effectiveness of media coverage as a signal of IPO readiness

In addition to listing standards, the study focused on media coverage as a signal of IPO readiness, based on its impact on IPO performance. The literature review, presented in section 3.5, supports the role of media coverage of specific IPO companies, in the period leading up to their IPOs, as a signal of IPO readiness. The measure used in a benchmark study (Pollock & Rindova, 2003) was the number of articles in a particular period pre-IPO, which was found to have a negative relationship with underpricing, or a positive relationship with IPO performance. Further, the study in Park et al (2016) made a distinction between print media and online media in its discussion of influences in the IPO environment, emphasising the growth of online media in the last decade and its likely influence on signals of IPO readiness. Drawing on the literature, the current study examined media coverage of each IPO company in the one-month period leading up to its listing on either the JSE and AltX, and distinguished between print media and online media articles in its approach, using two different databases, Sabinet and Moneyweb respectively, for the data gathering process. The study results support H2, on the increasing impact of media coverage on IPO performance, comparing pre-GFC and post-GFC.

As with the analysis of listing standards above, the interpretation of the *degree of effectiveness* of media coverage as a signal of IPO readiness varies by the type of analysis. The extent of the impact of media coverage on IPO performance appears strongest based on the results of the descriptive analysis. This is indicated in particular in the media coverage of IPOs on the JSE, and the change from pre-GFC to post-GFC, in which underpricing decreases, while media coverage for both print and online media increase. In the other areas of analysis, the impact of media coverage on IPO performance is also indicated, although to a lesser extent. In the comparative analysis, the difference (decrease) in underpricing between pre-GFC and post-GFC for IPOs on JSE is significant at the 0.05 level, while the difference (increase) in both print and online media coverage is significant at the 0.05 level. The decrease in underpricing for JSE, together with the increase in media coverage for JSE, supports H2, on the increase in the impact of media coverage on IPO

performance, from pre-GFC to post-GFC. The results for AltX are not consistent with those for JSE. In the correlation analysis, the correlation between media coverage and underpricing is negative (for both print and online media), which mean the correlation between media coverage and IPO performance is positive, but it is not significant at the 0.05 level. In the regression analysis, the betas for media coverage indicate a negative impact of print media on underpricing, and a positive impact of online media on underpricing, although the coefficient is not significant at the 0.10 level in any of the regression models. In an aggregate view of the results, although there is a degree of support for H2, the *degree of effectiveness* of media coverage as a signal of IPO readiness is *low*. The results are not comparable with the benchmark study of Pollock and Rindova (2003, p.639), in which the regression coefficient for media coverage (on underpricing) is significant at the 0.05 level.

Comparing the two signals in the study, both have a *low degree of effectiveness* as a signal of IPO readiness. However, the effectiveness of listing standards is lower but still comparable with the benchmark study, while media coverage is not comparable.

6.4.5 Impact of other explanatory variables on IPO performance

The study examines the impact of other explanatory variables (included as control variables in the study) on IPO performance, as a secondary objective. Section 3.6 discusses the relevance of control variables in an IPO signalling study. Essentially, explanatory variables in one IPO signalling study are potentially control variables in another study. As discussed in section 3.6.3, control variables are relevant at *two stages of analysis* in the study: they assist in the analysis of the impact of listing standards and media coverage on IPO performance, in *each period* (pre-GFC and post-GFC), and they assist in the analysis of *changes* in the impact of listing standards and media coverage, on IPO performance, *from pre-GFC to post-GFC*. As discussed in section 4.8, the selection of control variables in a study is guided by the principle of parsimony, and having appropriate theoretical justification. The selection of control variables for this study is discussed in section 4.9, including the organising of control variables into two groups, the first relating to the IPO offer and company, the second relating to the year of listing, divided into market conditions, listing activity, and media volume. Table 7.1 provides definitions of control variables. As discussed in section 6.3.4, the results indicate a change in the impact of other explanatory variables on IPO performance, from pre-GFC to post-GFC.

Building on these findings, there are additional results and observations relating to control variables that are relevant to the secondary objective of the study, to understand the changing impact of other explanatory variables on IPO performance. The impact of control variables is most evident in the result of the *regression analysis* for *post-GFC*, specifically in analysis sequence 1, models 1 and 2, in which control variables are included first (*table 28.1*). Based on the results for model 1, which comprises only the control variables relating to the IPO offer and company, including the industry sector, the Adjusted R Square is 0.215, with significance level at 0.188. In model 2, after the inclusion of control variables relating to the IPO environment, the Adjusted R Square of the model increases to 0.851, with significance at 0.007. The combined results of model 1 and model 2 indicate the high impact of control variables on IPO performance, compared to the two signals of listing standards and media coverage. Model 2 illustrates that as a sub-group, the "listing year" control variables relating to the IPO environment have the highest level of influence on IPO performance. This raises a question about whether the IPO performance levels in post-GFC, even though they are distinguished from pre-GFC in their alignment with signalling theory, are still determined more by conditions in the general IPO environment than by the attributes of specific IPO offers and companies. It is suggested that this is related to the relatively small size of the JSE, which was ranked 19th among global stock exchanges as at November 2018. The rationale is that in the smaller sized JSE, set in the smaller economy of South Africa, IPO performance is more sensitive to changes in the IPO environment than is the case in larger stock exchanges, set in larger, developed economies. The paucity of IPO signalling studies set in smaller economies suggests a need for further research on this point, to understand the relationship between the relative size of a stock exchange and the extent to which IPO performance is influenced by the IPO environment.

Further discussion focuses on seven control variables which, based on the results of the regression analysis for post-GFC, have a beta with significance at the 0.05 level (*table 29.3(a)*, *model 4*). Four variables refer to the IPO offer and company: number of pages in the PLS, log of total assets, leverage, and industrial sector. Three variables refer to the IPO environment, based on measures for the listing year: number of cross-listings, volume of print media, and volume of online media. Of the seven variables, four have a negative beta, meaning a negative relationship with underpricing, or a positive relationship with IPO performance, namely: log of total assets, leverage; and industrial sector. The interpretation

is that, in post-GFC, larger companies (higher total assets), with a demonstrated ability to raise debt capital (higher leverage), and categorised in the industrial sector (rather than resources or financial sector, as classified for the purpose of the study), will be expected to have a lower underpricing, or a higher IPO performance. This is in line with the literature, which indicates that the GFC created a preference by investors for less risky investments, characterised, for example, by larger companies, with demonstrated debt-raising ability, operating in less risky industrial sectors (van Heerden and Alagidede, 2012). This appears to be a reasonable interpretation of the results for the three control variables that are negatively related to underpricing, or positively related to IPO performance.

The other four variables are positively related to underpricing, or negatively related to IPO performance, namely: number of pages in the PLS, and three listing year variables – number of cross-listings, print media volume for AltX, and online media volume in total. Other than cross-listings, three variables relate to the volume of information available to the market, the first referring to the volume of information provided by the individual IPO company (number of pages in the pre-listing statement), and the other two referring to the volume of information at a total environment level – volume of print media coverage of AltX, and volume of online media coverage in total. The direction of the relationship between these variables and underpricing seems counterintuitive. Given that underpricing is associated with information asymmetry between IPO companies and investors in those companies, a higher volume of information would be expected to result in lower underpricing, not higher underpricing. A possible explanation is that the availability of increased information, at both the company level and at the total environment level, combined with more risk-averse pre-IPO investors (including underwriters), results in a lower issue price than expected, and a higher level of underpricing.

The seventh variable, number of cross-listings in the year of listing, is positively associated with underpricing, or negatively associated with IPO performance, of local listings included in the study. The result is notable as it is related to the objective of understanding the impact of control variables on IPO performance, in a changing IPO environment. What makes the result noteworthy is that the variable – number of cross-listings in year of listing – represents the influence of competing listing standards from other exchanges, in other countries, on the IPO performance of local IPOs. The interpretation is that, the more that initial investors in local IPOs are presented with information on, or the choice of investing in, IPOs also listed on exchanges on other countries (cross-listings), the more they are negatively predisposed

towards the local IPOs, resulting in lower IPO issue prices relative to closing prices on the first day of trading, which means higher underpricing or lower IPO performance.

The impact of cross-listings on the IPO performance of local companies is relevant to the JSE, in terms of its strategic management choices. In a media article published in January 2020 (West, 2020), the newly appointed CEO of the JSE is reported as stating that the JSE would be adopting a strategy of pursuing an increased number of “foreign listings” (also known as cross-listings, inward listings, dual listings, and secondary listings) on the JSE. This was seen as a viable growth strategy for the JSE. The strategy appears to make sense in the context of limited growth prospects for the JSE based on the economy in South Africa. The strategy could be effective at increasing the number of listings on the JSE, and increasing the related earnings from listings and trading activity. However, the strategy of pursuing foreign listings, or cross-listings, could have unintended negative consequences for IPO performance, and trading performance, of local IPOs. This represents an opportunity for further research at two levels. The first is to understand the general *impact of the globalization of stock exchanges*, represented by *cross-listings* on an exchange, on the *IPO performance of local IPOs* on the exchange. The research should include factors such as the country of origination of the cross-listing, and the size of the cross-listing offer and company, and assess the impact of these factors in IPO performance of local listings. More specifically, it represents an opportunity for research to understand the relationship between cross-listings on *smaller exchanges* such as the JSE, and the IPO performance of local IPOs. It is suggested that the *smaller IPO market* in South Africa provides an ideal setting to study these dynamics (Barnard et al, 2017), for example, due to the competition to local IPOs represented by cross-listings originating in a larger, more developed IPO market.

6.4.6 Summary

The discussion of additional results and observations has identified further insights from the study. The areas covered in the section were the explanation of the results of pre-GFC, the effectiveness of listing standards and media coverage as signals of IPO readiness, and the impact of other explanatory variables on IPO performance. The discussion has also identified areas that represent opportunities for future research, summarised in section 6.7.

6.5 CONTRIBUTIONS MADE BY THE STUDY

6.5.1 Contribution to theory

The main theory base for the study is signalling theory. The context is signalling IPO readiness, the impact of various signals on IPO performance, and the changing impact of various signals, in a changing IPO environment such as the GFC. Agenda-setting theory provides a complementary theory base, in the context of media coverage of IPO companies. The contribution to theory is related to the setting of the study and the choice of signals and control variables in the study. There are two aspects to the study setting: the market-based setting of the JSE and AltX stock exchanges in South Africa; and the time-based setting in which IPO performance is compared across two periods, pre-GFC and post-GFC. The signals are listing standards, comparing the JSE and AltX, and media coverage, comprising print media and online media. The control variables comprise two groups: control variables relating to the specific IPO offer and company, including the industry sector categorisation; and control variables relating to different aspects of the IPO environment in the year of listing, namely market conditions, listing activity, and volume of media articles.

Given this theory base and study framework, there are six inter-related points that together contribute to signalling theory. The first is that the study provides a testing of IPO signalling theory in a smaller market environment such as South Africa, in which there is a lack of IPO signalling studies. Second, given this setting for the study, the results indicate the listing standards of the JSE have a relatively low signalling impact on IPO performance, relative to the signalling impact of exchanges in developed markets, such as the TSX in Toronto. Third, the signalling impact of listing standards in this setting is low relative to the influence of control variables, especially those relating to the IPO environment. Fourth, building on the IPO environment, the study results show that changes in the IPO environment (from pre-GFC to post-GFC) have a significant impact of IPO performance, and change the effectiveness of listing standards as a signal of IPO readiness. Fifth, the results indicate that the number of cross-listings in the year of listing, effectively a feature of the IPO environment, has a significant influence on IPO performance of local IPOs. Sixth, the study results indicate that in the pre-GFC period, in which market sentiment is characterised by an element of “irrational exuberance”, there appears to be a limitation to the application of signalling theory.

Integrating these six points, the contribution of the study to signalling theory, in the context IPO signalling studies, is to demonstrate that signalling theory is applicable in a smaller market setting, but that in this setting, there are variances and limitations in the strength of different signals and control variables, due to the influence of the IPO environment, and of changes in the IPO environment from one period to the next. It is possible that certain variances and limitations are the result of the increased globalisation of the stock exchange environment in general, or alternatively a feature only of smaller market settings, and less common in a larger, developed market settings. An example is the result on the impact of cross-listings, representing competing listings standards from stock exchanges in other countries, which have a negative impact of IPO performance of local IPOs. It is possible that the impact of cross-listings on IPO performance represents the signalling impact of the increasing globalisation of the exchange environment (Pagano et al, 2001) and the competition between stock exchanges (Chemmanur & Fulghieri, 2006) as discussed in section 3.4.2, or that they reflect the dynamics of smaller IPO markets (Barnard et al, 2017). The changing impact of control variables, representing other explanatory variables, following a period of major change such as the GFC, responds to the discussion in Park et al (2016), and changes scholarly understanding of the reliability of various determinants of IPO performance after a period of major change (Butler et al, 2014).

In terms of media coverage in IPO signalling, the study provides a test of both signalling theory and agenda-setting theory in the study setting as described above. The main contribution is to demonstrate that, in this setting, there is a relatively limited impact of media coverage at the level of the individual IPO company, and a relatively large impact of media volume at the level of the IPO environment. It suggests that in a smaller market setting, there is a high influence of signals at the level of the general IPO environment, relative to signals at the level of the specific IPO company.

6.5.2 Contribution to practice

The study makes a contribution to practice by informing the strategic management decision-making of key players in the IPO process. These players include the IPO company, the stock exchange on which the company lists, underwriters, banks, initial (pre-IPO) investors in the company, advisers on the IPO process, first-day investors in the IPO, and media providing coverage of IPO companies. The decision-making of the various players are

motivated by different perspectives and objectives, but form part of an integrated process. One input to the decision-making relates to the impact on IPO performance of the different signals and control variables in the study, both in absolute terms and relative to each other, and across different time periods, characterised by different types of IPO markets and environments. The relatively low impact of listing standards as a signal of IPO readiness, and the relatively high impact of cross-listings on the IPO performance of local IPOs, is a phenomenon that has strategic decision-making implications for IPO players, for example the JSE, in the context of statements by the JSE that it intends to pursue a strategy of increasing the number of cross-listings on the JSE. The contribution to the objectives, decision-making and strategic management of different sets of practitioners has been discussed in detail in section 1.6.2.

6.5.3 Contribution to methodology

The study makes a contribution to research methodology in using a study design based on two time periods (pre-GFC and post-GFC) and two stock exchanges (JSE and AltX). Using this approach, it examines the changing impact of listing standards and media coverage on IPO performance over an extended time period in which the signalling environment has experienced major changes, accentuated by the GFC. The use of two time periods, across two stock exchanges, to assess the changing impact of different signals in a changing environment, is a novel research objective and approach in IPO studies. Another contribution to methodology is the study's distinction between different types of media coverage (print media and online media), in order to separately assess the impact of online media coverage on IPO performance, in the context of a changing signalling environment. Another contribution to methodology is to demonstrate the application of sample selection criteria based on signalling theory, in an IPO study set in South Africa, a setting in which there is a lack of IPO studies adopting signalling theory and related sampling methodology.

6.6 LIMITATIONS TO THE STUDY

The limitations to the study relate to the size of the study dataset, and the range of variables selected for the study. The number of IPOs in the study dataset is at the low end of the range of datasets relative to other IPO studies. This limitation is due to the setting of the study in the market of South Africa and the IPO market of the JSE and AltX. The market is

small compared to those in larger developed economies. Given this setting, the total number of new listings on both the JSE and AltX, for the period 2003 to 2019, the total period for which the JSE and AltX coexisted, was 329. After excluding initial listings based on sample selection criteria used in IPO signalling studies, there were 98 IPOs. After excluding three more IPOs in 2008, the year of the GFC, in order to compare IPO performance in pre-GFC and post-GFC, the final study dataset comprised 95 IPOs. Although relatively small, this constitutes the *total population* of IPOs eligible for inclusion in the study, for the study period.

Another limitation relates to the range of variables selected for the study, due to information availability constraints. Certain types of media were excluded from the study, due to limitations in data availability, such as broadcast media (radio, TV and online media channels), and social media (posts on sites such as Facebook, Twitter, and Linked In). The inclusion of the Moneyweb database of online articles served as a proxy for the broader range of online media. Another area is the selection of control variables, which was subject to the constraints of information availability and the limited time available for the study. It is possible that a larger range of variables would result in additional insights.

6.7 OPPORTUNITIES FOR FURTHER RESEARCH

Various opportunities have been identified for further research, arising from the study results. Three opportunities which assist in developing signalling theory relate to cross-listings, the IPO environment, and the analysis of underpricing in a period such as pre-GFC.

The first opportunity is to improve the understanding of the relationship between cross-listings on a stock exchange, and the IPO performance of the local IPOs on the exchange, in two possible contexts. First, the signalling impact of cross-listings could be studied in the context of the increased globalisation of the exchange environment, and the competition between exchanges, across all IPO markets. Studies should include different variables that describe the cross-listings, such as the other country represented, and that describe the cross-listing offer and company. Second, the phenomenon could be studied specifically in the context of smaller markets in which the cross-listings represent the listing standards of larger and more competitive stock exchanges, such as those in larger, developed markets.

The second opportunity is to improve the understanding of the relationship between listing year variables and IPO performance on other stock exchanges, especially those in smaller markets. This includes variables relating to both listing year activity and media volume, and also listing year variables. This would assist in understanding whether IPOs on stock exchanges in smaller markets are more influenced by changes in their environment than IPOs on larger stock exchanges in more developed markets.

The third opportunity is to develop a model that explains IPO performance during a period such as pre-GFC, in which underpricing and IPO performance appears not to be in line with the explanatory framework of signalling theory. Other than market sentiment, characterised as “irrational exuberance”, what other explanations are there for IPO performance in these type of markets? Further, what are the consequences post-IPO performance, for example, share price performance one year after IPO? Addressing these questions represents an opportunity for further research.

Additional opportunities for further research arise from the limitations based on the scope of the study which, while being aligned to the study objectives, exclude various areas of analysis. These additional areas of analysis, indicated for example in Johan (2010), are the analysis of withdrawn IPOs as an indicator of IPO readiness, the analysis of medium and long term performance of IPOs, such as one-year returns, the analysis of time to delisting, where applicable, the analysis of time to a major corporate action, such as a merger or acquisition, the reputation of the underwriter and auditor, and the reputation of a venture capital or private equity firm investing in the IPO company, where applicable. The analysis of these additional variables, and the impact on IPO performance, represent an opportunity for further research. It is noted that the information required to support these additional areas of analysis is not always available, or readily accessible, using financial services databases used for research in the local South African market, such as the IRESS database.

6.8 DISCUSSION CLOSING

The study results have been discussed from different perspectives – the link between key results, research questions and hypotheses, the interpretation of additional results and observations, the areas of contribution of the study, the limitations of the study, and the

opportunities for further research. The setting of the study, in terms of the size of the IPO market and the time period spanning the GFC, has been a key feature of the study in several respects – the results, the contribution made by the study, and the limitations.

7. CONCLUSION

As discussed in the introduction, the study was motivated by a call for further research into changes in the IPO signalling environment and their effect on IPO signalling and IPO performance, and by the related discussion on the potential impact of changes in the regulatory environment and media environment of IPOs (Park et al, 2016). The objectives of the study were to understand the impact of a changing IPO environment, characterised by the GFC, on the IPO signalling and IPO performance. The study focuses on the changing impact of listing standards and media coverage on IPO performance, as well as the changing impact of other explanatory variables on IPO performance, included in the study as control variables. The setting of the study was the JSE and AltX stock exchanges in the South African IPO market. The study involved a review of all IPOs on the JSE and AltX from 2003 to 2019. After using sample selection criteria to identify exclusions from the initial set of IPOs, and after excluding IPOs in 2008, the year of the GFC, the study was based on 95 IPOs, effectively the full population of IPOs eligible for inclusion in the study. This dataset was used to compare IPO performance in pre-GFC with post-GFC, and JSE with AltX. The study involved four areas of analysis – descriptive, comparative, correlation and regression. The results support the study hypotheses, and the study provides insights into the impact of changes in the IPO signalling environment, characterised by the GFC, on IPO signalling and IPO performance. The study has made contributions to theory, practice and methodology, and has assisted in identifying opportunities for further research.

Taking a step back from the study framework and the discussion of objectives and results, it is timely to reflect on the changing global environment at the conclusion of this study, in mid-2020. The broad theme of the study, signalling IPO readiness in a changing environment, is of increasing relevance in a global economic and social environment that has changed in a manner unprecedented in many decades. In a world characterised by great uncertainty about the future, reliable signals of quality and value are of increasing importance. Signalling IPO readiness in this changing environment, and signalling quality and value in a more general sense, will be subjects of interest not only for the key players in the IPO process, but also for businesses and organisations globally.

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APPENDIX A

9. APPENDIX A – ABBREVIATIONS AND ACRONYMS

9.1 ABBREVIATIONS AND ACRONYMS

Table 17: Abbreviations used in this document

Abbreviation	Meaning
AltX	Alternative Exchange (at the JSE)
IPO	Initial public offering
JSE	JSE Ltd (previously the JSE Securities Exchange, and the Johannesburg Stock Exchange)
HK	Hong Kong
NASDAQ	National Association of Securities Dealers Automated Quotations (world's second largest stock exchange, based in New York)
NYSE	New York Stock Exchange
SZ	Shenzhen (second board market)
TSX	Toronto Stock Exchange
TSX-V	Toronto Stock Exchange – Venture Board

APPENDIX B

10. APPENDIX B – LISTING REQUIREMENTS

10.1 LISTING REQUIREMENTS – JSE AND ALTX

The table below provides a high-level comparison of listing requirements for JSE and AltX, at two points in time: 2018, and 2008. The table is based on information from several sources:

Source of data for 2018 listing requirements

Fouchee, A. (2018). Discussion with Alwyn Fouchee, Head: Regulation Compliance, Issuer Regulation, JSE, on 2018-02-06, JSE, Johannesburg.

JSE Service Issue 25, February 2018. Lexus Nexus

Source of data for 2008 listing requirements

Maglolio, J. (2008). *The Guerrilla Principle: Winning Tactics for Global Project Managers*, *Appendix 12: Main Board and AltX: The Differences*. Juta Publishers, South Africa.

Table 18: Listing requirements: JSE and AltX

Criterion		JSE (main board)	AltX
Profit record	2018	A satisfactory three-year profit record. Pre-tax profit in last year of R15 million. No other major changes from 2008.	No significant changes from 2008.
	2008	A satisfactory three-year profit record. Pre-tax profit in last year of R8 million. Exceptions are mining companies and property companies, provided that property companies can show that the performance of the underlying property complies.	No profit record required. At this time, the AltX market is not keen on venture capital operations, but has not ruled them out. A company that is merely an idea is unlikely to be accorded a listing. This market is not intended for applicants that qualify for the main board.

Share-holder spread	2018	Public shareholders holding a minimum of 20% of the issued share capital.	Public shareholders should be holding a minimum of 10% of the issued share capital
	2008	A minimum of 500 public shareholders, holding a minimum of 20% of the issued share capital	A minimum of 100 public shareholders, holding a minimum of 10% of the issued share capital
Minimum capital	2018	R50 million in tangible or professionally valued net assets.	R2 million in tangible or professionally valued net assets.
	2008	R25 million in tangible or professionally valued net assets.	R2 million in tangible or professionally valued net assets.
Escrow shares	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	There are no provisions for escrow shares.	50% of the shares held by the directors may be sold immediately on listing (subject to market conditions), and the balance must be held in escrow. Of the balance remaining, half can only be sold when the results for the remainder of the current financial year have been audited. The remainder can only be sold another one year later.
Link to JSE	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	All listed companies are required to have an appointed sponsor at all times.	All listed companies are required to have an appointed designated advisor at all times.
Announce-ments	2018	No significant changes from 2008.	No significant changes from 2008.

	2008	Companies are required to publish a number of types of announcements in newspapers, published in English and one other official language, as well as on the Securities Exchange News Service (SENS). These announcements usually include: abridged listing particulars; interim and preliminary results (if applicable); cautionary announcements; trading updates; acquisition announcements; rights issue announcements; and dividend announcements.	All announcements must be published on SENS and do not need to be published in the press.
Directors' induction pro-gramme	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	There is no requirement for directors to attend the directors' induction programme.	All directors must attend the directors' induction programme.
Financial director	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	Can be appointed by the company without reference to the sponsor.	The appointment needs to be signed off by the designated advisor.
Directors	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	Require four directors. Recommended to comply with the King Code on Corporate Governance – areas of non-compliance must be detailed.	25% of the board must be non-executive. The designated advisor (DA) can be a director without being disqualified to act as

			DA. The DA must attend all board meetings.
Profit forecast at time of listing	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	No profit forecast is required.	The company must provide the JSE with a profit forecast for the remainder of the current year and one additional year. This does not have to be published.
Presentation to JSE	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	No presentation required.	Full presentation to the AltX listing advisory committee prior to being allowed to proceed with the listing process.
Shareholding by sponsor / designated adviser (DA)	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	The sponsor may hold shares in the company, but if this holding is in excess of 10%, another sponsor must be appointed for transactions.	The DA may hold up to 20% of the shares in the company without being rendered unable to act as DA at all times.
Health warning	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	No health warning is required.	A warning statement regarding the risks of investing in an AltX-listed company and the importance of the DA to the company must be on all published documentation.
Issue of shares for cash	2018	General authority to issue shares for cash enables the company to issue up to 30% in any one year.	No significant changes from 2008.

	2008	General authority to issue shares for cash enables the company to issue up to 15% in any one year.	General authority to issue shares for cash enables the company to issue up to 50% in any one year.
Revised listing particulars	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	Companies are required to publish revised listing particular statements if they issue more than 30% of their share capital in a three-month period	Companies are required to publish revised listing particular statements if they issue more than 50% of their share capital in a three-month period
Related party trans-actions	2018	No significant changes from 2008.	No significant changes from 2008.
	2008	Any transaction with a related party which involves more than 0.25% of the company's market capitalisation requires shareholder approval and a fair and reasonable statement by an independent financial advisor.	Any transaction with a related party which involves more than 10%. If it involves between 10% and 50%, the designated advisor (DA) may issue the fair and reasonable shareholder approval required. Above 50%, the fair and reasonable shareholder approval must be issued by an independent financial advisor. Shareholder approval is required.

APPENDIX C

11. APPENDIX C – RESEARCH DESIGN AND METHODOLOGY

11.1 TABLES ON RESEARCH DESIGN AND METHODOLOGY

Table 19.1 Benchmark study 1 of 2 on the impact of listing standards on IPO performance

Study	Johan, S. (2010). Listing standards as a signal of IPO preparedness and quality. *International Review of Law and Economics*, 30(2010), 128-144.

