

SOUTH AFRICAN SECURITY MARKET IMPERFECTIONS

by

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Assignment presented in partial fulfillment of the requirements for the degree of
Master of Commerce
at the University of Stellenbosch

SUPERVISOR: Prof. T. de Wet

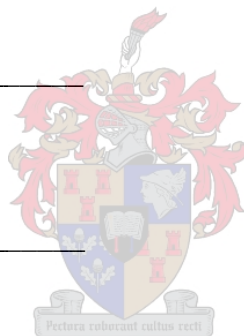
March 2006

DECLARATION

I, the undersigned, hereby declare that the work contained in this assignment is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

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ABSTRACT

In recent times many theories have surfaced posing challenging threats to the Efficient Market Hypothesis. We are entering an exciting era of financial economics fueled by the urge to have a better understanding of the intricate workings of financial markets. Many studies are emerging that investigate the relationship between stock market predictability and efficiency.

This paper studies the existence of calendar-based patterns in equity returns, price momentum and earnings momentum in the South African securities market. These phenomena are commonly referred to in the literature as security market imperfections, financial market puzzles and market anomalies. We provide evidence that suggests that they do exist in the South African context, which is consistent with findings in various international markets. A vast number of papers on the subject exist in the international arena. However, very few empirical studies on the South African market can be found in the public domain. We aim to contribute to the literature by investigating the South African case.

OPSOMMING

Die Doeltreffende Markhipotese ervaar die afgelope tyd 'n redelike bedreiging na aanleiding van nuwe voorgestelde teorieë wat poog om die gedrag van effekte-markte meer realisties te beskryf. Ons betree tans 'n uiterse opwindende era in die finansiële ekonomie. Daar bestaan 'n dringendheid om die ingewikkelde werking van finansiële markte beter te verstaan. Verskeie studies hieroor is reeds gepubliseer, wat die verband tussen effekte-mark voorspelbaarheid en doeltreffendheid in meer diepte bestudeer.

Hierdie werkstuk ondersoek of kalender-gebaseerde patrone, prys-momentum en verdienste-momentum in die Suid Afrikaanse effekte-mark bestaan. Op grond van hierdie studie word aangevoer dat dié verskynsels wel in Suid Afrika te vinde is wat in ooreenstemming is met internasionale bevindinge. Alhoewel 'n groot aantal studies met betrekking tot hierdie onderwerp bestaan in die internasionale literatuur, is daar byna geen gedokumenteerde inligting beskikbaar wat die plaaslike mark bestudeer nie. Hierdie studie poog om 'n bydrae tot die literatuur te maak deur die Suid Afrikaanse effekte-mark te ondersoek.

ACKNOWLEDGEMENTS

I would like to recognize the following individuals for their contributions during the course of this study:

- My supervisor, Prof. Tertius de Wet, for his invaluable advice, patience and guidance in the preparation of this paper.
- Dave Rossouw, for his time and assisting me with useful data sources.
- Willem Roets, for providing me with invaluable insights.
- Prof. Niel Krige for his useful comments.



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1. INTRODUCTION

World-wide equity markets experienced an era of low volatility prior to 1976. During this period many theories surfaced seeking to explain the behavior of security markets. The most famous of these is the pioneering Efficient Market Hypothesis (EMH), published by Fama (1970). This hypothesis gave birth to the random walk assumption that states that there exists no correlation between stock returns. The behaviour of stock returns are compared to that of a drunk in a field, since no one knows where he might end up. In short, it states that there is no predictability in stock returns. The hypothesis was very successful in capturing the behavior of security markets during this era, and soon became the widespread accepted market model.

During recent times, evidence appeared identifying patterns in market returns, suggesting that some form of predictability does in fact exist in security markets. Advocates of the EMH were soon to discredit these claims, stating that what the analysts were picking up was just noise. However, enormous amounts of evidence started to emerge and the phenomenon was impossible to ignore.

The most astonishing feature of these patterns is that they tend to persist over long periods of time or not disappear at all. According to the EMH, these patterns should disappear: if a trading strategy is successful in profiting from an anomaly, it is duplicated and the imperfection disappears. It was then argued that strategies designed to exploit the patterns are defeated by transaction costs and taxes, and therefore cannot be profitable. Hence, the anomaly remains unchallenged. However, futures and options are known for their low associated costs. Many authors argue that with the use of these instruments, an investor is able to gain the same amount of exposure as with a long or short position, but at a much lower cost.

For the most part, these patterns are not well understood or easily explained. Hence, the description financial market puzzles. The field has drawn immense interest from academics and practitioners alike. The evidence suggests that long-standing theories describing the workings of security markets are inadequate, fueling the interest amongst academics, while practitioners are lured by the prospect of making abnormal profits from the anomalies.

The field has given birth to a whole new branch of financial economics, known as behavioural finance. The EMH states that market efficiency is attained by the competitive behaviour of security market participants. After the discovery of so many anomalies, many came to the conclusion that financial markets are not as efficient as we once thought them to be. Market efficiency was supposed to be maintained by the analysts, and soon they were given the blame. A new theory based on investor psychology and behaviour started to emerge, and gave rise to a set of behavioural explanations for financial market puzzles.

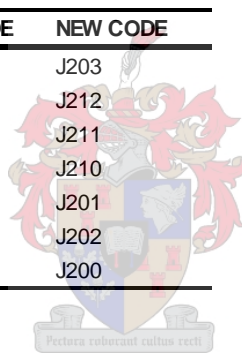
The purpose of this study is to examine the existence of calendar and momentum-based anomalies in the South African security market. Evidence of these contradicts the weak form of the EMH. The weak form states that no identifiable short-term pattern can be found in equity markets, and that future stock price movements cannot be predicted from historical information. In addition, the central axiom of the EMH states that the demand curve for securities is horizontal. This means that an increase in buying pressure can not have a positive effect on security prices. However, many authors argue that the demand curve for securities is in fact downward-sloping. During the course of the study, we will use many arguments that relate to the increase in buying pressure of a security to explain subsequent price rises. In most cases, we will find that price increases occur during times of the year where investors are typically experiencing high buying pressure. We therefore find the downward-sloping demand curve theory a plausible argument for explaining price rises after subsequent high buying periods.

The thesis is divided into two parts.

Part 1 investigates the existence of calendar-based return patterns. These are anomalies that relate to certain parts of the year, such as the day-of-the-week effect, the month-of-the-year effect and the turn-of-the-month effect. For most part of the calendar-effect analysis, we restrict our attention to seven of South Africa's major Johannesburg Stock Exchange (JSE) indices. They are J203, J212, J211, J210, J201, J202 and J200, which are respectively known as the *All Share*, *Financial 15*, *Industrial 25*, *Resource 20*, *Mid Cap*, *Small Cap* and *Top 40* indices. The following table gives the details of the indices analysed:

Table 1. Details of indices analysed

INDEX NAME	SHORT NAME	OLD CODE	NEW CODE
ALL SHARE	ALSH	CI01	J203
FINANCIAL 15	FINI	FI24	J212
INDUSTRIAL 25	INDI	FI27	J211
RESOURCE 20	RESI	FI11	J210
MID CAP	MIDC	GI01	J201
SMALL CAP	SMLC	GI02	J202
TOP 40	ALSI40	FI01	J200



In *Part 2* we determine if price and earnings momentum exist in the South African market by investigating whether historical price and earnings values can be used as precursors for market returns. This is done by constructing two sets of portfolios based on two different trading methodologies, one using only past stock returns as input for stock selection, and the other using only past earnings growth as input for stock selection. We then assess if the strategies were able to be profitable. The second part of the analysis is interesting in the sense that Fama concedes that price and earnings momentum are indeed robust persistent anomalies that can not be explained by the EMH.

PART 1

CALENDAR-BASED RETURN PATTERNS



2. DAY-OF-THE-WEEK EFFECTS

2.1. INTRODUCTION

A number of studies all over the world have indicated that stock returns change according to the days of the week. This pattern has been documented in various countries including the UK, USA, Canada, Japan, Finland, Australia, Turkey and Italy.

Cross (1973) and French (1980) found that the Standard and Poor's Composite Index generally has negative returns on Mondays. Gibbons and Hess (1981) found a similar result after analyzing the Dow Jones Industrial Index. Jaffe and Westerfield (1985a) showed that the Japanese and Australian markets exhibit negative return patterns on Tuesdays. A study of the Paris Bourse conducted by Solnik and Bousquet (1990) indicated that there was a strong negative return pattern present on Tuesdays. Barone (1990) showed that the Milan Stock Exchange's 'MIB storico' stock index exhibits negative Tuesday returns. Athanassakos and Robinson (1994) found significant negative Monday returns, insignificant positive Tuesday returns and significant positive Wednesday, Thursday and Friday returns in a number of Canadian stock indices. Canestrelli and Ziemba (1993) and Martikainen and Puttonen (1996) found a similar pattern in the Italian and Finnish stock markets respectively.

The following table is a summary of tests of the day of the week effect in international stock markets:

Table 2. Day-of-the-Week Author Summary

AUTHOR/S	MARKET/INDEX	EVIDENCE
Cross (1973)	S&P 500 Index	Negative Monday returns
French (1980)	S&P 500 Index	Negative Monday returns
Gibbons and Hess (1981)	DJIA	Negative Monday returns
Jaffe and Westerfield (1985a)	Japanese and Australian	Negative Tuesday returns
Solnik and Bousquet (1990)	CAC Index	Negative Tuesday returns
Barone (1990)	MIB	Negative Tuesday returns
Athanassakos and Robinson (1994)	Canadian	Negative Monday returns; Positive Wednesday to Friday returns
Canestrelli and Ziemba (1993)	Italian	Negative Monday and Tuesday returns; Positive Wednesday to Friday returns
Martikainen and Puttonen (1996)	Finnish	Negative Monday to Wednesday returns; Positive Thursday and Friday returns

The day of the week effect appears to differ from market to market, but most of the international evidence shows that Mondays have statistically significant negative returns. In this chapter, we will examine evidence for the possible existence of the day of the week effect in the JSE. Surprisingly, in contrast with the findings in the international markets, we will show that South Africa has a day of the week effect where the returns on Mondays appear to be significantly positive. What makes this even more interesting is that the effect was present in all seven indices, indicating that the effect indeed occurs throughout the whole market.

2.2. DATA AND METHODOLOGY



The data used in the analysis comprises the closing prices of the seven major South African indices. We analyse the ALSH, INDI, MIDC, SMLC and ALSI40 indices over the period from December 20, 1995 to November 11, 2006, and the FINI and RESI indices are analysed over the period from March 2, 1998 to November 11, 2006.

The daily returns are calculated using the formula,

$$R_d^I = 100 \times \frac{I_d - I_{d-1}}{I_{d-1}} \quad (1)$$

where:

R_d^I is the daily return of index I on day d ;

I_d is the closing price of index I on day d .

The analysis is divided into two parts. First, we look at some exploratory statistics for evidence of day of the week effects. This will be done by computing the return averages per day of the week over the period in consideration. In the second part of the analysis, we will perform a Student's t-test on our return samples and test the following hypothesis:

$$H_0 : R_d^I = 0 \quad (2)$$

vs. the two sided alternative

$$H_1 : R_d^I \neq 0 \quad (3)$$

95% Confidence intervals for returns of each day of the week are also computed.

2.3. ANALYSIS AND EMPIRICAL FINDINGS

Firstly, averages are computed for each day of the week using all the data as represented by ALLOBS. The period is then divided into four subsequent quarters of approximate equal length as represented by Q1 to Q4. We then compute the average daily return per day of the week for each quarter. The results are displayed in the following figure:



Figure 1. The Day-of-the-Week Effect

Examining the figures, one will notice various patterns, but without doubt, one can conclude that it appears that there is a very strong Monday pattern that occurs throughout the whole market. All the indices had positive returns on Mondays on aggregate for the period and sub-periods analysed, and when a negative return average on a Monday occurred for a sub-period, it was almost minuscule. The results of the sample t-tests¹ as well as 95% confidence intervals for the daily returns per day for the seven indices are given in *Table 3*.

¹ See, for example http://dss.princeton.edu/online_help/analysis/interpreting_regression.htm for documentation on how to interpret t-test results.

Table 3. Day-of-the-Week t-test Results

ALSH	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
MONDAY	465	0.1226	2.1821	0.0296**	(0.01219846 ; 0.23307277)
TUESDAY	468	0.0339	0.6127	0.5404	(-0.07476505 ; 0.14251343)
WEDNESDAY	486	-0.0197	-0.3591	0.7197	(-0.12732930 ; 0.08798336)
THURSDAY	485	0.0526	0.9853	0.3250	(-0.05228627 ; 0.15746213)
FRIDAY	479	0.0045	0.0891	0.9290	(-0.09540746 ; 0.10446981)
FINI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
MONDAY	363	0.0949	1.2429	0.2147	(-0.05525288 ; 0.24507111)
TUESDAY	362	0.0945	1.2211	0.2228	(-0.05767556 ; 0.24664210)
WEDNESDAY	378	-0.0472	-0.5580	0.5772	(-0.2133361 ; 0.1190167)
THURSDAY	378	-0.0470	-0.6335	0.5268	(-0.19306437 ; 0.09897189)
FRIDAY	373	-0.0527	-0.6972	0.4861	(-0.20121158 ; 0.09587873)
INDI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
MONDAY	465	0.1368	2.1316	0.0336**	(0.01067967 ; 0.26282285)
TUESDAY	468	0.0898	1.3375	0.1817	(-0.04211509 ; 0.22161573)
WEDNESDAY	486	-0.0517	-0.8084	0.4193	(-0.17743632 ; 0.07399207)
THURSDAY	485	-0.0004	-0.0072	0.9942	(-0.1220307 ; 0.1211355)
FRIDAY	479	-0.0686	-1.2083	0.2275	(-0.18027987 ; 0.04298369)
RESI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
MONDAY	363	0.1819	2.1731	0.0304**	(0.01729024 ; 0.34644963)
TUESDAY	362	-0.0168	-0.2112	0.8328	(-0.1735363 ; 0.1398730)
WEDNESDAY	378	-0.0727	-0.8491	0.3964	(-0.24117733 ; 0.09570577)
THURSDAY	378	0.2065	2.2726	0.0236**	(0.02783219 ; 0.38514254)
FRIDAY	373	0.1499	1.7045	0.0891*	(-0.02302709 ; 0.32278479)
MIDC	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
MONDAY	465	0.0894	1.9207	0.0554*	(-0.002068039 ; 0.180851404)
TUESDAY	468	0.0506	1.2217	0.2225	(-0.0308061 ; 0.1320547)
WEDNESDAY	486	-0.0030	-0.0689	0.9451	(-0.08982603 ; 0.08374271)
THURSDAY	485	0.0598	1.5424	0.1236	(-0.01639147 ; 0.13606858)
FRIDAY	479	0.0382	0.9284	0.3537	(-0.04264529 ; 0.11903814)
SMLC	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
MONDAY	465	0.0859	2.1398	0.0329**	(0.007011285 ; 0.164692934)
TUESDAY	468	0.0493	1.4666	0.1432	(-0.0167433 ; 0.1152599)
WEDNESDAY	486	0.0258	0.7568	0.4495	(-0.04117602 ; 0.09276824)
THURSDAY	485	0.0252	0.7805	0.4355	(-0.03823547 ; 0.08862829)
FRIDAY	479	0.0392	1.2574	0.2092	(-0.02208614 ; 0.10058100)
ALSI40	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
MONDAY	465	0.1231	1.9950	0.0466**	(0.001849185 ; 0.244425489)
TUESDAY	468	0.0287	0.4612	0.6449	(-0.09361109 ; 0.15102283)
WEDNESDAY	486	-0.0215	-0.3546	0.7230	(-0.14044135 ; 0.09749918)
THURSDAY	485	0.0543	0.9265	0.3546	(-0.06083229 ; 0.16939683)
FRIDAY	479	-0.0015	-0.0262	0.9791	(-0.1119506 ; 0.1090017)

* indicates significant at 10% level

** indicates significant at the 5% level

All indices, excluding the FINI index, had Monday return patterns that were significantly different from zero. The ALSH, INDI, RESI, SMLC and ALSI40 indices proved to be significant at the 5% level, while the MIDC index proved significant at the 10% level. The RESI index proved to be the only index to have other days of the week that exhibited return patterns significantly different from zero. The RESI had Thursdays significantly different from zero at the 5% level and Fridays significantly different at the 10% level. All the days that proved to be significantly different from zero at the 5% significance level had 95% confidence intervals that excluded the zero point and were positive.

