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Factors affecting the absolute and relative long-term performance of initial public offerings (IPOs) on the Johannesburg security exchange (JSE)

Abstract

Nowadays, investors are progressively espousing an absolute returns approach for their long-term investments as global markets are unceasingly faced with economic uncertainty and market volatility (Foster, Jones and Nichols, 2014). However, prior research has primarily focused on identifying factors that can be used to predict long run relative returns. As such, it is important for the research and practitioner communities to identify factors that can help investors in predicting long-term absolute returns. The aim of this study is to determine if the same factors that have been noted to predict the relative returns of IPOs are also able to predict the absolute returns of the IPOs on the JSE. Using 290 companies listed on the JSE between 1996 and 2009, this study finds that mean IPO returns for the first three years post IPO are 3.19%, -9.60%, and -25.06% respectively for absolute returns and -7.67%, -34.6%, and -65.4% respectively for relative returns. It is also established that after three years, 109 companies have a positive absolute return while only 43 companies outperform the market benchmark. Furthermore, the results indicate that the market period is the only factor that can significantly predict both the absolute and relative returns with IPOs issued in the cold market periods having a higher probability of producing positive returns and outperforming the market benchmark than IPOs listed in the hot market periods.

Keywords: absolute returns, relative returns, IPOs, long-term performance, JSE, South Africa.

JEL Classification: D53, E22, E44, G11.

Introduction

An initial public offering (IPO) offers a fresh source of capital that is vital to the growth of the company and provides the company and existing shareholders with a liquid market for their shares. From an investor's perspective, an IPO renders investors an opportunity to share in the rewards of the growth of the company (Foerster, 2003). However, prior studies (Govindasamy, 2010; Santos, 2011) on IPO long run performance have provided evidence that IPOs tend to underperform the market in a three to five year period subsequent to their listings. The long run underperformance of IPO shares hurt investors since they do not get an opportunity to earn superior long run returns from their investments. Liu (2009) defines the long run underperformance of IPOs as the negative average return over a long period after the issue. Drobetz et al. (2005) examined the long run performance of 109 Swiss IPOs from 1983 to 2000 and found that after three years, the underperformance was only about 7.5%, increased to 21% after four years and to 101% after ten years. Goergen et al. (2007) studied the performance of 252 IPOs that were listed on the London Stock Exchange and observed over the first 36 months, that the average returns were -21.3%. In studying the German IPO, Bessler and Thies (2007) established that when using the buy and hold (BHAR), IPO underperform the market over a three year by -12.7%. Likewise, other studies by Kirkulak

(2008) on the Japanese IPO market showed a long run underperformance of 18.3% over three years. Nonetheless, studies conducted on the Malaysian IPOs ascertained that IPOs outperformed the market over a period of 1992-1996, with a significant positive cumulative abnormal return (CAR) of 41.7% over three years from their listing day (Corhay et al., 2002). Thus, evidence of long run underperformance of IPOs seems to be dominant in most stock markets, regardless of the time period investigated.

Prior studies (Ritter and Welch, 2002; Sapusek, 2000) explicate that there are two possible options that can be considered by investors when measuring the long run performance of IPOs. According to these researchers, the first approach is to measure the absolute performance of the IPO (raw returns) while the second approach is to measure the performance relative to a benchmark (abnormal returns). Using a three year horizon for IPOs listed between 1980 and 2001 in the US, Ritter and Welch (2002) showed that investors who invested in an equally-weighted portfolio did not lose money in absolute terms. However, when comparing the returns with a market benchmark, the portfolio underperformed by 23.4%. Generally, the motto of every investor is to earn maximum returns on their investment, both in absolute and relative terms (Asma, 2010). Absolute returns target positive returns on investments over a given period of time, irrespective of market conditions. Conversely, relative returns look to outperform a market benchmark or index but has no commitment to deliver positive returns (Threadneedle Asset Management, 2010).