Types and sources of data	• Listing on Toronto main board (TSX) versus junior board or venture board (TSX-V)
	• Company attributes based on prospectus documents ("detailed, hand-collected data" obtained from "SEDAR" – System for Electronic Analysis and Retrieval), and other databases and documents, such as company circulars
	• Stock exchange price and volume data from TSX and various databases
	  • Thompson Financial
	  • Macdonald and Associated, Ltd
	  • Report on Business database
	• Study represents 215 IPOs on TSX, and 196 IPO on TSX-V; total of 411 IPOs.
	  • For the period Jan 1997 to Jun 2005

Dependent variables	• One-day share price change (IPO underpricing)
	• One-year share price change
	• One-day trade volume/share
	• One-year trade volume/share
	• 3 variables representing time lags between different dates relating to the IPO, indicating different levels of preparation for the IPO,
	  • Difference between Predicted IPO Date and IPO Announcement Date
	  • Difference between Actual IPO Date and Announcement Date
	  • Difference between Actual IPO Date and Predicted IPO Date

Independent variables	• Dummy variable (1 for listing on TSX; 0 for listing on TSX-V
Control variables	• 21 variables describing different firm attributes that influence IPO performance, including variables indicating market conditions, industry effects, and characteristics of the offering • 19 different variables indicating different reasons for going public
Analytical techniques	• Univariate based comparison tests (t-tests) • Correlation analysis (Pearson correlations between dependent variables and selected explanatory variables) • Multivariate regression analysis (OLS regressions testing various models) •

Key findings	• The results provided support for the hypotheses that:
	  • Listing standards negatively impact on *IPO underpricing*.
	  • Underpricing is lower on TSX (higher listing standards) than on TSX-V. The difference is statistically significant at the 1% level.
	  • Listing on TSX is associated with a higher level of preparedness
	  • Based on shorter time delays between key dates.
	• The results did not provide support for the hypotheses that:
	  • Listing standards impact other measures of IPO performance in the study:
	  • One-year share price change,
	  • One-day trade volume
	  • One-year trade volume.

Table 19.2 Benchmark study 2 of 2 on the impact of listing standards on IPO performance

Study	Ding, Y., Nowak, E., & Zhang, H. (2010). Foreign vs. domestic listing: An entrepreneurial decision. *Journal of Business Venturing*, 25(2010), 175-191.
Types and sources of data	• Listing on Honk Kong stock exchange (HK) versus listing on Shenzhen second board market (SZ) • IPOs on HK and SZ exchanges between 2000 and 2006; sample size of 120.
Dependent variable	• Dichotomous variable: listing or not listing on HK exchange

Independent variables	• Attributes of IPOs on each exchange:
	  • Growth potential
	  • Owner shareholdings
	  • Shares floated
	  • Managerial shareholdings
	  • Board independence
	  • Board size
	  • Founder-manager

Control variables	• Size • Leverage • Age of the firm
Analytical techniques	• Univariate analysis • Simple t-test of means • Non-parametric tests • Logit regression analysis

Key findings	• The results provided support for the hypotheses that:
	  • Firms listing on HK exchange, rather than SZ exchange, are more likely to display various characteristics, e.g.
	  • High growth potential
	  • Higher pre-IPO ownership shareholding, and lower free float
	• Note: Significant control variables are size and leverage:
	  • HK firms are smaller and more leveraged

Table 19.3 Benchmark study 1 of 2 on the impact of media coverage on IPO performance

Study	Pollock, T., & Rindova, V. (2003). Media legitimation effects in the market for initial public offerings. *Academy of Management Journal*, 46(5), 631-642
Types and sources of data	• Lexis-Nexus database for media coverage data • All newspaper and print magazine articles available on an IPO firm in target sections • One year prior to registration for IPO • Period and exchanges selected: 1992, US exchanges (regulated by the US Securities & Exchange Commission, known as the SEC) • Final sample of 225 IPOs in the US
Dependent variables	• IPO underpricing • Turnover on day 1
Independent variables	• Volume of media coverage (total number of articles in selected databases) • Tenor (positive vs. negative) of media coverage • For each of the above: one week pre-IP; one week post-IPO
Control variables	• Firm quality index • Underwriter reputation • Lead institutional investor size • Venture capital backing • Firm age at IPO • Offering size • Overpricing range • Industry dummy variables •
Analytical techniques	• Volume of media coverage based on total number of articles in selected databases of Lexis-Nexus • Tenor of media coverage (positive vs. negative) based on Janis-Fader coefficient of imbalance. • Regression analysis

Key findings	• The results provided support for the hypotheses that:
	  • *Volume of media coverage* affects *IPO underpricing* negatively, at a diminishing rate (higher media coverage, lower underpricing, at a diminishing rate).
	  • *Volume of media coverage* affects *day-one trading volume* positively, at a diminishing rate (higher media coverage, higher trading volume on day-one)
	• The results did *not* provide support for the hypotheses that:
	  • The proportion of positive tenor of media coverage affects underpricing negatively, as a diminishing rate
	  • The proportion of positive tenor of media coverage affects day-one trading volume positively, at a diminishing rate

Table 19.4 Benchmark study 2 of 2 on the impact of media coverage on IPO performance

Study	Guldiken, O., Tupper, C., Nair, A., & Yu, H. (2017). The impact of media coverage on IPO stock performance. *Journal of Business Research*, 72, 24-32
Types and sources of data	• Factiva news database for media coverage data • IPOs on NYSE or NASDAQ in 2006 • Mergent database • Bloomberg database • Each firm's web page • Final sample size of 97 firms
Dependent variables	• Stock price change one week after the IPO
Independent variables	• Volume of media coverage (one-week pre-IPO; one-week post IPO) • Uncertainty of tone of media coverage (one-week pre and post): uncertainty of tone, based on ratio of uncertain words to total words; method based on list of words used to determine uncertainty of media coverage, per Loughran & McDonald (2011)
Control variables	• Alternative determinants of IPO stock performance: • IPO firm size • IPO firm age • Listing on NYSE or NASDAQ • Headquarters located in US or foreign country • Firm backed by VC/PE or not • Firm sales prior to IPO • Prospectus risk factors • Offering size • Underwriter reputation • Media volume • Hot vs. cold IPOs • CEO founder or not – dummy variable • Board size, board age, board tenure • Industry dummy variables
Analytical techniques	• Correlation analysis • Regression analysis

Key findings	• The results provided support for the hypotheses that:
	  • *Volume of media coverage*, one-week pre-IPO, has impact on *stock price*, one-week post-IPO
	  • *Uncertainty of tone of media coverage*, one-week pre-IPO, has negative impact on stock price, one-week post-IPO
	• The results did not provide support for the hypotheses that:
	  • Volume of media coverage, one-week post-IPO, has impact on stock price, one-week post-IPO
	  • Uncertainty of tone of media coverage, one-week post-IPO, has negative impact on stock price, one-week post-IPO

Table 19.5. Summary of the research design for the study

Study title	Signalling IPO readiness in a changing environment: The changing impact of listing standards and media coverage on IPO performance

Types and sources of data	• IRESS (formerly BFA McGregor) database of South African companies
	  • Access to pre-listing statement for each company listing on JSE and AltX
	  • Access to data on post-IPO market performance for each company
	• Sabinet database
	  • Archive of digitalized print articles in the South African media
	  • Media articles published in one month leading up to the date of listing
	• Moneyweb article archive
	  • Archive of online articles published by Moneyweb
	  • Media articles published in the month preceding the date of listing
	• IPOs on the JSE and AltX
	• Analysis of IPOs in the study timeframe (2003 to 2019), and a comparison of two sets of IPOs on each exchange, corresponding to pre-GFC and post-GFC:
	  • 2003 to 2019
	  • JSE: 211 IPOs
	  • AltX: 118 IPOs
	  • Total: 329 IPOs
	• Note: The number of IPOs indicated for JSE, AltX and Total are ***before exclusions*** of IPOs based on IPO signalling study sample criteria (discussed in section 4.8)

Dependent variable	• Choice of dependent variable guided and motivated by the approach in Johan (2010), and by choice of dependent variable in numerous studies on IPO signaling
	  • IPO underpricing
	  • Change in share price from offer price to closing price on day one of trading, expressed as a percentage of the offer price

Independent variables	• Choice of independent variables is based on key studies as indicated below:
	  • Listing on the JSE vs. AltX
	  • Based on the approach in Johan (2010)
	  • Dummy variable (1 = JSE; 0 = AltX)
	  • Volume of media coverage in month preceding date of listing
	  • Based on the approach in Pollock & Rindova (2003)
	  • Number of articles in selected databases (SABINET; Moneyweb)

Control variables	• Choice of control variables were guided by the approach in Johan (2010) and other IPO studies, with selection of variables subject to availability of information in pre-listing statements (PLS), or prospectus documents.

	• The selection of control variables (discussed in detail in section 4.9.4) comprises:
	  • Offer profile characteristics
	  • Company profile characteristics
	  • Financial
	  • Non-financial
	  • Industry sector classification
	  • Market conditions in listing year
	  • Listing activity in listing year
	  • Media volume in listing year

Analytical techniques	• The choice of analytical techniques is based on the techniques in Johan (2010), Ding et al (2010), and Pollock & Rindova (2003)
	  o Descriptive analysis
	  o Comparative analysis
	  o Correlation analysis
	  o Regression analysis
	• The study is based on two sets of comparisons:
	  o Comparison of IPO performance across two exchanges
	  ▪ JSE and AltX
	  o Comparison of IPO performance across two time periods
	  ▪ pre-GFC (2003 to 2007) and post-GFC (2009 to 2019)

Hypotheses to be tested	On the changing impact of listing standards on IPO performance: H1. The impact of listing standards on IPO performance increased from pre-GFC to post-GFC On the changing impact of media coverage on IPO performance: H2. The impact of media coverage on IPO performance increased from pre-GFC to post-GFC

Table 19.6: Number of IPOs on the JSE and AltX in the study review period (before exclusions)

Year	Total	IPOs on JSE	IPOs on AltX
2003	8	8	0
2004	15	10	5
2005	20	14	6
2006	40	21	19
2007	62	25	37
Pre--GFC total	*145*	*78*	*67*
GFC: 2008	20	16	4
2009	9	5	4
2010	13	12	1
2011	16	13	3
2012	14	10	4
2013	13	8	5
2014	24	18	6
2015	21	13	8
2016	17	10	7
2017	21	13	8
2018	12	11	1
2019	4	4	0
Post-GFC total	*164*	*117*	*47*
Total from 2003 to 2019	*329*	*211*	*118*

Source of data: JSE; IRESS

Table 19.7. Definition of variables

Variable name	Definition
Dependent variable	
UP	Underpricing - difference between trading price at end of first day of trading and issue price, divided by issue price, net of market returns on first day of trading (equivalent to market-adjusted one-day initial return for investors)
Independent variables	
JSE	Dummy variable equal to 1 if IPO was on the JSE as the senior exchange (0 if on AltX as the junior exchange)
PMCO	Print media coverage of company - number of articles on Sabinet database, published in one-month period up to and including day of listing
OMCO	Online media coverage of company - number of articles on Moneyweb database, published in one-month period up to and including day of listing
CMCO	Combined media coverage (print + online) of company – no. of articles on Sabinet and Moneyweb, published in one-month period up to and including day of listing
Control variables	
Offer profile	
PLS	No of pages in the pre-listing statement (PLS)
IP	Issue price of IPO shares, in cents (1/100 of a South African Rand)
LOGOFF	Log of the offer amount, in ZAR (South African Rand)
Company profile	
AGE	Age of the company in years, at the time of the IPO
LOGNA	Log of net assets in ZAR, for most recent year reported
LOGTA	Log of total assets, in ZAR, for most recent year reported
LEV	Total liabilities divided by total assets, for most recent year reported
LOGREV	Log of total revenue, in ZAR, for most recent year reported
NETINC	Net income in ZAR, for most recent year reported
BOARD	Number of board directors
Industry sector	
RESSEC	Dummy variable equal to 1 if company in the resources sector, 0 if not
FINSEC	Dummy variable equal to 1 if company in the finance sector, 0 if not
INDSEC	Dummy variable equal to 1 if company in the industrial sector, 0 if not
Market conditions	
LYMI	Listing year, percentage change in market index (JSE All Share Index)
Listing activity	
LYTL	Listing year, total listings on JSE and AltX
LYSSL	Listing year, signalling study listings
LYCL	Listing year, cross listings on JSE and AltX
LYICL	Listing year, investment company listings on JSE and AltX

LYAOL	Listing year, all other listings
Media volume	
LYPMJSE	Listing year, print media, number of articles that mention JSE (Sabinet)
LYPMALT	Listing year, print media, number of articles that mention AltX (Sabinet)
LYPMALL	Listing year, print media, all articles (Sabinet)
LYOMJSE	Listing year, online media, number of articles that mention JSE (Moneyweb)
LYOMALT	Listing year, online media, number of articles that mention AltX (Moneyweb)
LYOMALL	Listing year, online media, all articles (Moneyweb)
Period variable	
POSTGFC	Dummy variable = 1 if IPO is post-GFC; 0 if pre-GFC Variable is used in comparative analysis only, to compare pre-GFC and post-GFC for each of the two exchanges

Table 19.8. Expected relationship between explanatory variables and underpricing

Variable	Expected relationship with		Reference
	IPO performance	*Underpricing*	
Indepen. variables			
JSE	Positive	Negative	Johan (2010)
PMCO	Positive	Negative	Guldiken et al (2017); Park et al (2016). Variables for media coverage broken down into print media and online media, and then combined.
OMCO	Positive	Negative	
CMCO	Positive	Negative	
Control variables			
Offer profile			
PLS	Positive	Negative	Park et al (2016)
IP	Positive	Negative	van Heerden & Alagidede (2012)
LOGOFF	Positive	Negative	Johan (2010); Park et al (2016)
Company profile			
AGE	Positive	Negative	Ding et al (2010); Pollock & Rindova (2003)
LOGNA	Positive	Negative	Johan (2010); variation of total assets variable
LOGTA	Positive	Negative	Johan (2010); Park et al (2010)
LEV	Positive	Negative	Johan (2010); Ding et al (2010)
LOGREV	Positive	Negative	Johan (2010)
NETINC	Positive	Negative	Johan (2010); Park et al (2016)
BOARD	Positive	Negative	Ding et al (2010)
Industry sector			
RESSEC	Potentially vary with year of listing and related market conditions		Johan (2010); van Heerden & Alagidede (2012). Three broad industry sectors used for this study.
FINSEC			
INDSEC			
Market conditions			
LYMI	Negative	Positive	Van Heerden & Alagidede (2012)
Listing activity			
LYTL	Negative	Positive	Guldiken et al (2017). Van Heerden & Alagidede (2012). “Hot vs. cold IPO market”; variable for total listings and for two key sub-totals
LYSSL	Negative	Positive	
LYCL	Negative	Positive	
LYICL	Negative	Positive	
LYAOL	Negative	Positive	
Media volume			
LYPMJSE	Positive	Negative	Guldiken et al (2017). Control variable for media volume broken down to represent separately media volume for print media versus online
LYPMALT	Positive	Negative	
LYPMALL	Positive	Negative	
LYOMJSE	Positive	Negative	

LYOMALT	Positive	Negative	media, and within each type of media, JSE versus AltX, for the listing year
LYOMALL	Positive	Negative	

Table 19.9 Summary of data sets and methods of analysis

Period	Total	JSE	AltX
Pre-GFC (2004 to 2007)	PRETOT - Descriptive statistics (for continuous variables) - Frequency table (for categorical variables) - Independent samples t-tests (pre-GFC JSE vs. pre-GFC AltX) - Pearson correlation analysis - Hierarchical multiple regression analysis (dependent variable: UP)	PREJSE • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)	PREALT • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)
Post-GFC (2009 to 2018)	POSTTOT • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables) • Independent samples t-tests (post-GFC JSE vs. post-GFC AltX) • Pearson correlation analysis • Hierarchical multiple regression analysis (dependent variable: UP)	POSTJSE • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)	POSTALT • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)
Total	Study sample	JSETOT • Independent samples t-tests (pre-GFC JSE vs. post-GFC JSE)	ALTTOT • Independent samples t-tests (pre-GFC AltX vs. post-GFC AltX)

APPENDIX D

12. APPENDIX D – EXECUTION OF STUDY

12.1 TABLES ON EXECUTION OF STUDY

This section comprises tables relating to the execution of the study.

Table 20.1. Description of the study sample – inclusions and exclusions

	All IPOs - 2004 to 2018			Exclusions			Study sample		
Year	JSE + ALtX	JSE	AltX	JSE + ALtX	JSE	AltX	JSE + ALtX	JSE	AltX
2003	8	8		8	8	0	0	0	0
2004	15	10	5	13	9	4	2	1	1
2005	20	14	6	15	14	1	5	0	5
2006	40	21	19	26	20	6	14	1	13
2007	62	25	37	16	12	4	46	13	33
2008	20	16	4	17	16	1	3	0	3
2009	9	5	4	8	4	4	1	1	0
2010	13	12	1	9	8	1	4	4	0
2011	16	13	3	15	12	3	1	1	0
2012	14	10	4	11	8	3	3	2	1
2013	13	8	5	12	7	5	1	1	0
2014	24	18	6	18	15	3	6	3	3
2015	21	13	8	17	9	8	4	4	0
2016	17	10	7	16	9	7	1	1	0
2017	21	13	8	15	9	6	6	4	2
2018	12	11	1	11	10	1	1	1	0
2019	4	4	0	4	4	0	0	0	0
Total	329	211	118	231	174	57	98	37	61
					Exclude: 2008 GFC		3	0	3
					Study sample		95	37	58
					Pre-GFC (2004-2007)		67	15	52
					Post-GFC (2009-2018)		28	22	6
					Study sample		95	37	58

Table 20.2. Breakdown of exclusions from the study sample

Exclusion type	Number	%
Cross-listings (aka secondary listings, dual listings, inward listings)	73	31,60%
Investment companies, incl. prop inv.; REITs; SPACs	67	29,00%
Listing via unbundling, or restructuring	29	12,55%
Listing by introduction,; no offer of shares	26	11,26%
Reverse listings	11	4,76%
Non-equity listings incl.: prefs, debentures, corporate bonds	14	6,06%
Other, incl. name changes, transfers between exchanges, etc.	11	4,76%
Total	231	100,00%

Table 20.3. Summary of data sets and types of analysis (N = number of cases in each data set)

Period	Total	JSE	AltX
Pre-GFC (2004 to 2007)	PRETOT (N = 67) - Descriptive statistics (for continuous variables) - Frequency table (for categorical variables) - Independent samples t-tests (pre-GFC JSE vs. pre-GFC AltX) - Pearson correlation analysis - Hierarchical multiple regression analysis (dependent variable: UP)	PREJSE (N = 15) • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)	PREALT (N = 52) • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)
Post-GFC (2009 to 2018)	POSTTOT (N = 28) • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables) • Independent samples t-tests (post-GFC JSE vs. post-GFC AltX) • Pearson correlation analysis • Hierarchical multiple regression analysis (dependent variable: UP)	POSTJSE (N = 22) • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)	POSTALT (N = 6) • Descriptive statistics (for continuous variables) • Frequency table (for categorical variables)
Total	Study sample (N = 95)	JSETOT (N = 37) • Independent samples t-tests (pre-GFC JSE vs. post-GFC JSE)	ALTTOT (N = 58) • Independent samples t-tests (pre-GFC AltX vs. post-GFC AltX)

Table 20.4 Control variable by listing year – market conditions

Listing Year		*LYMI*
	2003	0,120
Study sample: pre-GFC	*2004*	0,219
	2005	0,430
	2006	0,377
	2007	0,162
	2008	-0,257
Study sample: post-GFC	*2009*	0,286
	2010	0,161
	2011	-0,004
	2012	0,227
	2013	0,178
	2014	0,076
	2015	0,019
	2016	-0,001
	2017	0,175
	2018	-0,114
	2019	0,082
Study sample (excl. 2008)		
Mean: pre-GFC (2004-2007)		0,297
Mean: post-GFC (2009-2018)		0,100

Table 20.5 Control variables by listing year – listing activity

Listing Year		*LYTL*	*LYSSL*	*LYCL*	*LYICL*	*LYAOL*
	2003	8	0	1	3	4
Study sample: pre-GFC	*2004*	15	2	0	4	9
	2005	20	5	3	5	7
	2006	40	14	7	5	14
	2007	62	46	7	0	9
	2008	20	3	9	0	8
Study sample: post-GFC	*2009*	9	1	3	1	4
	2010	13	4	2	3	4
	2011	16	1	3	7	5
	2012	14	3	2	5	4
	2013	13	1	6	4	2
	2014	24	6	6	6	6
	2015	21	4	7	9	1
	2016	17	1	7	6	3
	2017	21	6	3	8	4
	2018	12	1	5	1	5
	2019	4	0	2	0	2
	Total	***329***	***98***	***73***	***67***	***91***
Study sample (excl. 2008)		297	95	61	64	77
Total: pre-GFC (2004-2007)		137	67	17	14	39
Total: post-GFC (2009-2018)		160	28	44	50	38
Mean: pre-GFC (2004-2007)		34,25	16,75	4,25	3,50	9,75
Mean: post-GFC (2009-2018)		16,00	2,80	4,40	5,00	3,80

Table 20.6 Control variables by listing year – media volume

Listing Year		*LYPMJSE*	*LYPMALT*	*LYPMALL*	*LYOMJSE*	*LYOMALT*	*LYOMALL*
	2003	2 295,00	101,00	129 013,00	0,00	0,00	0,00
Study sample: pre-GFC	*2004*	3 110,00	213,00	131 327,00	0,00	0,00	0,00
	2005	3 219,00	212,00	126 353,00	5,00	0,00	12,00
	2006	3 369,00	276,00	125 852,00	19,00	6,00	45,00
	2007	3 362,00	479,00	118 563,00	1 463,00	147,00	8 114,00
	2008	3 279,00	371,00	125 712,00	1 608,00	90,00	11 017,00
Study sample: post-GFC	*2009*	2 794,00	212,00	125 488,00	1 906,00	50,00	8 450,00
	2010	2 644,00	190,00	113 756,00	2 185,00	44,00	9 998,00
	2011	2 274,00	187,00	109 047,00	2 030,00	57,00	14 671,00
	2012	1 513,00	94,00	109 249,00	3 452,00	58,00	20 560,00
	2013	1 796,00	56,00	111 055,00	2 656,00	12,00	18 978,00
	2014	809,00	23,00	49 401,00	2 305,00	56,00	11 687,00
	2015	2 372,00	89,00	132 349,00	1 282,00	40,00	12 447,00
	2016	5 773,00	216,00	137 731,00	1 227,00	27,00	12 062,00
	2017	6 303,00	137,00	132 953,00	1 041,00	21,00	11 390,00
	2018	4 962,00	27,00	142 850,00	741,00	2,00	10 727,00
	2019	3 993,00	14,00	89 585,00	704,00	4,00	8 961,00
Study sample (excl. 2008)							
Mean: pre-GFC (2004-2007)		3 265,00	295,00	125 523,75	371,75	38,25	2 042,75
Mean: post-GFC (2009-2018)		3 124,00	123,10	116 387,90	1 882,50	36,70	13 097,00

APPENDIX E

13. APPENDIX E – RESULTS OF DESCRIPTIVE ANALYSIS

13.1 TABLES ON RESULTS OF DESCRIPTIVE ANALYSIS

Table 21. Summary of descriptive analysis tables

Table No.	Name
21.1	Descriptive statistics: PREJSE – continuous variables
21.2	Frequency table: PREJSE – categorical variables
21.3	Descriptive statistics: PREALT – continuous variables
21.4	Frequency table: PREALT – categorical variables
21.5	Descriptive statistics: PRETOT – continuous variables
21.6	Frequency table: PRETOT – categorical variables
21.7	Descriptive statistics: POSTJSE – continuous variables
21.8	Frequency table: POSTJSE – categorical variables
21.9	Descriptive statistics: POSTALT – continuous variables
21.10	Frequency table: POSTALT – categorical variables
2111	Descriptive statistics: POSTTOT – continuous variables
21.12	Frequency table: POSTTOT – categorical variables
21.13	Descriptive statistics: comparative summary– continuous variables - mean
21.14	Descriptive statistics: comparative summary– continuous variables – std. deviation
21.15	Descriptive statistics: comparative summary – categorical variables

Table 21.1 Descriptive statistics: PREJSE – continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
UP	15	-0,031	0,931	0,297	0,323	0,803	0,580	-0,817	1,121
PMCO	15	0	12	4,333	3,498	0,557	0,580	0,059	1,121
OMCO	15	0	14	3,267	3,390	2,464	0,580	7,560	1,121
CMCO	15	1	21	7,600	5,422	1,236	0,580	1,414	1,121
PLS	15	84	204	131,800	34,003	0,679	0,580	-0,026	1,121
IP	15	100	2800	708,000	712,640	1,960	0,580	4,841	1,121
LOGOFF	15	7,097	9,175	8,321	0,599	-0,560	0,580	-0,461	1,121
AGE	15	5	70	27,467	16,600	1,003	0,580	1,814	1,121
LOGNA	15	7,253	9,117	8,025	0,525	0,031	0,580	-0,019	1,121
LOGTA	15	7,654	9,450	8,522	0,486	0,150	0,580	0,005	1,121
LEV	15	0,380	0,930	0,641	0,155	0,027	0,580	-0,410	1,121
LOGREV	15	8,236	9,955	8,814	0,474	0,955	0,580	0,837	1,121
NETINC	15	9,00	287,30	66,360	68,478	2,697	0,580	8,333	1,121
BOARD	15	4	12	6,867	2,416	0,811	0,580	0,188	1,121
LYMI	15	0,162	0,377	0,180	0,056	3,503	0,580	12,626	1,121
LYTL	15	15	62	57,400	13,026	-2,991	0,580	8,938	1,121
LYSSL	15	2	46	40,933	13,562	-2,540	0,580	5,432	1,121
LYCL	15	0	7	6,533	1,807	-3,873	0,580	15,000	1,121
LYICL	15	0	5	0,600	1,595	2,473	0,580	4,900	1,121
LYAOL	15	9	14	9,333	1,291	3,873	0,580	15,000	1,121
LYPMJSE	15	3110	3369	3345,667	65,220	-3,868	0,580	14,972	1,121
LYPMALT	15	213	479	447,733	83,367	-2,504	0,580	5,145	1,121
LYPMALL	15	118563	131327	119899,867	3676,577	2,773	0,580	7,266	1,121
LYOMJSE	15	0	1463	1269,200	511,450	-2,405	0,580	4,351	1,121
LYOMALT	15	0	147	127,800	50,681	-2,407	0,580	4,369	1,121
LYOMALL	15	0	8114	7035,133	2847,135	-2,405	0,580	4,349	1,121
Valid N (listwise)	15								

Table 21.2 Frequency table: PREJSE – categorical variables

JSE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	15	100,0	100,000	100,000

RESSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	15	100,0	100,000	100,000

FINSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	15	100,0	100,000	100,000

INDSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	15	100,0	100,000	100,000

