AN ANALYSIS OF FACTORS IMPACTING INITIAL PUBLIC OFFERING PERFORMANCE IN SOUTH AFRICA.

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DECLARATION

I, Jan Johannes Jacobus du Plessis, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

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Jan Johannes Jacobus du Plessis

Signed at Johannesburg

On the 18th day of June 2019
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DEDICATION

I dedicate this study to the special people in my life who are willing to do anything for me. To my wife, Samantha, you have been a pillar of strength when I waivered and a coach when I needed encouragement. You celebrated every milestone and lived every challenge with me as if it were your own. Above all, you carried our young family through this time with a song in your heart. For all the support along this journey I am eternally thankful. To my parents, Jan & Louise: You brought me unlimited opportunities in life and selflessly sacrificed so much for my education. You taught me the value of family and you are always ready to rush to our aid, any time of day and night. You laugh and cry with us. The wisdom and values you have imparted on me and my family will live on for generations to come.
1 ABSTRACT

When a company looks to equity markets for funding or liquidity, a formal listing on a bourse such as the Johannesburg Securities Exchange (JSE) is required through an Initial Public Offering (IPO). Leading up to the listing, companies undergo a process of attracting investors known as book building. Investors are attracted to the possibility of achieving returns in excess of market growth while companies seek to maximise capital raised and value unlocked for pre-listing shareholders, also referred to as insiders. A balance must be struck between a high offer price and strong initial returns so that prospective shareholders and insiders are fairly compensated. This study examines factors thought to be associated with initial return and provides insight into the effect of market, industry and company specific variables on the returns on the first day and over the first 21 days of listing. 42 IPO’s on the Main Board of the JSE between 2003 and 2018 were analysed using stepwise multi-variate regression analysis to offer investors and insiders an opportunity to get a sense of expected initial returns based on a selection of measures that are readily available in the run-up to the listing.

The results indicated that Return on Equity, Price-Earnings multiple of the offer price and the quantum of capital raised play a significant role in the initial return on the first day of trade - associated with as much as 53% of the variability of first day returns. Over 21 days the results were not as strong as that of first day returns. A correlation coefficient of 43% was noted and capital raises was not found to be statistically significant. This could possibly be due to a range of other factors relating to investor behaviour and market forces that do not significantly impact returns over one day. Investors and firms looking to list could test their expectations of initial return and pricing against these variables for an indication of performance post listing.
2 INTRODUCTION

2.1 CONTEXT

Once a company reaches considerable size, listing on a formal securities exchange becomes a strong consideration. Such a listing is referred to as an Initial Public Offering. Companies undergo initial public offerings for various reasons including raising capital for acquisitions and capital expansion, unbundling from larger groups or as a means of exit by owners. South Africa hosts the largest capital market on the African continent - The Johannesburg Securities Exchange - which was founded in 1887, after the discovery of gold in the Witwatersrand, to provide newly established mines with access to funding (Moolman & Du Toit, 2005). The JSE has since grown to a total market capitalisation of US$1.1 trillion (Stockmarketclock.com, 2018). During the five years preceding December 2017, US$4.77 billion in capital was raised on the Johannesburg Stock Exchange through new listings (PWC, 2018). Equity markets stimulate economic activity by providing an efficient platform for companies to raise capital and for investors to generate inflation beating returns.

Companies are often undervalued during an IPO. The offer price is normally lower than the share price shortly after listing, i.e. the secondary market’s valuation - this phenomenon is referred to as under-pricing (Lowry, Officer, & Schwert, 2010). Under-pricing is a pervasive phenomenon in IPO’s – During 1995 to 2004, IPO’s in South Africa were under-priced by an average of 5.45%. In other words, investors gained 5.45% on the first day of trade with issuers leaving money on the table. (Alli, Subrahmanyam, & Gleason, 2010). During 2000 to 2011 the average under-pricing for the main board of the JSE was 10.1% (Govindjee, 2012). The threat of severe under-pricing can ultimately lead to the abandonment of the IPO process by issuers (Busaba, Benveniste, & Guo, 2001).
2.2 PROBLEM STATEMENT

Investors seek high initial returns while firms and insiders seek to list at a strong as possible listing share price (Offer Price) to maximise value gained through listing. This trade-off is extremely important in the listing process. Too high an offer price would detract investors due to low earnings potential post listing while too low an offer price would erode the value of the company artificially. Investors, firms and insiders should understand factors impacting the performance of an IPO.
2.3 OBJECTIVES

This study aims to identify, from international literature, factors that contribute to performance of IPO’s measured by initial return. These factors will be empirically tested to determine their impact on IPO under-pricing in South Africa for the 15-year period ended December 2018. The findings will provide prospective issuers and investors with insight into the significance of these factors. This knowledge could inform IPO readiness and timing as well as investment strategies in the context of the JSE.

2.4 DELIMITATIONS, LIMITATIONS AND ASSUMPTIONS

The study will focus on the 15 years to December 2018. The research seeks to test, inter alia, the impact of market timing on IPO’s. The period includes the global financial crisis during 2008, which dramatically impacted capital flows in developing countries (Te Velde et al., 2008). Other, more recent events affecting investor sentiment include cabinet reshuffles by former president Jacob Zuma and the ANC Elective Conference which will be considered in the analysis of results.