The results conclusively show that all sectors of the market tend to produce higher returns on Mondays than any other day of the week, and that the RESI index also tends to exhibit positive returns on Thursdays and Fridays.

2.4. DISCUSSION AND PROPOSED EXPLANATIONS

The most interesting feature about the Monday effect in the South African market is that it is the inverse of the common pattern witnessed in various international markets. A proposed explanation of the negative Monday returns in international markets is information related. Authors have argued that negative news is postponed to the end of the week and is then only released to the public via the media over weekends. This causes traders to return to the market filled with negative sentiment on Mondays and as a result Mondays are poor performing days.

Arguments used to explain the negative Monday returns in international markets cannot be used, since negative return Mondays are not the case in the South African market. Instead, we discuss an argument that is related to the participants in the South African market.

The proportion of private versus institutional investors differ considerable between the US and South Africa. The South African market is arguably dominated by the behaviour

of large institutional investment houses. Private investors to the contrary own large proportions of US equity, and can therefore have a great impact on the behaviour of the US market. It can be argued that an institutional investment house does not react as intensely as a private investor on bad news in the very short term, since the former has a more medium to long term based strategy and the latter is prone to react more emotionally. In short, institutional investors are more sophisticated than individual investors. In addition, for the institutional investor there is a separation of mind and capital since institutional investors invest on behalf of clients. This does not apply to private investors since they invest on behalf of themselves. Behavioural finance has argued that this can have an immense impact on how a market participant reacts to news and directs their investments. It is thus possible that negative news over the weekend does not have the same influence on the South African market during Mondays as in the US. These may be possible factors that contribute to the differences in the Monday return patterns. This issue is discussed further in the following paragraphs.

Figure 2 can serve as a starting point in trying to explain the phenomena in the South African context. The figure represents average daily volumes traded per index. It was constructed using data from June 24, 2002 to November 11, 2005. The first bars represent the average volume traded per day of the week; the second bars the average daily volume for all the observations and the third bar the difference. The third bar indicates whether certain days exhibit above or below average traded volumes.

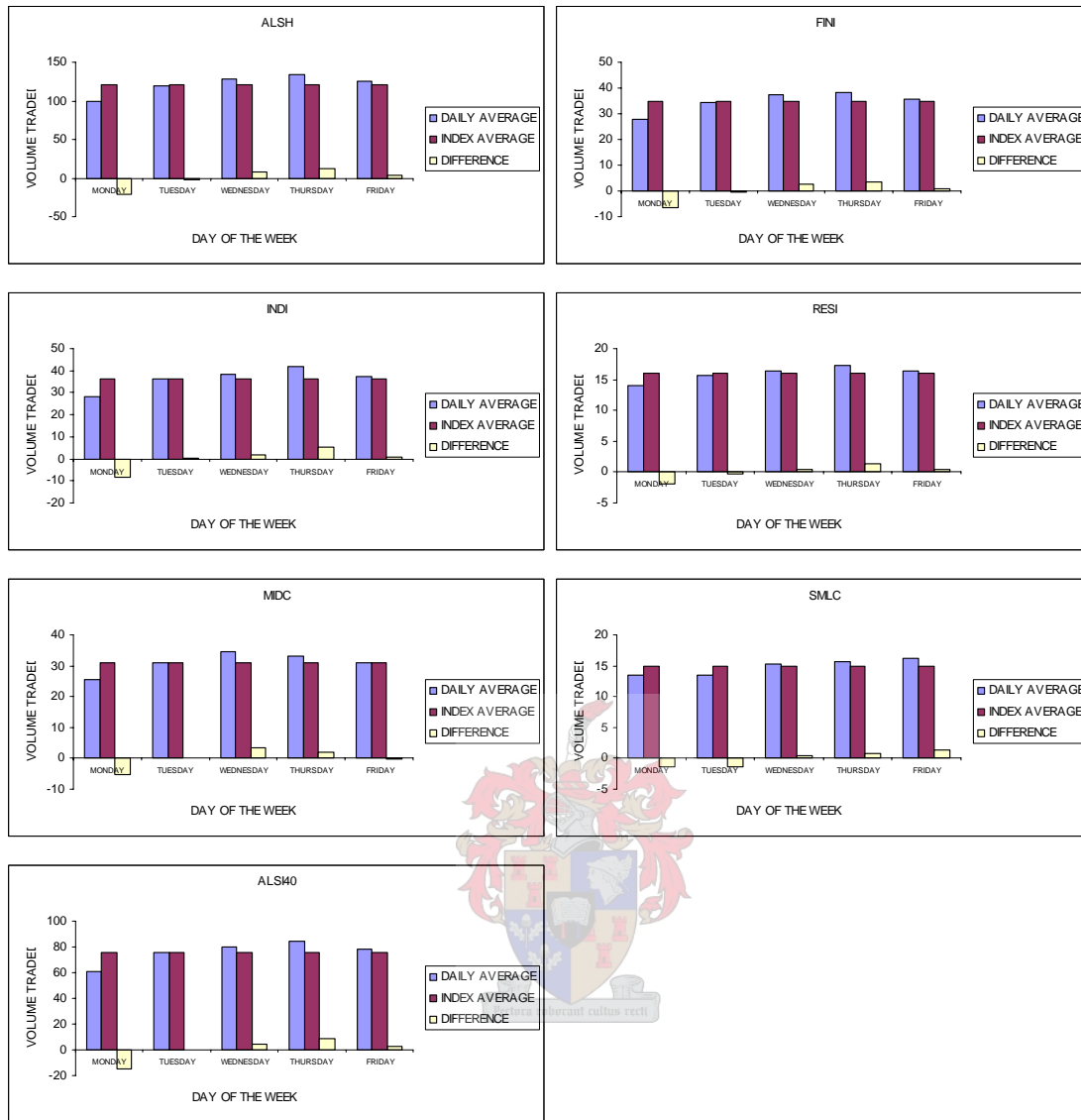


Figure 2. Average Volume Traded per Day of the Week - June 24, 2002 to November 11, 2005

Figure 2 indicates that Mondays were the only day amongst the indices to exhibit constant below average traded volumes. The other days in general either had volumes almost equal or slightly above the index daily volume average.

We can now argue that securities tend to be more scarcely traded during Mondays than any other day of the week. Economic theory suggests that this has a positive price impact on the item in question. However, the empirical findings do not support the counter argument. For example, Figure 2 suggest that Thursdays exhibit above average daily

volumes traded, but there is no evidence from our t-test results that Thursdays exhibit below average returns. In fact, it was shown that the RESI has a tendency to produce positive Thursday returns, and according to *Figure 2* exhibits above average volumes traded during Thursdays.

The below average volumes traded during Mondays can be explained by the amount of new information available to market participants during the beginning of the week. Investors have much less information to react upon at the beginning of the week since hardly any new market news is available on Mondays in the financial press. This has the effect of fewer buy and sell transactions being conducted during the beginning of the week, and this only increases when new information becomes available as the week develops. *Figure 2* indeed depicts such a pattern where low volumes are traded on Mondays, then picks up towards Wednesdays and Thursdays, and then slightly dies down towards Fridays.

Lastly, one can also argue that South African investors return to the market after weekends with a positive attitude and try to start the week with a clean slate. Therefore, investors begin the week with a bullish attitude and in turn push market prices upwards.



Also, notice that most of the upper bounds of the 95% confidence intervals for Monday returns do not extend over the 0.3% level. This has the implication that any long-only strategy that is designed to profit from the anomaly will almost certainly be defeated by the two-way transaction cost and taxes. However, index-futures are known to have very low associated costs. Therefore, it might be possible to design a strategy that successfully profits from these patterns by the skillful implementation of index-futures.

2.5. CONCLUSION

The day of the week effect refers to the phenomena that some days of the week exhibit higher than average returns. The effect has been identified in various international markets, and it has been shown that in general Mondays tend to exhibit negative return patterns.

Seven major South African indices were analysed over the period December 20, 1995 to November 11, 2006 to investigate if daily patterns exist. Our results confirmed that the inverse of this phenomena exists in all of the seven major South African indices, that is to say it was found that Mondays tend to exhibit positive returns. This is a strange but interesting phenomenon.

We also indicated that the RESI index was the only index out of the seven indices analysed that exhibit returns significantly different from zero on days other than Mondays. In this case, we also found that Thursdays and Fridays tended to be positive return days.

We suggested the use of index-futures when designing a strategy to profit from these anomalies since they tend to be rather small. Some proposed explanations were discussed but the exact reason why this phenomena occurs remains largely unknown.

3. TURN-OF-THE-MONTH EFFECTS

3.1. INTRODUCTION

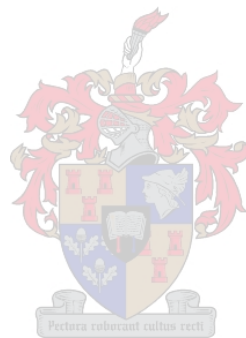
A magnitude of research has shown that the last trading day of the month and the three consecutive days that follow usually exhibit unusually high returns. This pattern where returns are statistically different from zero around the turn of the month has become known as the turn-of-the-month (TOTM) effect. It has been found that this pattern is also persistent over time. Amongst the international evidence are findings in markets in the US, Japan and the UK. In what follows, day 0 represents the last trading day of the previous month, +1 the first trading day of the current month, +2 the second, etc.

Ariel (1987) conducted a study on small-and large capitalisation stock indices trading on the NYSE and found that there were above average high returns during the turn of the month. Lakonishok and Smidt (1988) studied the Dow Jones Industrial Average and found that the index rose during the first four days of each month. Ziemba (1991) found that days -5 to +2 of the Japanese Nikkei stock average index had significantly positive returns. Further, the turn-of-the-month effect was reviewed in Ziemba (1994) and indicated that the pattern exists in most of 24 different stock markets and 12 regions analysed. They also showed that the pattern is more prominent in large economies, such as the US and UK, compared to smaller markets.

3.2. DATA AND METHODOLOGY

The data used is the same data set as described in *Section 2.2*. The data is grouped according to days of the month, each having indicator variables ranging from -7 to +7. Variables -7 to 0 represents the last eight trading days of the previous month and

variables +1 to +7 the first seven days of the current month. Daily returns are computed using *Formula (1)*. We do not consider TOTM effects per month due to scarcity of data, instead all the data is grouped according to their indicator variables for all months, e.g. for index J203 we group all +1 days through December 20, 1995 to November 11, 2006 for all months into one data set and perform analysis on that specific day of the month. Although we will not be able to distinguish the TOTM effects between months of the year, we will be able to construct a good picture of what happens around the TOTM per index. We again test the hypothesis (2) vs. (3) via a Student's t-test to determine whether any days round the TOTM is statistically significant different from zero.



3.3. ANALYSIS AND EMPIRICAL FINDINGS

Figure 3 represents the average daily return averages for each day around the TOTM per index. Observing the figure we notice that the days leading up to the turn of the month tend to be negative on average, and from day 0 to day +2/+3 it appears that there are very strong positive returns. Day -5 seems to be the largest negative return day across all indices, and day +2 the most positive return day around the TOTM.

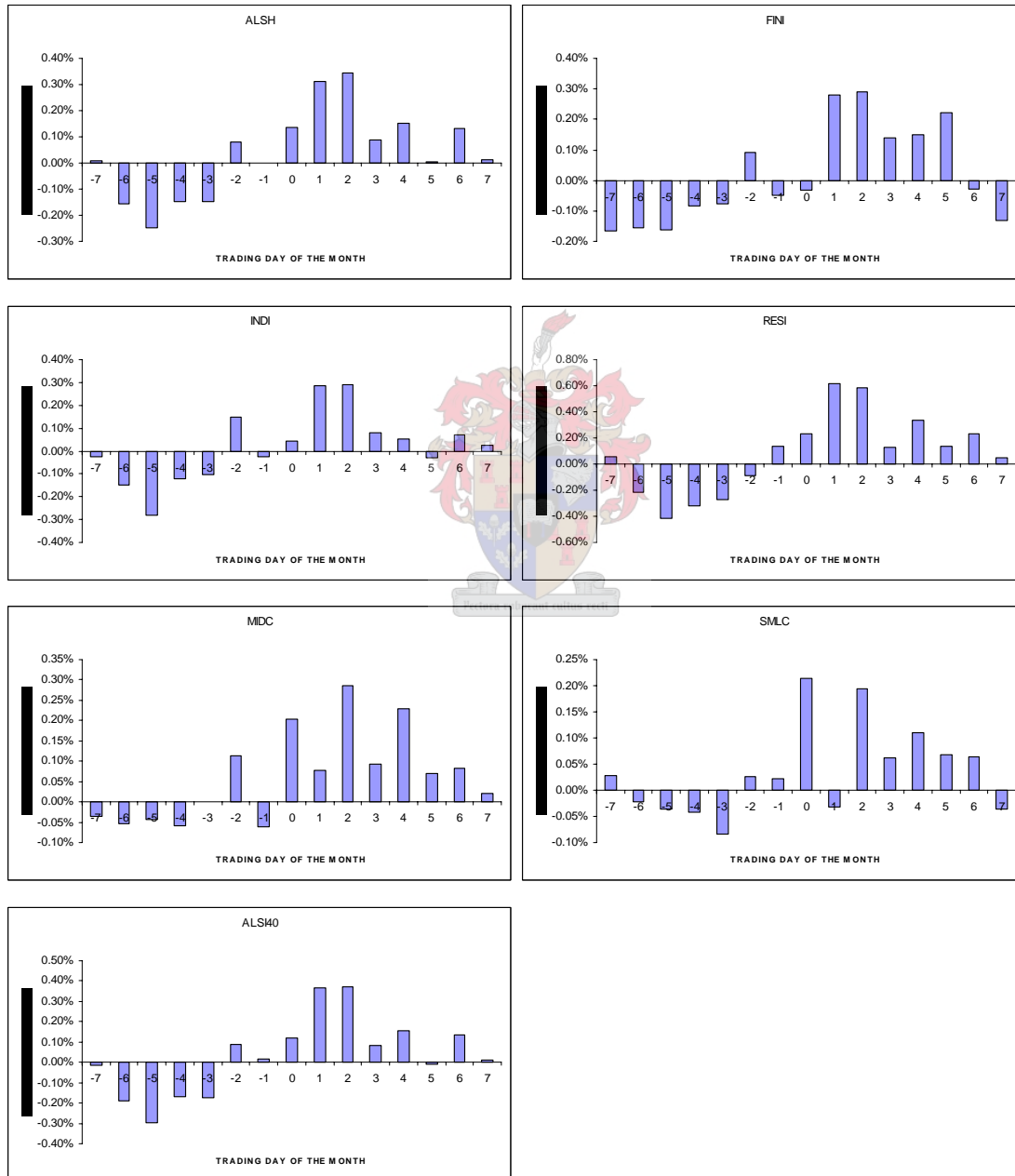


Figure 3. The Turn-of-the-Month Effect

The Student's t-test results are summarised in *table 4a-c*:

Table 4a. Turn-of-the-Month t-test results

ALSH	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
-7	118	0.0064	0.0695	0.9447	(-0.1753982 ; 0.1881598)
-6	118	-0.1622	-1.3741	0.172	(-0.39603854 ; 0.07158007)
-5	119	-0.2489	-2.6376	0.0095***	(-0.43583430 ; -0.06203487)
-4	119	-0.1473	-1.0966	0.2751	(-0.4132346 ; 0.1186845)
-3	119	-0.1494	-0.9641	0.337	(-0.4562947 ; 0.1574844)
-2	119	0.0781	0.6035	0.5473	(-0.1782100 ; 0.3344416)
-1	119	-0.0007	-0.0082	0.9934	(-0.1721444 ; 0.1707193)
0	119	0.1394	1.3881	0.1677	(-0.05947231 ; 0.33831570)
1	119	0.3123	2.817	0.0057***	(0.09275994 ; 0.53180811)
2	119	0.3444	3.5604	0.0005***	(0.1528314 ; 0.5359065)
3	119	0.0932	0.9778	0.3302	(-0.09556231 ; 0.28196765)
4	119	0.1554	1.5543	0.1228	(-0.04258775 ; 0.35333317)
5	119	0.0035	0.0297	0.9763	(-0.2278498 ; 0.2347939)
6	119	0.1321	1.4682	0.1447	(-0.04607953 ; 0.31034742)
7	119	0.0171	0.1684	0.8665	(-0.1838190 ; 0.2179923)