Table 21.3 Descriptive statistics: PREALT – continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
UP	52	-0,109	0,982	0,231	0,264	0,974	0,330	0,305	0,650
PMCO	52	0	9	2,385	2,435	1,244	0,330	1,022	0,650
OMCO	52	0	41	2,577	5,919	5,614	0,330	36,106	0,650
CMCO	52	0	50	4,962	7,206	5,005	0,330	30,684	0,650
PLS	52	64	204	103,500	28,537	1,438	0,330	2,554	0,650
IP	52	50	600	150,865	118,279	2,365	0,330	5,561	0,650
LOGOFF	52	6,398	8,695	7,595	0,456	-0,213	0,330	0,316	0,650
AGE	52	1	96	24,058	22,504	1,459	0,330	1,715	0,650
LOGNA	52	-6,613	8,469	6,892	2,723	-4,665	0,330	21,534	0,650
LOGTA	52	6,505	9,085	7,911	0,448	-0,323	0,330	1,351	0,650
LEV	52	0,090	1,100	0,626	0,247	-0,538	0,330	-0,397	0,650
LOGREV	52	5,301	9,184	8,013	0,613	-1,763	0,330	6,591	0,650
NETINC	52	-3,10	178,50	15,696	25,323	5,419	0,330	34,593	0,650
BOARD	52	4	20	6,423	2,484	3,452	0,330	17,286	0,650
LYMI	52	0,162	0,430	0,243	0,111	0,709	0,330	-1,453	0,650
LYTL	52	15	62	51,558	15,114	-1,113	0,330	-0,070	0,650
LYSSL	52	2	46	33,212	17,235	-0,661	0,330	-1,492	0,650
LYCL	52	0	7	6,481	1,502	-2,871	0,330	7,669	0,650
LYICL	52	0	5	1,808	2,409	0,585	0,330	-1,716	0,650
LYAOL	52	7	14	10,058	2,372	0,938	0,330	-0,661	0,650
LYPMJSE	52	213	3369	3289,442	437,132	-7,104	0,330	50,927	0,650
LYPMALT	52	212	479	397,462	110,008	-0,667	0,330	-1,474	0,650
LYPMALL	52	118563	131327	121379,750	3820,614	0,740	0,330	-1,101	0,650
LYOMJSE	52	0	1463	933,673	704,415	-0,576	0,330	-1,736	0,650
LYOMALT	52	0	147	94,788	69,501	-0,578	0,330	-1,731	0,650
LYOMALL	52	0	8114	5161,673	3928,824	-0,576	0,330	-1,737	0,650
Valid N (listwise)	52								

Table 21.4 Frequency table: PREALT – Categorical variables

		JSE			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	52	100,0	100,0	100,0
		RESSEC			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	46	88,5	88,5	88,5
	1	6	11,5	11,5	100,0
	Total	52	100,0	100,0	
		FINSEC			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	47	90,4	90,4	90,4
	1	5	9,6	9,6	100,0
	Total	52	100,0	100,0	
		INDSEC			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	11	21,2	21,2	21,2
	1	41	78,8	78,8	100,0
	Total	52	100,0	100,0	

Table 21.5 Descriptive statistics: PRETOT – continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
UP	67	-0,10900	0,98182	0,245	0,277	0,938	0,293	-0,031	0,578
PMCO	67	0	12	2,821	2,801	1,136	0,293	0,877	0,578
OMCO	67	0	41	2,731	5,440	5,596	0,293	37,932	0,578
CMCO	67	0	50	5,552	6,898	4,385	0,293	26,165	0,578
PLS	67	64	204	109,836	31,872	1,151	0,293	1,127	0,578
IP	67	50	2800	275,597	416,280	4,085	0,293	20,983	0,578
LOGOFF	67	6,398	9,175	7,757	0,574	0,276	0,293	0,047	0,578
AGE	67	1	96	24,821	21,257	1,371	0,293	1,670	0,578
LOGNA	67	-6,613	9,117	7,146	2,452	-5,175	0,293	27,354	0,578
LOGTA	67	6,505	9,450	8,047	0,521	0,082	0,293	0,869	0,578
LEV	67	0,090	1,100	0,629	0,229	-0,545	0,293	-0,140	0,578
LOGREV	67	5,301	9,955	8,192	0,672	-1,020	0,293	4,628	0,578
NETINC	67	-3,10	287,30	27,039	44,079	4,065	0,293	19,953	0,578
BOARD	67	4	20	6,522	2,458	2,866	0,293	13,137	0,578
LYMI	67	0,162	0,430	0,229	0,104	1,010	0,293	-0,892	0,578
LYTL	67	15	62	52,866	14,783	-1,358	0,293	0,559	0,578
LYSSL	67	2	46	34,940	16,705	-0,911	0,293	-1,063	0,578
LYCL	67	0	7	6,493	1,561	-3,092	0,293	8,892	0,578
LYICL	67	0	5	1,537	2,298	0,838	0,293	-1,321	0,578
LYAOL	67	7	14	9,896	2,189	1,209	0,293	0,006	0,578
LYPMJSE	67	213	3369	3302,030	386,156	-7,993	0,293	64,810	0,578
LYPMALT	67	212	479	408,716	106,167	-0,911	0,293	-1,066	0,578
LYPMALL	67	118563	131327	121048,433	3812,239	1,061	0,293	-0,353	0,578
LYOMJSE	67	0	1463	1008,791	677,327	-0,823	0,293	-1,364	0,578
LYOMALT	67	0	147	102,179	66,856	-0,825	0,293	-1,358	0,578
LYOMALL	67	0	8114	5581,104	3777,056	-0,823	0,293	-1,364	0,578
Valid N (listwise)	67								

Table 21.6 Frequency table: PRETOT– categorical variables

JSE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	21,4	21,4	21,4
	1	22	78,6	78,6	100,0
	Total	28	100,0	100,0	

RESSEC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	26	92,9	92,9	92,9
	1	2	7,1	7,1	100,0
	Total	28	100,0	100,0	

FINSEC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	22	78,6	78,6	78,6
	1	6	21,4	21,4	100,0
	Total	28	100,0	100,0	

INDSEC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	8	28,6	28,6	28,6
	1	20	71,4	71,4	100,0
	Total	28	100,0	100,0	

Table 21.7 Descriptive statistics: POSTJSE – continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
UP	22	-0,069	0,821	0,091	0,181	3,386	0,491	13,426	0,953
PMCO	22	0	46	11,182	13,340	1,373	0,491	1,115	0,953
OMCO	22	1	25	9,773	7,361	0,788	0,491	-0,555	0,953
CMCO	22	1	61	20,955	18,489	1,150	0,491	0,361	0,953
PLS	22	100	420	226,136	84,703	0,545	0,491	-0,057	0,953
IP	22	450	6050	1619,909	1385,783	2,084	0,491	4,342	0,953
LOGOFF	22	7,636	10,187	9,055	0,552	-0,344	0,491	1,057	0,953
AGE	22	7	119	38,682	31,545	1,414	0,491	1,505	0,953
LOGNA	22	7,709	10,722	8,866	0,783	0,371	0,491	-0,084	0,953
LOGTA	22	7,863	11,424	9,290	0,906	0,481	0,491	0,313	0,953
LEV	22	0,060	0,980	0,533	0,230	0,129	0,491	-0,363	0,953
LOGREV	22	7,829	10,690	9,205	0,674	0,118	0,491	0,111	0,953
NETINC	22	6,30	1053,60	260,848	289,672	1,609	0,491	2,280	0,953
BOARD	22	5	14	9,591	2,971	0,176	0,491	-1,213	0,953
LYMI	22	-0,114	0,286	0,111	0,098	-0,403	0,491	-0,346	0,953
LYTL	22	9	24	17,591	4,656	-0,147	0,491	-1,441	0,953
LYSSL	22	1	6	3,864	1,885	-0,395	0,491	-1,053	0,953
LYCL	22	2	7	4,273	2,074	0,233	0,491	-1,809	0,953
LYICL	22	1	9	5,773	2,617	-0,376	0,491	-1,023	0,953
LYAOL	22	1	6	3,682	1,585	-0,525	0,491	-0,390	0,953
LYPMJSE	22	809	6303	3105,818	1925,509	0,784	0,491	-0,799	0,953
LYPMALT	22	23	216	119,045	65,127	-0,066	0,491	-1,250	0,953
LYPMALL	22	49401	142850	114050,182	28375,618	-1,653	0,491	1,838	0,953
LYOMJSE	22	741	3452	1836,864	768,753	0,602	0,491	-0,245	0,953
LYOMALT	22	2	58	38,727	16,438	-0,644	0,491	-0,514	0,953
LYOMALL	22	8450	20560	12564,045	3296,572	1,672	0,491	2,085	0,953
Valid N (listwise)	22								

Table 21.8 Frequency table: POSTJSE – categorical variables

JSE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	100,0	100,0	100,0

RESSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	20	90,9	90,9	90,9
	1	2	9,1	9,1	100,0
	Total	22	100,0	100,0	

FINSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	18	81,8	81,8	81,8
	1	4	18,2	18,2	100,0
	Total	22	100,0	100,0	

INDSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	27,3	27,3	27,3
	1	16	72,7	72,7	100,0
	Total	22	100,0	100,0	

Table 21.9 Descriptive statistics: POSTALT – continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
UP	6	-0,026	0,754	0,298	0,286	0,628	0,845	-0,205	1,741
PMCO	6	0	3	0,667	1,211	1,952	0,845	3,657	1,741
OMCO	6	1	13	4,167	4,491	2,062	0,845	4,582	1,741
CMCO	6	1	16	4,833	5,636	2,132	0,845	4,844	1,741
PLS	6	111	218	166,167	41,792	-0,033	0,845	-1,650	1,741
IP	6	50	200	141,667	66,458	-0,326	0,845	-2,253	1,741
LOGOFF	6	6,845	8,477	7,778	0,562	-0,738	0,845	0,919	1,741
AGE	6	5	31	13,833	9,453	1,479	0,845	2,048	1,741
LOGNA	6	-6,740	8,349	5,235	5,886	-2,413	0,845	5,862	1,741
LOGTA	6	7,334	8,596	7,965	0,526	0,153	0,845	-2,032	1,741
LEV	6	0,340	1,170	0,668	0,307	0,897	0,845	0,028	1,741
LOGREV	6	6,690	8,160	7,625	0,631	-0,623	0,845	-1,531	1,741
NETINC	6	-76,20	16,20	-7,033	34,725	-2,196	0,845	5,011	1,741
BOARD	6	6	9	7,000	1,095	1,369	0,845	2,500	1,741
LYMI	6	0,07598	0,22712	0,134	0,066	0,358	0,845	-2,141	1,741
LYTL	6	14	24	21,333	3,882	-1,732	0,845	3,136	1,741
LYSSL	6	3	6	5,500	1,225	-2,449	0,845	6,000	1,741
LYCL	6	2	6	4,333	1,862	-0,165	0,845	-2,807	1,741
LYICL	6	5	8	6,500	1,225	0,490	0,845	-1,467	1,741
LYAOL	6	4	6	5,000	1,095	0,000	0,845	-3,333	1,741
LYPMJSE	6	809	6303	2757,667	2759,706	0,928	0,845	-1,886	1,741
LYPMALT	6	23	137	72,833	56,803	0,273	0,845	-2,713	1,741
LYPMALL	6	49401	132953	87226,333	42329,946	0,156	0,845	-2,953	1,741
LYOMJSE	6	1041	3452	2074,833	915,766	0,171	0,845	-0,387	1,741
LYOMALT	6	21	58	44,667	18,348	-0,960	0,845	-1,874	1,741
LYOMALL	6	11390	20560	13066,833	3673,769	2,441	0,845	5,967	1,741
Valid N (listwise)	6								

Table 21.10 Frequency table: POSTALT– categorical variables

JSE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	100,0	100,0	100,0

RESSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	6	100,0	100,0	100,0

FINSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	66,7	66,7	66,7
	1	2	33,3	33,3	100,0
	Total	6	100,0	100,0	

INDSEC

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	33,3	33,3	33,3
	1	4	66,7	66,7	100,0
	Total	6	100,0	100,0	

Table 21.11 Descriptive statistics: POSTTOT – continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
UP	28	-0,06896	0,82108	0,135	0,220	2,133	0,441	4,335	0,858
PMCO	28	0	46	8,929	12,570	1,691	0,441	2,200	0,858
OMCO	28	1	25	8,571	7,167	0,966	0,441	-0,146	0,858
CMCO	28	1	61	17,500	17,809	1,392	0,441	1,132	0,858
PLS	28	100	420	213,286	80,818	0,779	0,441	0,347	0,858
IP	28	50	6050	1303,143	1369,672	2,102	0,441	4,849	0,858
LOGOFF	28	6,845	10,187	8,782	0,762	-0,601	0,441	0,323	0,858
AGE	28	5	119	33,357	29,972	1,656	0,441	2,435	0,858
LOGNA	28	-6,740	10,722	8,088	3,032	-4,605	0,441	23,143	0,858
LOGTA	28	7,334	11,424	9,006	0,998	0,441	0,441	0,027	0,858
LEV	28	0,060	1,170	0,562	0,249	0,459	0,441	0,138	0,858
LOGREV	28	6,690	10,690	8,866	0,929	-0,407	0,441	0,101	0,858
NETINC	28	-76,20	1053,60	203,445	279,314	1,820	0,441	3,172	0,858
BOARD	28	5	14	9,036	2,874	0,536	0,441	-0,958	0,858
LYMI	28	-0,114	0,286	0,116	0,092	-0,450	0,441	-0,123	0,858
LYTL	28	9	24	18,393	4,701	-0,349	0,441	-1,353	0,858
LYSSL	28	1	6	4,214	1,873	-0,626	0,441	-0,875	0,858
LYCL	28	2	7	4,286	1,997	0,175	0,441	-1,780	0,858
LYICL	28	1	9	5,929	2,387	-0,525	0,441	-0,575	0,858
LYAOL	28	1	6	3,964	1,575	-0,611	0,441	-0,131	0,858
LYPMJSE	28	809	6303	3031,214	2077,307	0,703	0,441	-1,069	0,858
LYPMALT	28	23	216	109,143	65,341	0,063	0,441	-1,237	0,858
LYPMALL	28	49401	142850	108302,214	32919,559	-1,127	0,441	-0,290	0,858
LYOMJSE	28	741	3452	1887,857	790,469	0,496	0,441	-0,513	0,858
LYOMALT	28	2	58	40,000	16,693	-0,617	0,441	-0,795	0,858
LYOMALL	28	8450	20560	12671,786	3316,009	1,699	0,441	1,905	0,858
Valid N (listwise)	28								

Table 21.12 Frequency table: POSTTOT– categorical variables

JSE					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	52	77,6	77,6	77,6
	1	15	22,4	22,4	100,0
	Total	67	100,0	100,0	

RESSEC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	61	91,0	91,0	91,0
	1	6	9,0	9,0	100,0
	Total	67	100,0	100,0	

FINSEC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	62	92,5	92,5	92,5
	1	5	7,5	7,5	100,0
	Total	67	100,0	100,0	

INDSEC					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	11	16,4	16,4	16,4
	1	56	83,6	83,6	100,0
	Total	67	100,0	100,0	

Table 21.13 Descriptive statistics: summary – continuous variables – mean

	Mean					
Period	Pre-GFC			Post-GFC		
Exchange	JSE	AltX	Total	JSE	AltX	Total
Dataset	PREJSE	PREALT	PRETOT	POSTJSE	POSTALT	POSTTOT
UP	0,297	0,231	0,245	0,091	0,298	0,135
PMCO	4,333	2,385	2,821	11,182	0,667	8,929
OMCO	3,267	2,577	2,731	9,773	4,167	8,571
CMCO	7,600	4,962	5,552	20,955	4,833	17,500
PLS	131,800	103,500	109,836	226,136	166,167	213,286
IP	708,000	150,865	275,597	1619,909	141,667	1303,143
LOGOFF	8,321	7,595	7,757	9,055	7,778	8,782
AGE	27,467	24,058	24,821	38,682	13,833	33,357
LOGNA	8,025	6,892	7,146	8,866	5,235	8,088
LOGTA	8,522	7,911	8,047	9,290	7,965	9,006
LEV	0,641	0,626	0,629	0,533	0,668	0,562
LOGREV	8,814	8,013	8,192	9,205	7,625	8,866
NETINC	66,360	15,696	27,039	260,848	-7,033	203,445
BOARD	6,867	6,423	6,522	9,591	7,000	9,036
LYMI	0,180	0,243	0,229	0,111	0,134	0,116
LYTL	57,400	51,558	52,866	17,591	21,333	18,393
LYSSL	40,933	33,212	34,940	3,864	5,500	4,214
LYCL	6,533	6,481	6,493	4,273	4,333	4,286
LYICL	0,600	1,808	1,537	5,773	6,500	5,929
LYAOL	9,333	10,058	9,896	3,682	5,000	3,964
LYPMJSE	3345,667	3289,442	3302,030	3105,818	2757,667	3031,214
LYPMALT	447,733	397,462	408,716	119,045	72,833	109,143
LYPMALL	119899,867	121379,750	121048,433	114050,182	87226,333	108302,214
LYOMJSE	1269,200	933,673	1008,791	1836,864	2074,833	1887,857
LYOMALT	127,800	94,788	102,179	38,727	44,667	40,000
LYOMALL	7035,133	5161,673	5581,104	12564,045	13066,833	12671,786
N	15	52	67	22	6	28

Table 21.14 Descriptive statistics: summary – continuous variables – std. deviation

	Std. Deviation					
Period	Pre-GFC			Post-GFC		
Exchange	JSE	AltX	Total	JSE	AltX	Total
Dataset	PREJSE	PREALT	PRETOT	POSTJSE	POSTALT	POSTTOT
UP	0,323	0,264	0,277	0,181	0,286	0,220
PMCO	3,498	2,435	2,801	13,340	1,211	12,570
OMCO	3,390	5,919	5,440	7,361	4,491	7,167
CMCO	5,422	7,206	6,898	18,489	5,636	17,809
PLS	34,003	28,537	31,872	84,703	41,792	80,818
IP	712,640	118,279	416,280	1385,783	66,458	1369,672
LOGOFF	0,599	0,456	0,574	0,552	0,562	0,762
AGE	16,600	22,504	21,257	31,545	9,453	29,972
LOGNA	0,525	2,723	2,452	0,783	5,886	3,032
LOGTA	0,486	0,448	0,521	0,906	0,526	0,998
LEV	0,155	0,247	0,229	0,230	0,307	0,249
LOGREV	0,474	0,613	0,672	0,674	0,631	0,929
NETINC	68,478	25,323	44,079	289,672	34,725	279,314
BOARD	2,416	2,484	2,458	2,971	1,095	2,874
LYMI	0,056	0,111	0,104	0,098	0,066	0,092
LYTL	13,026	15,114	14,783	4,656	3,882	4,701
LYSSL	13,562	17,235	16,705	1,885	1,225	1,873
LYCL	1,807	1,502	1,561	2,074	1,862	1,997
LYICL	1,595	2,409	2,298	2,617	1,225	2,387
LYAOL	1,291	2,372	2,189	1,585	1,095	1,575
LYPMJSE	65,220	437,132	386,156	1925,509	2759,706	2077,307
LYPMALT	83,367	110,008	106,167	65,127	56,803	65,341
LYPMALL	3676,577	3820,614	3812,239	28375,618	42329,946	32919,559
LYOMJSE	511,450	704,415	677,327	768,753	915,766	790,469
LYOMALT	50,681	69,501	66,856	16,438	18,348	16,693
LYOMALL	2847,135	3928,824	3777,056	3296,572	3673,769	3316,009
N	15	52	67	22	6	28

Table 21.15 Descriptive statistics: summary – categorical variables

		Frequency					
Period		Pre-GFC			Post-GFC		
Exchange		JSE	AltX	Total	JSE	AltX	Total
Dataset		PREJSE	PREALT	PRETOT	POSTJSE	POSTALT	POSTTOT
RESSEC	N		**6**	**6**	**2**		**2**
	%		*11,54*	*8,96*	*9,09*		*7,14*
FINSEC	N		**5**	**5**	**4**	**2**	**6**
	%		*9,62*	*7,46*	*18,18*	*33,33*	*21,43*
INDSEC	N	**15**	**41**	**56**	**16**	**4**	**20**
	%	*100,00*	*78,85*	*83,58*	*72,73*	*66,67*	*71,43*
Total	N	**15**	**52**	**67**	**22**	**6**	**28**
	%	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,00*

APPENDIX F

14. APPENDIX F – RESULTS OF COMPARATIVE ANALYSIS

14.1 TABLES ON RESULTS OF COMPARATIVE ANALYSIS

Table 22. Summary of comparative analysis tables

Table No.	Name
22.1	Independent-samples t-tests – PRETOT – pre-GFC JSE vs. pre-GFC AltX
22.2	Independent-samples t-tests – POSTTOT – post-GFC JSE vs. post-GFC AltX
22.3	Independent-samples t-tests – JSETOT – pre-GFC JSE and post-GFC JSE
22.4	Independent-samples t-tests – ALTTOT – pre-GFC AltX and pre-GFC AltX
22.5	Independent-samples t-tests – Summary
22.6(a)	JSE-Sector crosstabulation – PRETOT – pre-GFC JSE vs. pre-GFC AltX
22.6(b)	Chi-square tests – JSE-Sector – PRETOT – pre-GFC JSE vs pre-GFC AltX
22.7(a)	JSE-Sector crosstabulation – POSTTOT – post-GFC JSE vs. post-GFC AltX
22.7(b)	Chi-square tests – JSE-Sector – POSTTOT – post-GFC JSE vs post-GFC AltX
22.8(a)	POSTGFC-Sector crosstabulation – JSETOT – pre-GFC JSE vs. post-GFC JSE
22.8(b)	Chi-square tests – POSTGFC and sectors – JSETOT – pre-GFC JSE vs post-GFC JSE
22.9(a)	POSTGFC-Sector crosstabulation – ALTTOT – pre-GFC AltX vs. post-GFC AltX
22.9(b)	Chi-square tests – POSTGFC and sectors – ALTTOT – pre-GFC AltX vs post-GFC AltX
22.10(a)	Crosstabulation for Chi-square tests – Summary of four data sets
22.10(b)	Chi-square tests – Summary of four data sets

Table 22.1 Independent-samples t-tests – PRETOT – pre-GFC JSE vs. pre-GFC AltX

	Equal variances assumed?	Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the Lower	Interval of the Upper
UP	Yes	1,878	0,175	-0,811	65	0,420	-0,066	0,081	-0,228	0,096
	No			-0,725	19,702	0,477	-0,066	0,091	-0,256	0,124
PMCO	Yes	3,268	0,075	-2,463	65	0,016	-1,949	0,791	-3,529	-0,369
	No			-2,021	18,088	0,058	-1,949	0,964	-3,974	0,076
OMCO	Yes	0,348	0,557	-0,430	65	0,669	-0,690	1,604	-3,894	2,514
	No			-0,575	40,783	0,569	-0,690	1,200	-3,114	1,734
CMCO	Yes	0,035	0,852	-1,312	65	0,194	-2,638	2,011	-6,654	1,377
	No			-1,534	29,776	0,136	-2,638	1,720	-6,152	0,875
PLS	Yes	1,078	0,303	-3,240	65	0,002	-28,300	8,734	-45,742	-10,858
	No			-2,939	20,040	0,008	-28,300	9,630	-48,385	-8,215
IP	Yes	30,954	0,000	-5,479	65	0,000	-557,135	101,679	-760,203	-354,067
	No			-3,016	14,223	0,009	-557,135	184,733	-952,764	-161,505
LOGOFF	Yes	2,741	0,103	-5,058	65	0,000	-0,726	0,144	-1,013	-0,439
	No			-4,348	18,920	0,000	-0,726	0,167	-1,076	-0,377
AGE	Yes	1,219	0,274	-0,544	65	0,588	-3,409	6,263	-15,918	9,100
	No			-0,643	30,432	0,525	-3,409	5,302	-14,230	7,412
LOGNA	Yes	1,192	0,279	-1,594	65	0,116	-1,132	0,710	-2,551	0,287
	No			-2,822	61,284	0,006	-1,132	0,401	-1,934	-0,330
LOGTA	Yes	0,150	0,699	-4,568	65	0,000	-0,611	0,134	-0,879	-0,344
	No			-4,368	21,378	0,000	-0,611	0,140	-0,902	-0,321
LEV	Yes	3,731	0,058	-0,230	65	0,819	-0,016	0,068	-0,151	0,119
	No			-0,295	36,676	0,769	-0,016	0,053	-0,122	0,091
LOGREV	Yes	0,150	0,700	-4,666	65	0,000	-0,801	0,172	-1,144	-0,458
	No			-5,373	28,882	0,000	-0,801	0,149	-1,106	-0,496
NETINC	Yes	11,460	0,001	-4,444	65	0,000	-50,664	11,401	-73,432	-27,895
	No			-2,811	15,120	0,013	-50,664	18,026	-89,059	-12,268
BOARD	Yes	0,351	0,556	-0,613	65	0,542	-0,444	0,724	-1,889	1,002
	No			-0,622	23,245	0,540	-0,444	0,713	-1,917	1,030
LYMI	Yes	38,731	0,000	2,101	65	0,040	0,062	0,030	0,003	0,122
	No			2,955	46,653	0,005	0,062	0,021	0,020	0,105
LYTL	Yes	5,357	0,024	-1,357	65	0,179	-5,842	4,305	-14,441	2,756
	No			-1,474	25,913	0,152	-5,842	3,963	-13,990	2,305
LYSSL	Yes	14,648	0,000	-1,596	65	0,115	-7,722	4,840	-17,387	1,944
	No			-1,821	28,391	0,079	-7,722	4,240	-16,401	0,957
LYCL	Yes	0,016	0,899	-0,114	65	0,910	-0,053	0,461	-0,973	0,868
	No			-0,103	19,913	0,919	-0,053	0,511	-1,119	1,014
LYICL	Yes	28,542	0,000	1,824	65	0,073	1,208	0,662	-0,115	2,530
	No			2,278	34,415	0,029	1,208	0,530	0,131	2,285
LYAOL	Yes	13,459	0,000	1,131	65	0,262	0,724	0,640	-0,554	2,003
	No			1,547	43,267	0,129	0,724	0,468	-0,220	1,669
LYPMJSE	Yes	0,859	0,357	-0,494	65	0,623	-56,224	113,829	-283,557	171,109
	No			-0,894	57,919	0,375	-56,224	62,915	-182,166	69,717
LYPMALT	Yes	16,202	0,000	-1,636	65	0,107	-50,272	30,728	-111,640	11,096
	No			-1,905	29,550	0,066	-50,272	26,383	-104,188	3,644
LYPMALL	Yes	6,351	0,014	1,332	65	0,187	1479,883	1110,799	-738,535	3698,302
	No			1,361	23,456	0,186	1479,883	1087,134	-766,609	3726,376
LYOMJSE	Yes	22,443	0,000	-1,715	65	0,091	-335,527	195,657	-726,281	55,227
	No			-2,043	30,968	0,050	-335,527	164,259	-670,549	-0,504
LYOMALT	Yes	22,053	0,000	-1,709	65	0,092	-33,012	19,315	-71,587	5,564
	No			-2,031	30,819	0,051	-33,012	16,252	-66,166	0,143
LYOMALL	Yes	22,578	0,000	-1,717	65	0,091	-1873,460	1091,000	-4052,338	305,417
	No			-2,047	31,034	0,049	-1873,460	915,014	-3739,562	-7,358
Pallant (2016), p.246-247				*F sig. = or < 0,05*			*t-test sig. (2-tailed)*			
(for interpretation of F sig. and t-test sig.)							*t-test sig. = or < 0,05*			