The data used in the study will be limited to published information regarding IPO’s on the main board of the JSE. The rest of the securities exchanges in South Africa, namely the AltX, ZARX, A2X, A4X and EESE, will be purposefully excluded from this research as the target market for these exchanges are typically small and medium enterprises for which the listing requirements are different. These companies typically trade at lower levels of liquidity, have small market capitalisations and high volatility in share price. IPO’s during recent years on these newer, smaller exchanges were performed to replace over the counter transactions and differ fundamentally in nature from the main board IPO’s (PWC, 2018). Secondary and inward listings are also excluded as they are already publicly quoted elsewhere.
3 LITERATURE REVIEW

3.1 INTRODUCTION

Literature attributes variability of IPO pricing to a range of factors. Information asymmetry causes uncertainty over the valuation of a company and therefore the offer price is discounted to compensate for this risk (Rock, 1986). Market conditions specifically and the occurrence of hot and cold periods (Busaba et al., 2001) (Rau & Stouraitis, 2011). Industry characteristics such as concentration and regulatory landscape (Brau, Francis, & Kohers, 2003) (Brau & Fawcett, 2006) and company specific factors including debt levels, issue size and ownership retention (Lee, Taylor, & Walter, 1999) (Su, 2004) have been argued to impact under-pricing. The literature reviewed in this section presents market, industry and company specific factors from which the hypotheses of this study are derived.

3.2 PRICING

3.2.1 VALUATION

Issuing firms are required to set an offer price in their prospectus. The offer price is determined, in part, by the valuation placed on the company’s equity by its owners. This valuation is generally arrived at using a combination of valuation methods. The most widely used methods are discounted cash flow (DCF) valuations, asset-based valuations and comparison of financial ratios (multiples) with peer firms (Kim & Ritter, 1999). The DCF model is scientifically robust but uncertainty of forecast data and assumptions used in projecting financial data is a significant drawback of this method in practice. The asset-based approach mainly considers the value of a firm’s assets to determine its value. For this method to be applied, the market value of the company’s assets must be reliably determinate and liquid. Valuation of items such as intangible assets would be difficult to estimate, and alternative methods may be better suited. Valuation uncertainty is higher in software and IT related industries due to the high R&D content of its operations. The multiples approach is most trusted as a practical and accurate method. This model requires a group of similar companies with quoted valuations and readily available financial data. Kim & Ritter (1999) finds the multiples method is not without its limitations. Accuracy improves when forecast earnings is used
and the valuations are more reliable for older companies due to higher availability of historical information. Multiples valuations, however, are subject to interpretation and are compared to peer firms. Underwriters may influence perception by selecting a peer group with relatively high valuations compared to the offering firm which results in the valuation appearing (Paleari, Signori, & Vismara, 2014).

### 3.2.2 Reservation price

Issuers typically withdraw from an IPO when the price offered in the run up to the listing is less than their reservation price. The reserve price can be affected by factors such as alternative access to funding, desired liquidity of current shareholders and the opportunity cost of withdrawing from an IPO. Potential investors are deterred from putting excessive pressure on pricing when the threat of a company pulling out from the IPO is high (Busaba et al., 2001). Withdrawal is therefore dependent on the strength of investor valuation as well as the minimum acceptable price for the issuer. Potential investors base their valuation of a company on many considerations including the liquidity of a share post listing and the absolute size and market capitalisation of the IPO.

### 3.2.3 Pricing

Over- or under-pricing is typically measured by initial return: the difference between the underwriter’s valuation of the company, reflected in the offer price and the valuation of the company in the secondary market (Rock, 1986). Variability in pricing can be explained in part by information asymmetry. The exact demand for a share is not known until it is offered – this is when market forces kick in to determine the equilibrium price, which is publicly known. The underwriter and the issuer have superior knowledge of the company as compared to any individual potential investor, however, the collective information of all potential investors may be even greater, causing mispricing (Rock, 1986). Book building, discussed further in the next section, decreases information asymmetry and has been proven to reduce under-pricing (Ljungqvist, Jenkinson, & Wilhelm, 2000). Under-pricing can also attract high levels of subscription when issuers opt to deliberately under-price their IPO to ensure liquidity of its share and dispersed ownership (Booth & Chua, 1996). Underwriters may
deliberately reduce fair-value estimations of a firm in the pricing process to provide a price discount (Roosenboom & Finance, 2012) and (Rust, 2015) identified that high PE Ratios have been associated with high initial returns. Huang, Chang, Kuo, and Hsieh (2017) argue that firms may bolster financial information pre-IPO which leads to long run underperformance.

3.2.4 BOOK BUILDING

Book building refers to a process whereby a company is marketed to potential investors before determining the final offer price. This allows the investment banker to determine market demand for the IPO and adjust the offer price accordingly. The book building approach has been the dominant form of price determination by investment bankers since the late 1990’s (Ljungqvist et al., 2000). Busaba et al (2001) argue that under-pricing is a reward for investors to express honest interest in an IPO while traditional book building theory suggests that wide marketing of the share reduces under-pricing by reducing information asymmetry and increases liquidity. The cost of listing via the Book building method is roughly double that of the fixed-pricing approach due to the increased cost of canvassing investor support. It is argued that the added cost is justified as book building decreases mispricing (Ljungqvist et al., 2000). The data includes the name of the sponsor and the cost of the listing.

3.2.5 SUMMARY—PRICING

The pricing of IPO’s vary substantially and is affected by various circumstances. (Lowry et al., 2010) Understanding how different factors impact the pricing of an IPO is key to understanding the performance of listings. The data includes offer price as well as the closing share price first day of listing to measure the movement after the first day of trade. In addition, the closing price at the end of the 21st day of trade was included to provide insight into the variability of pricing after the market has had time to assimilate more information.