FINI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
-7	92	-0.1606	-1.2578	0.2117	(-0.41414477 ; 0.09300156)
-6	92	-0.1663	-1.1271	0.2627	(-0.4594250 ; 0.1267949)
-5	92	-0.1689	-1.316	0.1915	(-0.42387346 ; 0.08604728)
-4	92	-0.0834	-0.4915	0.6243	(-0.4204444 ; 0.2536505)
-3	92	-0.0749	-0.4548	0.6503	(-0.4020720 ; 0.2522527)
-2	92	0.0791	0.4353	0.6644	(-0.2818460 ; 0.4400453)
-1	92	-0.0565	-0.3589	0.7205	(-0.3692682 ; 0.2562550)
0	92	-0.0261	-0.1809	0.8568	(-0.3123665 ; 0.2602111)
1	93	0.2779	1.6336	0.1058	(-0.05996223 ; 0.61574116)
2	93	0.2804	1.6709	0.0981*	(-0.05289311 ; 0.61364358)
3	93	0.1125	0.7573	0.4508	(-0.1826093 ; 0.4076870)
4	93	0.0949	0.5724	0.5685	(-0.2344646 ; 0.4243157)
5	93	0.2214	1.7762	0.079*	(-0.02616436 ; 0.46894882)
6	93	-0.0127	-0.0919	0.927	(-0.2874690 ; 0.2620502)
7	93	-0.1208	-0.8062	0.4222	(-0.4184334 ; 0.1768183)

INDI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
-7	118	-0.0275	-0.2591	0.796	(-0.2378089 ; 0.1827758)
-6	118	-0.1499	-1.0559	0.2932	(-0.4309934 ; 0.1312259)
-5	119	-0.2811	-2.5159	0.0132**	(-0.50243379 ; -0.05984988)
-4	119	-0.1223	-0.7985	0.4262	(-0.4254278 ; 0.1809246)
-3	119	-0.1063	-0.5907	0.5559	(-0.4626348 ; 0.2500585)
-2	119	0.1459	0.9931	0.3227	(-0.1449815 ; 0.4367066)
-1	119	-0.0252	-0.2568	0.7978	(-0.2192372 ; 0.1689054)
0	119	0.0486	0.4449	0.6572	(-0.1675735 ; 0.2646755)
1	119	0.2867	2.1312	0.0351**	(0.02030564 ; 0.55309196)
2	119	0.2910	2.4963	0.0139**	(0.06015557 ; 0.52188383)
3	119	0.0821	0.7019	0.4841	(-0.1495635 ; 0.3137945)
4	119	0.0511	0.4317	0.6668	(-0.1834422 ; 0.2857080)
5	119	-0.0293	-0.2443	0.8074	(-0.2667660 ; 0.2081747)
6	119	0.0740	0.6525	0.5154	(-0.1505815 ; 0.2985777)
7	119	0.0249	0.2232	0.8238	(-0.1960686 ; 0.2458845)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Table 4b. Turn-of-the-Month t-test results

RESI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
-7	92	0.0604	0.4028	0.688	(-0.2373144 ; 0.3580409)
-6	92	-0.2220	-1.2345	0.2202	(-0.5791461 ; 0.1351940)
-5	92	-0.4302	-2.6581	0.0093***	(-0.7517054 ; -0.1087215)
-4	92	-0.3222	-1.6323	0.1061	(-0.71427032 ; 0.06989503)
-3	92	-0.2643	-1.418	0.1596	(-0.6344777 ; 0.1059384)
-2	92	-0.0833	-0.5052	0.6147	(-0.4106219 ; 0.2441153)
-1	92	0.1325	0.8529	0.396	(-0.1761497 ; 0.4412167)
0	92	0.2356	1.4629	0.1469	(-0.08431737 ; 0.55560707)
1	93	0.6207	3.5822	0.0005***	(0.2765822 ; 0.9648877)
2	93	0.5702	3.5597	0.0006***	(0.252086 ; 0.888408)
3	93	0.1058	0.6902	0.4918	(-0.1987330 ; 0.4104043)
4	93	0.3115	1.7525	0.083*	(-0.04151887 ; 0.66450569)
5	93	0.1424	0.8496	0.3978	(-0.1905035 ; 0.4753136)
6	93	0.2463	1.5757	0.1185	(-0.06414482 ; 0.55674399)
7	93	0.0792	0.4329	0.6661	(-0.2841562 ; 0.4425328)

	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
-7	118	-0.0373	-0.5989	0.5504	(-0.16074175 ; 0.08609324)
-6	118	-0.0545	-0.6442	0.5207	(-0.2220911 ; 0.1130638)
-5	119	-0.0442	-0.565	0.5732	(-0.1991826 ; 0.1107570)
-4	119	-0.0576	-0.5728	0.5679	(-0.2568471 ; 0.1415977)
-3	119	0.0006	0.0052	0.9958	(-0.2402405 ; 0.2415160)
-2	119	0.1146	1.1261	0.2624	(-0.08690348 ; 0.31604018)
-1	119	-0.0606	-0.7413	0.46	(-0.2224327 ; 0.1012603)
0	119	0.2076	2.997	0.0033***	(0.07041417 ; 0.34470456)
1	119	0.0810	0.8749	0.3834	(-0.1022967 ; 0.2642156)
2	119	0.2839	3.7023	0.0003***	(0.1320333 ; 0.4356986)
3	119	0.0966	1.1314	0.2602	(-0.07247248 ; 0.26566192)
4	119	0.2316	2.8325	0.0054***	(0.06968832 ; 0.39354395)
5	119	0.0718	0.7843	0.4344	(-0.1094817 ; 0.2530876)
6	119	0.0830	1.1542	0.2508	(-0.05942597 ; 0.22548125)
7	119	0.0223	0.2574	0.7973	(-0.1494225 ; 0.1940771)

SMLC	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
-7	118	0.0277	0.4596	0.6467	(-0.09156148 ; 0.14689757)
-6	118	-0.0231	-0.343	0.7322	(-0.1562013 ; 0.1100854)
-5	119	-0.0372	-0.6946	0.4887	(-0.14321911 ; 0.06883955)
-4	119	-0.0410	-0.495	0.6215	(-0.2050510 ; 0.1230374)
-3	119	-0.0807	-0.8711	0.3855	(-0.2640198 ; 0.1027086)
-2	119	0.0264	0.2728	0.7855	(-0.1651144 ; 0.2178696)
-1	119	0.0233	0.376	0.7076	(-0.09935141 ; 0.14591626)
0	119	0.2180	3.6589	0.0004***	(0.09999639 ; 0.33593071)
1	119	-0.0297	-0.393	0.695	(-0.179466 ; 0.120025)
2	119	0.1960	3.7192	0.0003***	(0.09163027 ; 0.30032391)
3	119	0.0661	1.0395	0.3007	(-0.05979969 ; 0.19195633)
4	119	0.1134	1.8793	0.0627*	(-0.00609506 ; 0.232911337)
5	119	0.0707	0.9708	0.3336	(-0.07349646 ; 0.21485905)
6	119	0.0639	1.1897	0.2366	(-0.0424784 ; 0.1703201)
7	119	-0.0333	-0.5039	0.6153	(-0.16417074 ; 0.09757175)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Table 4c. Turn-of-the-Month t-test results

ALSI40	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
-7	118	-0.0133	-0.1295	0.8972	(-0.2168376 ; 0.1902204)
-6	118	-0.1987	-1.5097	0.1338	(-0.45928532 ; 0.06195205)
-5	119	-0.2966	-2.7721	0.0065***	(-0.50842404 ; -0.08471545)
-4	119	-0.1685	-1.1329	0.2596	(-0.4631743 ; 0.1260797)
-3	119	-0.1740	-1.0234	0.3082	(-0.5106827 ; 0.1626895)
-2	119	0.0875	0.6316	0.5289	(-0.1867913 ; 0.3617326)
-1	119	0.0142	0.1493	0.8816	(-0.1745699 ; 0.2030367)
0	119	0.1221	1.0672	0.288	(-0.1044567 ; 0.3486573)
1	119	0.3667	3.0331	0.003***	(0.1272781 ; 0.6060728)
2	119	0.3714	3.4481	0.0008***	(0.1580919 ; 0.5846718)
3	119	0.0858	0.8269	0.41	(-0.1197189 ; 0.2913879)
4	119	0.1561	1.4162	0.1593	(-0.06215966 ; 0.37431189)
5	119	-0.0102	-0.0791	0.9371	(-0.2662273 ; 0.2457657)
6	119	0.1375	1.3514	0.9008	(-0.06399731 ; 0.33904156)
7	119	0.0139	0.1249	0.1792	(-0.2069453 ; 0.2348160)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Observing the tables, we notice that every index had significantly positive returns on day +2. An interesting result is the day -5 result. The ALSH, INDI, RESI and the ALSI40 indices had statistically significant negative return days during day -5. In addition, only the indices that had significant negative -5 days had significant positive +1 days. Day -5 and day +1 are seven trading days apart. Some of the indices also had trading days that were significantly positive on day 0, day +4 and day +5. It is also worthwhile to notice that the Mid Cap and Small Cap indices had very similar results. The ALSH, INDI, RESI and ALSI40 indices also had very similar results when compared with each other. The FINI index, although having positive return days on day +2 and day +5 at the 10% significant level, had the weakest daily return patterns during the TOTM of all the indices.

The significance appeared to be very strong, almost all exceeding the 1% significant level, in the cases where trading days were statistically different from zero.

The empirical results suggest that there exists a TOTM effect in the South African market, where positive returns occur on days ranging from day 0 to day +5. The negative return effect on day -5 also appeared to be very significant in four of the seven indices analysed.

3.4. DISCUSSION AND PROPOSED EXPLANATIONS

The most viable argument that explains the TOTM effect is largely cash flow and institutionally based. The South African investment industry is arguably dominated by the institutional investor and mutual fund investor population. These investors are governed by strict mandates, which require that the amount of cash held in their portfolios be kept below a pre-specified margin. Vast amounts of cash flows enter the market during the TOTM. Salaries, dividends, principal repayments and debt interest are payable between the 0 and +1 days of the month. Institutional investors and mutual funds are compelled by mandate to turn these huge amounts of cash flows into non-cash investments. This immediate reinvestment could lead to anomalous large returns around the TOTM.

International evidence has also shown that the TOTM effect does not continue into the future. It was found that some TOTM effect disappeared shortly after authors published research identifying the effect.

To explain why the +2 days are the most significantly positive return days one could argue that the largest proportion of cash-receipts occur during +1 days and that there is at most a one day time lag between cash inflows and their reinvestment.

Another argument is behavioural. It is argued that most bad news, e.g. relating to earnings announcements, are postponed to the end of the month and then released. Good news is then announced immediately during the first days of the month to boost investor sentiment and moral. This could well cause returns to be negative during the days leading up to the beginning of the month and then suddenly turn positive during the first few days of the new month. *Figure 3* indeed depicts such a pattern.

The other interesting result was the significant negative return -5 days for the ALSH, INDI, RESI and ALSI40 indices. This is an unusual pattern and one can only speculate what causes such an effect.

Some of the daily patterns around the TOTM exhibited 95% confidence intervals that were positive far beyond the 0 point. Examining the RESI TOTM results, we notice that during days +1 and +2 it exhibited 95% confidence intervals with lower limits at around the 0.3% mark and upper bounds extending to a very assuring 0.9%. The TOTM results are thus far more promising than the Monday patterns documented in *Section 2.3*. Another good aspect of the TOTM results is the fact that some effects carry over to one or two consecutive days of positive returns, as was the case with the RESI index. Any strategy trying to exploit the Monday effect requires the investor to take up the position as early as possible on Monday morning and unwinding the position as late as possible Monday afternoons. As argued before, any long-only strategy will be defeated by the two-way transaction cost. However, as with the RESI index, we have two consecutive days with alarmingly large positive 95% confidence return intervals. Long-only positions thus become a possibility when considering a strategy that aims to exploit these patterns. Again, successful strategies can also be designed with the use of index-futures.

Naturally, there will be Mondays that fall on the +2 day of the month. We have shown in *Section 2.3* that Mondays tend to exhibit positive returns. It will be very interesting to investigate the effect of Mondays that are +1 and +2 days of the month and examine if the pattern is indeed inflated when this event occurs.

3.5. CONCLUSION

The turn-of-the-month (TOTM) effect refers to the phenomenon of returns being abnormally large during the last and first few trading days of each month. Various authors have shown that this pattern exists in international markets.

Seven major South African indices were analysed over the period December 20, 1995 to November 11, 2006 to investigate if days around the TOTM exhibit unusual return patterns. Various patterns were discovered. The most prominent of these were the tendency of -5 days to exhibit negative returns and +1 and +2 days to exhibit positive returns.

The results also show that some indices have consecutive positive return days, which is a promising feature when considering investment strategies that aims to exploit the patterns. The TOTM days also proved to be more significantly positive than the day-of-the-week effects presented in *Chapter 1*.

Cash-flow arguments were used to explain the TOTM effect, which appears to be a quite reasonable explanation for the tendency of returns being positive during the first few trading days of each month. Some international authors have also warned that the TOTM effect disappears soon after research is published that identifies the pattern.

4. THE JANUARY-EFFECT AND MONTH-OF-THE-YEAR EFFECTS

4.1. INTRODUCTION

Along with day-of-the-week effect, the January-effect is one of the best known and well-documented calendar based anomalies. Ever since its discovery, it has become a buzzword amongst investors.

The January effect refers to the tendency of stock market returns being positive during the month of January. It is also sometimes referred to as the Turn-of-the-year effect since in many cases it was found that some stock markets takes a dip during the end of December and then rebound significantly during the first weeks of January. International evidence has also shown that the pattern is more profound for small capitalisation stock, and that the small capitalisation sector tends to outperform any other sectors during this period.

In this chapter, we investigate whether the January-effect and other monthly effects exist in the South African market, and test whether certain months have return patterns that are significantly different from zero. We do so since it was found that there is a tendency for markets to show positive returns during the month that follows the financial year-end month. In the US, the financial year-end is in December, and studies have shown that there is a tendency for stock returns to be positive during January in the US markets. However, the financial year-end varies considerable across companies in South Africa; therefore, we need to investigate other months as well.

Amongst the international evidence of the January and Month-of-the-year effects is findings from countries such as the US, UK, Australia, Canada, Japan and Italy.

Rozeff and Kimney (1976) showed that stock returns in the US are generally much larger during January compared to other months of the year. A similar pattern was found in the Australian Stock Exchange by Officer (1975); the Canadian market by Tinic, Barone-Adesi and West (1990); the Tokyo Stock Exchange by Aggarwal, Rao and Hiraki (1990); the Italian market by Barone (1990); and in the London Exchange by Lewis (1989).

4.2. DATA AND METHODOLOGY

The data set analysed is again the seven major South African indices as described in *Section 2.2*. We will use the convention of analysing daily returns per month as opposed to the actual monthly returns per month. Daily returns are calculated using *Formula (1)*. The reason for this is two-fold. Firstly, due to scarcity of data, and secondly, using daily return data we avoid the possibility of a distortion of a specific month's performance due to a large dip or rise of an index at the end of a month. An example is the situation where an index has performed very well during the largest part of the month and then takes a sudden dip during the last days of the month. Although the index performed well during most of the month, using the actual monthly return values will distort the performance of the index negatively during the month in consideration. We also showed that this is indeed the case when we investigated turn-of-the-month effects, where the stock indices have a tendency to dip just before the end of the month as *Figure 3* indicates.

As a starting point, we compute the daily return averages per month per index and give a graphic illustration to see if we can visually notice any obvious patterns. We then formally test whether some months exhibit returns that is significantly different from zero using a Student's t-test. Using this, we test the hypothesis (2) vs. (3) and compute 95% confidence intervals for daily returns per specific month for each index.