Table 22.2 Independent-samples t-tests – POSTTOT – post-GFC JSE vs. post-GFC AltX

	Equal variances assumed?	Levene's Test for Equality of Variances		t-test for Equality of Means						
									of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
UP	Yes	3,321	0,080	2,187	26	0,038	0,207	0,095	0,012	0,402
	No			1,682	6,133	0,143	0,207	0,123	-0,093	0,507
PMCO	Yes	7,885	0,009	-1,902	26	0,068	-10,515	5,527	-21,877	0,846
	No			-3,642	22,203	0,001	-10,515	2,887	-16,499	-4,531
OMCO	Yes	3,846	0,061	-1,763	26	0,090	-5,606	3,179	-12,141	0,928
	No			-2,323	13,311	0,037	-5,606	2,413	-10,807	-0,405
CMCO	Yes	4,474	0,044	-2,084	26	0,047	-16,121	7,737	-32,025	-0,217
	No			-3,532	25,376	0,002	-16,121	4,564	-25,515	-6,728
PLS	Yes	2,650	0,116	-1,663	26	0,108	-59,970	36,062	-134,096	14,157
	No			-2,414	17,307	0,027	-59,970	24,844	-112,315	-7,625
IP	Yes	5,534	0,026	-2,576	26	0,016	-1478,242	573,758	-2657,620	-298,865
	No			-4,982	21,349	0,000	-1478,242	296,693	-2094,635	-861,850
LOGOFF	Yes	0,006	0,937	-5,009	26	0,000	-1,277	0,255	-1,801	-0,753
	No			-4,956	7,847	0,001	-1,277	0,258	-1,874	-0,681
AGE	Yes	3,985	0,056	-1,883	26	0,071	-24,848	13,196	-51,973	2,276
	No			-3,205	25,496	0,004	-24,848	7,754	-40,803	-8,894
LOGNA	Yes	16,968	0,000	-2,946	26	0,007	-3,630	1,232	-6,163	-1,098
	No			-1,507	5,048	0,192	-3,630	2,409	-9,805	2,544
LOGTA	Yes	1,363	0,254	-3,401	26	0,002	-1,325	0,390	-2,126	-0,524
	No			-4,588	14,143	0,000	-1,325	0,289	-1,944	-0,706
LEV	Yes	0,698	0,411	1,193	26	0,244	0,136	0,114	-0,098	0,369
	No			1,007	6,610	0,349	0,136	0,135	-0,187	0,458
LOGREV	Yes	0,000	0,990	-5,151	26	0,000	-1,580	0,307	-2,210	-0,949
	No			-5,358	8,407	0,001	-1,580	0,295	-2,254	-0,906
NETINC	Yes	6,640	0,016	-2,230	26	0,035	-267,881	120,106	-514,762	-21,001
	No			-4,228	23,003	0,000	-267,881	63,365	-398,960	-136,803
BOARD	Yes	8,503	0,007	-2,074	26	0,048	-2,591	1,249	-5,159	-0,023
	No			-3,342	23,072	0,003	-2,591	0,775	-4,195	-0,987
LYMI	Yes	1,765	0,196	0,536	26	0,597	0,023	0,043	-0,065	0,111
	No			0,669	11,737	0,516	0,023	0,034	-0,052	0,098
LYTL	Yes	3,147	0,088	1,799	26	0,084	3,742	2,081	-0,535	8,019
	No			2,001	9,352	0,075	3,742	1,870	-0,464	7,948
LYSSL	Yes	1,541	0,226	2,000	26	0,056	1,636	0,818	-0,046	3,319
	No			2,551	12,320	0,025	1,636	0,641	0,243	3,030
LYCL	Yes	1,000	0,327	0,065	26	0,949	0,061	0,937	-1,866	1,987
	No			0,069	8,720	0,947	0,061	0,879	-1,939	2,060
LYICL	Yes	4,143	0,052	0,654	26	0,519	0,727	1,111	-1,557	3,012
	No			0,971	18,412	0,344	0,727	0,749	-0,844	2,299
LYAOL	Yes	0,205	0,655	1,904	26	0,068	1,318	0,692	-0,105	2,742
	No			2,352	11,453	0,038	1,318	0,561	0,090	2,546
LYPMJSE	Yes	2,737	0,110	-0,358	26	0,723	-348,152	972,569	-2347,296	1650,993
	No			-0,290	6,389	0,781	-348,152	1199,106	-3239,493	2543,190
LYPMALT	Yes	0,198	0,660	-1,577	26	0,127	-46,212	29,297	-106,433	14,009
	No			-1,710	8,954	0,122	-46,212	27,029	-107,404	14,979
LYPMALL	Yes	4,626	0,041	-1,846	26	0,076	-26823,848	14527,310	-56685,163	3037,466
	No			-1,465	6,278	0,191	-26823,848	18309,459	-71148,662	17500,965
LYOMJSE	Yes	0,050	0,826	0,647	26	0,524	237,970	368,051	-518,570	994,510
	No			0,583	7,045	0,578	237,970	408,208	-726,051	1201,991
LYOMALT	Yes	0,385	0,540	0,767	26	0,450	5,939	7,748	-9,986	21,865
	No			0,718	7,345	0,495	5,939	8,270	-13,432	25,310
LYOMALL	Yes	0,060	0,809	0,324	26	0,749	502,788	1553,208	-2689,877	3695,452
	No			0,304	7,353	0,770	502,788	1656,322	-3376,027	4381,603
Pallant (2016), p.246-247				*F sig. = or < 0,05*			*t-test sig. (2-tailed)*			
(for interpretation of F sig. and t-test sig.)							*t-test sig. = or < 0,05*			

Table 22.3 Independent-samples t-tests – JSETOT – pre-GFC JSE and post-GFC JSE

	Equal variances assumed?	Levene's Test for Equality of Variances		t-test for Equality of Means						
						Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the	
		F	Sig.	t	df				Lower	Upper
UP	Yes	11,593	0,002	2,482	35	0,018	0,206	0,083	0,037	0,374
	No			2,241	20,038	0,037	0,206	0,092	0,014	0,398
PMCO	Yes	12,439	0,001	-1,935	35	0,061	-6,848	3,539	-14,032	0,335
	No			-2,295	25,067	0,030	-6,848	2,984	-12,994	-0,703
OMCO	Yes	13,996	0,001	-3,190	35	0,003	-6,506	2,040	-10,647	-2,365
	No			-3,620	31,524	0,001	-6,506	1,797	-10,169	-2,843
CMCO	Yes	10,446	0,003	-2,708	35	0,010	-13,355	4,931	-23,365	-3,344
	No			-3,192	26,011	0,004	-13,355	4,183	-21,953	-4,756
PLS	Yes	9,601	0,004	-4,080	35	0,000	-94,336	23,119	-141,271	-47,401
	No			-4,698	29,618	0,000	-94,336	20,080	-135,367	-53,306
IP	Yes	3,454	0,072	-2,339	35	0,025	-911,909	389,829	-1703,304	-120,514
	No			-2,620	33,002	0,013	-911,909	348,063	-1620,046	-203,772
LOGOFF	Yes	0,575	0,454	-3,841	35	0,000	-0,734	0,191	-1,123	-0,346
	No			-3,780	28,524	0,001	-0,734	0,194	-1,132	-0,337
AGE	Yes	3,901	0,056	-1,259	35	0,216	-11,215	8,905	-29,293	6,863
	No			-1,406	33,286	0,169	-11,215	7,975	-27,435	5,005
LOGNA	Yes	2,743	0,107	-3,634	35	0,001	-0,841	0,232	-1,311	-0,371
	No			-3,913	34,999	0,000	-0,841	0,215	-1,278	-0,405
LOGTA	Yes	4,837	0,035	-2,996	35	0,005	-0,768	0,256	-1,289	-0,248
	No			-3,337	33,508	0,002	-0,768	0,230	-1,236	-0,300
LEV	Yes	2,562	0,118	1,595	35	0,120	0,109	0,068	-0,030	0,247
	No			1,715	35,000	0,095	0,109	0,063	-0,020	0,237
LOGREV	Yes	1,590	0,216	-1,939	35	0,061	-0,391	0,202	-0,800	0,018
	No			-2,070	34,937	0,046	-0,391	0,189	-0,774	-0,008
NETINC	Yes	12,996	0,001	-2,542	35	0,016	-194,488	76,519	-349,830	-39,146
	No			-3,028	24,338	0,006	-194,488	64,239	-326,974	-62,002
BOARD	Yes	1,783	0,190	-2,945	35	0,006	-2,724	0,925	-4,602	-0,847
	No			-3,064	33,796	0,004	-2,724	0,889	-4,531	-0,917
LYMI	Yes	11,624	0,002	2,460	35	0,019	0,069	0,028	0,012	0,126
	No			2,714	34,194	0,010	0,069	0,025	0,017	0,121
LYTL	Yes	2,952	0,095	13,219	35	0,000	39,809	3,011	33,696	45,923
	No			11,352	16,462	0,000	39,809	3,507	32,392	47,226
LYSSL	Yes	11,580	0,002	12,724	35	0,000	37,070	2,913	31,155	42,984
	No			10,517	14,369	0,000	37,070	3,525	29,528	44,611
LYCL	Yes	8,308	0,007	3,424	35	0,002	2,261	0,660	0,920	3,601
	No			3,516	32,801	0,001	2,261	0,643	0,952	3,569
LYICL	Yes	6,859	0,013	-6,822	35	0,000	-5,173	0,758	-6,712	-3,633
	No			-7,459	34,674	0,000	-5,173	0,693	-6,581	-3,764
LYAOL	Yes	2,572	0,118	11,446	35	0,000	5,652	0,494	4,649	6,654
	No			11,906	33,780	0,000	5,652	0,475	4,687	6,616
LYPMJSE	Yes	31,721	0,000	0,480	35	0,634	239,848	499,610	-774,413	1254,110
	No			0,584	21,071	0,566	239,848	410,865	-614,418	1094,115
LYPMALT	Yes	0,011	0,919	13,452	35	0,000	328,688	24,434	279,083	378,292
	No			12,832	25,170	0,000	328,688	25,615	275,951	381,425
LYPMALL	Yes	10,289	0,003	0,790	35	0,435	5849,685	7400,851	-9174,841	20874,211
	No			0,955	22,027	0,350	5849,685	6123,728	-6849,252	18548,622
LYOMJSE	Yes	5,789	0,022	-2,502	35	0,017	-567,664	226,910	-1028,316	-107,011
	No			-2,697	34,994	0,011	-567,664	210,479	-994,962	-140,366
LYOMALT	Yes	5,906	0,020	7,713	35	0,000	89,073	11,549	65,627	112,518
	No			6,575	16,025	0,000	89,073	13,547	60,358	117,787
LYOMALL	Yes	0,223	0,640	-5,285	35	0,000	-5528,912	1046,245	-7652,902	-3404,922
	No			-5,436	32,942	0,000	-5528,912	1017,047	-7598,247	-3459,577
Pallant (2016), p.246-247				*F sig. = or < 0,05*			*t-test sig. (2-tailed)*			
(for interpretation of F sig. and t-test sig.)							*t-test sig. = or < 0,05*			

Table 22.4 Independent-samples t-tests – ALTTOT – pre-GFC AltX and pre-GFC AltX

	Equal variances assumed?	Levene's Test for Equality of Variances		t-test for Equality of Means						
						Sig. (2-tailed)	Mean Difference	Std. Error Difference	of the Difference	
		F	Sig.	t	df				Lower	Upper
UP	Yes	0,042	0,839	-0,586	56	0,560	-0,067	0,115	-0,297	0,162
	No			-0,548	6,020	0,603	-0,067	0,123	-0,367	0,232
PMCO	Yes	2,512	0,119	1,694	56	0,096	1,718	1,014	-0,313	3,749
	No			2,869	10,526	0,016	1,718	0,599	0,393	3,043
OMCO	Yes	0,002	0,965	-0,635	56	0,528	-1,590	2,503	-6,604	3,425
	No			-0,791	7,177	0,454	-1,590	2,009	-6,316	3,136
CMCO	Yes	0,000	0,989	0,042	56	0,967	0,128	3,052	-5,987	6,243
	No			0,051	7,039	0,961	0,128	2,509	-5,797	6,053
PLS	Yes	2,767	0,102	-4,851	56	0,000	-62,667	12,918	-88,544	-36,790
	No			-3,578	5,551	0,013	-62,667	17,514	-106,378	-18,956
IP	Yes	0,526	0,471	0,186	56	0,853	9,199	49,415	-89,790	108,188
	No			0,290	9,202	0,778	9,199	31,704	-62,281	80,679
LOGOFF	Yes	0,098	0,755	-0,913	56	0,365	-0,183	0,201	-0,586	0,219
	No			-0,771	5,784	0,471	-0,183	0,238	-0,771	0,404
AGE	Yes	2,799	0,100	1,095	56	0,278	10,224	9,339	-8,485	28,933
	No			2,060	13,127	0,060	10,224	4,963	-0,488	20,936
LOGNA	Yes	6,402	0,014	1,225	56	0,226	1,657	1,353	-1,053	4,367
	No			0,681	5,250	0,525	1,657	2,433	-4,508	7,822
LOGTA	Yes	0,727	0,397	-0,277	56	0,783	-0,054	0,197	-0,448	0,339
	No			-0,243	5,869	0,816	-0,054	0,224	-0,605	0,496
LEV	Yes	0,384	0,538	-0,390	56	0,698	-0,043	0,109	-0,261	0,176
	No			-0,327	5,772	0,755	-0,043	0,130	-0,364	0,279
LOGREV	Yes	0,339	0,563	1,465	56	0,149	0,388	0,265	-0,143	0,919
	No			1,431	6,142	0,201	0,388	0,271	-0,272	1,048
NETINC	Yes	1,276	0,264	2,004	56	0,050	22,729	11,339	0,014	45,445
	No			1,556	5,630	0,174	22,729	14,605	-13,584	59,043
BOARD	Yes	1,169	0,284	-0,559	56	0,578	-0,577	1,032	-2,644	1,490
	No			-1,022	12,270	0,327	-0,577	0,565	-1,804	0,650
LYMI	Yes	8,352	0,005	2,347	56	0,022	0,109	0,046	0,016	0,201
	No			3,485	8,612	0,007	0,109	0,031	0,038	0,180
LYTL	Yes	13,245	0,001	4,844	56	0,000	30,224	6,239	17,726	42,723
	No			11,503	29,074	0,000	30,224	2,628	24,851	35,598
LYSSL	Yes	49,191	0,000	3,907	56	0,000	27,712	7,093	13,502	41,921
	No			11,349	54,497	0,000	27,712	2,442	22,817	32,606
LYCL	Yes	2,349	0,131	3,240	56	0,002	2,147	0,663	0,820	3,475
	No			2,725	5,775	0,036	2,147	0,788	0,201	4,094
LYICL	Yes	21,171	0,000	-4,674	56	0,000	-4,692	1,004	-6,703	-2,681
	No			-7,803	10,262	0,000	-4,692	0,601	-6,028	-3,357
LYAOL	Yes	3,351	0,072	5,130	56	0,000	5,058	0,986	3,083	7,033
	No			9,111	11,539	0,000	5,058	0,555	3,843	6,273
LYPMJSE	Yes	111,942	0,000	1,335	56	0,187	531,776	398,447	-266,411	1329,962
	No			0,471	5,029	0,657	531,776	1128,275	-2363,526	3427,077
LYPMALT	Yes	14,106	0,000	7,080	56	0,000	324,628	45,852	232,776	416,481
	No			11,695	10,079	0,000	324,628	27,758	262,846	386,410
LYPMALL	Yes	777,673	0,000	6,018	56	0,000	34153,417	5675,558	22783,909	45522,925
	No			1,975	5,009	0,105	34153,417	17289,248	-10264,928	78571,761
LYOMJSE	Yes	0,029	0,866	-3,647	56	0,001	-1141,160	312,931	-1768,037	-514,283
	No			-2,953	5,703	0,027	-1141,160	386,411	-2098,722	-183,598
LYOMALT	Yes	42,233	0,000	1,747	56	0,086	50,122	28,695	-7,360	107,604
	No			4,106	27,791	0,000	50,122	12,207	25,109	75,135
LYOMALL	Yes	5,398	0,024	-4,693	56	0,000	-7905,160	1684,418	-11279,456	-4530,865
	No			-4,954	6,396	0,002	-7905,160	1595,704	-11751,879	-4058,441
Pallant (2016), p.246-247				*F sig. = or < 0,05*			*t-test sig. (2-tailed)*			
(for interpretation of F sig. and t-test sig.)							*t-test sig. = or < 0,05*			

Table 22.5 Independent-samples t-tests – Summary

Period	Pre-GFC		Post-GFC		Pre + Post		Pre + Post	
Comparison	JSE vs. AltX		JSE vs. ALtX		JSE - Pre vs Post		AltX - Pre vs. Post	
Dataset	PRETOT		POSTTOT		JSETOT		ALTTOT	
	Sig. (2-tailed)	Mean Difference	Sig. (2-tailed)	Mean Difference	Sig. (2-tailed)	Mean Difference	Sig. (2-tailed)	Mean Difference
UP	0,420	-0,066	0,038	0,207	0,018	0,206	0,560	-0,067
	0,477	-0,066	0,143	0,207	0,037	0,206	0,603	-0,067
PMCO	0,016	-1,949	0,068	-10,515	0,061	-6,848	0,096	1,718
	0,058	-1,949	0,001	-10,515	0,030	-6,848	0,016	1,718
OMCO	0,669	-0,690	0,090	-5,606	0,003	-6,506	0,528	-1,590
	0,569	-0,690	0,037	-5,606	0,001	-6,506	0,454	-1,590
CMCO	0,194	-2,638	0,047	-16,121	0,010	-13,355	0,967	0,128
	0,136	-2,638	0,002	-16,121	0,004	-13,355	0,961	0,128
PLS	0,002	-28,300	0,108	-59,970	0,000	-94,336	0,000	-62,667
	0,008	-28,300	0,027	-59,970	0,000	-94,336	0,013	-62,667
IP	0,000	-557,135	0,016	-1478,242	0,025	-911,909	0,853	9,199
	0,009	-557,135	0,000	-1478,242	0,013	-911,909	0,778	9,199
LOGOFF	0,000	-0,726	0,000	-1,277	0,000	-0,734	0,365	-0,183
	0,000	-0,726	0,001	-1,277	0,001	-0,734	0,471	-0,183
AGE	0,588	-3,409	0,071	-24,848	0,216	-11,215	0,278	10,224
	0,525	-3,409	0,004	-24,848	0,169	-11,215	0,060	10,224
LOGNA	0,116	-1,132	0,007	-3,630	0,001	-0,841	0,226	1,657
	0,006	-1,132	0,192	-3,630	0,000	-0,841	0,525	1,657
LOGTA	0,000	-0,611	0,002	-1,325	0,005	-0,768	0,783	-0,054
	0,000	-0,611	0,000	-1,325	0,002	-0,768	0,816	-0,054
LEV	0,819	-0,016	0,244	0,136	0,120	0,109	0,698	-0,043
	0,769	-0,016	0,349	0,136	0,095	0,109	0,755	-0,043
LOGREV	0,000	-0,801	0,000	-1,580	0,061	-0,391	0,149	0,388
	0,000	-0,801	0,001	-1,580	0,046	-0,391	0,201	0,388
NETINC	0,000	-50,664	0,035	-267,881	0,016	-194,488	0,050	22,729
	0,013	-50,664	0,000	-267,881	0,006	-194,488	0,174	22,729
BOARD	0,542	-0,444	0,048	-2,591	0,006	-2,724	0,578	-0,577
	0,540	-0,444	0,003	-2,591	0,004	-2,724	0,327	-0,577
LYMI	0,040	0,062	0,597	0,023	0,019	0,069	0,022	0,109
	0,005	0,062	0,516	0,023	0,010	0,069	0,007	0,109
LYTL	0,179	-5,842	0,084	3,742	0,000	39,809	0,000	30,224
	0,152	-5,842	0,075	3,742	0,000	39,809	0,000	30,224
LYSSL	0,115	-7,722	0,056	1,636	0,000	37,070	0,000	27,712
	0,079	-7,722	0,025	1,636	0,000	37,070	0,000	27,712
LYCL	0,910	-0,053	0,949	0,061	0,002	2,261	0,002	2,147
	0,919	-0,053	0,947	0,061	0,001	2,261	0,036	2,147
LYICL	0,073	1,208	0,519	0,727	0,000	-5,173	0,000	-4,692
	0,029	1,208	0,344	0,727	0,000	-5,173	0,000	-4,692
LYAOL	0,262	0,724	0,068	1,318	0,000	5,652	0,000	5,058
	0,129	0,724	0,038	1,318	0,000	5,652	0,000	5,058
LYPMJSE	0,623	-56,224	0,723	-348,152	0,634	239,848	0,187	531,776
	0,375	-56,224	0,781	-348,152	0,566	239,848	0,657	531,776
LYPMALT	0,107	-50,272	0,127	-46,212	0,000	328,688	0,000	324,628
	0,066	-50,272	0,122	-46,212	0,000	328,688	0,000	324,628
LYPMALL	0,187	1479,883	0,076	-26823,848	0,435	5849,685	0,000	34153,417
	0,186	1479,883	0,191	-26823,848	0,350	5849,685	0,105	34153,417
LYOMJSE	0,091	-335,527	0,524	237,970	0,017	-567,664	0,001	-1141,160
	0,050	-335,527	0,578	237,970	0,011	-567,664	0,027	-1141,160
LYOMALT	0,092	-33,012	0,450	5,939	0,000	89,073	0,086	50,122
	0,051	-33,012	0,495	5,939	0,000	89,073	0,000	50,122
LYOMALL	0,091	-1873,460	0,749	502,788	0,000	-5528,912	0,000	-7905,160
	0,049	-1873,460	0,770	502,788	0,000	-5528,912	0,002	-7905,160
		t-test sig. (2-tailed)						
		t-test sig. = or < 0,05						

Table 22.6(a) JSE-Sector crosstabulation – PRETOT – pre-GFC JSE vs. pre-GFC AltX

SECTOR * JSE Crosstabulation

			JSE		
			0 (AltX)	1 (JSE)	Total
SECTOR	1 (Resources)	Count	6	0	6
		% within SECTOR	100,0%	0,0%	100,0%
		Adjusted Residual	1,4	-1,4	
	2 (Financial)	Count	5	0	5
		% within SECTOR	100,0%	0,0%	100,0%
		Adjusted Residual	1,2	-1,2	
	3 (Industrial)	Count	41	15	56
		% within SECTOR	73,2%	26,8%	100,0%
		Adjusted Residual	-1,9	1,9	
Total		Count	52	15	67
		% within SECTOR	77,6%	22,4%	100,0%

Table 22.6(b) Chi-square tests – JSE-Sector – PRETOT – pre-GFC JSE vs pre-GFC AltX

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.796[a]	2	0,150
Likelihood Ratio	6,173	2	0,046
Linear-by-Linear Association	3,327	1	0,068
N of Valid Cases	67		

a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.12.

Table 22.7(a) JSE-Sector crosstabulation – POSTTOT – post-GFC JSE vs. post-GFC AltX

SECTOR * JSE Crosstabulation

			JSE		
			0 (AltX)	1 (JSE)	Total
SECTOR	1 (Resources)	Count	0	2	2
		% within SECTOR	0,0%	100,0%	100,0%
		Adjusted Residual	-0,8	0,8	
	2 (Financial)	Count	2	4	6
		% within SECTOR	33,3%	66,7%	100,0%
		Adjusted Residual	0,8	-0,8	
	3 (Industrial)	Count	4	16	20
		% within SECTOR	20,0%	80,0%	100,0%
		Adjusted Residual	-0,3	0,3	
Total		Count	6	22	28
		% within SECTOR	21,4%	78,6%	100,0%

Table 22.7(b) Chi-square tests – JSE-Sector – POSTTOT – post-GFC JSE vs post-GFC AltX

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.075[a]	2	0,584
Likelihood Ratio	1,442	2	0,486
Linear-by-Linear Association	0,011	1	0,916
N of Valid Cases	28		

a. 5 cells (83.3%) have expected count less than 5. The minimum expected count is .43.

Table 22.8(a) POSTGFC-Sector crosstabulation – JSETOT – pre-GFC JSE vs. post-GFC JSE

SECTOR * POSTGFC Crosstabulation

			POSTGFC		
			0 (pre-GFC)	1 (post-GFC)	Total
SECTOR	1 (Resources)	Count	0	2	2
		% within SECTOR	0,0%	100,0%	100,0%
		Adjusted Residual	-1,2	1,2	
	2 (Financial)	Count	0	4	4
		% within SECTOR	0,0%	100,0%	100,0%
		Adjusted Residual	-1,7	1,7	
	3 (Industrial)	Count	15	16	31
		% within SECTOR	48,4%	51,6%	100,0%
		Adjusted Residual	2,2	-2,2	
Total		Count	15	22	37
		% within SECTOR	40,5%	59,5%	100,0%

Table 22.8(b) Chi-square tests – POSTGFC and sectors – JSETOT – pre-GFC JSE vs post-GFC JSE

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.883[a]	2	0,087
Likelihood Ratio	7,018	2	0,030
Linear-by-Linear Association	4,134	1	0,042
N of Valid Cases	37		

a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .81.

Table 22.9(a) POSTGFC-Sector crosstabulation – ALTTOT – pre-GFC AltX vs. post-GFC AltX

SECTOR * POSTGFC Crosstabulation

			POSTGFC		
			0 (pre-GFC)	1 (post-GFC)	Total
SECTOR	1 (Resources)	Count	6	0	6
		% within SECTOR	100,0%	0,0%	100,0%
		Adjusted Residual	0,9	-0,9	
	2 (Financial)	Count	5	2	7
		% within SECTOR	71,4%	28,6%	100,0%
		Adjusted Residual	-1,7	1,7	
	3 (Industrial)	Count	41	4	45
		% within SECTOR	91,1%	8,9%	100,0%
		Adjusted Residual	0,7	-0,7	
Total		Count	52	6	58
		% within SECTOR	89,7%	10,3%	100,0%

Table 22.9(b) Chi-square tests – POSTGFC and sectors – ALTTOT – pre-GFC AltX vs post-GFC AltX

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.302[a]	2	0,192
Likelihood Ratio	3,209	2	0,201
Linear-by-Linear Association	0,001	1	0,982
N of Valid Cases	58		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .62.