3.3 MARKET FACTORS

Rau & Stouraitis (2011) observe waves of corporate activity starting with issue of equity. Issuances by existing public companies (Seasoned Equity Offerings – SEO’s) increase first, followed by a surge in IPO activity. This equity wave is shortly followed by a rise in
equity-based mergers before a share repurchase wave commences. These waves likely explain, at least in part, seasonality of IPO activity in the form of hot and cold periods. A period of increased SEO's can predict an imminent surge in IPO’s (Rau & Stouraitis, 2011). The number of IPO’s during a period is strongly associated with higher initial returns. Periods of high initial returns appear to predict surges in IPO volumes (Lowry et al., 2010). Busaba et al. (2001) observe higher numbers of withdrawals from the IPO process during cold periods due to high levels of under-pricing. It is also argued that initial return is determined more by firm and industry specific characteristics and the information that become available during the IPO process, rather than by the timing of the IPO (Lowry & Schwert, 2002). There is a clear difference in the performance of IPO’s after the liberalisation South African Markets which is associated with improved pricing (Alli et al., 2010). The number of listings in each year is recorded in the data to determine if IPO pricing could be influenced by hot or cold listing periods. Ahmad, Anwar, ur Rehman, and Basit (2016) finds that Initial returns in hot periods exceed cold period returns.

3.4 INDUSTRY FACTORS

Brau et al. (2003) found that high-concentration industries deter merger activity. An analysis of the Herfindahl-Hirschmann Index\(^1\) (HHI) of industries showed that IPO’s were favoured in high-concentration industries due to restrictions on mergers and acquisitions activity. The possible reasons put forward for this are the reputational benefits and positive investor sentiment in technology industries, while deregulation in financial services deter IPO’s. Technology based industries were more likely to undergo IPO’s where takeovers were more prominent in financial services industries (Brau et al., 2003). Consolidation of the financial services industry has been widely observed as companies seek to increase market dominance and efficiency. Factors that impact on the pace of consolidation include technological progress and changes in regulation (Berger, Demsetz, & Strahan, 1999). High technology firms empirically showed lower levels of under-pricing, while under-pricing in financial & commercial services firms

\(^1\) The Herfindahl Index is a widely used statistical measure of the level of concentration within an industry and has been used by competition authorities in the United States to evaluate the concentration in industries since the early 1980’s. (Calkins, 1983)
were not statistically significant within 141 IPO’s on the JSE from 1995 to 2004 (Alli et al., 2010).

IPO’s provide a large capital injection without the solvency and liquidity constraints associated with debt financing. Industries that by nature require high initial investment in research and development benefit from this as these firms often require very little additional external funding post IPO and can grow organically (Carpenter & Petersen, 2002).

3.5 COMPANY SPECIFIC FACTORS

There are many reasons why companies go public. In addition to raising equity funding, an IPO affords the company credibility, reputational benefits, reduced cost of capital and a known, liquid market value. Each company has a unique blend of characteristics that may affect the outcome of an IPO.

3.5.1 EXIT, MERGERS AND ACQUISITIONS

Listing provides a means of exit by current owners and can facilitate the acquisition or merger with other entities (Brau & Fawcett, 2006). The latter has been proven to be especially prevalent in the motivation of companies to undergo an IPO (Alli et al., 2010). IPO’s generate considerable amounts of cash that can be used to fund acquisitions shortly after listing and provides continued access to debt and equity markets to facilitate raising of capital for future acquisitions. A company can also use its shares as consideration in the purchase price in equity-based acquisitions (Hovakimian & Hutton, 2010). Equity based acquisitions involve funding decisions as much as it involves investment decisions, whereas pure cash acquisitions likely form pure investment activity (Rau & Stouraitis, 2011).

Public companies have a lower degree of valuation uncertainty and is therefore able to determine optimal acquisition strategy more efficiently as takeover gains can be more reliably measured. The prevalence acquisitions activity shortly after IPO’s supports the notion that IPO’s relate strongly to M&A ambitions - firms with higher than expected initial valuations are associated with higher acquisitions activity post IPO (Hsieh, Lyandres, & Zhdanov, 2011).
3.5.2 Ownership Structure

High insider retention signal to the market that the current owners of the business have confidence in its long-run performance (Su, 2004). Venture capitalists engage in direct oversight of the companies they have invested in and continually monitor performance. This overcomes much of the information asymmetry and lend credibility to the company. Venture capital funding thus ideal for of equity financing for young technology firms (Carpenter & Petersen, 2002). Higher venture capital involvement and the choice of bookrunner in companies pre-IPO have been shown to reduce the amount of valuation error (Lowry et al., 2010).

3.5.3 Financial Features of the Issuing Firm

IPO’s typically raise significant amounts of capital in relation to the size of the company and can accelerate growth beyond the level that debt funding would be able to facilitate (as much as 300%). Equity finance does not require collateral and aligns the interests of the funder with the company while lowering the risk of insolvency (Carpenter & Petersen, 2002). Listing to repay debt can, however, lead to high levels of under-pricing and possibly cause firms to withdraw from the IPO (Busaba et al., 2001). While under-pricing may be seen as a negative factor for the listing firm, initial returns are a gain for the investor and consequently, companies may seek not to over price their issues. Amor, Kooli, and Finance (2017) finds that stronger operational performance by companies bolstered initial returns.

Figure 1: Hierarchy of Capital illustrates the hierarchy of capital. Debt finding will be preferred until the marginal cost of debt reaches that of equity. At that point, it is preferable to issue new equity and leverage will begin to reduce.
Firms with higher revenues, cash flows, profits and tangible assets are less likely to withdraw as these companies are easier to value and lower levels of under-pricing exist when compared to smaller firms promising high growth (Busaba et al., 2001). Firms with higher levels of intangible assets are less likely to be granted high levels of debt and will require equity finance. The higher the leverage of a company, the higher the burden of debt financing becomes. Additional encumbrances and covenants are imposed, and the cost of debt rises (Carpenter & Petersen, 2002). Interestingly, Busaba et al. (2001) indicated that firms with high levels of debt were more likely to withdraw from the IPO process. High leverage causes uncertainty regarding the company’s financial strength and has been proven to increase under-pricing (Su, 2004).