Although both absolute and relative returns are important to investors, studies (Bessler and Thies, 2007; Cai, Liu and Mase, 2008; Drobetz et al., 2005; Helwege and Liang, 2004) trying to predict the long run performance of IPOs have primarily focused only on relative returns. This is understandable as Johnson (1999) argued that many investors are interested in relative returns because investors have diversified portfolios across different markets and industries and are satisfied when a particular stock outperforms its benchmark, and unhappy when the stocks underperform its benchmark. Additionally, relative performance is deemed superior to absolute performance when looking at the risk to return trade-off (Bessler and Thies, 2007). Nonetheless, many investment companies in South Africa (e.g. Old Mutual¹, Liberty², and PRESCIENT³) and other parts of the world (e.g. Australian Private Equity and Venture Capital Association Limited (AVCAL), Standard Life Investments, and Glenmede Investment Management⁴) have shown a continuous commitment to absolute return investments.

According to Foster et al. (2014), nowadays, simply outperforming a market benchmark is no real comfort for investors who are still getting an overall negative return. As such, they argue that there has been a high shift from traditional relative return approaches to absolute return approaches with the recent woes of the stock market. The need for reporting long run absolute returns have also been seen in recent studies (Ritter, 2014; Konku et al., 2012; Cao et al., 2013). However, these studies while acknowledging the importance of reporting long run absolute returns have not established the determinants of absolute returns. This creates a gap in empirical findings to guide investors who do not have diversified portfolios and focus primarily on absolute returns to have adequate information on factors that can aid in predicting the possibility of obtaining a positive absolute return. This is particularly important for emerging stock markets as new investors interested in trading on the stock market might not have the capacity to invest in diversified portfolios at once. Moreover, a study by the Threadneedle Asset Management (2010) showed that portfolios that have exposure to both relative and absolute returns were most likely to have a more attractive risk to return profile than portfolios

that were restricted to one type of strategy. Several studies in South Africa (Neneh and Smit, 2014; Govindasamy, 2010; M'kombe and Ward, 2002), and other African countries (Bruce and Thilakarathne, 2014; Wairia, 2010; Hearn, 2013) have only focused on relative IPO long run performance. As such, this study intends to computer absolute long run returns and determines if the same factors that have been noted to predict the relative performance of IPOs are also able to predict absolute performance of the IPOs.

1. Literature review

The literature review provides a brief review of IPO studies in South Africa and then moves forward to explicate the selected determinants of IPO long run performance. The determinants of long run performance examined in this study are the size of the IPO (gross proceeds), firm's age, industry and market periods (hot and cold market period).

1.1. IPO studies on the JSE. In South Africa, various studies have been conducted on the JSE in order to document what happens with short and long run performance of IPOs listed on the JSE. With respect to short run performance, Van Heerden, and Alagidede (2012) found significant short run underpricing on the JSE, with an average market-adjusted return of 108.33% for the first trading day from a period of 2006 to 2010. Neneh and Smit (2013) ascertained that IPOs on the JSE are significantly underpriced with an average market adjusted first day return of 62.9% during a period of 1996 to 2011. Also, Page and Reyneke (1997) studied the performance of 118 IPOs that were listed on the JSE from 1980 to 1991 and found that IPOs on the JSE are underpriced with an average market adjusted return was 32.7%. When assessing the long run performance of IPO listed on the JSE, M'kombe and Ward (2002) established that IPOs on the JSE underperformed the market by 21.47%, 35.67% and 87.84% over a three, five and ten year period respectively when using the capital asset pricing model. Also, studies by Govindaamy (2010) on the JSE, established that IPOs underperformed the market by 50% and 47% for BHAR and CAR respectively. Moreover, Neneh and Smit (2014) also observed that when using BHAR, IPOs on the JSE underperform the market over a three year period by 65.59%, a five year period by 64.37%, and ten year by 25.43%. Conversely, Mangozhe found no evidence of abnormal performance for IPOs listed on the JSE for a period of 1992 to 2007 when using the Fama and French three-factor model.

1.2. The determinants of long run performance.

1.2.1. Size (Gross proceeds). The gross proceeds of an IPO is usually used as a proxy of the size of a firm (Bessler and Thies, 2007; Cai et al., 2008). The

¹ SA Absolute Return Fund. Available at: <http://www.oldmutual.co.za/documents/OMIGSA08/AbsoluteReturn/SAAbsoluteReturnFund.pdf>.

² FSC Absolute Return Company Portfolio. Available at: <http://www.liberty.co.za/fund-performance/Documents/capital-alliance/201402/fsc-absolute-return-company.pdf>.