Table 22.10(a) Crosstabulation for Chi-square tests – Summary of four data sets

Period			Pre-GFC			Post-GFC			Pre-GFC and Post-GFC			Pre-GFC and Post-GFC		
Cross-tab for Chi-square tests			JSE and sector			JSE and sector			POSTGFC and sector			POSTGFC and sector		
Comparison between			JSE (N=15) and AltX (N=52)			JSE (N=22) and AltX (N=6)			Pre-GFC JSE (N=15) and Post-GFC JSE (N=22)			Pre-GFC AltX (N=52) and Post-GFC AltX (N=6)		
Data set			PRETOT			POSTTOT			JSETOT			ALTTOT		
N			N = 67			N = 28			N = 37			N = 58		
			SECTOR * JSE Crosstabulation						SECTOR * POSTGFC Crosstabulation					
			JSE			JSE			POSTGFC			POSTGFC		
			0 (AltX)	1 (JSE)	Total	0 (AltX)	1 (JSE)	Total	0 (pre-GFC)	1 (post-GFC)	Total	0 (pre-GFC)	1 (post-GFC)	Total
SECTOR	1 (Resources)	Count	6	0	6	0	2	2	0	2	2	6	0	6
		% within SECTOR	100,0%	0,0%	100,0%	0,0%	100,0%	100,0%	0,0%	100,0%	100,0%	100,0%	0,0%	100,0%
		Adjusted Residual	1,4	-1,4		-0,8	0,8		-1,2	1,2		0,9	-0,9	
	2 (Financial)	Count	5	0	5	2	4	6	0	4	4	5	2	7
		% within SECTOR	100,0%	0,0%	100,0%	33,3%	66,7%	100,0%	0,0%	100,0%	100,0%	71,4%	28,6%	100,0%
		Adjusted Residual	1,2	-1,2		0,8	-0,8		-1,7	1,7		-1,7	1,7	
	3 (Industrial)	Count	41	15	56	4	16	20	15	16	31	41	4	45
		% within SECTOR	73,2%	26,8%	100,0%	20,0%	80,0%	100,0%	48,4%	51,6%	100,0%	91,1%	8,9%	100,0%
		Adjusted Residual	-1,9	1,9		-0,3	0,3		2,2	-2,2		0,7	-0,7	
Total		Count	52	15	67	6	22	28	15	22	37	52	6	58
		% within SECTOR	77,6%	22,4%	100,0%	21,4%	78,6%	100,0%	40,5%	59,5%	100,0%	89,7%	10,3%	100,0%

Table 22.10(b) Chi-square tests – Summary of four data sets

Period	Pre-GFC			Post-GFC			Pre-GFC and Post-GFC			Pre-GFC and Post-GFC		
Cross-tab for Chi-square tests	JSE and sectors			JSE and sectors			POSTGFC and sectors			POSTGFC and sectors		
Comparison between	JSE (N=15) and AltX (N=52)			JSE (N=22) and AltX (N=6)			Pre-GFC JSE (N=15) and Post-GFC JSE (N=22)			Pre-GFC AltX (N=52) and Post-GFC AltX (N=6)		
Data set	PRETOT			POSTTOT			JSETOT			ALTTOT		
N	N = 67			N = 28			N = 37			N = 58		
	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3.796[a]	2	0,150	1.075[a]	2	0,584	4.883[a]	2	0,087	3.302[a]	2	0,192
Likelihood Ratio	6,173	2	0,046	1,442	2	0,486	7,018	2	0,030	3,209	2	0,201
Linear-by-Linear Association	3,327	1	0,068	0,011	1	0,916	4,134	1	0,042	0,001	1	0,982
N of Valid Cases	67			28			37			58		
	a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.12.			a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is 1.12.			a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .81.			a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is .62.		

APPENDIX G

15. APPENDIX G – RESULTS OF CORRELATION ANALYSIS

15.1 TABLES ON RESULTS OF CORRELATION ANALYSIS

Table 23. Summary of correlation analysis tables

Table No.	Name
23.1 (a)	Pearson correlations – PRETOT (part 1 of 3)
23.1 (b)	Pearson correlations – PRETOT (part 2 of 3)
23.1 (c)	Pearson correlations – PRETOT (part 3 of 3)
23.2 (a)	Pearson correlations – POSTTOT (part 1 of 3)
23.2 (b)	Pearson correlations – POSTTOT (part 2 of 3)
23.2 (c)	Pearson correlations – POSTTOT (part 3 of 3)
23.3	Pearson correlations – Comparison of pre-GFC and post-GFC (for correlations of dependent and independent variables with all other variables)

Table 23.1(a) Pearson correlations – PRETOT (part 1 of 3)

	Pearson correlations - Pre-GFC (PRETOT; N=67): Part 1 of 3											
	Variable		1	2	3	4	5	6	7	8	9	10
1	UP	Pearson Corr.	1	0,100	0,048	0,064	0,070	-0,053	-0,173	-0,175	-0,003	0,082
		Sig. (2-tailed)		0,420	0,697	0,606	0,572	0,668	0,161	0,156	0,979	0,507
2	JSE	Pearson Corr.	0,100	1	.292*	0,053	0,161	.373**	.562**	.531**	0,067	0,194
		Sig. (2-tailed)	0,420		0,016	0,669	0,194	0,002	0,000	0,000	0,588	0,116
3	PMCO	Pearson Corr.	0,048	.292*	1	.333**	.669**	0,158	.350**	.343**	0,086	0,040
		Sig. (2-tailed)	0,697	0,016		0,006	0,000	0,201	0,004	0,005	0,490	0,750
4	OMCO	Pearson Corr.	0,064	0,053	.333**	1	.924**	0,102	0,029	0,219	-0,071	0,097
		Sig. (2-tailed)	0,606	0,669	0,006		0,000	0,412	0,818	0,075	0,566	0,436
5	CMCO	Pearson Corr.	0,070	0,161	.669**	.924**	1	0,145	0,165	.312*	-0,022	0,092
		Sig. (2-tailed)	0,572	0,194	0,000	0,000		0,243	0,183	0,010	0,863	0,457
6	PLS	Pearson Corr.	-0,053	.373**	0,158	0,102	0,145	1	.323**	.477**	0,057	0,199
		Sig. (2-tailed)	0,668	0,002	0,201	0,412	0,243		0,008	0,000	0,648	0,107
7	IP	Pearson Corr.	-0,173	.562**	.350**	0,029	0,165	.323**	1	.653**	.299*	0,198
		Sig. (2-tailed)	0,161	0,000	0,004	0,818	0,183	0,008		0,000	0,014	0,108
8	LOGOFF	Pearson Corr.	-0,175	.531**	.343**	0,219	.312*	.477**	.653**	1	0,228	.244*
		Sig. (2-tailed)	0,156	0,000	0,005	0,075	0,010	0,000	0,000		0,064	0,047
9	AGE	Pearson Corr.	-0,003	0,067	0,086	-0,071	-0,022	0,057	.299*	0,228	1	0,045
		Sig. (2-tailed)	0,979	0,588	0,490	0,566	0,863	0,648	0,014	0,064		0,720
10	LOGNA	Pearson Corr.	0,082	0,194	0,040	0,097	0,092	0,199	0,198	.244*	0,045	1
		Sig. (2-tailed)	0,507	0,116	0,750	0,436	0,457	0,107	0,108	0,047	0,720	
11	LOGTA	Pearson Corr.	-0,036	.493**	.242*	0,084	0,164	.535**	.545**	.701**	.292*	.288*
		Sig. (2-tailed)	0,770	0,000	0,049	0,500	0,184	0,000	0,000	0,000	0,016	0,018
12	LEV	Pearson Corr.	0,157	0,029	0,225	0,080	0,154	0,048	-0,044	0,068	0,025	-.405**
		Sig. (2-tailed)	0,203	0,819	0,067	0,522	0,213	0,698	0,723	0,585	0,840	0,001
13	LOGREV	Pearson Corr.	0,062	.501**	.250*	0,186	.248*	.328**	.412**	.567**	.296*	0,148
		Sig. (2-tailed)	0,617	0,000	0,042	0,131	0,043	0,007	0,001	0,000	0,015	0,231
14	NETINC	Pearson Corr.	-0,089	.483**	.280*	0,040	0,145	.395**	.730**	.581**	0,179	.252*
		Sig. (2-tailed)	0,476	0,000	0,022	0,745	0,240	0,001	0,000	0,000	0,147	0,039
15	BOARD	Pearson Corr.	-0,029	0,076	.269*	0,235	.295*	0,136	0,117	0,203	-0,005	0,102
		Sig. (2-tailed)	0,815	0,542	0,028	0,056	0,016	0,271	0,344	0,100	0,971	0,411
16	RESSEC	Pearson Corr.	-0,169	-0,168	-0,224	-0,130	-0,193	-0,099	-0,099	-0,083	-0,067	0,020
		Sig. (2-tailed)	0,171	0,173	0,068	0,296	0,117	0,425	0,428	0,503	0,592	0,872
17	FINSEC	Pearson Corr.	-0,138	-0,153	0,018	-0,028	-0,015	0,050	-0,007	0,076	-0,208	0,087
		Sig. (2-tailed)	0,265	0,218	0,883	0,822	0,907	0,688	0,953	0,543	0,092	0,486
18	INDSEC	Pearson Corr.	0,228	0,238	0,160	0,120	0,159	0,041	0,081	0,010	0,199	-0,077
		Sig. (2-tailed)	0,063	0,052	0,196	0,335	0,198	0,742	0,514	0,933	0,107	0,536
19	LYMI	Pearson Corr.	0,096	-.252*	-0,072	-.320**	-.282*	-.400**	-0,204	-.528**	-0,173	-0,008
		Sig. (2-tailed)	0,440	0,040	0,563	0,008	0,021	0,001	0,097	0,000	0,161	0,949
20	LYTL	Pearson Corr.	-0,024	0,166	-0,012	.311*	0,240	.341**	-0,052	.474**	0,150	0,209
		Sig. (2-tailed)	0,845	0,179	0,926	0,010	0,050	0,005	0,677	0,000	0,226	0,089
21	LYSSL	Pearson Corr.	-0,058	0,194	-0,004	.332**	.260*	.363**	0,013	.484**	0,133	0,156
		Sig. (2-tailed)	0,641	0,115	0,972	0,006	0,034	0,003	0,914	0,000	0,284	0,207
22	LYCL	Pearson Corr.	0,077	0,014	-0,070	0,166	0,102	0,152	-.286*	.260*	0,107	.337**
		Sig. (2-tailed)	0,537	0,910	0,576	0,180	0,409	0,220	0,019	0,034	0,387	0,005
23	LYICL	Pearson Corr.	0,087	-0,221	-0,018	-.335**	-.271*	-.377**	-0,099	-.489**	-0,128	-0,085
		Sig. (2-tailed)	0,485	0,073	0,886	0,006	0,026	0,002	0,427	0,000	0,302	0,496
24	LYAOL	Pearson Corr.	0,133	-0,139	0,024	-0,202	-0,150	-0,185	-0,146	-0,166	0,057	0,069
		Sig. (2-tailed)	0,285	0,262	0,847	0,101	0,227	0,134	0,240	0,179	0,647	0,577
25	LYPMJSE	Pearson Corr.	0,049	0,061	-0,139	0,079	0,006	0,158	0,018	.245*	0,143	.662**
		Sig. (2-tailed)	0,691	0,623	0,261	0,524	0,962	0,200	0,882	0,046	0,249	0,000
26	LYPMALT	Pearson Corr.	-0,059	0,199	0,002	.332**	.263*	.368**	0,026	.491**	0,139	0,148
		Sig. (2-tailed)	0,633	0,107	0,987	0,006	0,032	0,002	0,834	0,000	0,262	0,232
27	LYPMALL	Pearson Corr.	0,049	-0,163	0,043	-.327**	-.241*	-.330**	0,061	-.433**	-0,094	-0,202
		Sig. (2-tailed)	0,691	0,187	0,732	0,007	0,050	0,006	0,625	0,000	0,450	0,101
28	LYOMJSE	Pearson Corr.	-0,078	0,208	0,002	.336**	.266*	.369**	0,059	.479**	0,120	0,115
		Sig. (2-tailed)	0,528	0,091	0,984	0,005	0,030	0,002	0,633	0,000	0,334	0,356
29	LYOMALT	Pearson Corr.	-0,076	0,207	0,003	.336**	.266*	.369**	0,056	.481**	0,122	0,118
		Sig. (2-tailed)	0,539	0,092	0,983	0,005	0,030	0,002	0,652	0,000	0,324	0,340
30	LYOMALL	Pearson Corr.	-0,079	0,208	0,003	.336**	.266*	.369**	0,061	.478**	0,120	0,114
		Sig. (2-tailed)	0,526	0,091	0,983	0,005	0,030	0,002	0,626	0,000	0,335	0,360
	*. Correlation is significant at the 0.05 level (2-tailed).											
	**. Correlation is significant at the 0.01 level (2-tailed).											

Table 23.1(b) Pearson correlations – PRETOT (part 2 of 3)

	Pearson correlations - Pre-GFC (PRETOT; N=67): Part 2 of 3											
	Variable		11	12	13	14	15	16	17	18	19	20
1	UP	Pearson Corr.	-0,036	0,157	0,062	-0,089	-0,029	-0,169	-0,138	0,228	0,096	-0,024
		Sig. (2-tailed)	0,770	0,203	0,617	0,476	0,815	0,171	0,265	0,063	0,440	0,845
2	JSE	Pearson Corr.	.493**	0,029	.501**	.483**	0,076	-0,168	-0,153	0,238	-.252*	0,166
		Sig. (2-tailed)	0,000	0,819	0,000	0,000	0,542	0,173	0,218	0,052	0,040	0,179
3	PMCO	Pearson Corr.	.242*	0,225	.250*	.280*	.269*	-0,224	0,018	0,160	-0,072	-0,012
		Sig. (2-tailed)	0,049	0,067	0,042	0,022	0,028	0,068	0,883	0,196	0,563	0,926
4	OMCO	Pearson Corr.	0,084	0,080	0,186	0,040	0,235	-0,130	-0,028	0,120	-.320**	.311*
		Sig. (2-tailed)	0,500	0,522	0,131	0,745	0,056	0,296	0,822	0,335	0,008	0,010
5	CMCO	Pearson Corr.	0,164	0,154	.248*	0,145	.295*	-0,193	-0,015	0,159	-.282*	0,240
		Sig. (2-tailed)	0,184	0,213	0,043	0,240	0,016	0,117	0,907	0,198	0,021	0,050
6	PLS	Pearson Corr.	.535**	0,048	.328**	.395**	0,136	-0,099	0,050	0,041	-.400**	.341**
		Sig. (2-tailed)	0,000	0,698	0,007	0,001	0,271	0,425	0,688	0,742	0,001	0,005
7	IP	Pearson Corr.	.545**	-0,044	.412**	.730**	0,117	-0,099	-0,007	0,081	-0,204	-0,052
		Sig. (2-tailed)	0,000	0,723	0,001	0,000	0,344	0,428	0,953	0,514	0,097	0,677
8	LOGOFF	Pearson Corr.	.701**	0,068	.567**	.581**	0,203	-0,083	0,076	0,010	-.528**	.474**
		Sig. (2-tailed)	0,000	0,585	0,000	0,000	0,100	0,503	0,543	0,933	0,000	0,000
9	AGE	Pearson Corr.	.292*	0,025	.296*	0,179	-0,005	-0,067	-0,208	0,199	-0,173	0,150
		Sig. (2-tailed)	0,016	0,840	0,015	0,147	0,971	0,592	0,092	0,107	0,161	0,226
10	LOGNA	Pearson Corr.	.288*	-.405**	0,148	.252*	0,102	0,020	0,087	-0,077	-0,008	0,209
		Sig. (2-tailed)	0,018	0,001	0,231	0,039	0,411	0,872	0,486	0,536	0,949	0,089
11	LOGTA	Pearson Corr.	1	0,031	.768**	.647**	0,218	-0,176	0,062	0,092	-.372**	.334**
		Sig. (2-tailed)		0,806	0,000	0,000	0,076	0,154	0,617	0,461	0,002	0,006
12	LEV	Pearson Corr.	0,031	1	.276*	0,013	0,144	-0,043	-.282*	0,233	-0,146	0,055
		Sig. (2-tailed)	0,806		0,024	0,914	0,246	0,732	0,021	0,058	0,237	0,658
13	LOGREV	Pearson Corr.	.768**	.276*	1	.408**	0,215	-0,149	-0,198	.255*	-.416**	.371**
		Sig. (2-tailed)	0,000	0,024		0,001	0,081	0,230	0,108	0,037	0,000	0,002
14	NETINC	Pearson Corr.	.647**	0,013	.408**	1	0,132	-0,109	0,127	-0,006	-0,225	-0,017
		Sig. (2-tailed)	0,000	0,914	0,001		0,285	0,381	0,307	0,961	0,068	0,894
15	BOARD	Pearson Corr.	0,218	0,144	0,215	0,132	1	-0,217	0,032	0,144	-0,151	0,167
		Sig. (2-tailed)	0,076	0,246	0,081	0,285		0,078	0,795	0,243	0,224	0,178
16	RESSEC	Pearson Corr.	-0,176	-0,043	-0,149	-0,109	-0,217	1	-0,089	-.708**	0,178	-0,182
		Sig. (2-tailed)	0,154	0,732	0,230	0,381	0,078		0,474	0,000	0,150	0,140
17	FINSEC	Pearson Corr.	0,062	-.282*	-0,198	0,127	0,032	-0,089	1	-.641**	-0,065	0,092
		Sig. (2-tailed)	0,617	0,021	0,108	0,307	0,795	0,474		0,000	0,602	0,461
18	INDSEC	Pearson Corr.	0,092	0,233	.255*	-0,006	0,144	-.708**	-.641**	1	-0,091	0,076
		Sig. (2-tailed)	0,461	0,058	0,037	0,961	0,243	0,000	0,000		0,464	0,543
19	LYMI	Pearson Corr.	-.372**	-0,146	-.416**	-0,225	-0,151	0,178	-0,065	-0,091	1	-.857**
		Sig. (2-tailed)	0,002	0,237	0,000	0,068	0,224	0,150	0,602	0,464		0,000
20	LYTL	Pearson Corr.	.334**	0,055	.371**	-0,017	0,167	-0,182	0,092	0,076	-.857**	1
		Sig. (2-tailed)	0,006	0,658	0,002	0,894	0,178	0,140	0,461	0,543	0,000	
21	LYSSL	Pearson Corr.	.326**	0,083	.368**	0,042	0,156	-0,150	0,080	0,059	-.931**	.971**
		Sig. (2-tailed)	0,007	0,502	0,002	0,734	0,207	0,225	0,521	0,634	0,000	0,000
22	LYCL	Pearson Corr.	0,204	-0,061	0,218	-.245*	0,133	-0,167	0,093	0,063	-.362**	.780**
		Sig. (2-tailed)	0,098	0,622	0,077	0,046	0,282	0,176	0,454	0,613	0,003	0,000
23	LYICL	Pearson Corr.	-.324**	-0,114	-.368**	-0,121	-0,144	0,132	-0,067	-0,055	.971**	-.903**
		Sig. (2-tailed)	0,008	0,359	0,002	0,331	0,244	0,286	0,591	0,661	0,000	0,000
24	LYAOL	Pearson Corr.	-0,039	-0,101	-0,073	-0,133	-0,009	-0,105	0,014	0,071	.557**	-.268*
		Sig. (2-tailed)	0,756	0,417	0,558	0,283	0,940	0,397	0,913	0,566	0,000	0,028
25	LYPMJSE	Pearson Corr.	.242*	-.244*	0,143	0,039	-0,003	0,011	0,045	-0,041	-0,036	.401**
		Sig. (2-tailed)	0,048	0,047	0,249	0,753	0,980	0,929	0,715	0,743	0,774	0,001
26	LYPMALT	Pearson Corr.	.333**	0,088	.376**	0,055	0,158	-0,156	0,080	0,064	-.939**	.971**
		Sig. (2-tailed)	0,006	0,481	0,002	0,660	0,202	0,206	0,520	0,608	0,000	0,000
27	LYPMALL	Pearson Corr.	-.275*	-0,057	-.317**	0,032	-0,144	0,110	-0,077	-0,030	.868**	-.957**
		Sig. (2-tailed)	0,024	0,648	0,009	0,794	0,245	0,376	0,535	0,809	0,000	0,000
28	LYOMJSE	Pearson Corr.	.314**	0,101	.358**	0,083	0,145	-0,127	0,070	0,048	-.954**	.924**
		Sig. (2-tailed)	0,010	0,418	0,003	0,504	0,241	0,305	0,574	0,697	0,000	0,000
29	LYOMALT	Pearson Corr.	.316**	0,099	.361**	0,080	0,147	-0,131	0,071	0,050	-.953**	.930**
		Sig. (2-tailed)	0,009	0,424	0,003	0,518	0,236	0,291	0,567	0,686	0,000	0,000
30	LYOMALL	Pearson Corr.	.313**	0,101	.358**	0,084	0,145	-0,127	0,070	0,048	-.954**	.922**
		Sig. (2-tailed)	0,010	0,417	0,003	0,499	0,242	0,308	0,576	0,699	0,000	0,000
	*. Correlation is significant at the 0.05 level (2-tailed).											
	**. Correlation is significant at the 0.01 level (2-tailed).											

Table 23.1(c) Pearson correlations – PRETOT (part 3 of 3)

	Pearson correlations - Pre-GFC (PRETOT; N=67): Part 3 of 3											
	Variable		21	22	23	24	25	26	27	28	29	30
1	UP	Pearson Corr.	-0,058	0,077	0,087	0,133	0,049	-0,059	0,049	-0,078	-0,076	-0,079
		Sig. (2-tailed)	0,641	0,537	0,485	0,285	0,691	0,633	0,691	0,528	0,539	0,526
2	JSE	Pearson Corr.	0,194	0,014	-0,221	-0,139	0,061	0,199	-0,163	0,208	0,207	0,208
		Sig. (2-tailed)	0,115	0,910	0,073	0,262	0,623	0,107	0,187	0,091	0,092	0,091
3	PMCO	Pearson Corr.	-0,004	-0,070	-0,018	0,024	-0,139	0,002	0,043	0,002	0,003	0,003
		Sig. (2-tailed)	0,972	0,576	0,886	0,847	0,261	0,987	0,732	0,984	0,983	0,983
4	OMCO	Pearson Corr.	.332**	0,166	-.335**	-0,202	0,079	.332**	-.327**	.336**	.336**	.336**
		Sig. (2-tailed)	0,006	0,180	0,006	0,101	0,524	0,006	0,007	0,005	0,005	0,005
5	CMCO	Pearson Corr.	.260*	0,102	-.271*	-0,150	0,006	.263*	-.241*	.266*	.266*	.266*
		Sig. (2-tailed)	0,034	0,409	0,026	0,227	0,962	0,032	0,050	0,030	0,030	0,030
6	PLS	Pearson Corr.	.363**	0,152	-.377**	-0,185	0,158	.368**	-.330**	.369**	.369**	.369**
		Sig. (2-tailed)	0,003	0,220	0,002	0,134	0,200	0,002	0,006	0,002	0,002	0,002
7	IP	Pearson Corr.	0,013	-.286*	-0,099	-0,146	0,018	0,026	0,061	0,059	0,056	0,061
		Sig. (2-tailed)	0,914	0,019	0,427	0,240	0,882	0,834	0,625	0,633	0,652	0,626
8	LOGOFF	Pearson Corr.	.484**	.260*	-.489**	-0,166	.245*	.491**	-.433**	.479**	.481**	.478**
		Sig. (2-tailed)	0,000	0,034	0,000	0,179	0,046	0,000	0,000	0,000	0,000	0,000
9	AGE	Pearson Corr.	0,133	0,107	-0,128	0,057	0,143	0,139	-0,094	0,120	0,122	0,120
		Sig. (2-tailed)	0,284	0,387	0,302	0,647	0,249	0,262	0,450	0,334	0,324	0,335
10	LOGNA	Pearson Corr.	0,156	.337**	-0,085	0,069	.662**	0,148	-0,202	0,115	0,118	0,114
		Sig. (2-tailed)	0,207	0,005	0,496	0,577	0,000	0,232	0,101	0,356	0,340	0,360
11	LOGTA	Pearson Corr.	.326**	0,204	-.324**	-0,039	.242*	.333**	-.275*	.314**	.316**	.313**
		Sig. (2-tailed)	0,007	0,098	0,008	0,756	0,048	0,006	0,024	0,010	0,009	0,010
12	LEV	Pearson Corr.	0,083	-0,061	-0,114	-0,101	-.244*	0,088	-0,057	0,101	0,099	0,101
		Sig. (2-tailed)	0,502	0,622	0,359	0,417	0,047	0,481	0,648	0,418	0,424	0,417
13	LOGREV	Pearson Corr.	.368**	0,218	-.368**	-0,073	0,143	.376**	-.317**	.358**	.361**	.358**
		Sig. (2-tailed)	0,002	0,077	0,002	0,558	0,249	0,002	0,009	0,003	0,003	0,003
14	NETINC	Pearson Corr.	0,042	-.245*	-0,121	-0,133	0,039	0,055	0,032	0,083	0,080	0,084
		Sig. (2-tailed)	0,734	0,046	0,331	0,283	0,753	0,660	0,794	0,504	0,518	0,499
15	BOARD	Pearson Corr.	0,156	0,133	-0,144	-0,009	-0,003	0,158	-0,144	0,145	0,147	0,145
		Sig. (2-tailed)	0,207	0,282	0,244	0,940	0,980	0,202	0,245	0,241	0,236	0,242
16	RESSEC	Pearson Corr.	-0,150	-0,167	0,132	-0,105	0,011	-0,156	0,110	-0,127	-0,131	-0,127
		Sig. (2-tailed)	0,225	0,176	0,286	0,397	0,929	0,206	0,376	0,305	0,291	0,308
17	FINSEC	Pearson Corr.	0,080	0,093	-0,067	0,014	0,045	0,080	-0,077	0,070	0,071	0,070
		Sig. (2-tailed)	0,521	0,454	0,591	0,913	0,715	0,520	0,535	0,574	0,567	0,576
18	INDSEC	Pearson Corr.	0,059	0,063	-0,055	0,071	-0,041	0,064	-0,030	0,048	0,050	0,048
		Sig. (2-tailed)	0,634	0,613	0,661	0,566	0,743	0,608	0,809	0,697	0,686	0,699
19	LYMI	Pearson Corr.	-.931**	-.362**	.971**	.557**	-0,036	-.939**	.868**	-.954**	-.953**	-.954**
		Sig. (2-tailed)	0,000	0,003	0,000	0,000	0,774	0,000	0,000	0,000	0,000	0,000
20	LYTL	Pearson Corr.	.971**	.780**	-.903**	-.268*	.401**	.971**	-.957**	.924**	.930**	.922**
		Sig. (2-tailed)	0,000	0,000	0,000	0,028	0,001	0,000	0,000	0,000	0,000	0,000
21	LYSSL	Pearson Corr.	1	.616**	-.978**	-.483**	.309*	1.000**	-.986**	.988**	.991**	.988**
		Sig. (2-tailed)		0,000	0,000	0,000	0,011	0,000	0,000	0,000	0,000	0,000
22	LYCL	Pearson Corr.	.616**	1	-.438**	.312*	.619**	.610**	-.637**	.490**	.504**	.487**
		Sig. (2-tailed)	0,000		0,000	0,010	0,000	0,000	0,000	0,000	0,000	0,000
23	LYICL	Pearson Corr.	-.978**	-.438**	1	.626**	-0,179	-.979**	.953**	-.997**	-.996**	-.997**
		Sig. (2-tailed)	0,000	0,000		0,000	0,146	0,000	0,000	0,000	0,000	0,000
24	LYAOL	Pearson Corr.	-.483**	.312*	.626**	1	0,099	-.477**	.514**	-.605**	-.591**	-.608**
		Sig. (2-tailed)	0,000	0,010	0,000		0,426	0,000	0,000	0,000	0,000	0,000
25	LYPMJSE	Pearson Corr.	.309*	.619**	-0,179	0,099	1	.293*	-.394**	0,235	.241*	0,233
		Sig. (2-tailed)	0,011	0,000	0,146	0,426		0,016	0,001	0,056	0,049	0,058
26	LYPMALT	Pearson Corr.	1.000**	.610**	-.979**	-.477**	.293*	1	-.981**	.988**	.991**	.988**
		Sig. (2-tailed)	0,000	0,000	0,000	0,000	0,016		0,000	0,000	0,000	0,000
27	LYPMALL	Pearson Corr.	-.986**	-.637**	.953**	.514**	-.394**	-.981**	1	-.973**	-.975**	-.973**
		Sig. (2-tailed)	0,000	0,000	0,000	0,000	0,001	0,000		0,000	0,000	0,000
28	LYOMJSE	Pearson Corr.	.988**	.490**	-.997**	-.605**	0,235	.988**	-.973**	1	1.000**	1.000**
		Sig. (2-tailed)	0,000	0,000	0,000	0,000	0,056	0,000	0,000		0,000	0,000
29	LYOMALT	Pearson Corr.	.991**	.504**	-.996**	-.591**	.241*	.991**	-.975**	1.000**	1	1.000**
		Sig. (2-tailed)	0,000	0,000	0,000	0,000	0,049	0,000	0,000	0,000		0,000
30	LYOMALL	Pearson Corr.	.988**	.487**	-.997**	-.608**	0,233	.988**	-.973**	1.000**	1.000**	1
		Sig. (2-tailed)	0,000	0,000	0,000	0,000	0,058	0,000	0,000	0,000	0,000	
	*. Correlation is significant at the 0.05 level (2-tailed).											
	**. Correlation is significant at the 0.01 level (2-tailed).											