4.3.ANALYSIS AND EMPIRICAL FINDINGS

Figure 4 represents the average daily returns over the whole observation period per index per month:

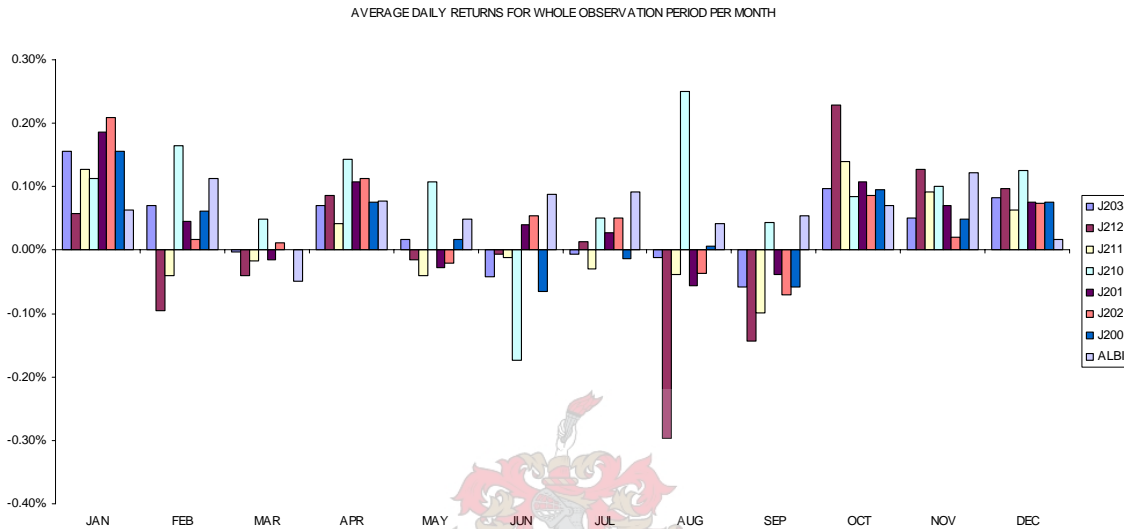


Figure 4. Average Daily Returns per Month over Whole Observation Period



Observing Figure 4, we notice that over the whole observation period all the indices averaged a positive daily return during the months of January, April, October, November and December. Also, notice that the Small Cap index as represented by J202 had the highest daily mean return during January of all the indices.

Figure 5 represents the daily return monthly averages per index for all years:

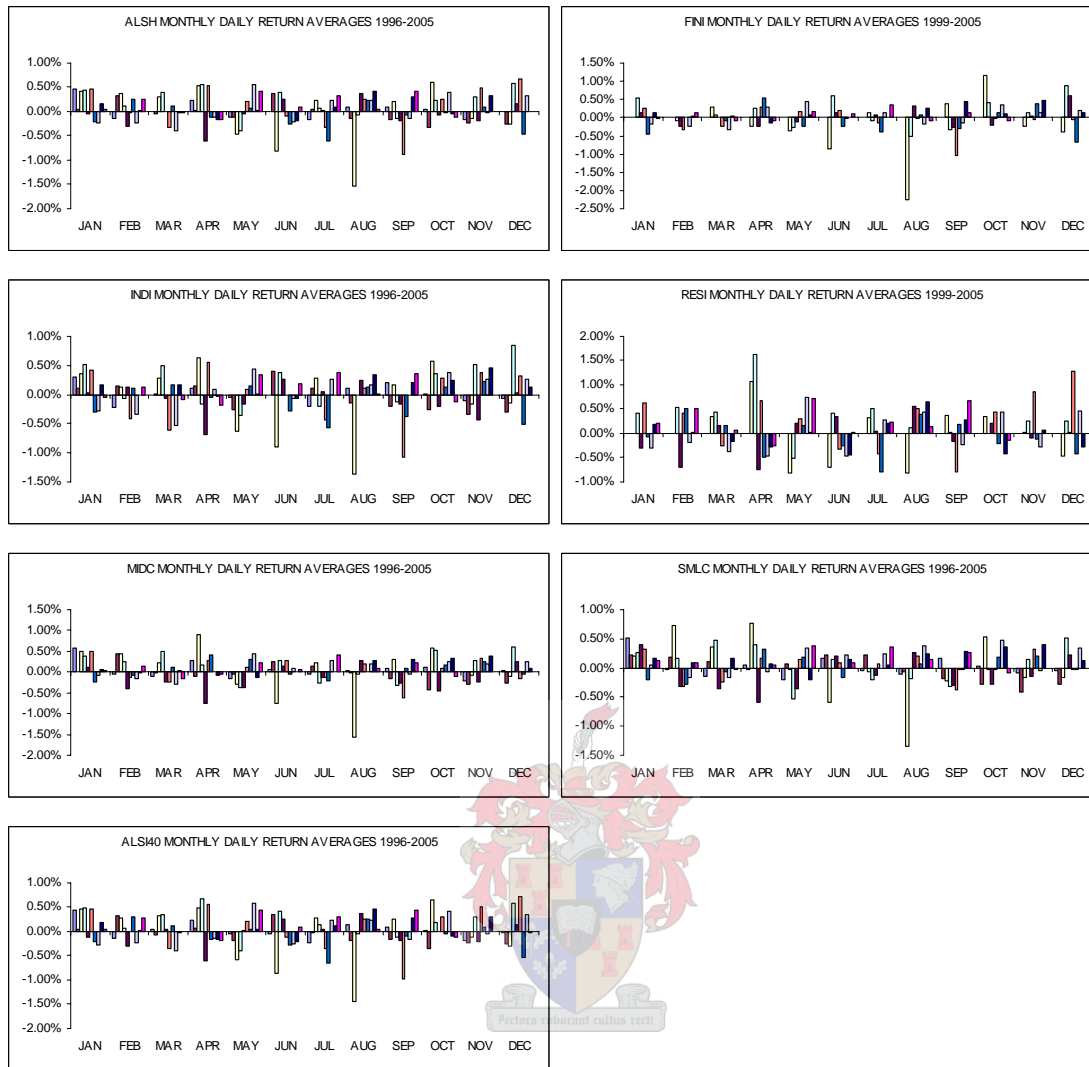


Figure 5. Daily Return Monthly Averages per Index

Observing *Figure 5*, we notice that the month of January tends to be a positive daily return month across all indices. Most of the indices have only exhibited one or two negative average daily return Januaries. Most of the other months appear to exhibit random return patterns from year to year, but looking at the August observations it looks like this month also tends to exhibit persistent positive returns. This is especially true if the observations of Aug-98 are excluded.

Table 5a-c represents the empirical findings of the Student's t-test results:

Table 5a. Month-of-the-year t-test Results

ALSH	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
JAN	203	0.1547	1.7992	0.0735*	(-0.01484434 ; 0.32430825)
FEB	202	0.0679	1.0653	0.288	(-0.05782593 ; 0.19372177)
MAR	196	0.0081	0.1089	0.9134	(-0.1385726 ; 0.1547774)
APR	175	0.0737	0.7554	0.451	(-0.1188698 ; 0.2662797)
MAY	205	0.0173	0.2274	0.8204	(-0.1330639 ; 0.1677541)
JUN	193	-0.0467	-0.6852	0.494	(-0.18123826 ; 0.08777831)
JUL	223	-0.0089	-0.1334	0.894	(-0.1398686 ; 0.1221372)
AUG	204	-0.0003	-0.0037	0.9971	(-0.1700353 ; 0.1694049)
SEP	197	-0.0457	-0.4945	0.6215	(-0.2277245 ; 0.1364129)
OCT	225	0.0949	0.8458	0.3986	(-0.1262195 ; 0.3160320)
NOV	197	0.0772	1.0297	0.3044	(-0.0706719 ; 0.2251113)
DEC	163	0.0693	0.7536	0.4522	(-0.1123714 ; 0.2510611)

FINI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
JAN	142	0.0732	0.4953	0.6211	(-0.2189911 ; 0.3654231)
FEB	141	-0.0969	-1.0177	0.3106	(-0.28516433 ; 0.09135583)
MAR	160	-0.0304	-0.2848	0.7762	(-0.2409356 ; 0.1802115)
APR	136	0.1012	0.7775	0.4382	(-0.1562369 ; 0.3586720)
MAY	164	-0.0153	-0.1428	0.8866	(-0.2262082 ; 0.1956891)
JUN	156	-0.0105	-0.0983	0.9218	(-0.2211813 ; 0.2002096)
JUL	177	0.0099	0.1089	0.9134	(-0.1697502 ; 0.1895833)
AUG	163	-0.2768	-2.2443	0.0262**	(-0.5203782 ; -0.033254)
SEP	158	-0.1275	-0.8129	0.4175	(-0.4371656 ; 0.1822460)
OCT	179	0.2222	1.6601	0.0987*	(-0.04193054 ; 0.48624306)
NOV	156	0.1594	1.541	0.1254	(-0.04492751 ; 0.36368729)
DEC	122	0.0883	0.7155	0.4757	(-0.1560332 ; 0.3326453)

INDI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
JAN	203	0.1278	1.2548	0.211	(-0.07302242 ; 0.32861363)
FEB	202	-0.0409	-0.5804	0.5623	(-0.1799695 ; 0.0981126)
MAR	196	-0.0014	-0.0166	0.9867	(-0.1720809 ; 0.1692009)
APR	175	0.0457	0.3824	0.7026	(-0.190156 ; 0.281541)
MAY	205	-0.0377	-0.4566	0.6484	(-0.2004980 ; 0.1250953)
JUN	193	-0.0159	-0.1963	0.8446	(-0.1753162 ; 0.1435736)
JUL	223	-0.0318	-0.4042	0.6864	(-0.1867301 ; 0.1231642)
AUG	204	-0.0297	-0.3442	0.7311	(-0.2000229 ; 0.1405664)
SEP	197	-0.0846	-0.7237	0.4701	(-0.3150348 ; 0.1458882)
OCT	225	0.1317	0.9862	0.3251	(-0.1314630 ; 0.3948715)
NOV	197	0.1195	1.3212	0.188	(-0.05888362 ; 0.29792783)
DEC	163	0.0576	0.5982	0.5505	(-0.1325949 ; 0.2478441)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Table 5b. Month-of-the-year t-test Results

RESI	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
JAN	142	0.1126	1.001	0.3185	(-0.1097897 ; 0.3350115)
FEB	141	0.1590	1.2584	0.2103	(-0.09080518 ; 0.40883643)
MAR	160	0.0593	0.4548	0.6499	(-0.1981665 ; 0.3167433)
APR	136	0.1390	0.8169	0.4154	(-0.1974906 ; 0.4754413)
MAY	164	0.1103	0.7701	0.4423	(-0.1725109 ; 0.3931042)
JUN	156	-0.1793	-1.6236	0.1065	(-0.39745941 ; 0.03885313)
JUL	177	0.0471	0.3547	0.7233	(-0.2147752 ; 0.3088803)
AUG	163	0.2606	1.8972	0.0596*	(-0.01065199 ; 0.53176188)
SEP	158	0.0628	0.4685	0.6401	(-0.2019777 ; 0.3275926)
OCT	179	0.0949	0.8323	0.4063	(-0.1301313 ; 0.3199709)
NOV	156	0.1228	1.051	0.2949	(-0.1080353 ; 0.3536946)
DEC	122	0.1033	0.5991	0.5502	(-0.2379782 ; 0.4445049)

MIDC	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
JAN	203	0.1747	2.2757	0.0239**	(0.02332895 ; 0.32605130)
FEB	202	0.0418	0.7807	0.4359	(-0.06379571 ; 0.14742053)
MAR	196	-0.0021	-0.0384	0.9694	(-0.1094257 ; 0.1052496)
APR	175	0.1212	1.4248	0.156	(-0.04671312 ; 0.28921265)
MAY	205	-0.0288	-0.4854	0.6279	(-0.14556718 ; 0.08805221)
JUN	193	0.0385	0.6894	0.4914	(-0.07162798 ; 0.14860979)
JUL	223	0.0269	0.5582	0.5773	(-0.06807194 ; 0.12186798)
AUG	204	-0.0448	-0.6353	0.526	(-0.18374243 ; 0.09419562)
SEP	197	-0.0291	-0.4432	0.6581	(-0.1586382 ; 0.1004148)
OCT	225	0.0978	1.1577	0.2482	(-0.06869867 ; 0.26437808)
NOV	197	0.0960	1.5932	0.1127	(-0.02282415 ; 0.21476432)
DEC	163	0.0785	1.3158	0.1901	(-0.03931693 ; 0.19635013)

SMLC	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
JAN	203	0.2075	3.379	0.0009***	(0.08643435 ; 0.32865904)
FEB	202	0.0155	0.4049	0.686	(-0.06016957 ; 0.09126214)
MAR	196	0.0203	0.4769	0.634	(-0.0635031 ; 0.1040075)
APR	175	0.1201	2.0148	0.0455**	(0.00244763 ; 0.237688659)
MAY	205	-0.0246	-0.5272	0.5987	(-0.1164444 ; 0.0673129)
JUN	193	0.0521	1.0579	0.2914	(-0.04500379 ; 0.14911706)
JUL	223	0.0498	1.4192	0.1572	(-0.01934825 ; 0.11892896)
AUG	204	-0.0251	-0.3985	0.6907	(-0.14917479 ; 0.09901047)
SEP	197	-0.0650	-1.0661	0.2877	(-0.18518207 ; 0.05522227)
OCT	225	0.0824	1.231	0.2196	(-0.04950693 ; 0.21429664)
NOV	197	0.0377	0.8025	0.4233	(-0.05493173 ; 0.13030433)
DEC	163	0.0743	1.4088	0.1608	(-0.02986559 ; 0.17854857)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Table 5c. Month-of-the-year t-test Results

ALS140	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
JAN	203	0.1559	1.6563	0.0992*	(-0.02969495 ; 0.34146506)
FEB	202	0.0587	0.8276	0.4089	(-0.08121574 ; 0.19869547)
MAR	196	0.0122	0.1462	0.8839	(-0.1519291 ; 0.1762647)
APR	175	0.0776	0.7198	0.4726	(-0.1352323 ; 0.2904976)
MAY	205	0.0187	0.2215	0.8249	(-0.1478100 ; 0.1852238)
JUN	193	-0.0691	-0.925	0.3561	(-0.21629370 ; 0.07818953)
JUL	223	-0.0163	-0.2194	0.8265	(-0.1627181 ; 0.1301139)
AUG	204	0.0159	0.1725	0.8632	(-0.1656306 ; 0.1973861)
SEP	197	-0.0439	-0.4282	0.669	(-0.2459041 ; 0.1581686)
OCT	225	0.0948	0.7535	0.4519	(-0.1531644 ; 0.3428184)
NOV	197	0.0739	0.8912	0.3739	(-0.08959429 ; 0.23731536)
DEC	163	0.0555	0.5431	0.5878	(-0.1462125 ; 0.2571568)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Four of the seven indices analysed exhibited daily returns significantly different from zero during January. These were the All Share, Mid Cap, Small Cap and Top40 indices. Similar to international findings, the smaller cap indices returns proved to be more significant different from zero than the other indices. The Small Cap index daily returns were significantly different from zero at the 1% significant level during the month of January and the Mid Cap index significant at the 5% level. The larger cap indices daily returns also proved significantly different from zero during Januaries, such as the All Share and Top 40 indices, but with the significance level at 10% proved to be much weaker compared to the smaller cap indices. Also, the Mid Cap and Small Cap indices were the only indices with 95% January daily return confidence intervals that excluded the zero point.

The results also show that there were indeed months other than January that exhibited daily returns significantly different from zero. The FINI index proved significant during August at the 5% level and during October at the 10% level. The RESI index proved significant during August at the 10% level. The Small Cap index proved significant during April at the 5% level.

4.4. DISCUSSION AND PROPOSED EXPLANATIONS

The most popular explanation for the January-effect in international markets is financial year-end related. The US and European year-end is at the end of December. It is argued that traders sell their loser shares in their portfolios just before year-end. The reason for this is two-fold. Firstly, traders do so to avoid reporting too many losers in their portfolios at the year-end.² Secondly, selling loser stock realizes capital losses that effectively reduce the taxable capital gains at the year-end. Shortly after the year-end reporting these stocks are bought back to recover the desired portfolio structure again. This behaviour results in mass selling during December and mass buying during January, which in turn causes the tendency for January returns to be positive.

The above argument seems plausible in the US and Europe since their financial year-end falls at the end of December. The argument can only apply to South Africa if our year-end falls at the end of December. This is in fact not the case. The year-end for companies in South Africa vary considerable, with popular year-end months including February, March, June and December. However, as *Table 6* illustrates, eleven out of the twenty largest capitalisation investment houses in South Africa have a December year-end. The behaviour of these large institutions invariably influences the reaction of South African markets. Massive selling in December and buying in January is therefore a plausible argument to explain the January pattern in the South African economy.

² This is sometimes referred to as “window dressing”.