³ 2013 winner of Absolute returns manager of the year award in South Africa.

⁴ 2014 Lipper Award for Best Absolute Return Fund among 90 Companies in the United States focusing on absolute returns.

size of a firm has widely been recognized as an important determinant of IPO long run underperformance. For example, Goergen, Khurshed, and Mudambi (2007) established from his study on IPOs in the UK that small firms suffered from a greater level of initial underperformance than larger firms. Cai et al., (2008) observed that the larger the offer size of IPOs, the worse the long run performance was. Vithessonthi (2008) found that IPOs with the smallest size had the worst long run performance. Ibbotson and Ritter (1995) ascertained that smaller IPOs do worse in the long run. However, contrary to these studies, Kaya (2012) established that the performance of IPOs does not differ based on firm size. Likewise, Allen, Morkel-Kingsbury and Piboonthanakiat (1999) pointed out that smaller issues had the tendency to perform better than the larger issues in the long run. Also, Cai et al., (2008) found that the larger the offer size of IPOs, the worse the long run performance was. Moreover, in studying the German stock market, Bessler and Thies (2007) found that the magnitude of negative abnormal returns increased as the proceeds of an IPO increases. Based on these discussions, this study hypothesizes that the size of an issue will have a significant positive influence on the long run absolute and relative performance of the IPO firm.

1.2.2. Industry sectors. Several studies examining the performance of IPOs across different industrial sectors have produced mixed results. For example, Ritter (1991) established that IPOs of financial institutions significantly outperform the matching firms. How (2000) observed that in the long run, IPOs in the mining sector do not perform as poorly as IPOs in the industrial sector in Australia. Also, Finkle and Lamb (2002) compared the long run aftermarket performance of IPOs in emerging industries (biotechnology, semiconductor and internet IPOs) to those in non-emerging industries during the period between 1993 and 1996. This study found that the returns from emerging industry IPOs after a year were worse than that of non-emerging industry IPOs and that the performance for both industries was negative. Furthermore, Dong and Michel (2012) found that IPOs of high-growth industries had superior long run performance. Moreover, Miloud (2014) established that underperformance of IPO varied across the different type of industrial sector in the Euro.NM market, with IPOs in the technological and telecommunication companies underperforming the market while IPOs in the industrial and financial services sector having the worse long run performance. Contrary to the results of Finkle and Lamb (2002), Ang and Boyer (2009), observed that IPOs in new industries tend to declare

bankruptcy less often and became delisted less often than companies conducting an IPO in established industries. Following the arguments in this section, it is hypothesized that long run IPO absolute and relative performance will vary significantly across different industries.

1.2.3. Firm's age. Several studies by Younesi et al. (2012), Ahmad-Zaluki and Abiding (2011) found a firm's age to be a significant determinant of IPO long run performance. Merikas, Gounopoulos and Nounis (2009) found a strong relationship between a firm's age and its long run performance. Carter, Frederick and Singh (1998) established a positive relationship between a company's age and long run performance. By way of contrast, Shikha and Balwinder (2008) established that a firm's age had no significant relationship with IPO long run performance. Their results showed that the relationship between age and returns was inconsistent as within the first three years, age showed an inverse relationship with returns, while for the fourth and fifth year, age showed a direct relationship with returns (resulting in a 'V' shaped graph over the five year period). As such it was inconclusive in determining which trend is dominant thus resulting to the conclusion that age had no significant relationship with long run returns. Kaya (2012) observed that younger companies in Turkey performed better within three months; older companies had their best performance at the end of six months and thus concluded that there was no significant statistical relationship between a firm's age and short-term performance. Likewise, Khurshed et al. (1999, p. 4) and Shikha and Balwinder (2008) did not find any statistically significant relationship between a firm's age and its long run performance. However, it is hypothesized in this study that firm age has a significant positive influence on the absolute and relative performance of IPOs on the JSE.

1.2.4. Hot and cold market period. It is well documented that IPO markets follow cyclical patterns with dramatic swings, often called hot and cold markets (Helwege and Liang, 2002). The hot market issue is defined by periods of rising initial returns and increasing numbers of IPOs (Doeswij et al., 2006). Prior research (Aggarwal, 2006; Alti, 2005) have shown that the hot IPO markets are characterized by extremely high initial returns, an unusually high volume of offerings, severe underpricing, frequent oversubscription of offerings, prevalence of smaller issues, and, to a certain extent, by concentrations in particular industries. In contrast, cold IPO markets have less underpricing, lower issuance, fewer instances of oversubscription, and larger offerings (Helwege and Liang, 2004).