Table 23.2(a) Pearson correlations – POSTTOT (part 1 of 3)

	Pearson correlations - Post-GFC (POSTTOT; N=28): Part 1 of 3											
	Variable		1	2	3	4	5	6	7	8	9	10
1	UP	Pearson Corr.	1	-.394*	-0,139	-0,034	-0,112	-0,220	-0,294	-.409*	-0,340	-0,010
		Sig. (2-tailed)		0,038	0,482	0,862	0,572	0,260	0,129	0,031	0,077	0,961
2	JSE	Pearson Corr.	-.394*	1	0,350	0,327	.378*	0,310	.451*	.701**	0,346	.500**
		Sig. (2-tailed)	0,038		0,068	0,090	0,047	0,108	0,016	0,000	0,071	0,007
3	PMCO	Pearson Corr.	-0,139	0,350	1	.598**	.947**	0,239	.468*	.617**	0,043	0,282
		Sig. (2-tailed)	0,482	0,068		0,001	0,000	0,220	0,012	0,000	0,828	0,145
4	OMCO	Pearson Corr.	-0,034	0,327	.598**	1	.825**	0,325	.513**	.608**	0,070	0,267
		Sig. (2-tailed)	0,862	0,090	0,001		0,000	0,091	0,005	0,001	0,724	0,170
5	CMCO	Pearson Corr.	-0,112	.378*	.947**	.825**	1	0,300	.536**	.680**	0,058	0,307
		Sig. (2-tailed)	0,572	0,047	0,000	0,000		0,121	0,003	0,000	0,768	0,113
6	PLS	Pearson Corr.	-0,220	0,310	0,239	0,325	0,300	1	0,157	.439*	0,153	0,179
		Sig. (2-tailed)	0,260	0,108	0,220	0,091	0,121		0,426	0,019	0,438	0,361
7	IP	Pearson Corr.	-0,294	.451*	.468*	.513**	.536**	0,157	1	.561**	-0,039	0,287
		Sig. (2-tailed)	0,129	0,016	0,012	0,005	0,003	0,426		0,002	0,845	0,139
8	LOGOFF	Pearson Corr.	-.409*	.701**	.617**	.608**	.680**	.439*	.561**	1	0,296	.377*
		Sig. (2-tailed)	0,031	0,000	0,000	0,001	0,000	0,019	0,002		0,127	0,048
9	AGE	Pearson Corr.	-0,340	0,346	0,043	0,070	0,058	0,153	-0,039	0,296	1	0,167
		Sig. (2-tailed)	0,077	0,071	0,828	0,724	0,768	0,438	0,845	0,127		0,396
10	LOGNA	Pearson Corr.	-0,010	.500**	0,282	0,267	0,307	0,179	0,287	.377*	0,167	1
		Sig. (2-tailed)	0,961	0,007	0,145	0,170	0,113	0,361	0,139	0,048	0,396	
11	LOGTA	Pearson Corr.	-.464*	.555**	.477*	.504**	.540**	.681**	.382*	.749**	.391*	.536**
		Sig. (2-tailed)	0,013	0,002	0,010	0,006	0,003	0,000	0,045	0,000	0,040	0,003
12	LEV	Pearson Corr.	-0,237	-0,228	-0,229	0,014	-0,156	0,152	-0,231	-0,057	0,324	-.477*
		Sig. (2-tailed)	0,224	0,244	0,240	0,942	0,428	0,441	0,237	0,775	0,093	0,010
13	LOGREV	Pearson Corr.	-.455*	.711**	.556**	.450*	.574**	.461*	.391*	.828**	.430*	.587**
		Sig. (2-tailed)	0,015	0,000	0,002	0,016	0,001	0,013	0,040	0,000	0,022	0,001
14	NETINC	Pearson Corr.	-0,225	.401*	.748**	.613**	.775**	0,357	0,293	.687**	0,139	0,354
		Sig. (2-tailed)	0,250	0,035	0,000	0,001	0,000	0,062	0,130	0,000	0,479	0,064
15	BOARD	Pearson Corr.	-0,265	.377*	0,173	0,265	0,229	.397*	0,195	.390*	.422*	0,348
		Sig. (2-tailed)	0,173	0,048	0,378	0,173	0,241	0,037	0,321	0,040	0,025	0,070
16	RESSEC	Pearson Corr.	-0,138	0,145	0,226	0,234	0,254	0,249	.685**	0,186	-0,093	0,153
		Sig. (2-tailed)	0,483	0,462	0,247	0,231	0,193	0,202	0,000	0,342	0,638	0,438
17	FINSEC	Pearson Corr.	.427*	-0,152	-0,258	0,032	-0,169	0,113	-0,293	-.412*	-0,207	0,012
		Sig. (2-tailed)	0,024	0,442	0,185	0,872	0,389	0,566	0,130	0,030	0,290	0,951
18	INDSEC	Pearson Corr.	-0,309	0,055	0,105	-0,162	0,009	-0,245	-0,124	0,268	0,241	-0,098
		Sig. (2-tailed)	0,110	0,781	0,594	0,410	0,964	0,209	0,529	0,169	0,216	0,619
19	LYMI	Pearson Corr.	-0,234	-0,105	-0,085	-0,112	-0,105	-0,023	-0,001	-0,235	0,036	-0,126
		Sig. (2-tailed)	0,230	0,597	0,667	0,572	0,595	0,908	0,996	0,228	0,858	0,523
20	LYTL	Pearson Corr.	.402*	-0,333	-0,137	0,004	-0,095	-0,349	-0,288	-0,033	0,118	-0,191
		Sig. (2-tailed)	0,034	0,084	0,488	0,984	0,631	0,069	0,137	0,869	0,551	0,330
21	LYSSL	Pearson Corr.	0,218	-0,365	-0,058	0,062	-0,016	-0,173	-0,144	-0,004	0,193	-0,215
		Sig. (2-tailed)	0,265	0,056	0,771	0,753	0,937	0,378	0,463	0,983	0,326	0,272
22	LYCL	Pearson Corr.	.447*	-0,013	-0,132	-0,009	-0,097	-0,241	-0,307	-0,029	-0,001	0,039
		Sig. (2-tailed)	0,017	0,949	0,503	0,963	0,624	0,218	0,112	0,884	0,998	0,844
23	LYICL	Pearson Corr.	0,245	-0,127	-0,009	-0,030	-0,018	-.484**	-0,159	0,043	-0,015	-0,220
		Sig. (2-tailed)	0,210	0,519	0,964	0,880	0,926	0,009	0,420	0,829	0,941	0,262
24	LYAOL	Pearson Corr.	0,002	-0,350	-0,159	-0,005	-0,114	0,203	-0,058	-0,121	0,145	-0,032
		Sig. (2-tailed)	0,992	0,068	0,419	0,981	0,563	0,299	0,771	0,541	0,463	0,873
25	LYPMJSE	Pearson Corr.	-0,275	0,070	.487**	0,002	0,345	0,037	0,186	0,365	-0,006	-0,218
		Sig. (2-tailed)	0,157	0,723	0,009	0,994	0,072	0,851	0,343	0,056	0,974	0,266
26	LYPMALT	Pearson Corr.	-0,339	0,296	.417*	0,164	0,360	-0,014	.468*	0,245	-0,008	0,007
		Sig. (2-tailed)	0,078	0,127	0,027	0,406	0,060	0,942	0,012	0,209	0,968	0,972
27	LYPMALL	Pearson Corr.	-0,307	0,340	.406*	-0,016	0,280	0,054	0,236	0,285	-0,174	-0,049
		Sig. (2-tailed)	0,112	0,076	0,032	0,937	0,149	0,784	0,227	0,141	0,376	0,805
28	LYOMJSE	Pearson Corr.	-0,003	-0,126	-.388*	-0,028	-0,285	0,077	-0,107	-.374*	0,016	0,160
		Sig. (2-tailed)	0,989	0,524	0,041	0,888	0,141	0,696	0,587	0,050	0,935	0,417
29	LYOMALT	Pearson Corr.	0,242	-0,149	-.403*	0,054	-0,263	-0,134	-0,120	-.382*	-0,026	0,129
		Sig. (2-tailed)	0,215	0,450	0,033	0,784	0,177	0,498	0,543	0,045	0,896	0,512
30	LYOMALL	Pearson Corr.	-0,079	-0,063	-0,279	-0,173	-0,266	-0,026	-0,198	-0,264	-0,124	0,041
		Sig. (2-tailed)	0,690	0,749	0,151	0,380	0,171	0,894	0,313	0,175	0,531	0,835
	*. Correlation is significant at the 0.05 level (2-tailed).											
	**. Correlation is significant at the 0.01 level (2-tailed).											

Table 23.2(b) Pearson correlations – POSTTOT (part 2 of 3)

	Pearson correlations - Post-GFC (POSTTOT; N=28): Part 2 of 3											
	Variable		11	12	13	14	15	16	17	18	19	20
1	UP	Pearson Corr.	-.464*	-0,237	-.455*	-0,225	-0,265	-0,138	.427*	-0,309	-0,234	.402*
		Sig. (2-tailed)	0,013	0,224	0,015	0,250	0,173	0,483	0,024	0,110	0,230	0,034
2	JSE	Pearson Corr.	.555**	-0,228	.711**	.401*	.377*	0,145	-0,152	0,055	-0,105	-0,333
		Sig. (2-tailed)	0,002	0,244	0,000	0,035	0,048	0,462	0,442	0,781	0,597	0,084
3	PMCO	Pearson Corr.	.477*	-0,229	.556**	.748**	0,173	0,226	-0,258	0,105	-0,085	-0,137
		Sig. (2-tailed)	0,010	0,240	0,002	0,000	0,378	0,247	0,185	0,594	0,667	0,488
4	OMCO	Pearson Corr.	.504**	0,014	.450*	.613**	0,265	0,234	0,032	-0,162	-0,112	0,004
		Sig. (2-tailed)	0,006	0,942	0,016	0,001	0,173	0,231	0,872	0,410	0,572	0,984
5	CMCO	Pearson Corr.	.540**	-0,156	.574**	.775**	0,229	0,254	-0,169	0,009	-0,105	-0,095
		Sig. (2-tailed)	0,003	0,428	0,001	0,000	0,241	0,193	0,389	0,964	0,595	0,631
6	PLS	Pearson Corr.	.681**	0,152	.461*	0,357	.397*	0,249	0,113	-0,245	-0,023	-0,349
		Sig. (2-tailed)	0,000	0,441	0,013	0,062	0,037	0,202	0,566	0,209	0,908	0,069
7	IP	Pearson Corr.	.382*	-0,231	.391*	0,293	0,195	.685**	-0,293	-0,124	-0,001	-0,288
		Sig. (2-tailed)	0,045	0,237	0,040	0,130	0,321	0,000	0,130	0,529	0,996	0,137
8	LOGOFF	Pearson Corr.	.749**	-0,057	.828**	.687**	.390*	0,186	-.412*	0,268	-0,235	-0,033
		Sig. (2-tailed)	0,000	0,775	0,000	0,000	0,040	0,342	0,030	0,169	0,228	0,869
9	AGE	Pearson Corr.	.391*	0,324	.430*	0,139	.422*	-0,093	-0,207	0,241	0,036	0,118
		Sig. (2-tailed)	0,040	0,093	0,022	0,479	0,025	0,638	0,290	0,216	0,858	0,551
10	LOGNA	Pearson Corr.	.536**	-.477*	.587**	0,354	0,348	0,153	0,012	-0,098	-0,126	-0,191
		Sig. (2-tailed)	0,003	0,010	0,001	0,064	0,070	0,438	0,951	0,619	0,523	0,330
11	LOGTA	Pearson Corr.	1	0,075	.873**	.708**	.613**	0,251	-0,082	-0,069	-0,056	-0,242
		Sig. (2-tailed)		0,706	0,000	0,000	0,001	0,198	0,679	0,729	0,779	0,214
12	LEV	Pearson Corr.	0,075	1	-0,043	-0,092	0,089	-0,320	0,199	0,001	0,061	0,126
		Sig. (2-tailed)	0,706		0,828	0,643	0,654	0,097	0,309	0,994	0,757	0,522
13	LOGREV	Pearson Corr.	.873**	-0,043	1	.735**	.472*	0,123	-0,253	0,160	-0,184	-0,271
		Sig. (2-tailed)	0,000	0,828		0,000	0,011	0,534	0,194	0,417	0,347	0,163
14	NETINC	Pearson Corr.	.708**	-0,092	.735**	1	.455*	0,091	-0,160	0,094	-0,038	-0,152
		Sig. (2-tailed)	0,000	0,643	0,000		0,015	0,644	0,415	0,636	0,847	0,441
15	BOARD	Pearson Corr.	.613**	0,089	.472*	.455*	1	0,193	0,024	-0,132	0,329	-0,240
		Sig. (2-tailed)	0,001	0,654	0,011	0,015		0,325	0,903	0,503	0,088	0,219
16	RESSEC	Pearson Corr.	0,251	-0,320	0,123	0,091	0,193	1	-0,145	-.439*	0,138	-0,324
		Sig. (2-tailed)	0,198	0,097	0,534	0,644	0,325		0,462	0,020	0,483	0,093
17	FINSEC	Pearson Corr.	-0,082	0,199	-0,253	-0,160	0,024	-0,145	1	-.826**	0,207	-0,082
		Sig. (2-tailed)	0,679	0,309	0,194	0,415	0,903	0,462		0,000	0,290	0,678
18	INDSEC	Pearson Corr.	-0,069	0,001	0,160	0,094	-0,132	-.439*	-.826**	1	-0,267	0,259
		Sig. (2-tailed)	0,729	0,994	0,417	0,636	0,503	0,020	0,000		0,169	0,183
19	LYMI	Pearson Corr.	-0,056	0,061	-0,184	-0,038	0,329	0,138	0,207	-0,267	1	-0,335
		Sig. (2-tailed)	0,779	0,757	0,347	0,847	0,088	0,483	0,290	0,169		0,082
20	LYTL	Pearson Corr.	-0,242	0,126	-0,271	-0,152	-0,240	-0,324	-0,082	0,259	-0,335	1
		Sig. (2-tailed)	0,214	0,522	0,163	0,441	0,219	0,093	0,678	0,183	0,082	
21	LYSSL	Pearson Corr.	-0,138	0,083	-0,249	-0,041	0,081	-0,032	-0,108	0,117	0,128	.785**
		Sig. (2-tailed)	0,484	0,676	0,202	0,835	0,682	0,870	0,584	0,554	0,517	0,000
22	LYCL	Pearson Corr.	-0,191	-0,072	-0,099	-0,115	-.447*	-0,323	0,013	0,173	-.714**	.564**
		Sig. (2-tailed)	0,330	0,716	0,615	0,561	0,017	0,093	0,949	0,379	0,000	0,002
23	LYICL	Pearson Corr.	-0,229	0,062	-0,157	-0,094	-0,216	-0,347	-0,133	0,318	-0,217	.752**
		Sig. (2-tailed)	0,240	0,754	0,425	0,634	0,271	0,071	0,501	0,099	0,267	0,000
24	LYAOL	Pearson Corr.	0,031	0,276	-0,150	-0,116	0,082	0,006	0,068	-0,066	0,085	0,197
		Sig. (2-tailed)	0,876	0,155	0,447	0,557	0,678	0,974	0,730	0,740	0,668	0,315
25	LYPMJSE	Pearson Corr.	0,087	0,073	0,194	0,166	0,083	-0,053	-0,357	0,355	0,112	-0,029
		Sig. (2-tailed)	0,662	0,712	0,322	0,399	0,673	0,790	0,062	0,064	0,569	0,885
26	LYPMALT	Pearson Corr.	0,163	-0,107	0,271	0,329	0,344	0,350	-0,163	-0,052	0,365	-.568**
		Sig. (2-tailed)	0,408	0,588	0,164	0,087	0,073	0,068	0,408	0,794	0,056	0,002
27	LYPMALL	Pearson Corr.	0,116	-0,154	0,289	0,192	0,075	0,047	-0,201	0,156	0,078	-.458*
		Sig. (2-tailed)	0,558	0,434	0,136	0,329	0,704	0,813	0,305	0,428	0,692	0,014
28	LYOMJSE	Pearson Corr.	0,037	0,157	-0,128	-0,120	0,119	0,106	.378*	-.404*	.402*	-0,289
		Sig. (2-tailed)	0,853	0,424	0,517	0,543	0,548	0,591	0,047	0,033	0,034	0,136
29	LYOMALT	Pearson Corr.	-0,113	0,013	-0,227	-0,098	0,061	0,068	.414*	-.415*	0,105	0,092
		Sig. (2-tailed)	0,567	0,947	0,245	0,620	0,758	0,732	0,028	0,028	0,595	0,641
30	LYOMALL	Pearson Corr.	0,007	0,260	-0,055	-0,203	-0,104	-0,228	0,250	-0,097	0,240	-0,208
		Sig. (2-tailed)	0,972	0,181	0,781	0,301	0,600	0,244	0,199	0,622	0,218	0,288
	*. Correlation is significant at the 0.05 level (2-tailed).											
	**. Correlation is significant at the 0.01 level (2-tailed).											

Table 23.2(c) Pearson correlations – POSTTOT (part 3 of 3)

	Pearson correlations - Post-GFC (POSTTOT; N=28): Part 3 of 3											
	Variable		21	22	23	24	25	26	27	28	29	30
1	UP	Pearson Corr.	0,218	.447*	0,245	0,002	-0,275	-0,339	-0,307	-0,003	0,242	-0,079
		Sig. (2-tailed)	0,265	0,017	0,210	0,992	0,157	0,078	0,112	0,989	0,215	0,690
2	JSE	Pearson Corr.	-0,365	-0,013	-0,127	-0,350	0,070	0,296	0,340	-0,126	-0,149	-0,063
		Sig. (2-tailed)	0,056	0,949	0,519	0,068	0,723	0,127	0,076	0,524	0,450	0,749
3	PMCO	Pearson Corr.	-0,058	-0,132	-0,009	-0,159	.487**	.417*	.406*	-.388*	-.403*	-0,279
		Sig. (2-tailed)	0,771	0,503	0,964	0,419	0,009	0,027	0,032	0,041	0,033	0,151
4	OMCO	Pearson Corr.	0,062	-0,009	-0,030	-0,005	0,002	0,164	-0,016	-0,028	0,054	-0,173
		Sig. (2-tailed)	0,753	0,963	0,880	0,981	0,994	0,406	0,937	0,888	0,784	0,380
5	CMCO	Pearson Corr.	-0,016	-0,097	-0,018	-0,114	0,345	0,360	0,280	-0,285	-0,263	-0,266
		Sig. (2-tailed)	0,937	0,624	0,926	0,563	0,072	0,060	0,149	0,141	0,177	0,171
6	PLS	Pearson Corr.	-0,173	-0,241	-.484**	0,203	0,037	-0,014	0,054	0,077	-0,134	-0,026
		Sig. (2-tailed)	0,378	0,218	0,009	0,299	0,851	0,942	0,784	0,696	0,498	0,894
7	IP	Pearson Corr.	-0,144	-0,307	-0,159	-0,058	0,186	.468*	0,236	-0,107	-0,120	-0,198
		Sig. (2-tailed)	0,463	0,112	0,420	0,771	0,343	0,012	0,227	0,587	0,543	0,313
8	LOGOFF	Pearson Corr.	-0,004	-0,029	0,043	-0,121	0,365	0,245	0,285	-.374*	-.382*	-0,264
		Sig. (2-tailed)	0,983	0,884	0,829	0,541	0,056	0,209	0,141	0,050	0,045	0,175
9	AGE	Pearson Corr.	0,193	-0,001	-0,015	0,145	-0,006	-0,008	-0,174	0,016	-0,026	-0,124
		Sig. (2-tailed)	0,326	0,998	0,941	0,463	0,974	0,968	0,376	0,935	0,896	0,531
10	LOGNA	Pearson Corr.	-0,215	0,039	-0,220	-0,032	-0,218	0,007	-0,049	0,160	0,129	0,041
		Sig. (2-tailed)	0,272	0,844	0,262	0,873	0,266	0,972	0,805	0,417	0,512	0,835
11	LOGTA	Pearson Corr.	-0,138	-0,191	-0,229	0,031	0,087	0,163	0,116	0,037	-0,113	0,007
		Sig. (2-tailed)	0,484	0,330	0,240	0,876	0,662	0,408	0,558	0,853	0,567	0,972
12	LEV	Pearson Corr.	0,083	-0,072	0,062	0,276	0,073	-0,107	-0,154	0,157	0,013	0,260
		Sig. (2-tailed)	0,676	0,716	0,754	0,155	0,712	0,588	0,434	0,424	0,947	0,181
13	LOGREV	Pearson Corr.	-0,249	-0,099	-0,157	-0,150	0,194	0,271	0,289	-0,128	-0,227	-0,055
		Sig. (2-tailed)	0,202	0,615	0,425	0,447	0,322	0,164	0,136	0,517	0,245	0,781
14	NETINC	Pearson Corr.	-0,041	-0,115	-0,094	-0,116	0,166	0,329	0,192	-0,120	-0,098	-0,203
		Sig. (2-tailed)	0,835	0,561	0,634	0,557	0,399	0,087	0,329	0,543	0,620	0,301
15	BOARD	Pearson Corr.	0,081	-.447*	-0,216	0,082	0,083	0,344	0,075	0,119	0,061	-0,104
		Sig. (2-tailed)	0,682	0,017	0,271	0,678	0,673	0,073	0,704	0,548	0,758	0,600
16	RESSEC	Pearson Corr.	-0,032	-0,323	-0,347	0,006	-0,053	0,350	0,047	0,106	0,068	-0,228
		Sig. (2-tailed)	0,870	0,093	0,071	0,974	0,790	0,068	0,813	0,591	0,732	0,244
17	FINSEC	Pearson Corr.	-0,108	0,013	-0,133	0,068	-0,357	-0,163	-0,201	.378*	.414*	0,250
		Sig. (2-tailed)	0,584	0,949	0,501	0,730	0,062	0,408	0,305	0,047	0,028	0,199
18	INDSEC	Pearson Corr.	0,117	0,173	0,318	-0,066	0,355	-0,052	0,156	-.404*	-.415*	-0,097
		Sig. (2-tailed)	0,554	0,379	0,099	0,740	0,064	0,794	0,428	0,033	0,028	0,622
19	LYMI	Pearson Corr.	0,128	-.714**	-0,217	0,085	0,112	0,365	0,078	.402*	0,105	0,240
		Sig. (2-tailed)	0,517	0,000	0,267	0,668	0,569	0,056	0,692	0,034	0,595	0,218
20	LYTL	Pearson Corr.	.785**	.564**	.752**	0,197	-0,029	-.568**	-.458*	-0,289	0,092	-0,208
		Sig. (2-tailed)	0,000	0,002	0,000	0,315	0,885	0,002	0,014	0,136	0,641	0,288
21	LYSSL	Pearson Corr.	1	0,042	.501**	0,342	0,093	-0,336	-.401*	-0,180	0,078	-0,331
		Sig. (2-tailed)		0,830	0,007	0,075	0,636	0,080	0,034	0,358	0,693	0,086
22	LYCL	Pearson Corr.	0,042	1	.385*	-0,220	-0,297	-.581**	-0,284	-0,251	0,007	-0,121
		Sig. (2-tailed)	0,830		0,043	0,260	0,124	0,001	0,142	0,198	0,973	0,538
23	LYICL	Pearson Corr.	.501**	.385*	1	-0,355	0,252	-0,178	0,119	-.421*	-0,109	0,049
		Sig. (2-tailed)	0,007	0,043		0,063	0,195	0,363	0,546	0,026	0,582	0,803
24	LYAOL	Pearson Corr.	0,342	-0,220	-0,355	1	-0,202	-0,287	-.711**	0,309	0,338	-0,149
		Sig. (2-tailed)	0,075	0,260	0,063		0,302	0,139	0,000	0,109	0,078	0,448
25	LYPMJSE	Pearson Corr.	0,093	-0,297	0,252	-0,202	1	.494**	.722**	-.750**	-.816**	-0,306
		Sig. (2-tailed)	0,636	0,124	0,195	0,302		0,008	0,000	0,000	0,000	0,113
26	LYPMALT	Pearson Corr.	-0,336	-.581**	-0,178	-0,287	.494**	1	.626**	-0,206	-0,183	-0,244
		Sig. (2-tailed)	0,080	0,001	0,363	0,139	0,008		0,000	0,292	0,351	0,210
27	LYPMALL	Pearson Corr.	-.401*	-0,284	0,119	-.711**	.722**	.626**	1	-.536**	-.668**	-0,013
		Sig. (2-tailed)	0,034	0,142	0,546	0,000	0,000	0,000		0,003	0,000	0,948
28	LYOMJSE	Pearson Corr.	-0,180	-0,251	-.421*	0,309	-.750**	-0,206	-.536**	1	.727**	.652**
		Sig. (2-tailed)	0,358	0,198	0,026	0,109	0,000	0,292	0,003		0,000	0,000
29	LYOMALT	Pearson Corr.	0,078	0,007	-0,109	0,338	-.816**	-0,183	-.668**	.727**	1	0,222
		Sig. (2-tailed)	0,693	0,973	0,582	0,078	0,000	0,351	0,000	0,000		0,256
30	LYOMALL	Pearson Corr.	-0,331	-0,121	0,049	-0,149	-0,306	-0,244	-0,013	.652**	0,222	1
		Sig. (2-tailed)	0,086	0,538	0,803	0,448	0,113	0,210	0,948	0,000	0,256	
	*. Correlation is significant at the 0.05 level (2-tailed).											
	**. Correlation is significant at the 0.01 level (2-tailed).											