Table 6. Top 20 Investment Companies by Market Capitalisation

Name	Code	Sector	Year End	Market Cap (million)
Standard Bank Group Ltd	SBK	Banks	Dec	108461
FirstRand Ltd	FSR	Banks	Jun	108146
Old Mutual plc	OML	Life Insurance	Dec	104757
Absa Group Ltd	ASA	Banks	Dec	72520
Nedbank Group Ltd	NED	Banks	Dec	48105
Sanlam Ltd	SLM	Life Insurance	Dec	39260
RMB Holdings Ltd	RMH	Banks	Jun	34399
Liberty Group Ltd	LGL	Life Insurance	Dec	24673
Investec plc	INP	General Financial	Mar	22193
Discovery Holdings Ltd	DSY	Life Insurance	Jun	15121
African Bank Investments Ltd	ABL	General Financial	Sep	13755
Investec Ltd	INL	General Financial	Mar	13046
Liberty Holdings Ltd	LBH	Life Insurance	Dec	11043
Santam Ltd	SNT	Nonlife Insurance	Dec	10230
Mutual & Federal Insurance Co Ltd	MAF	Nonlife Insurance	Dec	8936
Metropolitan Holdings Ltd	MET	Life Insurance	Dec	7622
Alexander Forbes Ltd	AFB	Nonlife Insurance	Mar	7491
Brait S.A.	BAT	General Financial	Mar	2541
South African Eagle Insurance Company Ltd	SAE	Nonlife Insurance	Dec	2314
Coronation Fund Managers Ltd	CML	General Financial	Sep	2303

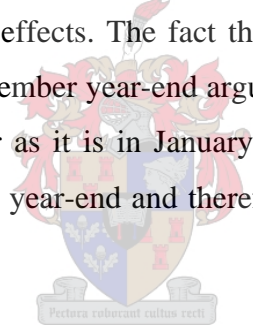
As to why the effect is more prominent within the Small Cap sector, it has been argued that large cap stocks tend to be more stable than small cap stocks and are therefore not sold off to the same extent as small cap stocks around the year-end.

The January-effect can appear very appealing to investors. The day-of-the-week effects and turn-of-the-month effects usually occur over the duration of a period of at most two consecutive days. This allows the investor a very short time frame for holding a position that intends to exploit the pattern, and thus the investor runs a huge risk of being defeated by transaction costs and taxes. Things look far more optimistic with a pattern that runs over the duration of a whole month. With a January daily return 95% confidence interval that excludes the 0 point and is positive, makes the SMLC index quite inviting.

During the 1980's US investors noticed the January-effect in the market and started to take advantage of the phenomena. The term January-effect soon became a buzzword and many investors simply employed a strategy of favoring small cap stocks during the month of January. However, recent studies have shown that the January effect has disappeared in the US market. This establishes some creditability towards the Efficient

Market Hypothesis in that the market now anticipates the January-effect and has since disappeared. In the South African context though, there has to date been no indication of the effect disappearing. During the last decade, the SMLC index exhibited only a single year where January had a negative daily return average. Investors should remain cautious though since the January-effect is bound to disappear here as well, as was the case in the US market.

January is by far the most striking monthly effect in the South African market and we tried to explain this through arguing that most of the largest investment houses have a December year-end. However, the empirical results also indicate that some indices exhibited significantly positive return months during April, August and October. Although not as popular as the December year-end, many investment firms have their year-end at March and September. The above arguments can therefore also be used to try to explain the April and October effects. The fact that the March and September year-ends are not as popular as the December year-end arguably explains why the effect is not as profound in April and October as it is in January. In the case of the August effect, hardly any companies have a July year-end and therefore the above explanations cannot be applied.



Finally, international authors have also proposed a more behavioural explanation for the January effect. They argue that investors tend to postpone the implementation of new investment strategies until the beginning of a new year. Added to this, simple psychology suggests that people tend to start the New Year with a clean slate and optimistic views. Therefore, the New Year is met with energetic traders full of new ideas and bullish attitudes, buying vigorously to implement their new thought-out strategies. This has the effect to push market prices upwards during the month of January.

4.5. CONCLUSION

The January effect refers to the tendency of stock market returns being positive during the month of January. Other months with significant positive returns have also been documented worldwide but are not found as abundantly.

Seven major South African indices were analysed over the period December 20, 1995 to November 11, 2006 to investigate if monthly patterns exist. Our analysis discovered that January months tend to produce significant positive returns in four out of the seven indices analysed.

Other monthly effects were also exhibited, where some indices showed significant positive returns during April, August and October months. The small cap index also exhibited the most significant positive January return pattern, which is similar as what was found in international markets.

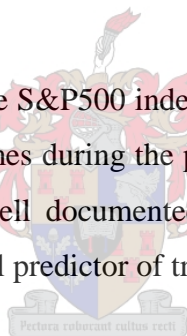
Some global markets, where the January-effect used to be present, have recently reported that the pattern has since disappeared. We discussed an argument of financial year-end mass selling and new-year mass buying amongst investors to explain the January effect. This argument was extended to explain the positive returns during April and October, since in the South African market many companies have March and September financial year-ends.

5. THE JANUARY BAROMETER

5.1. INTRODUCTION

Various studies have shown that January can be a robust predictor of the market returns over the rest of the year. It was found that the market had a tendency to follow the return magnitude of January during the remainder of the year. If the outcome for January was positive, the following 11 months had an inclination to perform well and vice versa. In the words of Hirsch (1986): "As January goes so goes the whole year with January part of the year."

In The US, the January returns of the S&P500 index were able to predict the direction of the market correctly 51 out of 54 times during the period from 1950 to 2004.³ Strangely, the January Barometer is not as well documented as the famous January-effect even though it has proved to be a powerful predictor of trends in the US market.



We will use the All Share Index to investigate if a similar phenomenon exists in the South African market and whether January can be used as a predictor for the year ahead. The All Share Index can be considered as a good representative of the South African security market as a whole.

5.2. DATA AND METHODOLOGY

We use the All Share Index data series from 1961 to 2006 to investigate if the January Barometer is a successful indicator for South African yearly market behaviour. For the

³ See, for example http://www.dogsofthedow.com/January_Barometer.htm.

period 1961 to 1995, we will use the old share code CI01 values of the All Share Index and thereafter the new code J203 values for the remainder of the period.⁴

January actual and yearly actual returns are computed.⁵ We compare the up and down signals from January to the yearly return values with January part of the year to investigate if there is any consistent pattern. Thereafter, the values are ranked in descending order according to the January return values. This will allow us to assess the predictive power of January returns conditional on whether January was positive or negative.

We also investigate if January can be a precursor for the direction of the market following the months after January. We test this for a range of periods, ranging from one month to eleven months post-January.

We then conduct a more formal test to determine if there exists a significant difference between the 11-month returns following positive Januaries and the 11-month returns following negative Januaries.

We test the following hypothesis via a t-test:

$$H_0 : R_{POS} - R_{NEG} = 0 \quad (4)$$

Vs. the two sided alternative

$$H_1 : R_{POS} - R_{NEG} \neq 0 \quad (5)$$

where:

⁴ The new All Share Index J203 was introduced during 1995 and the old code CI01 index was dropped soon after that.

⁵ Monthly and yearly actual returns are calculated using an adaptation of *Formula (1)*.

R_{POS} represents the actual return from February to December in a January positive return year;

R_{NEG} represents the actual return from February to December in a January negative return year.

If we are able to reject the null-hypothesis H_0 , then there exists significant difference between the market returns over the 11 months following January positive return years and January negative return years.

5.3. ANALYSIS AND EMPIRICAL FINDINGS

Table 7 represents the January vs. the yearly market return values. The X in the table indicates the years where the index wrongly predicted the direction of the market. Over the whole period, the index managed to predict the direction of the market correctly 27 out of the 45 years. This is a success rate of 60%, which is close to the predictive power of flipping a coin.

However, observing the ranked performance we notice that the conditional predictive power of the index is much better during positive January return years. When one conditions on the fact that January was indeed a positive return month, it predicted a positive market yearly return correctly 21 out of 28 times. The predictive power has risen to a 75% success rate when conditioning on positive January return months. The same can not be said for negative return Januaries since it failed miserably to predict negative return years correctly.

The last result may purely be because positive Januaries occur more frequently than negative Januaries. This is evident when examining the ranked return results of *Table 7*. This is also consistent with our empirical findings on the January-effect in *Section 4.3*.

Table 7. January vs. Yearly Market Return Values

MARKET PERFORMANCE IN JANUARY					RANKED BY PERFORMANCE			
Year	Previous Year's Close	January Close	January Change	Year Change	Rank	Year	January Change	Year Change
1961	78	77	-1.28%	3.85% X	1	1974	15.75%	9.84%
1962	81	81	0.00%	20.99%	2	1996	10.52%	7.09%
1963	98	102	4.08%	16.33%	3	1983	9.56%	8.08%
1964	114	121	6.14%	13.16%	4	2001	9.53%	28.08%
1965	129	133	3.10%	1.55%	5	1979	8.71%	82.26%
1966	131	137	4.58%	15.27%	6	1989	8.44%	49.55%
1967	151	159	5.30%	13.91%	7	1999	8.08%	66.62%
1968	172	181	5.23%	46.51%	8	1987	7.52%	-8.18% X
1969	252	262	3.97%	-13.10% X	9	1990	7.33%	-8.60% X
1970	219	200	-8.68%	-29.68%	10	1972	6.88%	57.50%
1971	154	157	1.95%	3.90%	11	1998	6.77%	-8.23% X
1972	160	171	6.88%	57.50%	12	1964	6.14%	13.16%
1973	252	249	-1.19%	0.79% X	13	1986	5.90%	49.85%
1974	254	294	15.75%	9.84%	14	1993	5.34%	50.14%
1975	279	260	-6.81%	-19.00%	15	1967	5.30%	13.91%
1976	226	231	2.21%	-11.06% X	16	1968	5.23%	46.51%
1977	201	192	-4.48%	-4.48% X	17	1992	4.80%	-5.26% X
1978	243	243	0.00%	27.57%	18	1966	4.58%	15.27%
1979	310	337	8.71%	82.26%	19	2004	4.45%	21.85%
1980	565	559	-1.06%	32.04% X	20	1963	4.08%	16.33%
1981	746	630	-15.55%	-7.24%	21	1969	3.97%	-13.10% X
1982	692	671	-3.03%	27.02% X	22	1965	3.10%	1.55%
1983	879	963	9.56%	8.08%	23	1976	2.21%	-11.06% X
1984	950	936	-1.47%	3.58% X	24	1971	1.95%	3.90%
1985	984	949	-3.56%	34.35% X	25	2005	1.12%	42.98%
1986	1322	1400	5.90%	49.85%	26	1997	0.46%	-8.84% X
1987	1981	2130	7.52%	-8.18% X	27	1962	0.00%	20.99%
1988	1819	1568	-13.80%	9.40% X	28	1978	0.00%	27.57%
1989	1990	2158	8.44%	49.55%	29	1980	-1.06%	32.04% X
1990	2976	3194	7.33%	-8.60% X	30	2002	-1.18%	-11.28%
1991	2720	2556	-6.03%	26.47% X	31	1973	-1.19%	0.79% X
1992	3440	3605	4.80%	-5.26% X	32	1961	-1.28%	3.85% X
1993	3259	3433	5.34%	50.14%	33	2000	-1.29%	-2.31%
1994	4893	4755	-2.82%	19.90% X	34	1984	-1.47%	3.58% X
1995	5866.9	5054.1	-13.85%	-4.57%	35	1994	-2.82%	19.90% X
1996	5598.729	6187.72	10.52%	7.09%	36	1982	-3.03%	27.02% X
1997	5995.822	6023.594	0.46%	-8.84% X	37	1985	-3.56%	34.35% X
1998	5465.6	5835.504	6.77%	-8.23% X	38	1977	-4.48%	20.90% X
1999	5015.719	5420.877	8.08%	66.62%	39	2003	-5.16%	11.96% X
2000	8357.193	8249.354	-1.29%	-2.31%	40	1991	-6.03%	26.47% X
2001	8164.293	8942.375	9.53%	28.08%	41	1975	-6.81%	-19.00%
2002	10456.474	10333.52	-1.18%	-11.28%	42	1970	-8.68%	-29.68%
2003	9277.22	8798.35	-5.16%	11.96% X	43	1988	-13.80%	9.40% X
2004	10387.22	10849.25	4.45%	21.85%	44	1995	-13.85%	-4.57%
2005	12656.86	12798.55	1.12%	42.98%	45	1981	-15.55%	-7.24%
2006	18096.54	19745.16	9.11%	??				

X = JANUARY PREDICTION ERROR

Up to now, we have only looked at January returns vs. whole year returns with January part of the year. We have seen that the statement of Hirsch (1986) does not hold for the South African market. We will now consider the predictive power of January price movements over the periods that follow January. We start by looking at the return of the eleven months succeeding January, i.e. the return over the remainder of the year, and investigate if the movement is in the same direction. We then systematically shorten the period that follows January to determine if January is able to predict market movements

more accurately over the short term. We look at the return period succeeding January in intervals ranging from 11 months to 1 month. The results are summarised in the following table:

Table 8. January Return vs. Succeeding Periods

IS THE MARKET DIRECTION THE SAME DIRECTION AS JANUARY?							
YEAR	JAN RETURN	FEB-DEC RETURN	FEB-JUN RETURN	FEB-MAY RETURN	FEB-APR RETURN	FEB-MAR RETURN	FEB RETURN
1961	-1.28%	5.19% X	-6.49%	-14.29%	-20.78%	-11.69%	-6.49%
1962	0.00%	20.99%	8.64%	7.41%	4.94%	2.47%	2.47%
1963	4.08%	11.76%	4.90%	0.98%	0.00%	2.94%	1.96%
1964	6.14%	6.61%	1.65%	7.44%	8.26%	12.40%	4.13%
1965	3.10%	-1.50% X	-0.75% X	2.26%	5.26%	8.27%	5.26%
1966	4.58%	10.22%	4.38%	5.84%	0.73%	2.92%	1.46%
1967	5.30%	8.18%	-6.29% X	-3.14% X	-1.26% X	-0.63% X	0.63%
1968	5.23%	39.23%	21.55%	17.68%	17.13%	13.81%	7.73%
1969	3.97%	-16.41% X	11.83%	28.24%	30.92%	19.47%	3.82%
1970	-8.68%	-23.00%	-23.50%	-15.00%	3.50% X	-3.50%	0.50% X
1971	1.95%	1.91%	8.92%	8.28%	6.37%	1.91%	0.64%
1972	6.88%	47.37%	27.49%	25.73%	16.37%	10.53%	1.17%
1973	-1.19%	2.01% X	18.88% X	9.24% X	3.61% X	5.22% X	2.41% X
1974	15.75%	-5.10% X	-7.48% X	-0.34% X	12.24%	21.77% X	4.08%
1975	-6.81%	-13.08%	10.00% X	-0.38%	-5.38%	0.38% X	3.85% X
1976	2.21%	-12.99% X	-9.09% X	0.43%	-3.46% X	-9.09% X	-3.46% X
1977	-4.48%	26.56% X	-1.04%	-1.04%	0.52% X	2.08% X	8.33% X
1978	0.00%	27.57%	7.00%	0.41%	-4.53%	-7.00%	-7.00%
1979	8.71%	67.66%	5.04%	8.61%	1.19%	2.37%	4.45%
1980	-1.06%	33.45% X	21.11% X	10.91% X	0.54% X	1.07% X	10.20% X
1981	-15.55%	9.84% X	-4.44% X	9.05% X	9.21% X	7.78% X	1.11% X
1982	-3.03%	31.00% X	-32.64%	-26.68%	-19.52%	-21.61%	-8.64%
1983	9.56%	-1.35% X	-0.83% X	-1.35% X	-4.67% X	-12.88% X	-14.43% X
1984	-1.47%	5.13% X	9.94% X	11.75% X	13.46% X	12.50% X	10.47% X
1985	-3.56%	39.30% X	18.86% X	19.39% X	14.65% X	8.96% X	-1.05%
1986	5.90%	41.50%	7.14%	1.43%	-3.00% X	4.57%	-0.43% X
1987	7.52%	-14.60% X	9.44%	9.48%	10.33%	1.55%	-1.60% X
1988	-13.80%	26.91% X	11.93% X	6.89% X	2.36% X	7.14% X	-3.19%
1989	8.44%	37.91%	21.78%	11.12%	20.20%	17.38%	5.89%
1990	7.33%	-14.84% X	-3.66% X	-0.19% X	-5.07% X	1.97%	-3.44% X
1991	-6.03%	34.59% X	29.34% X	21.87% X	18.66% X	12.56% X	9.66% X
1992	4.80%	-9.60% X	1.39%	3.52%	-4.19% X	-1.53% X	-0.22% X
1993	5.34%	42.53%	18.79%	16.28%	8.74%	3.70%	-0.44% X
1994	-2.82%	23.38% X	13.65% X	13.48% X	12.70% X	3.87% X	1.91% X
1995	-13.85%	23.23% X	7.25% X	8.26% X	8.41% X	4.51% X	1.84% X
1996	10.52%	-3.10% X	0.40%	0.42%	2.44%	-1.88% X	-2.83% X
1997	0.46%	-9.26% X	10.90%	4.52%	6.93%	5.73%	6.82%
1998	6.77%	-14.05% X	3.43%	16.45%	26.68%	15.66%	7.67%
1999	8.08%	54.17%	23.99%	13.39%	23.20%	10.19%	2.26%
2000	-1.29%	-1.03%	-8.23%	-13.01%	-12.11%	-5.87%	-6.26%
2001	9.53%	16.93%	1.65%	3.67%	-0.45% X	-9.38% X	-0.29% X
2002	-1.18%	-10.22%	3.14% X	8.39% X	6.52% X	6.60% X	5.24% X
2003	-5.16%	18.06% X	-5.07%	-2.66%	-14.64%	-12.71%	-4.50%
2004	4.45%	16.66%	-6.83% X	-4.01% X	-4.27% X	-1.44% X	0.43%
2005	1.12%	41.40%	10.60%	7.72%	-1.90% X	3.91%	5.30%
SUCCESS RATE		46.67%	62.22%	66.67%	53.33%	57.78%	55.56%
X = JANUARY PREDICTION ERROR							

Table 8 illustrates that the market does not follow the same direction as the January return even over short periods succeeding January. Only 46.76% of the time did the 11 month period post-January, i.e. the remainder of the year, move in the same direction as January. January was able to predict the movement of the three-month period February to May the most accurately with a success rate of 66.76%. The rest of the results were similar, with the success rates remaining close to the 50% mark. This indicates that January fails to predict post-January return movements correctly even over very short periods.