These authors documented that both hot and neutral market IPOs tend to underperform while cold market IPOs tend to outperform a variety of benchmarks. Likewise, Yung, Colak, and Wang (2006) in their study established that the distributions of IPO returns in hot and cold periods were substantially different. They observed that long-run abnormal returns increase substantially during hot IPO markets, with most hot IPOs having the tendency of being delisted within the first few years after listing. Cook, Jarrell and Kieschnick (2003) established that the performance of IPOs during hot markets was worse than IPOs during cold markets. Thomadakis et al. (2010) found that hot market IPOs in Greece showed a positive returns in their first and second year but, however, turn to underperform the market in their third year. Following existing evidence, this study hypothesizes that hot market IPOs in the JSE perform poorer than cold market IPOs.

2. Methodology

2.1. Sample and data collection methods. The population for the study comprised 313 IPO companies that were listed on the JSE during the period of 1996-2009. The information was obtained from McGregor-BFA database, where data from each company's prospectus and daily trading prices were obtained. The JSE All Share Index (ALSI) was used as the broad benchmark to assess the relative returns from these listings. In calculating the absolute and relative returns in this study, where companies were delisted within three years of post IPO trading or did not have a complete data, these listings were not included in the sample. This resulted in the initial sample size reducing from 313 to 290 that had complete data for a period of three years post IPO. The purposeful choice of the sample frame of 1996-2009 was chosen because the ALSI started in 1996 and the end date of 2009 allowed sufficient time for examining the three year aftermarket trading for all IPOs in the sample. This study also classified the industries into four main sectors (mining, financial, technology and others) as used by studies in the JSE (Govindasamy, 2010; Van Heerden and Alagidede, 2012).

2.2. Measurement for long run absolute and relative performance. IPO long run performance was calculated using BHAR, over 36 months after the IPO. For firms delisted within 36 month test period, these listings were not included in the sample. Absolute returns were defined as the returns (gain or loss on an investment portfolio) that a particular asset achieves over a certain period which is not compared to other measures or benchmarks. Relative return is the difference between the absolute return and the performance of the market which is usually gauged by a benchmark, or other index.

The absolute holding period return (BHR) for a company i stock is calculated for the period T as:

$$BHR_{i,T} = \left[\prod_{t=1}^{\min[T, delist]} (1 + R_{i,t}) \right] - 1, \quad (1)$$

where, $\min[T, delist]$ refers to either the last day of the JSE-listed trading or the end of the three year window depending on which comes first (Loughran and Ritter, 1995, p. 27).

$R_{i,t}$ is the raw return of company i stock at time t and T is the time period for which the BHR is calculated.

The relative holding period return (BHR) for a company i stock is calculated for the period T as:

$$BHAR_i = \frac{1}{N} \sum_{t=1}^N \left[\left(\prod_{t=1}^{\min[T, delist]} (1 + R_{i,t}) \right) - \left(\prod_{t=1}^{\min[T, delist]} (1 + R_{m,t}) \right) \right],$$

where, $R_{m,t}$ is the market benchmark (JSE All share Index) returns.

3. Results and discussion

Table 1. Long run performance for period of three years using BHAR

Years	Absolute BHAR		Relative BHAR	
	Returns	T-stats	Returns	T-stats
One year	3.19%	0.490522	-7.67%	-1.12308
Two years	-9.60%	-1.05268	-34.6%	-3.69407*
Three years	-25.06%	-3.40834***	-65.4 %	-8.63366*

Notes: *** Significant at 1%; *Significant at 10%.