Table 23.3 Pearson correlations – Comparison of pre-GFC and post-GFC

(correlations of dependent and independent variables with each other and with all other variables)

	Pearson correlations		Pre-GFC (PRETOT; N=67)					Post-GFC (POSTTOT; N=28)				
	Variable		1	2	3	4	5	1	2	3	4	5
1	UP	Pearson Corr.	1	0,100	0,048	0,064	0,070	1	-.394*	-0,139	-0,034	-0,112
		Sig. (2-tailed)		0,420	0,697	0,606	0,572		0,038	0,482	0,862	0,572
2	JSE	Pearson Corr.	0,100	1	.292*	0,053	0,161	-.394*	1	0,350	0,327	.378*
		Sig. (2-tailed)	0,420		0,016	0,669	0,194	0,038		0,068	0,090	0,047
3	PMCO	Pearson Corr.	0,048	.292*	1	.333**	.669**	-0,139	0,350	1	.598**	.947**
		Sig. (2-tailed)	0,697	0,016		0,006	0,000	0,482	0,068		0,001	0,000
4	OMCO	Pearson Corr.	0,064	0,053	.333**	1	.924**	-0,034	0,327	.598**	1	.825**
		Sig. (2-tailed)	0,606	0,669	0,006		0,000	0,862	0,090	0,001		0,000
5	CMCO	Pearson Corr.	0,070	0,161	.669**	.924**	1	-0,112	.378*	.947**	.825**	1
		Sig. (2-tailed)	0,572	0,194	0,000	0,000		0,572	0,047	0,000	0,000	
6	PLS	Pearson Corr.	-0,053	.373**	0,158	0,102	0,145	-0,220	0,310	0,239	0,325	0,300
		Sig. (2-tailed)	0,668	0,002	0,201	0,412	0,243	0,260	0,108	0,220	0,091	0,121
7	IP	Pearson Corr.	-0,173	.562**	.350**	0,029	0,165	-0,294	.451*	.468*	.513**	.536**
		Sig. (2-tailed)	0,161	0,000	0,004	0,818	0,183	0,129	0,016	0,012	0,005	0,003
8	LOGOFF	Pearson Corr.	-0,175	.531**	.343**	0,219	.312*	-.409*	.701**	.617**	.608**	.680**
		Sig. (2-tailed)	0,156	0,000	0,005	0,075	0,010	0,031	0,000	0,000	0,001	0,000
9	AGE	Pearson Corr.	-0,003	0,067	0,086	-0,071	-0,022	-0,340	0,346	0,043	0,070	0,058
		Sig. (2-tailed)	0,979	0,588	0,490	0,566	0,863	0,077	0,071	0,828	0,724	0,768
10	LOGNA	Pearson Corr.	0,082	0,194	0,040	0,097	0,092	-0,010	.500**	0,282	0,267	0,307
		Sig. (2-tailed)	0,507	0,116	0,750	0,436	0,457	0,961	0,007	0,145	0,170	0,113
11	LOGTA	Pearson Corr.	-0,036	.493**	.242*	0,084	0,164	-.464*	.555**	.477*	.504**	.540**
		Sig. (2-tailed)	0,770	0,000	0,049	0,500	0,184	0,013	0,002	0,010	0,006	0,003
12	LEV	Pearson Corr.	0,157	0,029	0,225	0,080	0,154	-0,237	-0,228	-0,229	0,014	-0,156
		Sig. (2-tailed)	0,203	0,819	0,067	0,522	0,213	0,224	0,244	0,240	0,942	0,428
13	LOGREV	Pearson Corr.	0,062	.501**	.250*	0,186	.248*	-.455*	.711**	.556**	.450*	.574**
		Sig. (2-tailed)	0,617	0,000	0,042	0,131	0,043	0,015	0,000	0,002	0,016	0,001
14	NETINC	Pearson Corr.	-0,089	.483**	.280*	0,040	0,145	-0,225	.401*	.748**	.613**	.775**
		Sig. (2-tailed)	0,476	0,000	0,022	0,745	0,240	0,250	0,035	0,000	0,001	0,000
15	BOARD	Pearson Corr.	-0,029	0,076	.269*	0,235	.295*	-0,265	.377*	0,173	0,265	0,229
		Sig. (2-tailed)	0,815	0,542	0,028	0,056	0,016	0,173	0,048	0,378	0,173	0,241
16	RESSEC	Pearson Corr.	-0,169	-0,168	-0,224	-0,130	-0,193	-0,138	0,145	0,226	0,234	0,254
		Sig. (2-tailed)	0,171	0,173	0,068	0,296	0,117	0,483	0,462	0,247	0,231	0,193
17	FINSEC	Pearson Corr.	-0,138	-0,153	0,018	-0,028	-0,015	.427*	-0,152	-0,258	0,032	-0,169
		Sig. (2-tailed)	0,265	0,218	0,883	0,822	0,907	0,024	0,442	0,185	0,872	0,389
18	INDSEC	Pearson Corr.	0,228	0,238	0,160	0,120	0,159	-0,309	0,055	0,105	-0,162	0,009
		Sig. (2-tailed)	0,063	0,052	0,196	0,335	0,198	0,110	0,781	0,594	0,410	0,964
19	LYMI	Pearson Corr.	0,096	-.252*	-0,072	-.320**	-.282*	-0,234	-0,105	-0,085	-0,112	-0,105
		Sig. (2-tailed)	0,440	0,040	0,563	0,008	0,021	0,230	0,597	0,667	0,572	0,595
20	LYTL	Pearson Corr.	-0,024	0,166	-0,012	.311*	0,240	.402*	-0,333	-0,137	0,004	-0,095
		Sig. (2-tailed)	0,845	0,179	0,926	0,010	0,050	0,034	0,084	0,488	0,984	0,631
21	LYSSL	Pearson Corr.	-0,058	0,194	-0,004	.332**	.260*	0,218	-0,365	-0,058	0,062	-0,016
		Sig. (2-tailed)	0,641	0,115	0,972	0,006	0,034	0,265	0,056	0,771	0,753	0,937
22	LYCL	Pearson Corr.	0,077	0,014	-0,070	0,166	0,102	.447*	-0,013	-0,132	-0,009	-0,097
		Sig. (2-tailed)	0,537	0,910	0,576	0,180	0,409	0,017	0,949	0,503	0,963	0,624
23	LYICL	Pearson Corr.	0,087	-0,221	-0,018	-.335**	-.271*	0,245	-0,127	-0,009	-0,030	-0,018
		Sig. (2-tailed)	0,485	0,073	0,886	0,006	0,026	0,210	0,519	0,964	0,880	0,926
24	LYAOL	Pearson Corr.	0,133	-0,139	0,024	-0,202	-0,150	0,002	-0,350	-0,159	-0,005	-0,114
		Sig. (2-tailed)	0,285	0,262	0,847	0,101	0,227	0,992	0,068	0,419	0,981	0,563
25	LYPMJSE	Pearson Corr.	0,049	0,061	-0,139	0,079	0,006	-0,275	0,070	.487**	0,002	0,345
		Sig. (2-tailed)	0,691	0,623	0,261	0,524	0,962	0,157	0,723	0,009	0,994	0,072
26	LYPMALT	Pearson Corr.	-0,059	0,199	0,002	.332**	.263*	-0,339	0,296	.417*	0,164	0,360
		Sig. (2-tailed)	0,633	0,107	0,987	0,006	0,032	0,078	0,127	0,027	0,406	0,060
27	LYPMALL	Pearson Corr.	0,049	-0,163	0,043	-.327**	-.241*	-0,307	0,340	.406*	-0,016	0,280
		Sig. (2-tailed)	0,691	0,187	0,732	0,007	0,050	0,112	0,076	0,032	0,937	0,149
28	LYOMJSE	Pearson Corr.	-0,078	0,208	0,002	.336**	.266*	-0,003	-0,126	-.388*	-0,028	-0,285
		Sig. (2-tailed)	0,528	0,091	0,984	0,005	0,030	0,989	0,524	0,041	0,888	0,141
29	LYOMALT	Pearson Corr.	-0,076	0,207	0,003	.336**	.266*	0,242	-0,149	-.403*	0,054	-0,263
		Sig. (2-tailed)	0,539	0,092	0,983	0,005	0,030	0,215	0,450	0,033	0,784	0,177
30	LYOMALL	Pearson Corr.	-0,079	0,208	0,003	.336**	.266*	-0,079	-0,063	-0,279	-0,173	-0,266
		Sig. (2-tailed)	0,526	0,091	0,983	0,005	0,030	0,690	0,749	0,151	0,380	0,171

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

APPENDIX H

16. APPENDIX H – RESULTS OF REGRESSION ANALYSIS

16.1 TABLES ON RESULTS OF REGRESSION ANALYSIS

Table 24. Sequencing of variables for different sequences and models used in the regression analysis

Variable	Brief description	Approach 1 Model				Approach 2 Model			
		1	2	3	4	1	2	3	4
Dependent variable									
UP	Underpricing	✓	✓	✓	✓	✓	✓	✓	✓
Independent variables									
Exchange									
JSE	JSE (1, 0)			✓	✓	✓	✓	✓	✓
Media coverage									
PMCO	Print media - company				✓		✓	✓	✓
OMCO	Online media - company				✓		✓	✓	✓
CMCO	Combined media - company				✓		✓	✓	✓
Control variables									
Relating to IPO offer and company									
Offer profile									
PLS	No. of pages in PLS (pre listing statement)	✓	✓	✓	✓			✓	✓
IP	Issue proce	✓	✓	✓	✓			✓	✓
LOGOFF	Log of offer amount	✓	✓	✓	✓			✓	✓
Company profile									
AGE	Age of company	✓	✓	✓	✓			✓	✓
LOGNA	Log of net assets	✓	✓	✓	✓			✓	✓
LOGTA	Log of total assets	✓	✓	✓	✓			✓	✓
LEV	Leverage (assets / liabilities)	✓	✓	✓	✓			✓	✓
LOGREV	Log of revenues	✓	✓	✓	✓			✓	✓
NETINC	Net income	✓	✓	✓	✓			✓	✓
BOARD	Number of board members	✓	✓	✓	✓			✓	✓
Industry sector									
RESSEC	Resources sector (1, 0)	✓	✓	✓	✓			✓	✓
FINSEC	Financial sector (1,0)	✓	✓	✓	✓			✓	✓
INDSEC	Industrial sector (1,0)	✓	✓	✓	✓			✓	✓
Relating to IPO environment									
Market conditions									
LYMI	Listing year - change in market index		✓	✓	✓				✓
Listing activity									
LYTL	Listing year - total listings		✓	✓	✓				✓
LYSSL	Listing year - signalling study listings		✓	✓	✓				✓
LYCL	Listing year - cross listings		✓	✓	✓				✓
LYICL	Listing year - investment company listings		✓	✓	✓				✓
LYAOL	Listing year - all other listings		✓	✓	✓				✓
Media volume									
LYPMJSE	Listing year - print media - JSE		✓	✓	✓				✓
LYPMALT	Listing year - print media - AltX		✓	✓	✓				✓
LYPMALL	Listing year - print media - all		✓	✓	✓				✓
LYOMJSE	Listing year - online media - JSE		✓	✓	✓				✓
LYOMALT	Listing year - online media - AltX		✓	✓	✓				✓
LYOMALL	Listing year - online media - all		✓	✓	✓				✓

Table 25. Summary of regression analysis tables

Period	Pre-GFC		Post-GFC	
Analysis sequence	1	2	1	2
Model summary	Table 26.1	Table 27.1	Table 28.1	Table 29.1
ANOVA	Table 26.2	Table 27.2	Table 28.2	Table 29.2
Coefficiencies	Table 26.3 (a) and (b)	Table 27.3	Table 28.3 (a) and (b)	Table 29.3
Results summary	Table 30			

Table 26.1 Regression on UP (underpricing) – pre-GFC (PRETOT):

Sequence 1 (control variables first, then independent variables) – Model Summary

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.417[a]	0,174	-0,009	0,278	0,174	0,949	12	54	0,507
2	.425[b]	0,181	-0,081	0,288	0,007	0,100	4	50	0,982
3	.485[c]	0,235	-0,031	0,281	0,054	3,464	1	49	0,069
4	.494[d]	0,244	-0,061	0,285	0,009	0,292	2	47	0,748

a. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA

b. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

c. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE

d. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE, OMCO, PMCO

e. Dependent Variable: UP

Table 26.2 Regression on UP (underpricing) – pre-GFC (PRETOT:

Sequence 1 (control variables first, then independent variables) – ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0,881	12	0,073	0,949	.507[b]
	Residual	4,175	54	0,077		
	Total	5,055	66			
2	Regression	0,914	16	0,057	0,690	.790[c]
	Residual	4,141	50	0,083		
	Total	5,055	66			
3	Regression	1,187	17	0,070	0,885	.594[d]
	Residual	3,868	49	0,079		
	Total	5,055	66			
4	Regression	1,235	19	0,065	0,800	.696[e]
	Residual	3,820	47	0,081		
	Total	5,055	66			

a. Dependent Variable: UP

b. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA

c. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

d. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE

e. Predictors: (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE, OMCO, PMCO

Table 26.3(a) Regression on UP (underpricing) – pre-GFC (PRETOT):

Sequence 1 (control variables first, then independent variables) – Coefficients – part 1 of 2

Coefficients[a]											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	0,240	0,801		0,299	0,766					
	PLS	0,000	0,001	-0,020	-0,130	0,897	-0,053	-0,018	-0,016	0,651	1,535
	IP	-9,871E-05	0,000	-0,148	-0,702	0,486	-0,173	-0,095	-0,087	0,342	2,925
	LOGOFF	-0,115	0,098	-0,238	-1,169	0,248	-0,175	-0,157	-0,145	0,370	2,702
	AGE	4,818E-05	0,002	0,004	0,027	0,979	-0,003	0,004	0,003	0,809	1,236
	LOGNA	0,028	0,017	0,251	1,702	0,094	0,082	0,226	0,211	0,702	1,425
	LOGTA	0,014	0,152	0,026	0,092	0,927	-0,036	0,013	0,011	0,187	5,340
	LEV	0,269	0,192	0,222	1,398	0,168	0,157	0,187	0,173	0,606	1,651
	LOGREV	0,042	0,095	0,102	0,440	0,662	0,062	0,060	0,054	0,285	3,510
	NETINC	0,000	0,001	0,040	0,189	0,851	-0,089	0,026	0,023	0,336	2,973
	BOARD	-0,010	0,015	-0,093	-0,703	0,485	-0,029	-0,095	-0,087	0,875	1,143
	FINSEC	0,112	0,184	0,107	0,608	0,546	-0,138	0,082	0,075	0,492	2,031
	INDSEC	0,196	0,125	0,265	1,574	0,121	0,228	0,209	0,195	0,541	1,848
2	(Constant)	-0,026	1,238		-0,021	0,984					
	PLS	6,378E-06	0,001	0,001	0,004	0,996	-0,053	0,001	0,001	0,596	1,677
	IP	0,000	0,000	-0,197	-0,652	0,517	-0,173	-0,092	-0,084	0,180	5,559
	LOGOFF	-0,083	0,133	-0,172	-0,623	0,536	-0,175	-0,088	-0,080	0,214	4,668
	AGE	0,000	0,002	0,008	0,053	0,958	-0,003	0,008	0,007	0,724	1,381
	LOGNA	0,031	0,023	0,275	1,359	0,180	0,082	0,189	0,174	0,401	2,493
	LOGTA	0,003	0,164	0,006	0,019	0,985	-0,036	0,003	0,002	0,172	5,814
	LEV	0,271	0,200	0,224	1,356	0,181	0,157	0,188	0,174	0,601	1,664
	LOGREV	0,050	0,103	0,121	0,482	0,632	0,062	0,068	0,062	0,262	3,824
	NETINC	8,264E-05	0,002	0,013	0,047	0,963	-0,089	0,007	0,006	0,205	4,872
	BOARD	-0,010	0,016	-0,092	-0,647	0,520	-0,029	-0,091	-0,083	0,817	1,224
	FINSEC	0,121	0,202	0,115	0,597	0,553	-0,138	0,084	0,076	0,438	2,282
	INDSEC	0,197	0,136	0,266	1,454	0,152	0,228	0,201	0,186	0,490	2,040
	LYMI	-0,059	1,240	-0,022	-0,047	0,962	0,096	-0,007	-0,006	0,076	13,222
	LYCL	-0,017	0,108	-0,097	-0,159	0,874	0,077	-0,023	-0,020	0,044	22,830
	LYAOL	0,014	0,050	0,110	0,277	0,783	0,133	0,039	0,035	0,103	9,704
	LYPMJSE	8,785E-07	0,000	0,001	0,004	0,997	0,049	0,001	0,000	0,140	7,141

a. Dependent Variable: UP

Table 26.3(b) Regression on UP (underpricing) – pre-GFC (PRETOT):

Sequence 1 (control variables first, then independent variables) – Coefficients – part 2 of 2

Coefficients[a]											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
3	(Constant)	-0,267	1,215		-0,220	0,827					
	PLS	-0,001	0,001	-0,063	-0,381	0,705	-0,053	-0,054	-0,048	0,571	1,752
	IP	0,000	0,000	-0,479	-1,446	0,155	-0,173	-0,202	-0,181	0,142	7,032
	LOGOFF	-0,069	0,130	-0,143	-0,528	0,600	-0,175	-0,075	-0,066	0,214	4,684
	AGE	0,001	0,002	0,058	0,386	0,701	-0,003	0,055	0,048	0,701	1,427
	LOGNA	0,032	0,022	0,280	1,418	0,163	0,082	0,199	0,177	0,401	2,493
	LOGTA	0,054	0,162	0,102	0,334	0,740	-0,036	0,048	0,042	0,167	5,985
	LEV	0,325	0,197	0,269	1,650	0,105	0,157	0,229	0,206	0,588	1,702
	LOGREV	-0,010	0,106	-0,025	-0,097	0,923	0,062	-0,014	-0,012	0,237	4,215
	NETINC	-0,001	0,002	-0,184	-0,623	0,536	-0,089	-0,089	-0,078	0,179	5,590
	BOARD	-0,003	0,016	-0,029	-0,205	0,839	-0,029	-0,029	-0,026	0,772	1,296
	FINSEC	0,161	0,198	0,154	0,810	0,422	-0,138	0,115	0,101	0,433	2,309
	INDSEC	0,155	0,134	0,209	1,151	0,255	0,228	0,162	0,144	0,476	2,101
	LYMI	-1,202	1,357	-0,451	-0,885	0,380	0,096	-0,125	-0,111	0,060	16,626
	LYCL	-0,122	0,120	-0,687	-1,017	0,314	0,077	-0,144	-0,127	0,034	29,265
	LYAOL	0,061	0,055	0,480	1,099	0,277	0,133	0,155	0,137	0,082	12,232
	LYPMJSE	0,000	0,000	0,302	0,813	0,420	0,049	0,115	0,102	0,113	8,811
	JSE	0,247	0,132	0,374	1,861	0,069	0,100	0,257	0,233	0,386	2,588
4	(Constant)	-0,209	1,236		-0,169	0,867					
	PLS	-0,001	0,001	-0,064	-0,381	0,705	-0,053	-0,055	-0,048	0,569	1,758
	IP	0,000	0,000	-0,474	-1,394	0,170	-0,173	-0,199	-0,177	0,139	7,200
	LOGOFF	-0,087	0,135	-0,180	-0,644	0,523	-0,175	-0,093	-0,082	0,205	4,874
	AGE	0,001	0,002	0,069	0,447	0,657	-0,003	0,065	0,057	0,676	1,480
	LOGNA	0,030	0,023	0,263	1,295	0,202	0,082	0,186	0,164	0,389	2,573
	LOGTA	0,074	0,167	0,139	0,442	0,661	-0,036	0,064	0,056	0,163	6,128
	LEV	0,322	0,206	0,266	1,559	0,126	0,157	0,222	0,198	0,552	1,810
	LOGREV	-0,022	0,108	-0,053	-0,201	0,842	0,062	-0,029	-0,025	0,232	4,301
	NETINC	-0,001	0,002	-0,188	-0,627	0,534	-0,089	-0,091	-0,080	0,179	5,594
	BOARD	-0,005	0,016	-0,048	-0,326	0,746	-0,029	-0,047	-0,041	0,750	1,333
	FINSEC	0,149	0,206	0,143	0,725	0,472	-0,138	0,105	0,092	0,414	2,415
	INDSEC	0,138	0,139	0,186	0,993	0,326	0,228	0,143	0,126	0,456	2,193
	LYMI	-1,186	1,406	-0,445	-0,844	0,403	0,096	-0,122	-0,107	0,058	17,324
	LYCL	-0,123	0,122	-0,692	-1,002	0,321	0,077	-0,145	-0,127	0,034	29,612
	LYAOL	0,062	0,056	0,493	1,107	0,274	0,133	0,159	0,140	0,081	12,336
	LYPMJSE	0,000	0,000	0,311	0,805	0,425	0,049	0,117	0,102	0,107	9,320
	JSE	0,255	0,135	0,386	1,882	0,066	0,100	0,265	0,239	0,382	2,620
	PMCO	0,003	0,017	0,029	0,173	0,863	0,048	0,025	0,022	0,573	1,744
	OMCO	0,005	0,008	0,097	0,633	0,530	0,064	0,092	0,080	0,680	1,470

a. Dependent Variable: UP

Table 27.1 Regression on UP (underpricing) – pre-GFC (PRETOT):

Sequence 2 (independent variables first, then control variables) – Model Summary

Model Summary[e]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.100[a]	0,010	-0,005	0,277	0,010	0,658	1	65	0,420
2	.116[b]	0,013	-0,033	0,281	0,003	0,111	2	63	0,895
3	.469[c]	0,220	-0,009	0,278	0,207	1,125	12	51	0,361
4	.494[d]	0,244	-0,061	0,285	0,024	0,377	4	47	0,824

a. Predictors: (Constant), JSE

b. Predictors: (Constant), JSE, OMCO, PMCO

c. Predictors: (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA

d. Predictors: (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

e. Dependent Variable: UP

Table 27.2 Regression on UP (underpricing) – pre-GFC (PRETOT):

Sequence 2 (independent variables first, then control variables) – ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0,051	1	0,051	0,658	.420[b]
	Residual	5,005	65	0,077		
	Total	5,055	66			
2	Regression	0,068	3	0,023	0,287	.835[c]
	Residual	4,987	63	0,079		
	Total	5,055	66			
3	Regression	1,112	15	0,074	0,959	.509[d]
	Residual	3,943	51	0,077		
	Total	5,055	66			
4	Regression	1,235	19	0,065	0,800	.696[e]
	Residual	3,820	47	0,081		
	Total	5,055	66			

a. Dependent Variable: UP

b. Predictors: (Constant), JSE

c. Predictors: (Constant), JSE, OMCO, PMCO

d. Predictors: (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA

e. Predictors: (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

Table 27.3 Regression on UP (underpricing) – pre-GFC (PRETOT):

Sequence 2 (independent variables first, then control variables) – Coefficients

Coefficients[a]											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	0,231	0,038		5,993	0,000					
	JSE	0,066	0,081	0,100	0,811	0,420	0,100	0,100	0,100	1,000	1,000
2	(Constant)	0,223	0,050		4,441	0,000					
	JSE	0,064	0,086	0,097	0,739	0,463	0,100	0,093	0,092	0,912	1,096
	PMCO	5,634E-05	0,014	0,001	0,004	0,997	0,048	0,001	0,001	0,814	1,229
	OMCO	0,003	0,007	0,059	0,442	0,660	0,064	0,056	0,055	0,887	1,127
3	(Constant)	0,803	0,831		0,966	0,339					
	JSE	0,187	0,117	0,284	1,600	0,116	0,100	0,219	0,198	0,485	2,062
	PMCO	0,004	0,015	0,040	0,264	0,793	0,048	0,037	0,033	0,674	1,484
	OMCO	0,004	0,007	0,076	0,534	0,596	0,064	0,075	0,066	0,751	1,332
	PLS	-0,001	0,001	-0,059	-0,378	0,707	-0,053	-0,053	-0,047	0,635	1,575
	IP	0,000	0,000	-0,233	-1,045	0,301	-0,173	-0,145	-0,129	0,307	3,255
	LOGOFF	-0,155	0,103	-0,322	-1,516	0,136	-0,175	-0,208	-0,187	0,338	2,957
	AGE	0,001	0,002	0,068	0,475	0,637	-0,003	0,066	0,059	0,747	1,338
	LOGNA	0,027	0,017	0,237	1,601	0,115	0,082	0,219	0,198	0,697	1,434
	LOGTA	0,052	0,155	0,097	0,333	0,741	-0,036	0,047	0,041	0,179	5,592
	LEV	0,294	0,199	0,243	1,475	0,146	0,157	0,202	0,182	0,564	1,772
	LOGREV	-0,006	0,100	-0,015	-0,063	0,950	0,062	-0,009	-0,008	0,257	3,888
	NETINC	4,497E-05	0,001	0,007	0,033	0,973	-0,089	0,005	0,004	0,333	3,003
	BOARD	-0,010	0,015	-0,089	-0,654	0,516	-0,029	-0,091	-0,081	0,829	1,206
	RESSEC	-0,148	0,128	-0,154	-1,153	0,254	-0,169	-0,159	-0,143	0,858	1,166
	FINSEC	-0,028	0,155	-0,027	-0,181	0,857	-0,138	-0,025	-0,022	0,699	1,431
4	(Constant)	-0,071	1,220		-0,058	0,954					
	JSE	0,255	0,135	0,386	1,882	0,066	0,100	0,265	0,239	0,382	2,620
	PMCO	0,003	0,017	0,029	0,173	0,863	0,048	0,025	0,022	0,573	1,744
	OMCO	0,005	0,008	0,097	0,633	0,530	0,064	0,092	0,080	0,680	1,470
	PLS	-0,001	0,001	-0,064	-0,381	0,705	-0,053	-0,055	-0,048	0,569	1,758
	IP	0,000	0,000	-0,474	-1,394	0,170	-0,173	-0,199	-0,177	0,139	7,200
	LOGOFF	-0,087	0,135	-0,180	-0,644	0,523	-0,175	-0,093	-0,082	0,205	4,874
	AGE	0,001	0,002	0,069	0,447	0,657	-0,003	0,065	0,057	0,676	1,480
	LOGNA	0,030	0,023	0,263	1,295	0,202	0,082	0,186	0,164	0,389	2,573
	LOGTA	0,074	0,167	0,139	0,442	0,661	-0,036	0,064	0,056	0,163	6,128
	LEV	0,322	0,206	0,266	1,559	0,126	0,157	0,222	0,198	0,552	1,810
	LOGREV	-0,022	0,108	-0,053	-0,201	0,842	0,062	-0,029	-0,025	0,232	4,301
	NETINC	-0,001	0,002	-0,188	-0,627	0,534	-0,089	-0,091	-0,080	0,179	5,594
	BOARD	-0,005	0,016	-0,048	-0,326	0,746	-0,029	-0,047	-0,041	0,750	1,333
	RESSEC	-0,138	0,139	-0,144	-0,993	0,326	-0,169	-0,143	-0,126	0,768	1,303
	FINSEC	0,011	0,164	0,011	0,068	0,946	-0,138	0,010	0,009	0,655	1,527
	LYMI	-1,186	1,406	-0,445	-0,844	0,403	0,096	-0,122	-0,107	0,058	17,324
	LYCL	-0,123	0,122	-0,692	-1,002	0,321	0,077	-0,145	-0,127	0,034	29,612
	LYAOL	0,062	0,056	0,493	1,107	0,274	0,133	0,159	0,140	0,081	12,336
	LYPMJSE	0,000	0,000	0,311	0,805	0,425	0,049	0,117	0,102	0,107	9,320

a. Dependent Variable: UP

Table 28.1 Regression on UP (underpricing) – post-GFC (POSTTOT):