IPO’s involve high fixed costs and is therefore more desirable for large share issues. Larger listings with high expected market capitalisations attract favourable valuations from potential investors. Li, Liu, Liu, and Tsai (2018) finds that the size of a firm affects IPO performance. These factors contribute to the liquidity of a share and attract institutional investors, lowering the risk associated with investment in these IPO’s as opposed to smaller listings. Institutional investors have been proven to be more
informed based on the profits made on issues. They are observed to apply for allotment significantly more in under-priced IPO’s as compared to retail investors (Lee et al., 1999).

3.6 ALTERNATIVES TO AN IPO

Smaller IPO’s have been found to attract lower levels of interest from investors, resulting in a decline in IPO’s of smaller companies over time (Rose & Solomon, 2016). An alternative to public listing is the option to be acquired by a publicly traded entity. The decision to be acquired rather than listing directly is impacted by (1) Industry characteristics: Concentration, competition and regulatory structure; (2) Market conditions: Hot & Cold IPO or Acquisition Periods; (3) Company specific features: Size of the company, insider ownership and liquidity; and (4) Funding requirements (Brau et al., 2003). Each of these factors are contemplated in more detail further on in the review of IPO literature. Special purpose acquisition companies (SPAC’s) have gained momentum during recent years. This type of company is formed and listed with the specific goal of performing acquisitions. These companies have no material financial history and rely on the track record of its founders and management team (Riemer, 2007).
3.7 HYPOTHESES

The literature reviewed has been summarised under market, industry and company specific factors and its impact variability of IPO pricing, measured by initial return. The following hypotheses were derived from the review of the literature in each area:

3.7.1 MARKET INDICATORS:

Market cycles may impact initial returns, and IPO volumes may vary during these cycles, which can impact on the liquidity and demand for a share:

H1: Initial return varies for varying average levels of market growth.

3.7.2 INDUSTRY INDICATORS

For reasons such as regulatory environment and competitive landscape, IPO pricing could vary for different industries:

H2: Different industries will have different average levels of initial return.

3.7.3 COMPANY SPECIFIC INDICATORS

3.7.3.1 RATIONALE FOR LISTING

Companies often list to facilitate mergers and acquisitions, fund expansion, provide liquidity to owners or to unbundle from larger groups. Market signalling and future prospects may alter the initial return depending on the use of the proceeds of a listing.

H3: Initial return will vary according to the rationale of listing.

3.7.3.2 OWNERSHIP STRUCTURE:

High retention of shares by insiders signals confidence to the market.

H4: The level of insider ownership retention influences initial returns.

3.7.3.3 FINANCIAL FEATURES OF THE ISSUING FIRM

Financial performance has been shown to be a significant determinant of pricing. The following factors are hypothesised to influence initial return:

H5: Level of Long-Term Borrowings

H6: Proportion of Intangible Assets and Goodwill

H7: Cash Flows
H8: Profitability
H9: Size of listing

3.7.3.4 BOOK BUILDING

The book building process can influence the information asymmetry and impact on pricing.

H10: IPO cost influences initial return.
H11: The sponsor of the transaction can significantly influence the initial return.

3.7.3.5 PRICING AND VALUATION

H12: The pre-listing valuation is associated with varying levels of initial return.
4 DATA COLLECTION AND ANALYSIS

4.1 POPULATION

The purpose of the study is to determine the impact of various factors on the performance of IPO’s in South Africa. It is key to the research that the IPO’s cover various industries, span market cycles and have a sufficient number of observations to determine statistical significance through performing multi-variate regression analysis and to provide meaningful descriptive statistics. The population for the analysis consists of all IPO’s from 2003 to 2018 on the main board of the JSE.

4.2 SAMPLE SIZE AND SELECTION

All IPO’s during the period were reviewed in the analysis, therefore, as this is a census of the entire population, no sampling of data was performed. Primary listings of ordinary shares on the Main Board were included. Any inward and dual listings excluded as these listings are not considered IPO’s for the purpose of this study. Property funds and Real Estate Investment Trusts (REITs) were excluded as these are investment vehicles as opposed to operating businesses and has a unique pricing profile. Listings though unbundling are included in the analysis as these are companies grew to considerable size within a larger, listed entity and is required to raise their own capital and operate as a standalone listing from the date of unbundling onward.

4.3 DATA COLLECTION

Performance of IPO’s measured using financial data and as such the analysis will be quantitative, making use of numerical data from financial and market sources. A list of all equity issuances during the research period was accessed from the “iRess” corporate actions database. Any seasoned equity offerings, dual listings and foreign inward listings were excluded and only ordinary share issuances were considered. The final dataset comprises 42 observations. The pre-listing statement for each of the observations was obtained and each of the variables discussed in the next section was extracted.
4.4 DATA ANALYSIS

This study seeks to utilise valid measurements to arrive at actionable, generalisable findings which can be applied in the IPO process. Generalisability of findings is one of the key strengths of quantitative research (Winter, 2000). The literature review has revealed that a combination of the factors discussed therein could predict the performance of an IPO. It is therefore believed that descriptive statistics and multivariate regression analysis would illustrate their effect on performance. This approach has been followed extensively in literature (Alli et al., 2010) (Brau et al., 2003) (Karlis, 2000) (Govindjee, 2012).