The results in Table 1 show that the yearly BHAR for a 3 years aftermarket performance (based on absolute and relative returns) differ from each other. From Table 1, it is observed that when using the absolute returns, IPOs on the JSE outperform the market by 3.19% for the first year but however, underperform the market in the second and third year by -9.60% and -25.06% respectively. This result indicates that investors who bought the shares at the offered price and held the shares for one year, made significant profits. With regards to relative returns, the results show that IPOs on the JSE underperform the market by -7.6% for the first year, -34.6% for the second year and -65.4% for the third year when using the BHAR. This result suggests that investors who did not get the chance to buy their shares at the offered price (mostly individual investors) do not benefit from the abnormal returns and thus incur substantial losses starting from the first year. The finding further indicates that on average, IPOs on the JSE have poor long run returns, though the results for the relative returns are worse than the absolute returns. Moreover, investors who focus on relative returns will be more

disappointed because the returns are worse. A study by the RS Research Paper (2007) on Hong Kong found that the relative performances were worse than those of absolute performance which is in line with the findings of this study. These findings are also consistent with other studies by Govindasamy (2010) which showed that the IPOs on the JSE underperformed the market by 50% when using BHAR. Also, other studies by Jaskiewicz et al. (2005) established that when using the BHAR, IPO underperform the market by 32.8% over three years.

Table 2. Long run performance based on IPO issue size (Gross proceeds)

Gross proceeds	Absolute BHAR			Relative return		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
≤ Median	10.1	-6.6	-38.5	-1.0	-32.1	-79.9
>Median	-5.6	-13.5	-7.8	-16.3	-37.8	-46.9

The results from Table 2 show the long run IPO absolute and relative returns based on the gross proceeds. The calculated median for the sample was R2, 447,303¹. The results indicate that IPOs with a gross proceeds of less than or equal to the median and IPO priced above the median had very poor long run performance, but the results for the long run relative returns are worse than the long run absolute returns. This finding is in line with a prior study by Vithessonthi (2008) that showed that IPOs with the smallest size showed the worst long run performance.

Table 3. Long run performance based on market period

Market period	BHAR (%)					
	Absolute return			Relative return		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Hot market	-1.2	-28.1	-52.7	-12.0	-50.4	-90.4
Cold market	15.3	40.7	50.0	4.1	8.2	2.6

The results from Table 3 show the long run performance based on market period. Hot and cold market periods are defined based on the annual volume of new listings. From Table 3, it is evident that IPOs issued during the cold market periods have positive returns both for absolute and relative returns, while IPOs issued during the hot market period have very poor long run performance (both

for absolute and relative returns). The results indicate that the returns earned from IPOs issued during hot market periods were worse than those earned by IPOs issued during cold market periods over a 3 year period. These findings are consistent with other studies (Cook et al., 2003; Govindasamy, 2010) which established that the long term performance of IPOs issued during hot market periods was worse than that of IPOs issued during cold market periods. In contrast, Schuster (2003) established that IPOs issued during the hot market period had a better absolute and relative return in the long run while IPOs issued during the cold market period experienced poorer absolute and relative returns.

Table 4. Long run performance based on industries

Industrial sector	BHAR (%)					
	Absolute return			Relative return		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Mining	5.3	-17.0	-29.5	-2.8	-34.4	-50.8
Financial	-4.2	-7.2	-25.1	-18.2	-37.2	-79.4
Technology	13.3	-5.4	-42.9	-6.3	-45.0	-101.4
Other	1.4	-10.1	-17.2	-5.8	-29.9	-50.8

The results in Table 4 depict that IPOs in the technology, mining and other sectors have positive absolute returns in year one and subsequently negative absolute returns for year two and three. Also observed is the fact that IPOs in the technology, financial, mining and other sectors have a poor relative returns and most especially the returns of IPOs in the technology and financial sectors (-101.4% and -79.4% respectively) are worse comparatively to the others. The long run performance results for the financial sector and technology are similar to the findings of Govindasamy (2010) on the JSE. Using the 3 year BHAR, he established that IPOs in the financial sector had a BHAR of -81.8% while technology IPOs had a BHAR of -113.2%. However, using 21 mining companies, he obtained a BHAR of -75.7% which is considerably different from the results of this study, although his results were not statistically significant. Having a negative BHAR return for mining companies is not uncommon as How (2000) in her study on Australian mining IPOs obtained a 3 year BHAR of -36%.