Sequence 1 (control variables first, then independent variables) – Model Summary

Model Summary[e]									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.751[a]	0,564	0,215	0,195	0,564	1,616	12	15	0,188
2	.983[b]	0,967	0,851	0,085	0,403	8,100	9	6	0,010
3	.988[c]	0,977	0,873	0,078	0,010	2,074	1	5	0,209
4	.992[d]	0,984	0,857	0,083	0,008	0,709	2	3	0,559

a. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV

b. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT

c. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE

d. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE, OMCO, PMCO

e. Dependent Variable: UP

Table 28.2 Regression on UP (underpricing) – post-GFC (POSTTOT):

Sequence 1 (control variables first, then independent variables) – ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0,734	12	0,061	1,616	.188[b]
	Residual	0,568	15	0,038		
	Total	1,302	27			
2	Regression	1,258	21	0,060	8,329	.007[c]
	Residual	0,043	6	0,007		
	Total	1,302	27			
3	Regression	1,271	22	0,058	9,467	.010[d]
	Residual	0,031	5	0,006		
	Total	1,302	27			
4	Regression	1,281	24	0,053	7,728	.058[e]
	Residual	0,021	3	0,007		
	Total	1,302	27			

a. Dependent Variable: UP

b. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV

c. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT

d. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE

e. Predictors: (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE, OMCO, PMCO

Table 28.3(a) Regression on UP (underpricing) – post-GFC (POSTTOT):

Sequence 1 (control variables first, then independent variables) – Coefficients – part 1 of 2

Coefficients[a] (model 1 and model 2)											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1,623	0,905		1,792	0,093					
	PLS	0,000	0,001	0,176	0,618	0,546	-0,220	0,158	0,105	0,359	2,788
	IP	-4,244E-05	0,000	-0,265	-0,773	0,451	-0,294	-0,196	-0,132	0,248	4,033
	LOGOFF	0,126	0,124	0,437	1,016	0,326	-0,409	0,254	0,173	0,157	6,353
	AGE	0,001	0,002	0,070	0,282	0,782	-0,340	0,073	0,048	0,475	2,105
	LOGNA	0,032	0,024	0,443	1,333	0,203	-0,010	0,325	0,227	0,264	3,795
	LOGTA	-0,196	0,130	-0,892	-1,510	0,152	-0,464	-0,363	-0,257	0,083	11,995
	LEV	-0,050	0,262	-0,057	-0,192	0,851	-0,237	-0,049	-0,033	0,330	3,026
	LOGREV	-0,108	0,124	-0,457	-0,875	0,396	-0,455	-0,220	-0,149	0,106	9,406
	NETINC	0,000	0,000	0,376	1,218	0,242	-0,225	0,300	0,208	0,305	3,281
	BOARD	-0,006	0,018	-0,082	-0,341	0,738	-0,265	-0,088	-0,058	0,505	1,981
	RESSEC	-0,089	0,280	-0,106	-0,317	0,755	-0,138	-0,082	-0,054	0,260	3,846
	INDSEC	-0,224	0,120	-0,469	-1,861	0,082	-0,309	-0,433	-0,317	0,457	2,188
2	(Constant)	0,812	0,683		1,188	0,280					
	PLS	0,003	0,001	0,926	4,804	0,003	-0,220	0,891	0,357	0,149	6,720
	IP	5,561E-05	0,000	0,347	1,836	0,116	-0,294	0,600	0,136	0,155	6,462
	LOGOFF	-0,240	0,081	-0,833	-2,962	0,025	-0,409	-0,771	-0,220	0,070	14,311
	AGE	-0,001	0,001	-0,178	-1,093	0,316	-0,340	-0,407	-0,081	0,209	4,775
	LOGNA	0,000	0,013	0,005	0,025	0,981	-0,010	0,010	0,002	0,162	6,191
	LOGTA	-0,334	0,075	-1,516	-4,443	0,004	-0,464	-0,876	-0,330	0,047	21,072
	LEV	-0,506	0,165	-0,574	-3,072	0,022	-0,237	-0,782	-0,228	0,158	6,310
	LOGREV	0,210	0,089	0,888	2,355	0,057	-0,455	0,693	0,175	0,039	25,693
	NETINC	0,000	0,000	0,194	0,973	0,368	-0,225	0,369	0,072	0,139	7,218
	BOARD	0,031	0,011	0,409	2,935	0,026	-0,265	0,768	0,218	0,284	3,517
	RESSEC	-0,502	0,193	-0,600	-2,604	0,040	-0,138	-0,728	-0,194	0,104	9,598
	INDSEC	-0,330	0,067	-0,692	-4,964	0,003	-0,309	-0,897	-0,369	0,284	3,520
	LYMI	-1,410	0,556	-0,589	-2,539	0,044	-0,234	-0,720	-0,189	0,103	9,745
	LYSSL	0,170	0,050	1,449	3,402	0,014	0,218	0,812	0,253	0,030	32,798
	LYCL	0,131	0,029	1,193	4,472	0,004	0,447	0,877	0,332	0,078	12,869
	LYICL	0,014	0,035	0,156	0,404	0,700	0,245	0,163	0,030	0,037	26,855
	LYAOL	0,118	0,030	0,848	3,926	0,008	0,002	0,848	0,292	0,119	8,437
	LYPMJSE	0,000	0,000	-1,183	-2,740	0,034	-0,275	-0,746	-0,204	0,030	33,727
	LYPMALT	0,006	0,001	1,915	4,325	0,005	-0,339	0,870	0,322	0,028	35,463
	LYOMALT	-0,017	0,005	-1,329	-3,732	0,010	0,242	-0,836	-0,277	0,044	22,930
	LYOMALL	7,572E-05	0,000	1,144	3,804	0,009	-0,079	0,841	0,283	0,061	16,348

a. Dependent Variable: UP

Table 28.3(b) Regression on UP (underpricing) – post-GFC (POSTTOT):

Sequence 1 (control variables first, then independent variables) – Coefficients – part 2 of 2

Coefficients[a] (model 3 and model 4)											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
3	(Constant)	0,511	0,663		0,771	0,476					
	PLS	0,003	0,000	0,924	5,207	0,003	-0,220	0,919	0,357	0,149	6,720
	IP	5,861E-05	0,000	0,366	2,095	0,090	-0,294	0,684	0,143	0,154	6,498
	LOGOFF	-0,148	0,098	-0,515	-1,511	0,191	-0,409	-0,560	-0,103	0,040	24,738
	AGE	0,000	0,001	-0,061	-0,362	0,732	-0,340	-0,160	-0,025	0,162	6,161
	LOGNA	0,000	0,012	0,002	0,014	0,989	-0,010	0,006	0,001	0,162	6,191
	LOGTA	-0,361	0,072	-1,643	-5,034	0,004	-0,464	-0,914	-0,345	0,044	22,721
	LEV	-0,553	0,155	-0,626	-3,562	0,016	-0,237	-0,847	-0,244	0,152	6,593
	LOGREV	0,219	0,082	0,928	2,666	0,045	-0,455	0,766	0,183	0,039	25,864
	NETINC	0,000	0,000	0,149	0,796	0,462	-0,225	0,335	0,054	0,135	7,433
	BOARD	0,035	0,010	0,459	3,452	0,018	-0,265	0,839	0,236	0,265	3,775
	RESSEC	-0,503	0,178	-0,601	-2,831	0,037	-0,138	-0,785	-0,194	0,104	9,598
	INDSEC	-0,349	0,063	-0,732	-5,571	0,003	-0,309	-0,928	-0,382	0,272	3,681
	LYMI	-1,142	0,545	-0,477	-2,098	0,090	-0,234	-0,684	-0,144	0,091	11,036
	LYSSL	0,135	0,052	1,152	2,599	0,048	0,218	0,758	0,178	0,024	41,876
	LYCL	0,123	0,028	1,123	4,488	0,006	0,447	0,895	0,307	0,075	13,363
	LYICL	0,020	0,033	0,217	0,607	0,570	0,245	0,262	0,042	0,037	27,243
	LYAOL	0,103	0,030	0,742	3,501	0,017	0,002	0,843	0,240	0,104	9,586
	LYPMJSE	0,000	0,000	-1,054	-2,587	0,049	-0,275	-0,757	-0,177	0,028	35,430
	LYPMALT	0,006	0,001	1,662	3,741	0,013	-0,339	0,858	0,256	0,024	42,067
	LYOMALT	-0,015	0,005	-1,135	-3,202	0,024	0,242	-0,820	-0,219	0,037	26,787
	LYOMALL	6,733E-05	0,000	1,017	3,500	0,017	-0,079	0,843	0,240	0,056	18,002
	JSE	-0,163	0,113	-0,311	-1,440	0,209	-0,394	-0,541	-0,099	0,101	9,916
4	(Constant)	1,716	1,366		1,256	0,298					
	PLS	0,002	0,001	0,915	4,826	0,017	-0,220	0,941	0,352	0,148	6,768
	IP	6,211E-05	0,000	0,387	1,900	0,154	-0,294	0,739	0,138	0,128	7,839
	LOGOFF	-0,210	0,136	-0,729	-1,549	0,219	-0,409	-0,667	-0,113	0,024	41,787
	AGE	0,002	0,002	0,263	0,797	0,484	-0,340	0,418	0,058	0,049	20,470
	LOGNA	0,009	0,015	0,119	0,571	0,608	-0,010	0,313	0,042	0,123	8,159
	LOGTA	-0,393	0,082	-1,786	-4,806	0,017	-0,464	-0,941	-0,350	0,038	26,023
	LEV	-0,704	0,210	-0,798	-3,355	0,044	-0,237	-0,889	-0,244	0,094	10,662
	LOGREV	0,112	0,126	0,474	0,893	0,438	-0,455	0,458	0,065	0,019	53,256
	NETINC	0,001	0,001	0,965	1,307	0,282	-0,225	0,602	0,095	0,010	102,897
	BOARD	0,024	0,015	0,308	1,607	0,206	-0,265	0,680	0,117	0,144	6,935
	RESSEC	-0,327	0,274	-0,391	-1,193	0,319	-0,138	-0,567	-0,087	0,050	20,197
	INDSEC	-0,401	0,082	-0,841	-4,911	0,016	-0,309	-0,943	-0,358	0,181	5,522
	LYMI	-1,799	0,801	-0,752	-2,246	0,110	-0,234	-0,792	-0,164	0,047	21,109
	LYSSL	0,134	0,057	1,140	2,353	0,100	0,218	0,805	0,171	0,023	44,253
	LYCL	0,126	0,030	1,149	4,254	0,024	0,447	0,926	0,310	0,073	13,750
	LYICL	0,011	0,037	0,122	0,304	0,781	0,245	0,173	0,022	0,033	30,618
	LYAOL	0,124	0,039	0,887	3,156	0,051	0,002	0,877	0,230	0,067	14,893
	LYPMJSE	-3,443E-05	0,000	-0,326	-0,425	0,700	-0,275	-0,238	-0,031	0,009	110,938
	LYPMALT	0,005	0,002	1,586	3,278	0,047	-0,339	0,884	0,239	0,023	44,146
	LYOMALT	-0,014	0,005	-1,070	-2,774	0,069	0,242	-0,848	-0,202	0,036	28,045
	LYOMALL	8,930E-05	0,000	1,349	3,239	0,048	-0,079	0,882	0,236	0,031	32,670
	JSE	-0,044	0,172	-0,084	-0,257	0,814	-0,394	-0,147	-0,019	0,050	20,168
	PMCO	-0,011	0,010	-0,653	-1,122	0,343	-0,139	-0,544	-0,082	0,016	63,877
	OMCO	0,005	0,007	0,156	0,639	0,568	-0,034	0,346	0,047	0,089	11,266

a. Dependent Variable: UP

Table 29.1 Regression on UP (underpricing) – post-GFC (POSTTOT):

Sequence 2 (independent variables first, then control variables) – Model Summary

Model Summary[e]									
					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.394[a]	0,155	0,123	0,206	0,155	4,781	1	26	0,038
2	.412[b]	0,170	0,066	0,212	0,014	0,208	2	24	0,814
3	.812[c]	0,659	0,234	0,192	0,490	1,437	12	12	0,270
4	.992[d]	0,984	0,857	0,083	0,325	6,800	9	3	0,071

a. Predictors: (Constant), JSE

b. Predictors: (Constant), JSE, OMCO, PMCO

c. Predictors: (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA

d. Predictors: (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA, LYMI, LYAOL, LYOMALL, LYSSL, LYCL, LYOMALT, LYICL, LYPMALT, LYPMJSE

e. Dependent Variable: UP

Table 29.2 Regression on UP (underpricing) – post-GFC (POSTTOT):

Sequence 2 (independent variables first, then control variables) – ANOVA

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0,202	1	0,202	4,781	.038[b]
	Residual	1,099	26	0,042		
	Total	1,302	27			
2	Regression	0,221	3	0,074	1,635	.208[c]
	Residual	1,081	24	0,045		
	Total	1,302	27			
3	Regression	0,858	15	0,057	1,548	.225[d]
	Residual	0,443	12	0,037		
	Total	1,302	27			
4	Regression	1,281	24	0,053	7,728	.058[e]
	Residual	0,021	3	0,007		
	Total	1,302	27			

a. Dependent Variable: UP

b. Predictors: (Constant), JSE

c. Predictors: (Constant), JSE, OMCO, PMCO

d. Predictors: (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA

e. Predictors: (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA, LYMI, LYAOL, LYOMALL, LYSSL, LYCL, LYOMALT, LYICL, LYPMALT, LYPMJSE

Table 29.3 Regression on UP (underpricing) – post-GFC (POSTTOT):

Sequence 2 (independent variables first, then control variables) – Coefficients

Coefficients[a]											
		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	0,298	0,084		3,547	0,002					
	JSE	-0,207	0,095	-0,394	-2,187	0,038	-0,394	-0,394	-0,394	1,000	1,000
2	(Constant)	0,279	0,091		3,063	0,005					
	JSE	-0,218	0,106	-0,414	-2,060	0,050	-0,394	-0,388	-0,383	0,856	1,168
	PMCO	-0,001	0,004	-0,085	-0,357	0,724	-0,139	-0,073	-0,066	0,616	1,625
	OMCO	0,005	0,007	0,152	0,645	0,525	-0,034	0,131	0,120	0,626	1,597
3	(Constant)	0,468	1,075		0,436	0,671					
	JSE	-0,315	0,180	-0,599	-1,744	0,107	-0,394	-0,450	-0,294	0,241	4,153
	PMCO	0,000	0,005	-0,020	-0,064	0,950	-0,139	-0,018	-0,011	0,295	3,389
	OMCO	0,003	0,009	0,084	0,277	0,787	-0,034	0,080	0,047	0,305	3,274
	PLS	0,001	0,001	0,235	0,812	0,432	-0,220	0,228	0,137	0,340	2,944
	IP	-2,105E-05	0,000	-0,131	-0,344	0,737	-0,294	-0,099	-0,058	0,195	5,127
	LOGOFF	0,192	0,146	0,667	1,320	0,212	-0,409	0,356	0,222	0,111	9,008
	AGE	0,001	0,002	0,176	0,663	0,520	-0,340	0,188	0,112	0,402	2,489
	LOGNA	0,024	0,025	0,336	0,988	0,343	-0,010	0,274	0,166	0,245	4,079
	LOGTA	-0,252	0,135	-1,146	-1,873	0,086	-0,464	-0,476	-0,315	0,076	13,188
	LEV	-0,271	0,289	-0,307	-0,937	0,367	-0,237	-0,261	-0,158	0,265	3,773
	LOGREV	0,019	0,144	0,080	0,131	0,898	-0,455	0,038	0,022	0,076	13,080
	NETINC	0,000	0,000	0,129	0,292	0,775	-0,225	0,084	0,049	0,145	6,909
	BOARD	0,002	0,020	0,032	0,124	0,903	-0,265	0,036	0,021	0,435	2,299
	RESSEC	0,043	0,265	0,051	0,163	0,873	-0,138	0,047	0,027	0,284	3,523
	FINSEC	0,308	0,143	0,585	2,148	0,053	0,427	0,527	0,362	0,382	2,615
4	(Constant)	1,315	1,351		0,974	0,402					
	JSE	-0,044	0,172	-0,084	-0,257	0,814	-0,394	-0,147	-0,019	0,050	20,168
	PMCO	-0,011	0,010	-0,653	-1,122	0,343	-0,139	-0,544	-0,082	0,016	63,877
	OMCO	0,005	0,007	0,156	0,639	0,568	-0,034	0,346	0,047	0,089	11,266
	PLS	0,002	0,001	0,915	4,826	0,017	-0,220	0,941	0,352	0,148	6,768
	IP	6,211E-05	0,000	0,387	1,900	0,154	-0,294	0,739	0,138	0,128	7,839
	LOGOFF	-0,210	0,136	-0,729	-1,549	0,219	-0,409	-0,667	-0,113	0,024	41,787
	AGE	0,002	0,002	0,263	0,797	0,484	-0,340	0,418	0,058	0,049	20,470
	LOGNA	0,009	0,015	0,119	0,571	0,608	-0,010	0,313	0,042	0,123	8,159
	LOGTA	-0,393	0,082	-1,786	-4,806	0,017	-0,464	-0,941	-0,350	0,038	26,023
	LEV	-0,704	0,210	-0,798	-3,355	0,044	-0,237	-0,889	-0,244	0,094	10,662
	LOGREV	0,112	0,126	0,474	0,893	0,438	-0,455	0,458	0,065	0,019	53,256
	NETINC	0,001	0,001	0,965	1,307	0,282	-0,225	0,602	0,095	0,010	102,897
	BOARD	0,024	0,015	0,308	1,607	0,206	-0,265	0,680	0,117	0,144	6,935
	RESSEC	0,074	0,285	0,089	0,260	0,812	-0,138	0,149	0,019	0,046	21,858
	FINSEC	0,401	0,082	0,764	4,911	0,016	0,427	0,943	0,358	0,219	4,556
	LYMI	-1,799	0,801	-0,752	-2,246	0,110	-0,234	-0,792	-0,164	0,047	21,109
	LYSSL	0,134	0,057	1,140	2,353	0,100	0,218	0,805	0,171	0,023	44,253
	LYCL	0,126	0,030	1,149	4,254	0,024	0,447	0,926	0,310	0,073	13,750
	LYICL	0,011	0,037	0,122	0,304	0,781	0,245	0,173	0,022	0,033	30,618
	LYAOL	0,124	0,039	0,887	3,156	0,051	0,002	0,877	0,230	0,067	14,893
	LYPMJSE	-3,443E-05	0,000	-0,326	-0,425	0,700	-0,275	-0,238	-0,031	0,009	110,938
	LYPMALT	0,005	0,002	1,586	3,278	0,047	-0,339	0,884	0,239	0,023	44,146
	LYOMALT	-0,014	0,005	-1,070	-2,774	0,069	0,242	-0,848	-0,202	0,036	28,045
	LYOMALL	8,930E-05	0,000	1,349	3,239	0,048	-0,079	0,882	0,236	0,031	32,670

a. Dependent Variable: UP

Table 30. Regression on UP – Summary of model summaries

PRETOT (pre-GFC) - Regression - analysis sequence 1
(Control variables first, then independent variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	67	0,174	-0,009	0,949	.507
2	67	0,181	-0,081	0,690	.790
3	67	0,235	-0,031	0,885	.594
4	67	0,244	-0,061	0,800	.696

POSTTOT (post-GFC) - Regression - analysis sequence 1
(Control variables first, then independent variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	28	0,564	0,215	1,616	.188
2	28	0,967	0,851	8,329	.007
3	28	0,977	0,873	9,467	.010
4	28	0,984	0,857	7,728	.058

PRETOT (pre-GFC) - Regression - analysis sequence 2
(Independent variables first, then control variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	67	0,010	-0,005	0,658	.420
2	67	0,013	-0,033	0,287	.835
3	67	0,220	-0,009	0,959	.509
4	67	0,244	-0,061	0,800	.696

POSTTOT (post-GFC) - Regression - analysis sequence 2
(Independent variables first, then control variables)

Model summary

Model	N	R Square	Adjusted R Square	F	Sig.
1	28	0,155	0,123	4,781	.038
2	28	0,170	0,066	1,635	.208
3	28	0,659	0,234	1,548	.225
4	28	0,984	0,857	7,728	.058

Dependent variable: UP.

Model predictors

Pre-GFC - analysis sequence 1 (control variables first, then independent variables)

Model no.

1 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA

2 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

3 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE

4 (Constant), INDSEC, NETINC, BOARD, LEV, AGE, PLS, LOGNA, LOGREV, FINSEC, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL, JSE, OMCO, PMCO

Pre-GFC - analysis sequence 2 (independent variables first, then control variables)

Model no.

1 (Constant), JSE

2 (Constant), JSE, OMCO, PMCO

3 (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA

4 (Constant), JSE, OMCO, PMCO, AGE, LOGNA, RESSEC, FINSEC, BOARD, PLS, LEV, NETINC, LOGREV, LOGOFF, IP, LOGTA, LYAOL, LYPMJSE, LYMI, LYCL

Post-GFC - analysis sequence 1 (control variables first, then independent variables)

Model no.

1 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV

2 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT

3 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE

4 (Constant), INDSEC, LEV, LOGTA, IP, AGE, BOARD, PLS, NETINC, LOGNA, RESSEC, LOGOFF, LOGREV, LYAOL, LYMI, LYPMJSE, LYSSL, LYOMALL, LYOMALT, LYCL, LYICL, LYPMALT, JSE, OMCO, PMCO

Post-GFC - analysis sequence 2 (independent variables first, then control variables)

Model no.

1 (Constant), JSE

2 (Constant), JSE, OMCO, PMCO

3 (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA

4 (Constant), JSE, OMCO, PMCO, RESSEC, FINSEC, BOARD, LEV, PLS, AGE, LOGNA, NETINC, IP, LOGOFF, LOGREV, LOGTA, LYMI, LYAOL, LYOMALL, LYSSL, LYCL, LYOMALT, LYICL, LYPMALT, LYPMJSE

APPENDIX I

17. APPENDIX H – SUMMARY OF RESULTS

17.1 TABLES ON SUMMARY OF RESULTS

Table 31.1 Summary of study framework

Study title	***Signalling IPO readiness in a changing environment: the changing impact of listing standards and media coverage on IPO performance***
Primary objective	• To understand the impact of a period of major change in the IPO environment, namely the GFC, on the impact of signals of IPO readiness on IPO performance, focusing on the changing impact of two IPO signals – listing standards and media coverage – from pre-GFC to post-GFC.
Secondary objective	• To understand the impact of a period of major change in the IPO environment, namely the GFC, on the impact of other explanatory variables on IPO performance, included in the study as control variables, from pre-GFC to post-GFC
Area 1	***On the changing impact of listing standards on IPO performance***
Research question 1	• What was the change in the impact of listing standards on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?
Hypothesis 1	• The impact of listing standards on IPO performance increased from pre-GFC to post-GFC
Area 2	***On the changing impact of media coverage on IPO performance***
Research question 2	• What was the change in the impact of media coverage on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?
Hypothesis 2	• The impact of media coverage on IPO performance increased from pre-GFC to post-GFC
Area 3	***On the changing impact of control variables on IPO performance***
Research question 3	• What was the change in the impact of control variables on IPO performance, for the JSE and AltX, comparing pre-GFC and post-GFC?
Hypothesis 3	• The impact of control variables on IPO performance increased from pre-GFC to post-GFC

Table 31.2 Expected versus actual relationship between explanatory variables and underpricing

Variable	**Expected relationship with underpricing**		
	Expected relationship (Table 11)	Actual - Pre-GFC results of correlation analysis (Table 16.3)	Actual Post-GFC results of correlation analysis (Table 16.3)
Indepen. variables			
JSE	Negative	Positive	Negative
PMCO	Negative	Positive	Negative
OMCO	Negative	Positive	Negative
CMCO	Negative	Positive	Negative
Control variables			
Offer profile			
PLS	Negative	Negative	Negative
IP	Negative	Negative	Negative
LOGOFF	Negative	Negative	Negative
Company profile			
AGE	Negative	Negative	Negative
LOGNA	Negative	Positive	Negative
LOGTA	Negative	Negative	Negative
LEV	Negative	Positive	Negative
LOGREV	Negative	Positive	Negative
NETINC	Negative	Negative	Negative
BOARD	Negative	Negative	Negative
Industry sector			
RESSEC	Potentially vary with year of listing and market conditions	Negative	Negative
FINSEC		Negative	Positive
INDSEC		Positive	Negative
Market conditions			
LYMI	Positive	Positive	Negative
Listing activity			
LYTL	Positive	Negative	Positive
LYSSL	Positive	Negative	Positive
LYCL	Positive	Positive	Positive
LYICL	Positive	Positive	Positive
LYAOL	Positive	Positive	Positive
Media volume			
LYPMJSE	Negative	Positive	Negative
LYPMALT	Negative	Negative	Negative
LYPMALL	Negative	Positive	Negative

LYOMJSE	Negative	Negative	Negative
LYOMALT	Negative	Negative	Positive
LYOMALL	Negative	Negative	Negative

Table 31.3. Comparison of study results – Johan (2010) and current study

Comparison criteria	**TSX vs TSX-V (Johan, 2010, p.136)**	**JSE vs. AltX (Table 22.3)**
Maximum negative impact on underpricing of higher listing standards (maximum positive impact on IPO performance)	94,8%	41,4%
Significance level	1%	5%
Minimum negative impact on underpricing of higher listing standards (minimum positive impact on IPO performance)	44,8%	39,4%
Significance level	1%	5%

APPENDIX J

18. APPENDIX J – CONSENT FORMS

18.1 CONSENT FORMS

Based on the empirical nature of the research methodology and the use of publicly accessible archival data, no information was required from personal interviews, individual surveys, or other personal sources. Consent forms were not required for the study.

APPENDIX K

19. APPENDIX K – QUESTIONNAIRES

19.1 QUESTIONNAIRES

The research was based on data gathered from various data bases. Questionnaires were not required for the study.