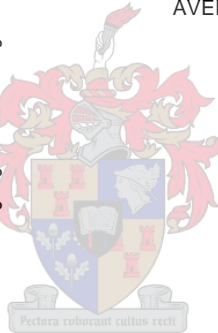
We now move on to determine whether the market returns over the 11 months following January positive return years and January negative return years differ significantly from another.

Table 9 represents the returns for January positive and negative years:



Table 9. Results for Positive and Negative January Return Years

POSITIVE JANUARY YEARS			NEGATIVE JANUARY YEARS		
YEAR	JAN RETURN	FEB - DEC RETURN	YEAR	JAN RETURN	FEB - DEC RETURN
1962	0.00%	20.99%	1961	-1.28%	5.19%
1963	4.08%	11.76%	1970	-8.68%	-23.00%
1964	6.14%	6.61%	1973	-1.19%	2.01%
1965	3.10%	-1.50%	1975	-6.81%	-13.08%
1966	4.58%	10.22%	1977	-4.48%	26.56%
1967	5.30%	8.18%	1980	-1.06%	33.45%
1968	5.23%	39.23%	1981	-15.55%	9.84%
1969	3.97%	-16.41%	1982	-3.03%	31.00%
1971	1.95%	1.91%	1984	-1.47%	5.13%
1972	6.88%	47.37%	1985	-3.56%	39.30%
1974	15.75%	-5.10%	1988	-13.80%	26.91%
1976	2.21%	-12.99%	1991	-6.03%	34.59%
1978	0.00%	27.57%	1994	-2.82%	23.38%
1979	8.71%	67.66%	1995	-13.85%	23.23%
1983	9.56%	-1.35%	2000	-1.29%	5.57%
1986	5.90%	41.50%	2002	-1.18%	-14.69%
1987	7.52%	-14.60%	2003	-5.16%	23.63%
1989	8.44%	37.91%	AVERAGE	-5.37%	14.06%
1990	7.33%	-14.84%			
1992	4.80%	-9.60%			
1993	5.34%	42.53%			
1996	10.52%	-0.28%			
1997	0.46%	-15.05%			
1998	6.77%	-20.17%			
1999	8.08%	50.76%			
2001	9.53%	17.27%			
2004	4.45%	16.16%			
2005	1.12%	34.28%			
AVERAGE	5.63%	13.21%			



During January positive years, the return from February to December averaged 13.21%. On the other hand, January negative years averaged 14.06%. That gives rise to a spread of -0.85%, which is very insignificant. In fact, the returns over the remaining 11 months averaged higher during negative January than positive January return years.

Figure 6a and *b* represents the returns from February to December for January positive and negative years respectively:

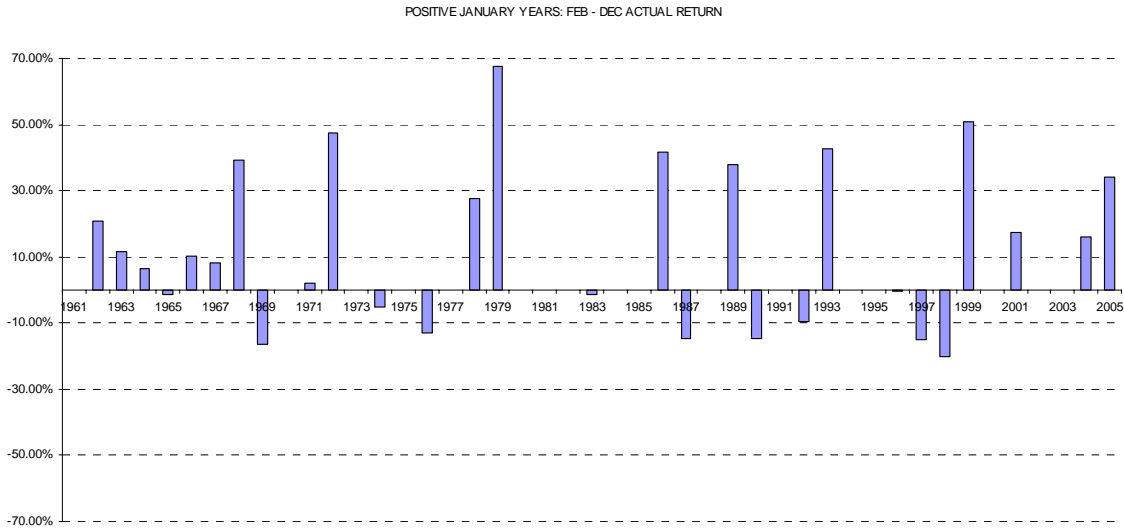


Figure 6a. Positive January Years: February to December Actual Returns

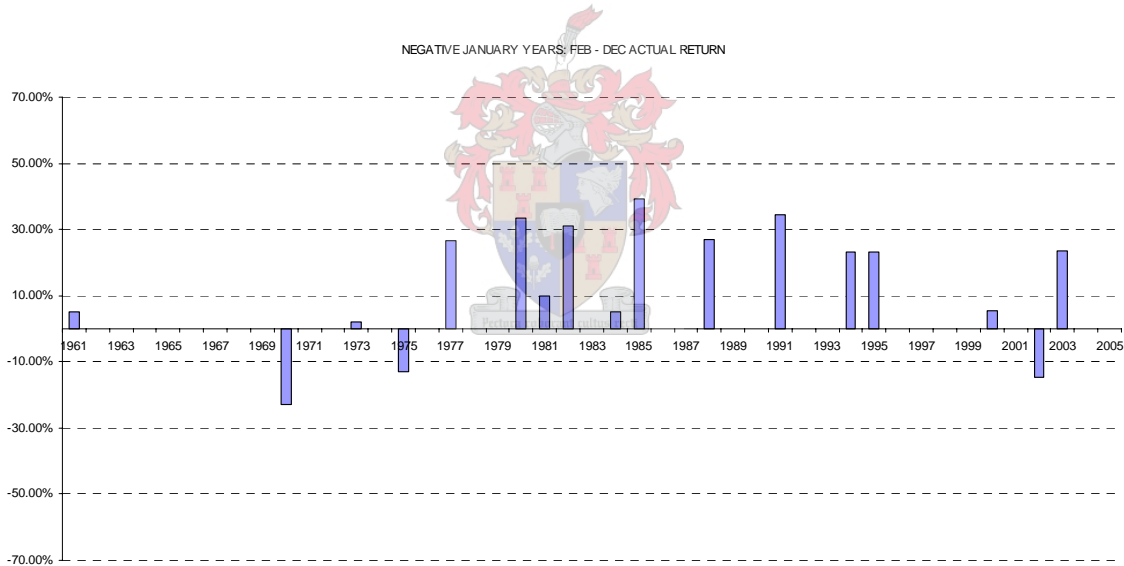


Figure 6b. Negative January Years: February to December Actual Returns

Observing the figures, we notice that during negative January years most of the market returns were positive over the months February to December. In addition, during January positive years there were some negative market returns over the months February to December. There is no noticeable difference between the return patterns from *Figure 6a* and *b*.

The result from the t-test is presented in the following table:

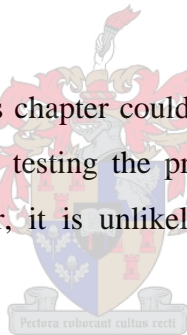
Table 10. Difference in Mean Returns t-test Results

JAN POS MEAN (%)	JAN NEG MEAN (%)	DEGREES OF FREEDOM	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
0.1321414	0.1406107	43	-0.123	0.9027	(-0.1473478 ; 0.1304091)

The results confirm that the null-hypothesis (4) cannot be rejected, and therefore no significant difference exists between the market returns over the 11 months following January positive return years and January negative return years.

5.4. DISCUSSION

The same analysis performed in this chapter could have been applied to a host of other monthly combinations, for example testing the predictive power of February over the period March to January. However, it is unlikely that any useful combinations will appear.



The success of the S&P500 index as a precursor for market returns in the US is surprising considering its simplicity. It has been argued that positive January months is an indication of high investor sentiment, and when investor sentiment is high then positive returns are more likely to occur than negative returns. This in turn spills over into the remainder of the year.

However, in the South African context, the January All Share return values contain little information about market returns over the remainder of the year.

5.5. CONCLUSION

Various studies have shown that January can be a robust predictor of the market returns over the rest of the year. In The US, the January returns of the S&P500 index were able to predict the direction of the market correctly 51 out of 54 times during the period from 1950 to 2004.

In this chapter, we tested this hypothesis in the South African context using the All Share Index return values over the period 1961 to 2005. We found that the January return values are not a good predictor of the direction of market returns for the whole year, and that the bold statement of Hirsch (1986): "As January goes so goes the whole year with January part of the year." does not hold for South African security markets.

We also investigated if January can be a precursor for the direction of the market following the months after January. We tested this for a range of periods, ranging from one month to eleven months post-January in which January failed to predict market movements correctly in all instances.

We then formally tested if any significant difference exists between positive and negative post-January returns and found that no significant difference between the market returns over the 11 months following January positive return years and January negative return years exists.

6. INDEX INCLUSIONS AND DELETIONS

6.1. INTRODUCTION

Various international studies have indicated that the inclusion of a security into an index results in a significant price increase of the underlying security. It was also found that the converse is true when a security is deleted from an index.

Studies on the S&P 500 in the US suggest that the price effect of inclusions and exclusions is permanent. However, various studies on other indices have shown that the price change is temporary and soon fully reversed.

Some of the international evidence includes work from Schleifer (1986) and Harris and Gurel (1986) who were amongst the first to indicate that an inclusion in the S&P 500 index results in a significant price increase in stock value. Schleifer (1986) found that additions to the index after 1976 resulted in permanent price changes; while Harris and Gurel (1986) pointed out that the price increase is in fact temporary and subsequently reversed after a period of about two weeks after inclusion. Other papers supporting the permanent price change hypothesis after stock inclusion into the S&P 500 index include papers from Dhillon and Johnson (1991), Lynch and Mendenhall (1997), Erwin and Miller (1998) and Chen, Noronha and Singal (2004). Papers documenting a permanent price decrease when a stock is deleted from the S&P 500 are less common but can be found amongst the literature.

In this chapter, we investigate if a price change occurs when a share is added or deleted to an index in the South African context. If a price change is indeed exhibited, we examine if the price change is permanent or reversed after a passage of time.

According to the Ground Rules for the Management of the FTSE/JSE Africa Index Series, stocks are added or dropped from an index based on significant changes in market capitalisation of a company as well as corporate actions such as new listings, terminations, unbundlings and mergers. The rules are designed in order to ensure that the indices continue to be representative of the market.⁶

6.2. DATA AND METHODOLOGY

We restrict our attention to inclusions and deletions made to the Mid Cap, Small Cap, Resources 20, Financial 15, Industrial 25 and Top 40 indices between the period September 2002 and December 2005. We exclude the observation of the deletion of New Africa Investment –N- from the Small Cap index since it is such an extreme outlier. The New Africa Investment –N- security rose from 1c to 15c in a matter of two weeks. Some other observations were also omitted due to unavailability of data. Details of all inclusions and deletions, as well as those omitted from the samples, are presented in *Appendix A*.

There usually exists a time lag of roughly 7 to 8 trading days between the announcement date and effective date. The announcement date (AD) is the first trading day after announcement that the firm is being added or deleted from the index, and the effective date (ED) is the first trading day that the firm is actually in or excluded from the index. All of the indices are reviewed on a quarterly basis during the months of March, June, September and December. The FTSE/JSE Advisory Committee usually meets for one day between the 7th and 12th of these months, after which quarterly changes to the indices are

⁶ See, for example <http://www.ftsejse.co.za> for a comprehensive look at the rules relating to insertion and deletion.

announced on the same day as the meeting. The effective date is also stipulated during the day of announcement.

We then compute the actual return⁷ during the first trading day after announcement as represented by AD; the actual return during the first trading day that the firm is included in the index, as represented by ED; the actual return between the AD and the close on the last trading day before inclusion, as represented by AD-ED; the actual return between the AD and 5(10) trading days after the ED, as represented by AD-ED+5TD(10TD); and the actual return between the ED and 5(10) trading days after the ED, as represented by ED-ED+5TD(10TD). The actual returns for all the periods as described above are computed for inclusions and deletions.

We again test a null hypothesis of zero means versus a two-sided alternative as in (2) and (3) via a Student's t-test. 95% Confidence intervals for the return in each subsequent period are also computed.



6.3. ANALYSIS AND EMPIRICAL FINDINGS

Figure 7 represents the actual returns for stocks included into the various indices over different time lengths after the AD. Observing the figure, we notice that stocks tend to average very large positive returns between the AD and the ED when included into an index. In addition, stocks included into an index tend to exhibit positive returns on the AD, during AD-ED+5TD and during AD-ED+10TD, with the exception of the Financial 15 index showing negative returns during some of these time intervals. Furthermore, stocks included tend to exhibit negative return patterns during ED-ED+5TD and during ED-ED+10TD.

⁷ Again, actual returns for various time intervals are computed using an adaptation of *Formula (1)*.