Table 5. Long run performance based on a firm's age¹

Firm's age	BHAR (%)					
	Absolute return			Relative return		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
< 1 years	-2.3%	-1.5%	-27.7%	-17.95%	-32.49%	-73.75%
1-2 years	34.1%	19.6%	-10.3%	26.92%	-1.71%	-49.12%
3-5 years	-21.1%	-47.7%	-48.6%	-34.19%	-76.64%	-98.17%
6-10 years	-6.0%	-20.7%	-30.9%	-25.16%	-49.29%	-67.75%
> 10 years	-3.4%	-17.3%	-23.3%	-10.07%	-38.69%	-59.54%

¹ R1 = 0.094 USD as of June 25, 2014.

From Table 5, it is established that across the different age groups most companies have a poor long run absolute and relative returns; however the results for the relative returns are worse than that of

the absolute returns. This result confirms with studies by Shikha and Balwinder (2008) who established that a firm's age had no significant relationship with long run returns.

Table 6. Correlation matrix between the regression variables

Factors	Absolute return	Relative return	Gross proceeds	Market period	Firm age	Industry
Absolute return	1					
Relative return	0.479*** (0.000)	1				
Gross proceeds	(-0.003) (0.956)	0.102* (0.083)	1			
Market period	-0.085 (0.48)	-0.336*** (0.000)	-0.135** (0.022)	1		
Firms age	-0.072 (0.221)	0.009 (0.885)	0.179*** (0.002)	-0.015 (0.800)	1	
Industry	(0.135) (0.021)**	0.028 (0.631)	-0.183** (0.002)	0.031 (0.599)	0.064 (0.277)	1

Notes: N.B. Industry is classified in to four categories namely: financial, mining, technology, and others. *** significant at 1%; ** significant at 5%; * significant at 10%.

Table 6 provides the correlation coefficients (p-value in parentheses) of selected variables and IPO long run performance. The significant positive relationship between absolute and relative returns is expected as there is a high probability that IPOs with high absolute returns are more likely to outperform the market benchmark while IPOs with low absolute returns underperform the benchmark. This relationship highlights why it is important to consider investments both in absolute and relative terms as highlighted by Asma (2010). Also, only the industry shows a significant relationship with absolute returns. Based on the classification of industries in this study, the positive relationship indicates that IPOs listed in the technology and others sectors tend to have higher absolute returns than IPOs listed in the mining and financial sectors. A possible explanation to this scenario is the fact that financial and mining sector IPOs on the JSE are highly underpriced as depicted in prior studies (Neneh, 2013; Van Heerden and Alagidede, 2012). As such, the poor returns from these industries follow existing evidence (Ritter and Welch, 2002; Akhigbe, Johnson and Madura, 2006; Mazouz, Saadouni and Yin, 2008) that highly underpriced companies tend to underperform in the long run.

Gross proceeds have a significant positive relationship with relative returns. The results indicate that IPO companies with a larger size in terms of gross proceeds tend to perform better relative to the market benchmark than firms with smaller gross proceeds. These findings are in line with Vithessonthi (2008) who found that IPOs with the smallest size had the worst long run performance. However, the findings contradict those of Kaya (2012) who observed that the performance of IPOs does not differ based on firm size. The market period has a significant negative relationship with relative returns which shows that

IPO companies listed in the hot market period perform worse than companies listed in the cold market period. This is in line with prior studies (Cook et al., 2003; Helwege and Liang, 2004) which showed that the performance of IPOs issued during hot market period was worse than IPOs issued during the cold market period.

Furthermore, a positive relationship between firm age and gross proceeds suggest that older firms have a larger firm size while the significant negative relationship between industry and gross proceeds shows that IPO companies in the financial and mining sectors have a larger size than companies in the technology and other sectors. Mining companies usually require enormous financial resources to fund their operations. As such, it is reasonable to have mining companies issue more shares and have higher gross proceeds than companies in other industries. This study did not find any significant relationship between firm age and absolute and relative returns, which is similar to prior studies (Shikha and Balwinder, 2008; and Khurshed et al., 1999) which did not find any significant relationship between a firm's age and its long run IPO performance.

As already explained above, investors focusing on absolute returns target positive return on investments over a given period of time, irrespective of market conditions, while, those focusing on relative returns look to outperform a market benchmark or index but have no commitment to deliver positive returns (Threadneedle Asset Management, 2010). Based on this information, in order to determine whether selected independent variables can be used to predict whether or not a company or portfolio will yield positive returns, or outperform the market, the absolute and relative returns are transformed to dummy variable as indicated below.