4.4.1 VARIABLES

The following variables were collected and analysed:

4.4.2 INITIAL RETURN — THE DEPENDENT VARIABLE

Initial return (IR) of the share is to be used as a measure of under- or overpricing. Two separate iterations of the analysis will be performed using the first day (IR1) and first 21 day return (IR21) respectively to control for the assimilation of information by the market over the first few weeks after the IPO:

\[
IR_1 = \frac{MP_1}{OP} \\
\text{AND;}
\]

\[
IR_{21} = \frac{MP_{21}}{OP}
\]

Where IR1 represents the initial return for the first day of listing and IR21, the initial return for the first 21 days. MP1 and MP 21 is the closing share price at the end of the first day and at the end of the 21st day respectively and OP is the offer price of the IPO. (Su, 2004) (Alli et al., 2010).

4.4.2.1 MARKET INDICATORS

H1: (IPOCOUNT) - The number of IPO’s in each year.
(ALSI GROWTH) - The average monthly growth in the JSE All Share Index for the year in which each observation occurred.

(ALSI1) and (ALSI21) - ALSI as an index at the end of the first day and first 21 days respectively where the opening ALSI index on the day of listing is 100.

(ALSI MOVE) - Movement between (ALSI1) and (ALSI21).

### 4.4.2.2 INDUSTRY INDICATORS

H2: (INDUSTRY) - The JSE industry classification is assigned to each observation based on the sector noted in the pre listing statement for each observation. There were then grouped into the following variables and assigned a numeric categorical value:

1. Consumer Goods & Services, Telecommunication & Healthcare
2. Financials & Real Estate Development
3. Basic Materials & Industrials

### 4.4.2.3 COMPANY SPECIFIC INDICATORS

### 4.4.2.4 RATIONALE FOR LISTING

H3: (RATIONALE) - The pre listing statements of each listing indicated the rationale for the listing and use of proceeds as well as the long-term debt before and after listing. Each observation was assigned one of the following categorical values according to the rationale for listing:

1. Liquidity: To provide owners with a tradeable share, large offers for sale by owners or unbundling.
2. Funding: Raising large amounts of capital to facilitate acquisitions, repay debt or fund expansion.

(REPAY DEBT) - To establish whether the use of proceeds to repay debt, was used as a categorical value 1 if proceeds used to repay debt and 0 if not.
4.4.2.5 OWNERSHIP STRUCTURE:

H4: (INSIDE%) - High retention of shares by owners has a market signalling effect. The percentage shareholding retained by the owners of a firm post listing comprises the proportion of shares not placed in private placement, offered for sale or issued as part of the listing process.

4.4.2.6 FINANCIAL FEATURES OF THE ISSUING FIRM

The following variables were constructed from the pro-forma and historical financial information as per the pre-listing statement of each company:

H5: (DEBT/TOT.ASSETS) - Long Term Debt / Total Assets (%)

H6: (INT.ASSETS POST (Rm)) - Total pro forma Intangible Assets and Goodwill post listing (Rm)

H7: (CF.FIN (Rm)) – Cash Flow from financing activities pre-listing

(OPCF%TA) - Operating Cash flow / Total Assets (%)

H8: (EARNINGS POST (Rm)) - Pro forma Profit After Tax (Rm)

(ROE) - Pro forma Profit After Tax (Rm) / Total Equity (%)

(Pro Forma EPS (Cents)) - Pro forma Profit After Tax (c) / No. of shares in issue post listing.

H9: (MARKET CAP @ OP (Rm)) - Expected Market Capitalisation post-listing (Rm)

(TOT.EQUITY PRE (Rm)) - Total Equity prior to listing (Rm)

(Capital Raised) - Total equity issued during listing (Rm)

4.4.2.7 BOOK BUILDING

The effect of the book building process is illustrated by the cost of the IPO and the specific sponsor of the transaction:

H10: (IPOCOST%MKTCAP) - Cost of the IPO (Rm) / MARKET CAP @ OP (Rm)

H11: (SPONSOR) - The lead sponsor of the transaction assigned a categorical numeric value from 1 to 12.

4.4.2.8 PRICING AND VALUATION
H12:  (PE at Offer Price) - Pro Forma EPS (Cents) / Offer Price (Cents)

4.4.2.9 VALIDITY & RELIABILITY

Validity of data depends not only on whether observations can be accurately measured, but also on whether constructs accurately reflect the circumstances they are required to measure (Winter, 2000). The observations can be accurately measured as it relates to published data from past IPO’s and quoted market data. The data is derived from secondary sources and not from survey of other primary instruments. Listing documentation is subject to scrutiny by regulators and are required to be audited while market data, including share prices, are published. Companies undergoing IPO are also required to comply with stringent listing requirements. The data is robust, accurate and stable and does not require material adjustment to be used in this study.

4.5 RESULTS

4.5.1 DESCRIPTIVE AND SUMMARY STATISTICS

The following section describes the summary and descriptive statistics of the dataset and provides an overview of the information gathered. The statistical significance of the data is then determined through multi-variate regression analysis upon which any conclusions to the hypothesis testing will be based.

4.5.2 INITIAL RETURN

The initial return is an expression of the share price index for the first day (IR1) and first 21 days (IR21) respectively where offer price represents 100 - i.e. the mean for the first day returns is 8.85% or a share price index of 108.85. Descriptive statistics of the initial returns of the 42 observations are set out below:

<table>
<thead>
<tr>
<th>Measure</th>
<th>IR1</th>
<th>IR21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>108.85</td>
<td>105.28</td>
</tr>
<tr>
<td>Median</td>
<td>105.21</td>
<td>105.45</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>22.89</td>
<td>27.61</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>6.05</td>
<td>3.63</td>
</tr>
<tr>
<td>Skewness</td>
<td>1.52</td>
<td>0.93</td>
</tr>
<tr>
<td>Minimum</td>
<td>59.63</td>
<td>40.00</td>
</tr>
<tr>
<td>Maximum</td>
<td>200.00</td>
<td>199.64</td>
</tr>
</tbody>
</table>

*Table 1: Initial Return Descriptive Statistics*
The data is positively skewed as there are a few (8) severely over-priced issues in the data set as the graph below will illustrate. The standard deviation and minimum and maximum values also indicate a greater degree of variance for IR21.