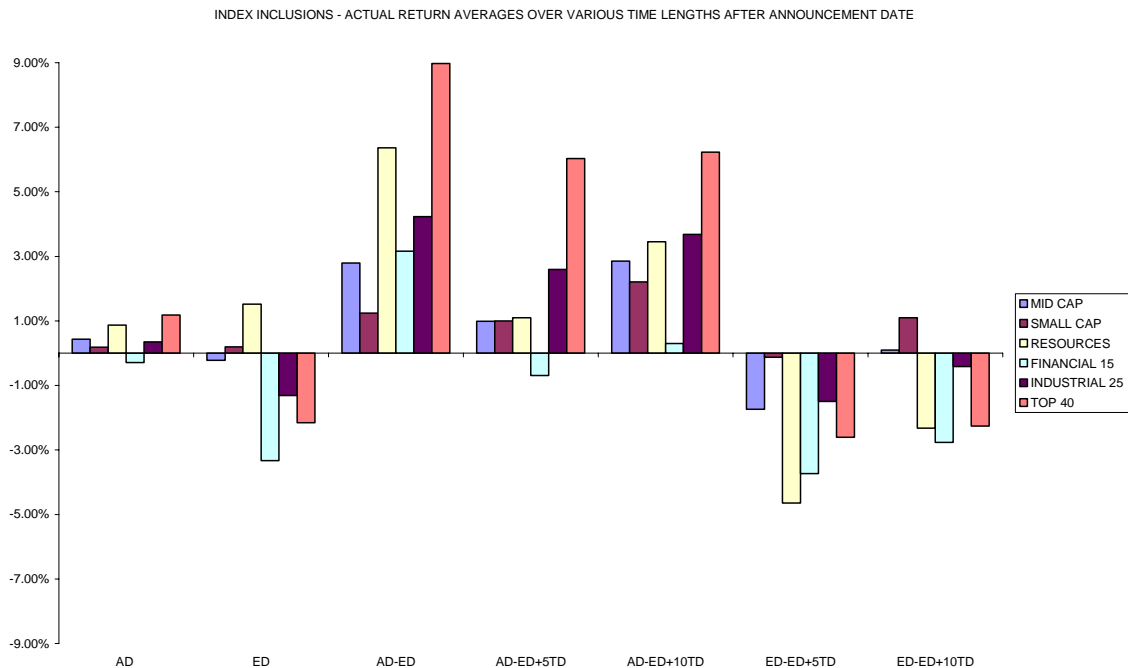


Figure 7. Average Returns for Stock Inclusions over Various Time Lengths after AD

Table 11a and b represents the t-test results for stock index inclusions:

Table 11a. Index Inclusions t-test Results

INCLUSIONS					
MID CAP	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	22	0.433608	1.1629	0.2579	(-0.3417921 ; 1.2090071)
ED	22	-0.22071	-0.6696	0.5104	(-0.9061755 ; 0.4647607)
AD-ED	22	2.792311	3.1532	0.0048***	(0.9506999 ; 4.6339228)
AD-ED+5TD	22	0.989822	0.7435	0.4654	(-1.778839 ; 3.758482)
AD-ED+10TD	22	2.852576	2.1133	0.0467**	(0.04549705 ; 5.65965462)
ED-ED+5TD	22	-1.73926	-1.6702	0.1097	(-3.9048027 ; 0.4262798)
ED-ED+10TD	22	0.094837	0.0817	0.9357	(-2.320371 ; 2.510045)
SMALL CAP	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	67	0.185785	0.7864	0.4344	(-0.2858800 ; 0.6574508)
ED	67	0.194432	0.6547	0.5149	(-0.3984950 ; 0.7873581)
AD-ED	67	1.238864	1.8372	0.0707*	(-0.107456 ; 2.585184)
AD-ED+5TD	67	1.001962	0.7487	0.4567	(-1.669829 ; 3.673753)
AD-ED+10TD	67	2.210352	1.7696	0.0814*	(-0.2835344 ; 4.7042392)
ED-ED+5TD	67	-0.13026	-0.1033	0.918	(-2.646746 ; 2.386222)
ED-ED+10TD	67	1.096247	0.8877	0.3779	(-1.369462 ; 3.561955)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Table 11b. Index Inclusions t-test Results

INCLUSIONS					
RESOURCES 20	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	6	0.870963	1.2895	0.2536	(-0.8652589 ; 2.6071842)
ED	6	1.521034	3.0228	0.0293**	(0.2275345 ; 2.8145328)
AD-ED	6	6.362823	1.6336	0.1633	(-3.649713 ; 16.375358)
AD-ED+5TD	6	1.099828	0.2551	0.8088	(-9.980996 ; 12.180652)
AD-ED+10TD	6	3.451984	0.8882	0.4151	(-6.538416 ; 13.442384)
ED-ED+5TD	6	-4.6461	-1.2196	0.277	(-14.439163 ; 5.146965)
ED-ED+10TD	6	-2.32436	-0.5993	0.5751	(-12.294701 ; 7.645986)
FINANCIAL 15	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	8	-0.29461	-0.8288	0.4345	(-1.1351332 ; 0.5459086)
ED	8	-3.3339	-3.8213	0.0065***	(-5.396935 ; -1.270871)
AD-ED	8	3.164025	2.4775	0.0424**	(0.1440984 ; 6.1839524)
AD-ED+5TD	8	-0.69674	-0.4677	0.6542	(-4.219137 ; 2.825648)
AD-ED+10TD	8	0.298104	0.1933	0.8522	(-3.348988 ; 3.945196)
ED-ED+5TD	8	-3.73611	-4.0006	0.0052***	(-5.944379 ; -1.527838)
ED-ED+10TD	8	-2.7629	-2.476	0.0425**	(-5.4014675 ; -0.1243262)
INDUSTRIAL 25	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	13	0.348739	0.6947	0.5005	(-0.7450366 ; 1.4425149)
ED	13	-1.31347	-1.7618	0.1035	(-2.9378001 ; 0.3108695)
AD-ED	13	4.229962	3.5294	0.0042***	(1.618668 ; 6.841257)
AD-ED+5TD	13	2.593718	1.632	0.1286	(-0.8690946 ; 6.0565312)
AD-ED+10TD	13	3.681073	2.598	0.0233**	(0.5939761 ; 6.7681696)
ED-ED+5TD	13	-1.49728	-0.9982	0.3379	(-4.765436 ; 1.770872)
ED-ED+10TD	13	-0.415	-0.2688	0.7926	(-3.778333 ; 2.948336)
TOP 40	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	4	1.182115	4.2824	0.0234**	(0.3036322 ; 2.0605968)
ED	4	-2.15379	-0.9535	0.4107	(-9.342582 ; 5.034999)
AD-ED	4	8.973867	1.8595	0.1599	(-6.384608 ; 24.332343)
AD-ED+5TD	4	6.032967	1.1938	0.3183	(-10.04921 ; 22.11515)
AD-ED+10TD	4	6.230037	1.4795	0.2356	(-7.171339 ; 19.631413)
ED-ED+5TD	4	-2.60753	-0.8676	0.4494	(-12.171990 ; 6.956935)
ED-ED+10TD	4	-2.25988	-0.6006	0.5905	(-14.234649 ; 9.714886)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

The table shows that when a stock is included into an index it exhibits significant positive returns during AD-ED in all cases with the exception of the Resources and Top 40 indices. The inconclusive results for the Resources and Top 40 indices could be due to the small sample sizes used during the analysis. This also explains the extremely wide 95% confidence intervals.

Other results include significant positive returns on the AD in the case of TOP 40 index inclusion, significant positive returns on the ED in the case of Mid Cap index inclusion, significant positive returns during AD-ED+10TD in the case of Mid Cap, Small Cap and Industrial 25 index inclusion.

An interesting find is the Financial 15 index inclusion result. Notice that stocks included in the Financial 15 index exhibit significant positive returns during AD-ED with a mean return of 3.16%. Then, on the ED stocks included exhibit a significant negative return with a mean of -3.33%. This indicates that the positive return period AD-ED is followed by a negative return day on the ED with a similar magnitude. Also, notice that during the period AD-ED+10TD a large P-value is observed, which implies that we have no grounds to reject the null hypothesis of zero mean returns during the period AD-ED+10TD. This evidence suggests that the price change due to inclusion into the Financial 15 index is temporary and reversed after a short passage of time.

Therefore, we have shown that there is evidence suggesting that stocks tend to exhibit large positive returns between the period of the AD and ED when included into an index, and in some cases, the price increase tends to be temporary and is soon reversed as in the case of Financial 15 index inclusions.

We now move on to investigate the event of index deletions. *Figure 8* represents the actual returns for stocks deleted from various indices over different time lengths after the AD.

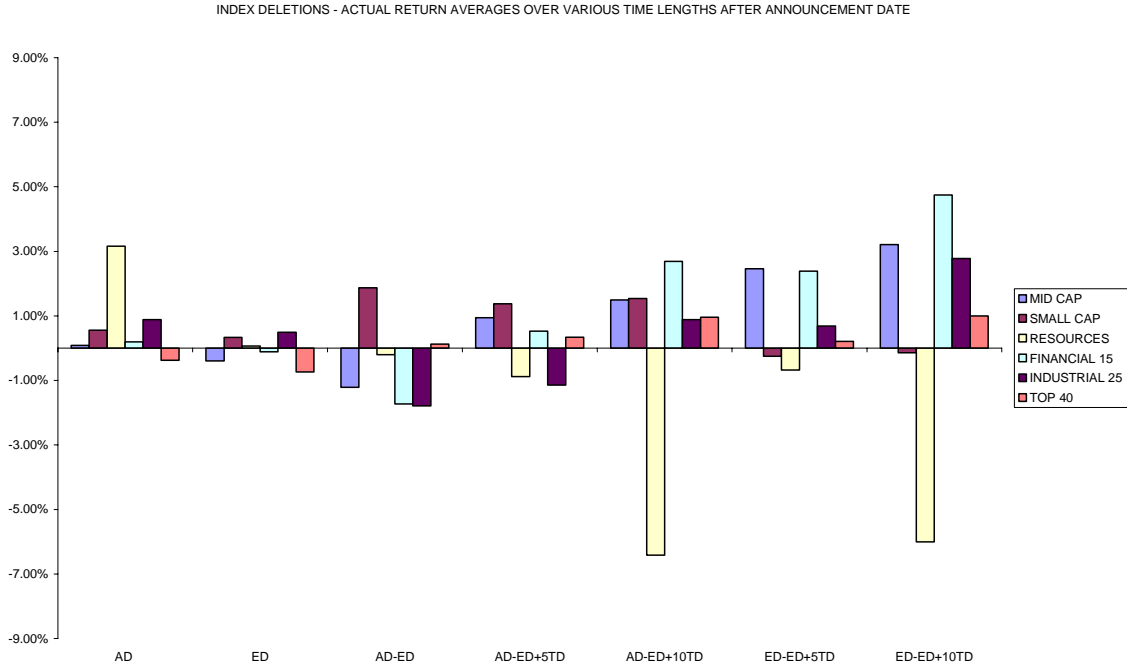


Figure 8. Average Returns for Stock Deletions over Various Time Lengths after AD

Observing the figure, we notice no abnormally large positive or negative return patterns for stocks being deleted from the indices. It appears that the results vary across the indices in all periods. The return magnitudes are also far smaller than the returns exhibited during index inclusions. Stocks deleted from indices appear to exhibit positive returns on the AD and during AD-ED+10TD. If one excludes the Small Cap and Top 40 observations, we notice that returns tend to be negative during AD-ED. In addition, if the Resources index observation is excluded, it appears that stocks deleted from indices tend to exhibit positive returns during AD-ED+10TD and during ED-ED+10TD.

Table 12a and b represents the t-test results for stock index deletions:

Table 12a. Index Deletions t-test Results

DELETIONS					
MID CAP	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	21	0.089389	0.2817	0.7811	(-0.5725295 ; 0.7513084)
ED	21	-0.39967	-0.6774	0.5059	(-1.6304441 ; 0.8310958)
AD-ED	21	-1.21749	-0.682	0.5031	(-4.941206 ; 2.506236)
AD-ED+5TD	21	0.943667	0.3536	0.7273	(-4.622870 ; 6.510203)
AD-ED+10TD	21	1.494045	0.617	0.5442	(-3.557358 ; 6.545448)
ED-ED+5TD	21	2.460665	0.9572	0.3499	(-2.901614 ; 7.822945)
ED-ED+10TD	21	3.210402	1.1518	0.263	(-2.603968 ; 9.024772)
SMALL CAP	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	37	0.552556	1.3164	0.1964	(-0.2987379 ; 1.4038498)
ED	37	0.332381	0.8113	0.4225	(-0.498497 ; 1.163260)
AD-ED	37	1.870663	1.135	0.2639	(-1.472106 ; 5.213431)
AD-ED+5TD	37	1.376117	0.8652	0.3927	(-1.849603 ; 4.601836)
AD-ED+10TD	37	1.53764	0.9383	0.3543	(-1.78586 ; 4.86114)
ED-ED+5TD	37	-0.25378	-0.2437	0.8088	(-2.365611 ; 1.858047)
ED-ED+10TD	37	-0.14222	-0.1242	0.9019	(-2.465456 ; 2.181018)
RESOURCES 20	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	5	3.161976	1.8129	0.1441	(-1.680533 ; 8.004486)
ED	5	0.062155	0.0416	0.9688	(-4.083429 ; 4.207740)
AD-ED	5	-0.20606	-0.0713	0.9466	(-8.231312 ; 7.819189)
AD-ED+5TD	5	-0.88236	-0.1655	0.8766	(-15.68495 ; 13.92022)
AD-ED+10TD	5	-6.41755	-1.4785	0.2133	(-18.468629 ; 5.633532)
ED-ED+5TD	5	-0.67584	-0.1577	0.8823	(-12.57478 ; 11.22310)
ED-ED+10TD	5	-6.00221	-1.2863	0.2677	(-18.957505 ; 6.953088)
FINANCIAL 15	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	6	0.192386	0.2186	0.8356	(-2.069828 ; 2.454600)
ED	6	-0.11004	-0.0773	0.9413	(-3.767164 ; 3.547091)
AD-ED	6	-1.7299	-0.7025	0.5137	(-8.05972 ; 4.59993)
AD-ED+5TD	6	0.523344	0.168	0.8732	(-7.484868 ; 8.531555)
AD-ED+10TD	6	2.68999	0.7812	0.47	(-6.161673 ; 11.541652)
ED-ED+5TD	6	2.386098	0.8551	0.4316	(-4.786905 ; 9.559101)
ED-ED+10TD	6	4.746079	1.1772	0.2921	(-5.617881 ; 15.110039)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Table 12b. Index Deletions t-test Results

DELETIONS					
INDUSTRIAL 25	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	13	0.880758	1.6184	0.1315	(-0.3049497 ; 2.0664657)
ED	13	0.490031	1.1892	0.2574	(-0.4078107 ; 1.3878718)
AD-ED	13	-1.78987	-0.9665	0.3529	(-5.824942 ; 2.245206)
AD-ED+5TD	13	-1.14269	-0.5576	0.5873	(-5.607420 ; 3.322042)
AD-ED+10TD	13	0.884254	0.3852	0.7068	(-4.116985 ; 5.885493)
ED-ED+5TD	13	0.682454	0.6647	0.5188	(-1.554672 ; 2.919579)
ED-ED+10TD	13	2.774522	1.6907	0.1167	(-0.8010444 ; 6.3500894)

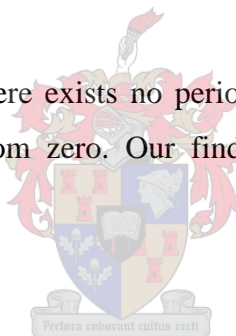
TOP 40	SAMPLE SIZE	MEAN (%)	T-STATISTIC	P-VALUE	95% CONFIDENCE INTERVAL
AD	4	-0.37155	-0.2607	0.8112	(-4.906927 ; 4.163826)
ED	4	-0.73807	-0.5627	0.613	(-4.912575 ; 3.436439)
AD-ED	4	0.12478	0.0461	0.9662	(-8.497375 ; 8.746934)
AD-ED+5TD	4	0.341685	0.1216	0.9109	(-8.601249 ; 9.284618)
AD-ED+10TD	4	0.960328	0.4194	0.7031	(-6.326833 ; 8.247490)
ED-ED+5TD	4	0.209503	1.4365	0.2464	(-0.2546224 ; 0.6736292)
ED-ED+10TD	4	0.99799	0.3296	0.7634	(-8.637511 ; 10.633492)

* indicates significant at 10% level

** indicates significant at the 5% level

*** indicates significant at the 1% level

Table 12a and b indicates that there exists no period after the AD that exhibits return patterns significantly different from zero. Our findings on stock index deletions are therefore inconclusive.



6.4. DISCUSSION AND PROPOSED EXPLANATIONS

Index inclusion and deletion can be considered as an information-free event since the FTSE/JSE Advisory Committee is only allowed to use public information when including and deleting stocks from indices. According to the EMH, an information-free event should not be able to affect stock prices observed in security markets. Therefore, our findings in the case of index inclusions are in contrast with the underlying assumptions of the EMH.

A popular explanation of this phenomenon is mass buying and mass selling related. It has been argued that the demand for a security increases when it is included in an index. This is due to the behaviour of index funds. An index fund is required to track an index as

closely as possible in order to minimise index tracking-error. Therefore, an index inclusion sets off a mass buying of the security being added, and as a result an increase in the stock price is observed. The inverse argument holds for the case of index deletion where a mass selling is triggered. Other funds possibly also contribute to the phenomenon. In many instances an index such as the All Share Index is used as a benchmark against which portfolio performance is assessed. It is likely that a portfolio manager will include a security into his portfolio as soon as it is included into his benchmark index and vice-versa during index deletions. On top of this, many fund mandates do not allow the fund manager to deviate considerable from the benchmark index constituents.