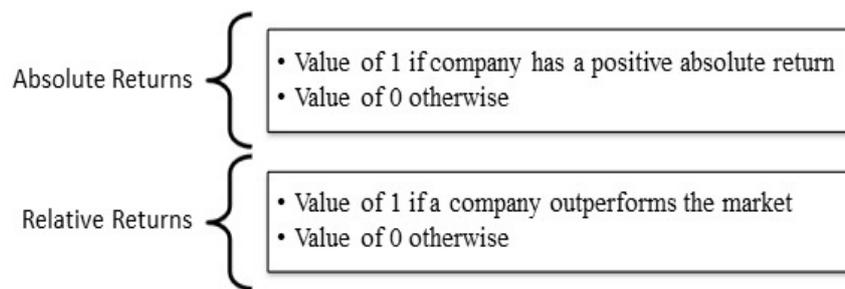


Fig. 1. Grouping of IPO absolute and relative returns

After grouping the IPO absolute and relative returns into dummy variables, a logistic regression was performed to determine the factors that can be used to predict whether a company earns a positive absolute return or outperforms the market index. Prior to conducting the logistic regression, it was imperative to eliminate possible multicollinearity issues as the findings in Table 6 indicate significant correlations between the independent variables. In overcoming this problem, firstly, variance inflation factor (VIF) was calculated to test the presence of multicollinearity between the explanatory factors. Neter et al. (1985) explicate that multicollinearity

becomes a critical issue when the VIF is greater than ten. The calculations in this study showed that all the VIFs were less than two (1.045 for firm age, 1.129 for size, 1.067 for market period, and 1.881 for the highest industry dummies) indicating that there is no serious problem of multicollinearity in the regression model. Secondly, it was also seen that even though the correlations in Table 6 were significant, the correlation coefficients were weak (less than 0.5) further suggesting that multicollinearity could not be a problem. Based on these assumptions, all the variables were imputed into the model and the logistic regression presented in Table 7 below.

Table 7. Logistic regression estimation: absolute and relative within three years of IPO using sample of 290 listed on the JSE from 1996 to 2009

Variable	Model (A)			Model (B)		
	Coeff.	Exp(B)	p-value	Coeff.	Exp(B)	p-value
Intercept	-3.108	0.142	.028**	-6.561	0.060	0.001***
Log(age)	-0.312	0.732	0.168	-0.022	0.978	0.944
Log(size)	0.245	1.277	0.145	0.272	1.312	0.233
Market dummy	-0.578	0.561	0.042**	-1.872	0.154	0.000***
Financial dummy	-0.415	1.340	0.247	-0.089	0.915	0.850
Mining dummy	-0.428	0.652	0.289	-1.227	0.293	0.069**
Technology dummy	0.258	1.295	0.446	0.043	1.044	0.935
Positive absolute returns	105			-		
Outperformance	-			43		
Total observations	290			290		
Log likelihood	369.325			208.818		
Cox and snell R ²	0.035			0.113		
Nagelkerke R ²	0.048			0.198		
Hosmer-Lemeshow χ^2	6.008			3.310		
Hosmer-Lemeshow p-value	0.646			0.913		

Notes: Model (A) uses absolute returns as the dependent variable while Model (B) uses relative returns. Log (age) is the natural log of one plus firm age, where firm age is calculated as number of years since incorporation measured at the time of IPO. Log (size) is the natural log of the firm's value measured in terms of gross proceeds. Market period (MP) is measured as a dummy variable with 1 representing hot market IPOs and 0 otherwise. Financial dummy, mining dummy, and technology dummy are dummy variables for these industries where for each dummy variable, an IPO listed in the industry takes a value of 1 and all other industries take a value of 0. *** significant at the 1% level; ** significant at the 5% level, * significant at the 10%.