**Figure 2: Histogram Plot - IR1**

The kurtosis for IR1 is much greater than the expected value of 3 for normal distribution and therefore indicates a high concentration of observations around the mean while the results over 21 days are spread more widely, possibly attributable to market forces over the longer three-week period.

**Figure 3: Histogram Plot - IR21**
As mentioned above, the average share price index is 108.85 at the end of the first day and 105.28 at the end of the 21st day of trade.

4.5.3 Market

The table below summarises the average level of initial return (IR) for each five-year period from 2003 to 2008. ALSI refers to the average growth in the JSE All Share Index for each of the periods.

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of observations</th>
<th>ALSI</th>
<th>IR1</th>
<th>IR21</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003 to 2008</td>
<td>17</td>
<td>124</td>
<td>114</td>
<td>110</td>
</tr>
<tr>
<td>2009 to 2013</td>
<td>11</td>
<td>115</td>
<td>103</td>
<td>105</td>
</tr>
<tr>
<td>2014 to 2018</td>
<td>14</td>
<td>108</td>
<td>107</td>
<td>99</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>116</td>
<td>109</td>
<td>105</td>
</tr>
</tbody>
</table>

Table 2: Summary Statistics by Listing Period

Over the full period of 15 years, the closing market price at the end of the first day of trade was on average 109% of the offer price at the end of the first day of trade (i.e. a 9% first day return) and 105% at the end of the 21st day of trade or a return of 5% on the offer price for the first 21 trading days. Returns were higher during 2003 to 2008 than during the subsequent 10 years.

The number of listings were also slightly higher in the first five years compared to the remaining period. The All Share Index outperformed initial returns consistently over the period.

4.5.4 Industry

The table below sets out the average price indices for each classification:

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of observations</th>
<th>IR1</th>
<th>IR21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>12</td>
<td>120</td>
<td>116</td>
</tr>
<tr>
<td>Consumer</td>
<td>20</td>
<td>105</td>
<td>101</td>
</tr>
<tr>
<td>Financials</td>
<td>10</td>
<td>103</td>
<td>102</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>109</td>
<td>105</td>
</tr>
</tbody>
</table>

Table 3: Summary Statistics by Industry

Industry classification was grouped into three categories: Basic materials and industrials (Basic); Consumer goods & services, telecommunication and healthcare
(Consumer) and Financials. Initial returns for Basic Materials and Industrials were notably higher than financial and consumer driven industries.

4.5.4.1 COMPANY SPECIFIC INDICATORS

4.5.4.2 RATIONALE FOR LISTING

The use of proceeds and rationale for listing was arranged under four categories. Funding relates listing for the purpose of capital expansion and organic growth. Liquidity refers to listing in order to unlock value for shareholders. Listings conducted to raise funding for or to use shares as currency in acquisitions activity were grouped under M&A.

<table>
<thead>
<tr>
<th>Rationale</th>
<th>Number of observations</th>
<th>IR1</th>
<th>IR21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding</td>
<td>11</td>
<td>102</td>
<td>97</td>
</tr>
<tr>
<td>Liquidity</td>
<td>12</td>
<td>107</td>
<td>110</td>
</tr>
<tr>
<td>M&amp;A</td>
<td>9</td>
<td>116</td>
<td>111</td>
</tr>
<tr>
<td>Unbundling</td>
<td>10</td>
<td>112</td>
<td>103</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>42</strong></td>
<td><strong>109</strong></td>
<td><strong>105</strong></td>
</tr>
</tbody>
</table>

*Table 4: Summary Statistics by Use of Proceeds*

Listing to facilitate acquisitions were most severely under-priced while listing to expand or grow were priced closer to market valuations at the end of the first day and even slightly above over a 21-day period.

4.5.4.3 FINANCIAL AND OTHER FACTORS

The following table represents summary statistics on selected financial measures grouped by 15 lowest and 15 highest initial returns. The highest and lowest item were as well as the mid-range variable were excluded for this summary.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lowest 15</th>
<th>Highest 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on Equity</td>
<td>15%</td>
<td>21%</td>
</tr>
<tr>
<td>Debt % Total Assets</td>
<td>18%</td>
<td>7%</td>
</tr>
<tr>
<td>Intangible Assets % Total Assets</td>
<td>13%</td>
<td>10%</td>
</tr>
<tr>
<td>Market Capitalisation (Rm)</td>
<td>6,227</td>
<td>14,679</td>
</tr>
<tr>
<td>Listing Expenses % Total Equity</td>
<td>0.63%</td>
<td>0.69%</td>
</tr>
<tr>
<td>Insider Retention %</td>
<td>63%</td>
<td>71%</td>
</tr>
</tbody>
</table>

*Table 5: Summary Statistics for Firm Specific Indicators*
Average Return on Equity, Debt % Total Assets, Insider Retention and Listing Expenses were lower for the lower initial returns while levels of Intangible Assets and Market Capitalisation were higher for the higher initial returns.

4.5.4.4 REGRESSION ANALYSIS

A stepwise multi-variate regression analysis was performed for both the 1 day and 21 return datasets. The first iteration included all 20 explanatory variables described in the previous section.