From Table 7, it is seen that for absolute returns, 105 (36.2%) companies had a positive absolute return after three years of post IPO trading. The number is however considerably smaller when looking at relative performance as only 43 (14.8%) companies outperformed the market. This confirms the view of Ritter and Welch (2002) that investors might not lose money when evaluating their

investments in absolute terms; however, their investments can still underperform when comparing it to a market benchmark. The log likelihood, Nagelkerke R² and Hosmer-Lemeshow statistic depicts the goodness of fit for the two models. The reported Hosmer-Lemeshow goodness-of-fit statistic is insignificant for both models, indicating that the models fit the data well. For absolute returns, only the

market period can significantly predict the chance of obtaining a positive absolute return on a given IPO company. The negative coefficient (-0.578) for market dummy indicates that IPO companies listed in the cold market period are more likely to have positive returns than IPO companies listed during hot market periods. The Exp(B) value for market dummy (0.561) indicates that being listed in the hot market period decreases the chance of earning a positive return on an IPO company by 0.561 times. It is therefore important for investors who focus on achieving positive absolute returns to carefully evaluate the timing of their investments as the market period is a valuable indicator of possible future returns.

When evaluating the relative performance, the results show that the market period and mining industry are the two factors that can predict the likelihood that a given IPO company will outperform the market benchmark. The negative coefficient for market dummy shows that IPO companies listed in the cold market period are more likely to outperform the market benchmark than IPO companies listed in the hot market period. The Exp(B) value for market dummy depicts that being listed in the hot market period decreases the chance of outperforming the market benchmark by 0.154 times. These findings are in line with prior studies (Helwege and Liang, 2004; Shikha and Balwinder, 2008). The negative coefficient for the mining industry dummy shows that companies that are not in the mining sector tend to significantly outperform the market than companies in the mining sector. This could be as a result of the many labor strikes that have been witnessed in the South African mining sector over the past decade. Furthermore, it should be noted that the relative performance of mining companies are more likely to be benchmarked against the resources index of the JSE unlike the Allshare index used in this study. Nonetheless, these findings are consistent with prior studies (Kooli and Suret, 2004; Ritter, 1991) in Canada and USA which showed that mining companies significantly underperformed the market over a three years post IPO period. Contrary to this study, How (2000) elucidated that Australian mining companies did not underperform the market index for up to three years of after-market trading.

Conclusion

Similar to the most stock markets around the world, IPOs on the JSE underperform the market over a three-year period (both in terms of absolute and relative returns). However, for investors who do not have diversified portfolios and focus primarily on absolute returns, this study established that the IPOs outperformed the market by 3.19% for the first year, thus suggesting that investors who bought the shares at the offer price and held the shares for one year, made

significant profits. This goes to show that not all IPO companies have poor long run returns and thus pinpoints the fact that IPOs are still an attractive investment platform that presents both immensely profitable opportunities for investors and existing shareholders.

The results on three years long run performances (both in terms of absolute and relative returns) of IPOs showed that the long run performance of hot market IPOs is worse than that of cold market IPOs. These findings are consistent with prior studies across different stock markets. Most often, low quality IPOs time their IPOs in hot markets when there is high demand for shares. As such, uninformed investors who subscribe to these low quality IPOs find themselves in the long run holding a large number of underperforming IPOs. Also, it was observed that cold market IPOs had a significantly high absolute return over a period of three years. This probably supports why investor wanting a positive return on their investment are turning to an absolute return strategy as highlighted by Foster et al. (2014). It is therefore imperative for investors in the JSE to be extremely cautious when subscribing to IPOs in the hot market. With regards to the gross proceeds, the results indicated that as the price increases above the median for any given period, aftermarket performance is poor (negative). Moreover, this study also established that there is a substantially and huge difference in the level of long run performance across the four sectors, with IPOs in the financial and technology sectors (-79.4% and -101.4% respectively) having worse long run performance comparative to the others. The implication of these findings is that JSE investors with single portfolios should carefully evaluate the companies they invest in as companies in the technology and financial sectors tend to perform the worst in the long run.

Focusing on the determinants of long run absolute and relative performance of IPOs on the JSE, this study established that the market period is the only factor which significantly affects long run absolute performance, while the market period and mining industry significantly affects long run relative performance. It is therefore important for investors who focus on achieving positive absolute returns to carefully evaluate the timing of their investments as the market period is a valuable indicator of possible future returns. Future research should evaluate absolute returns over a longer period of time say 5 to 10 years. Furthermore, given that the JSE all share index was used as the only benchmark in calculating the long run relative performance, future research could use other benchmarks such as the book to market portfolio and the market capitalization to find out if the results differ across the different benchmarks on the JSE.

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