The correlation coefficients also indicate a stronger relationship between the explanatory variables and initial returns for the first day as opposed to 21-day returns:

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th>IR1</th>
<th>IR21</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Squared</td>
<td>0.716</td>
<td>0.598</td>
</tr>
<tr>
<td>Adjusted R Squared</td>
<td>0.446</td>
<td>0.215</td>
</tr>
<tr>
<td>Standard Error</td>
<td>17.05</td>
<td>24.46</td>
</tr>
<tr>
<td>LLF</td>
<td>-168.21</td>
<td>-183.36</td>
</tr>
<tr>
<td>AIC</td>
<td>416.42</td>
<td>446.73</td>
</tr>
<tr>
<td>SBIC</td>
<td>411.17</td>
<td>441.48</td>
</tr>
<tr>
<td>Observations</td>
<td>42</td>
<td>42</td>
</tr>
</tbody>
</table>

*Table 6: Regression Results - All Variables*

Although the R Squared values in both cases show a strong correlation, an analysis of variance (ANOVA) showed significance for the 1-day population but not for the 21 day population, possibly due to the impact of market forces and other phenomena on the movement of the share price during the 21 days post listing which are not contained in the variables.

<table>
<thead>
<tr>
<th>ANOVA: 1 Day Returns</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p-Value</th>
<th>SIG?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>20</td>
<td>15386</td>
<td>769.3</td>
<td>2.65</td>
<td>1.58646%</td>
<td>TRUE</td>
</tr>
<tr>
<td>Residuals</td>
<td>21</td>
<td>6103</td>
<td>290.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>21489</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ANOVA: 21 Day Returns</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p-Value</th>
<th>SIG?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>20</td>
<td>18684</td>
<td>934.2</td>
<td>1.56</td>
<td>15.90000%</td>
<td>FALSE</td>
</tr>
<tr>
<td>Residuals</td>
<td>21</td>
<td>12560</td>
<td>598.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>31244</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
At a 95% confidence level, the p value is 1.58% for IR1 vs. 15.9% for IR21 and a significantly higher F-Value indicating that the results for the 1 Day returns, using all variables, are statistically significant and that the 21-day returns are not.

The following table outlines the correlation statistics and p-values of the individual variables as per the results of the above regression:

<table>
<thead>
<tr>
<th></th>
<th>IR1</th>
<th></th>
<th>IR21</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R Squared</td>
<td>p-Value</td>
<td>R Squared</td>
<td>p-Value</td>
</tr>
<tr>
<td>ALSI1 / 21</td>
<td>0.089</td>
<td>0.203</td>
<td>0.160</td>
<td>0.286</td>
</tr>
<tr>
<td>ALSIMOVE</td>
<td>0.074</td>
<td>0.379</td>
<td>0.111</td>
<td>0.385</td>
</tr>
<tr>
<td>ALSI GROWTH</td>
<td>0.290</td>
<td>0.033</td>
<td>0.303</td>
<td>0.070</td>
</tr>
<tr>
<td>INDUSTRY</td>
<td>0.263</td>
<td>0.120</td>
<td>0.222</td>
<td>0.297</td>
</tr>
<tr>
<td>CAPITAL RAISED</td>
<td>-0.271</td>
<td>0.417</td>
<td>-0.152</td>
<td>0.470</td>
</tr>
<tr>
<td>INSIDE%</td>
<td>0.254</td>
<td>0.052</td>
<td>0.115</td>
<td>0.238</td>
</tr>
<tr>
<td>ROE</td>
<td>0.640</td>
<td>0.009</td>
<td>0.554</td>
<td>0.121</td>
</tr>
<tr>
<td>EPS (Cents)</td>
<td>0.343</td>
<td>0.359</td>
<td>0.292</td>
<td>0.488</td>
</tr>
<tr>
<td>PE at Offer Price</td>
<td>0.289</td>
<td>0.003</td>
<td>0.372</td>
<td>0.003</td>
</tr>
<tr>
<td>TOT. EQUITY PRE (Rm)</td>
<td>0.254</td>
<td>0.421</td>
<td>0.153</td>
<td>0.436</td>
</tr>
<tr>
<td>EARNINGS POST (Rm)</td>
<td>0.213</td>
<td>0.405</td>
<td>0.153</td>
<td>0.466</td>
</tr>
<tr>
<td>MARKET CAP @ OP (Rm)</td>
<td>0.193</td>
<td>0.208</td>
<td>0.097</td>
<td>0.493</td>
</tr>
<tr>
<td>DEBT / TOT. ASSETS</td>
<td>0.185</td>
<td>0.337</td>
<td>0.263</td>
<td>0.287</td>
</tr>
<tr>
<td>INT. ASSETS POST (Rm)</td>
<td>0.143</td>
<td>0.500</td>
<td>0.043</td>
<td>0.402</td>
</tr>
<tr>
<td>OPCF % TA</td>
<td>0.034</td>
<td>0.317</td>
<td>0.021</td>
<td>0.302</td>
</tr>
<tr>
<td>REPAY DEBT</td>
<td>-0.161</td>
<td>0.221</td>
<td>-0.089</td>
<td>0.283</td>
</tr>
<tr>
<td>CF. FIN (Rm)</td>
<td>-0.215</td>
<td>0.255</td>
<td>-0.191</td>
<td>0.376</td>
</tr>
<tr>
<td>IPOCOST % MKTCAP</td>
<td>0.011</td>
<td>0.355</td>
<td>0.088</td>
<td>0.212</td>
</tr>
<tr>
<td>SPONSOR</td>
<td>-0.118</td>
<td>0.346</td>
<td>-0.120</td>
<td>0.368</td>
</tr>
<tr>
<td>RATIONALE</td>
<td>-0.031</td>
<td>0.137</td>
<td>-0.071</td>
<td>0.480</td>
</tr>
</tbody>
</table>

A multicollinearity test was performed to determine whether any redundant variables could be eliminated for the second iteration of the stepwise regression. The following six variables were identified and eliminated:

- ALSIMOVE
- EPS (Cents)
- TOT. EQUITY PRE (Rm)
- EARNINGS POST (Rm)
• MARKET CAP @ OP (Rm)
• INT. ASSETS POST (Rm)

The effect of this was that the R Squared decreased slightly (but still remains relatively strong at close to 0.6), however the adjusted R squared, and p-Value increased for both return periods. The 21 day return ANOVA also now indicates statistic significance at the 95% confidence level.

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th>IR1</th>
<th>IR21</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Squared</td>
<td>0.64</td>
<td>0.57</td>
</tr>
<tr>
<td>Adjusted R Squared</td>
<td>0.46</td>
<td>0.35</td>
</tr>
<tr>
<td>p-Value</td>
<td>0.26000%</td>
<td>1.60200%</td>
</tr>
</tbody>
</table>

Table 9: Regression Results - Excl. Redundancies

The final step was to perform a series of forward (FWD) and backward (BKWD) and bi-directional (BIDI) elimination of variables to determine combination of variables that ensures the best fit. The results were as follows:

<table>
<thead>
<tr>
<th>Stepwise Regression RI1</th>
<th>FWD</th>
<th>BKWD</th>
<th>BIDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALSI GROWTH</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Capital Raised</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>ROE</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PE at Offer Price</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>R Square</td>
<td>53.7%</td>
<td>59.2%</td>
<td>53.7%</td>
</tr>
<tr>
<td>Standard Error</td>
<td>16.2</td>
<td>15.4</td>
<td>16.2</td>
</tr>
<tr>
<td>AIC</td>
<td>355.7</td>
<td>352.9</td>
<td>355.7</td>
</tr>
</tbody>
</table>

Table 10: Stepwise Regression Analysis – Selection of Variables

In all instances ROE and PE at Offer Price was identified. ALSI GROWTH was identified in backward and Capital Raised in forward and bi-directional elimination with little difference in the goodness of fit (AIC) which supports a statistically significant association with initial return. ALSI Growth was not found to be statistically significant at the 95% confidence interval and therefore, the final regression included Capital Raised, ROE and PE at Offer Price, yielding the following results:

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th>IR1</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Squared</td>
<td>0.537</td>
</tr>
<tr>
<td>Adjusted R Squared</td>
<td>0.5002</td>
</tr>
<tr>
<td>p-Value</td>
<td>0.000167%</td>
</tr>
</tbody>
</table>
The correlation coefficient accounts for 53.6% of the variation in IR1 with a p-Value of 0.000167% at a 95% confidence interval. The following expression was derived from the results:

\[ IR1 = 109.599877 - 0.002277 (\text{CAPITAL RAISED}) + 7.094628 \text{ (ROE)} + 0.001885 \text{ (PE AT OFFER PRICE)} \]

The null hypotheses can be rejected in favour of the following alternative hypotheses as it pertains to IR1 as the associated variables have been found to be statistically significant at the 95% confidence interval.

H8: Profitability influences initial return, based on (ROE) with a p-Value of 0.001%.

H9: Size of listing influences initial return, based on (Capital Raised) with a p-Value of 2.1407%.

H12: The pre-listing valuation is associated with varying levels of initial return, based on (PE at Offer Price) with a p-Value of 0.8152%.

In the rest of the cases the null hypotheses could not be rejected at the 95% confidence interval for IR1.

For the 21-day return, all three iterations of the stepwise regression identified ROE and PE at Offer price at the only statistically significant variables:

<table>
<thead>
<tr>
<th>Stepwise Regression RI21</th>
<th>FWD</th>
<th>BKWD</th>
<th>BIDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PE at Offer Price</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>( R \text{ Square} )</td>
<td>43.1%</td>
<td>43.1%</td>
<td>43.1%</td>
</tr>
<tr>
<td>( \text{Standard Error} )</td>
<td>21.4</td>
<td>21.4</td>
<td>21.4</td>
</tr>
<tr>
<td>( \text{AIC} )</td>
<td>377.6</td>
<td>377.6</td>
<td>377.6</td>
</tr>
</tbody>
</table>

The variables for 43.1% of the variation in IR21 with a p-Value of 0.001690% at the 95% confidence interval. The following expression was derived from the results:

\[ IR2 = 103.0056 + 7.6424 \text{ (ROE)} + 0.0028 \text{ (PE AT OFFER PRICE)} \]
The null hypotheses can be rejected in favour of the following alternative hypotheses as it pertains to IR21 as the associated variables have been found to be statistically significant at the 95% confidence interval.

H8: Profitability influences initial return, based on (ROE) with a p-Value of 0.0104%.

H12: The pre-listing valuation is associated with varying levels of initial return, based on (PE at Offer Price) with a p-Value of 0.4186%.

In the rest of the cases the null hypotheses could not be rejected at the 95% confidence interval for IR21.
4.6 CONCLUSION

There are many factors that impact on the initial returns of IPO’s. Of the variables tested in this study, a combination of Return on Equity, Price / Earnings and the amount of capital raised showed the strongest association with first day returns. The correlations were stronger for the first day returns than that of the first 21-days, suggesting that market forces and other factors play more of a role over the first few weeks. The results suggest that a firm’s profitability and the valuation of the firm relative to earnings are strongly associated with initial returns. Investors and firms looking to list could test their expectations of initial return and pricing against these three variables for an indication of performance post listing. Future studies could build upon these factors by including more variables related to investor behaviour and risk to further refine a model for forecasting initial returns.
REFERENCES