Some analysts believe that stock inclusion into an index is not information free. Authors argue that index constructors prefer stability in stock indices, and this has led them to believe that the inclusion of a security into an index can be considered as a reduction in the riskiness of the security and as a sign of confidence in the management of the company. They argue that the committee responsible for including and deleting securities from indices may in fact have access to private information. Even though it is categorically stated that only public information is utilised in the re-evaluation process, they believe it is possible that private information subconsciously influence the decision making of the committee. Behavioural finance adheres to such an argument. Therefore, index inclusions are interpreted as positive information.

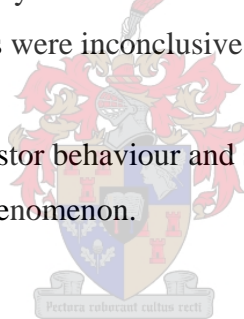
It has also been argued that investor awareness of a particular stock is increased when it is included in an index. This increases the likeliness of someone buying the share, and in turn can have the effect of influencing stock prices positively.

6.5. CONCLUSION

Analysis performed on the US S&P 500 index suggests that a significant price increase is observed when a security is included in the index. Analysts also found that the converse is true when a security is deleted from the index. In this chapter, we tested if a similar phenomenon exists in the South African context.

Stock inclusions and deletions from the Mid Cap, Small Cap, Resources 20, Financial 15, Industrial 25 and Top 40 indices between the period September 2002 and December 2005 were analysed. Our results indicated that securities included in the indices tend to exhibit a significant price increase during the period where it is announced that it will be included in the index up to the date that the change is effective. We also showed that the price increase tends to be temporary and is soon reversed in the event of inclusion into the Financial 15 index. Our results were inconclusive in the case of index deletions.

Various arguments relating to investor behaviour and security information were discussed as proposed explanations of the phenomenon.



PART 2

MOMENTUM-BASED ANOMALIES

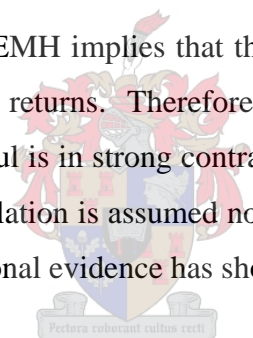


7. PRICE MOMENTUM

7.1. INTRODUCTION

The price momentum anomaly is one of the most famous security market anomalies and has puzzled financial economists for over a decade. Jegadeesh and Titman (1993) were the first to identify the phenomenon. They showed that abnormal large profits could be generated by implementing a trading strategy of longing stocks with recent high returns and shorting stocks with recent low returns.

The weak form efficiency of the EMH implies that the performance of a stock portfolio should be independent of past returns. Therefore, evidence suggesting that price momentum strategies are successful is in strong contrast with to EMH. The random walk assumption also implies that correlation is assumed not to exist between successive stock price changes. However, international evidence has shown that this is not the case.



The price momentum effect has been tested in various international markets. Jegadeesh and Titman (1993) documented abnormal returns by employing a momentum-based strategy on the New York Stock Exchange and American Stock Exchange in the US. Rouwenhourst (1998) tested momentum strategies in 12 European countries and reported successful results.

There are two popular types of momentum-based strategies. The first, as mentioned above, is known as price momentum trading. This strategy relies on short-term positive autocorrelation in stock returns since recent winners are bought and recent losers are sold. The second and much stranger than the first, are known as contrarian strategies. This type of strategy relies on short-term negative autocorrelation in stock returns, where recent winners are sold and recent losers are bought. International evidence has shown that the

price momentum strategies are most profitable if the portfolio is rebalanced over 3- to 12-month horizons, while contrarian strategies are most profitable over very short time horizons ranging from 1 to 4 weeks.

In this chapter we construct two sets of portfolios; one based on a price momentum strategy and the other on a contrarian strategy and investigate whether a similar phenomenon exists in the South African context.

7.2. DATA AND METHODOLOGY

We construct two sets of portfolios based on past returns. To simplify the analysis, we restrict our investment universe to 37 securities and ignore all transaction costs and taxes. These 37 shares were selected from the constituents of the Top 40 Index as on 31 December 2005. The remaining three shares were omitted due to lack of data. The details of the investment universe can be found in *Appendix B*. We also use the Top 40 index as a benchmark to which the performance of the strategies are compared.

Using data from our investment universe from June 2000 to December 2005, we rank the performance of our 37 stocks in a descending order based on their 1-, 2-, 3-, 4- and 6-month returns. The top 10 shares are known as the winner shares and the bottom 10 the loser shares. For each strategy, five portfolios are constructed using rebalancing schemes ranging from 1- to 6-month horizons, e.g. the 1-month portfolio is rebalanced at the end of each month using only the return values of the previous month. The price momentum portfolios are constructed by including only the winner shares and the contrarian portfolios are constructed by including only the loser shares. The portfolios are rebalanced at the different time horizons using an equal weighting of the past period's 10 best or 10 worst performing shares.

These portfolios are each initiated on 1 January 2001 assuming a start-up amount of R1,000,000. We also construct a Top 40 portfolio that represents R1,000,000 being

invested in the Top 40 index on 1 January 2001. Portfolio performances are then compared to investigate whether the strategies abnormally outperform the benchmark Top 40 portfolio.

7.3. ANALYSIS AND EMPIRICAL FINDINGS

Figure 9 represents the performance of the price momentum strategy portfolios:

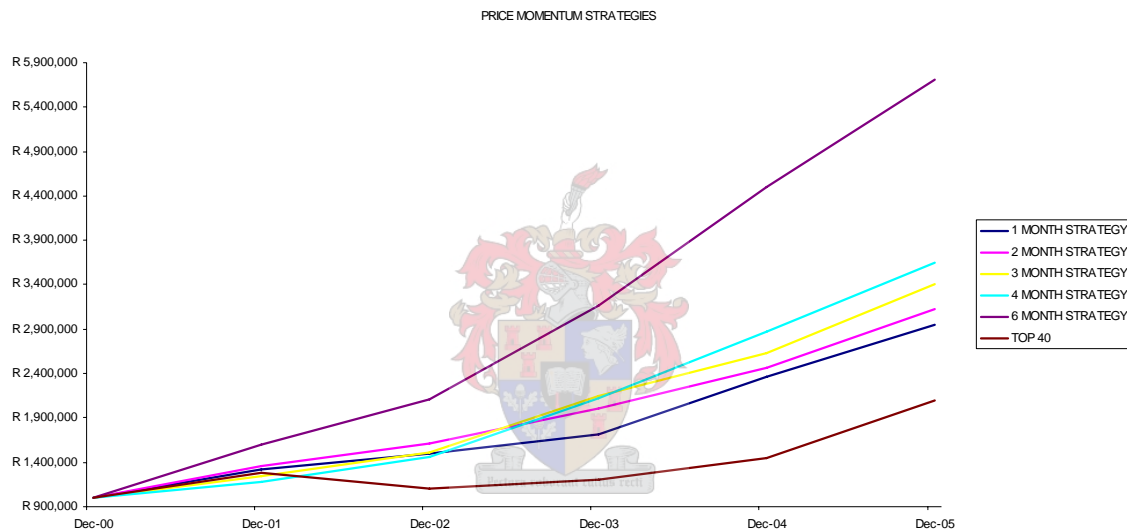


Figure 9. Price Momentum Strategy Portfolio Performance

Observing the figure, we notice that each of the price momentum portfolios outperformed the TOP 40 portfolio. Similar to international evidence, we find that the 6-month horizon price momentum strategy proved to be the most profitable strategy. When the rebalancing horizon is systematically reduced from 6- to 1-month intervals, we notice that the portfolios tend to perform less well. This suggests that stock returns exhibit stronger positive autocorrelation over the medium term, i.e. 6-months.

Table 13 represents the annual return statistics for the price momentum strategy portfolios:

Table 13. Annual Return Statistics for Price Momentum Strategy Portfolios

PORTFOLIOS	1 MONTH STRATEGY		2 MONTH STRATEGY		3 MONTH STRATEGY	
DATE	VALUE	RETURN	VALUE	RETURN	VALUE	RETURN
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,321,678	32.17%	R 1,358,557	35.86%	R 1,248,945	24.89%
31-Dec-02	R 1,491,775	12.87%	R 1,617,576	19.07%	R 1,511,040	20.99%
31-Dec-03	R 1,715,023	14.97%	R 2,012,466	24.41%	R 2,144,507	41.92%
31-Dec-04	R 2,359,732	37.59%	R 2,464,672	22.47%	R 2,628,475	22.57%
31-Dec-05	R 2,952,908	25.14%	R 3,131,627	27.06%	R 3,404,345	29.52%
AVERAGE ANNUAL RETURN		24.55%		25.77%		27.98%

PORTFOLIOS	4 MONTH STRATEGY		6 MONTH STRATEGY		TOP 40	
DATE	VALUE	RETURN	VALUE	RETURN	VALUE	RETURN
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,174,701	17.47%	R 1,603,191	60.32%	R 1,285,855	28.59%
31-Dec-02	R 1,463,351	24.57%	R 2,107,070	31.43%	R 1,104,218	-14.13%
31-Dec-03	R 2,115,873	44.59%	R 3,169,123	50.40%	R 1,207,711	9.37%
31-Dec-04	R 2,868,195	35.56%	R 4,505,622	42.17%	R 1,450,628	20.11%
31-Dec-05	R 3,648,082	27.19%	R 5,710,162	26.73%	R 2,090,662	44.12%
AVERAGE ANNUAL RETURN		29.88%		42.21%		17.61%

Over the five-year period, all the price momentum portfolios achieved an annual average return in excess of 24%, and none experienced a negative return year. The 6-month portfolio averaged an impressive average annual return of 42.21%. The Top 40 portfolio only managed an average annual return of 17.61%. In addition, during 2002 the Top 40 portfolio experienced a negative return year while all the price momentum portfolios achieved positive returns. This suggests that a price momentum strategy can indeed prove very successful.

Figure 10 represents the performance of the contrarian strategy portfolios. Again, similar to international evidence, the figure illustrates that contrary strategies do perform better over shorter rebalancing horizons. All the portfolios except for the 6-month portfolio managed to outperform the Top 40 portfolio. We notice that the 6-month portfolio performed rather poorly when compared to the 1-month strategy.

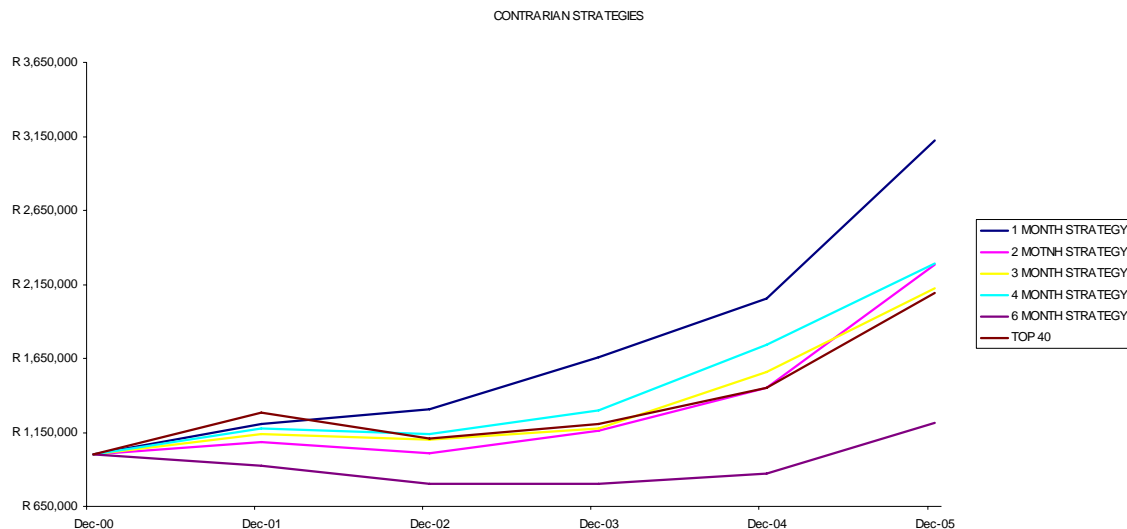


Figure 10. Contrarian Strategy Portfolio Performance

Table 14 represents the annual return statistics for the contrarian strategy portfolios:

Table 14. Annual Return Statistics for Contrarian Strategy Portfolios

PORTFOLIOS	1 MONTH STRATEGY		2 MONTH STRATEGY		3 MONTH STRATEGY	
DATE	VALUE	RETURN	VALUE	RETURN	VALUE	RETURN
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,207,756	20.78%	R 1,088,818	8.88%	R 1,134,853	13.49%
31-Dec-02	R 1,305,300	8.08%	R 1,011,464	-7.10%	R 1,097,356	-3.30%
31-Dec-03	R 1,657,540	26.99%	R 1,164,631	15.14%	R 1,179,107	7.45%
31-Dec-04	R 2,051,594	23.77%	R 1,449,359	24.45%	R 1,559,688	32.28%
31-Dec-05	R 3,123,452	52.25%	R 2,282,506	57.48%	R 2,121,074	35.99%
AVERAGE ANNUAL RETURN		26.37%		19.77%		17.18%

PORTFOLIOS	4 MONTH STRATEGY		6 MONTH STRATEGY		TOP 40	
DATE	VALUE	RETURN	VALUE	RETURN	VALUE	RETURN
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,176,059	17.61%	R 925,758	-7.42%	R 1,285,855	28.59%
31-Dec-02	R 1,135,278	-3.47%	R 805,751	-12.96%	R 1,104,218	-14.13%
31-Dec-03	R 1,302,139	14.70%	R 800,193	-0.69%	R 1,207,711	9.37%
31-Dec-04	R 1,742,801	33.84%	R 874,516	9.29%	R 1,450,628	20.11%
31-Dec-05	R 2,292,740	31.55%	R 1,217,537	39.22%	R 2,090,662	44.12%
AVERAGE ANNUAL RETURN		18.85%		5.49%		17.61%

The table indicates that the average annual return for the contrarian strategy portfolios deteriorates when the rebalancing horizons are increased. This suggests that stock returns exhibit stronger negative autocorrelation over shorter horizons, i.e. 1- 4 weeks. The

results are less telling when compared to the price momentum strategies even though some contrarian portfolios were able to outperform the Top 40 portfolio. Also, notice that most of the contrarian strategies failed to realise positive returns during 2002, which is the year where the benchmark Top 40 portfolio exhibited a negative annual return. We showed that during this year, all price momentum-based strategies were profitable.

7.4. DISCUSSION AND PROPOSED EXPLANATIONS

An impressive feature of our analysis is that even though we restricted ourselves to a small investment universe, we were still able to obtain telling results. The most difficult obstacle to overcome when using a contrarian strategy is the fact that it tends to be more successful with frequent rebalancing schemes. This results in large transaction costs when implementing the strategy and in turn may render it fruitless. On the contrary, the price momentum strategy proved more successful when rebalancing occurred over larger time horizons. We showed that the 6-month price momentum strategy was extremely profitable and implementing it only requires rebalancing once per half-year. Therefore, the price momentum strategy seems to be a more viable approach since it is less transaction intensive. In addition, some authors suggest that with the use of options one can achieve the same level of exposure with lower transaction costs. Never the less, it would be an interesting study to assess the profitability of both strategies after transaction costs and taxes are introduced.

Investors have grown accustomed to the fact that riskier investments yield higher returns. Therefore, some would argue that the superior returns generated from the price momentum strategies are a result of bearing more systematic risk. However, some international authors have pointed out that the high returns generated from these strategies cannot be accounted for by adjusting for risk.

Hon and Tonks (2001) tested price momentum in UK security markets over the period 1955-1996. They found that the phenomenon was only present at the latter stage of their

sample, and concluded that price momentum is not a general feature of UK security markets. They argue that this could possibly be due to the less volatile markets prior to 1976, which adhered to the random walk model. Our analysis was founded over a short period spanning only five years. Therefore, the possibility could also exist that price momentum is not a general feature of the South African market.

Similar to the calendar-based-patterns, many proposed behavioural arguments exist that aims to explain the momentum effect. Some argue that investors in general tend to under react to positive news. This initial under reaction can have the effect that positive price movements are again followed by positive price movements. The same argument applies to negative news. In addition, many investors use the most recent past performance as their best proxy for expected future returns. This can bring about a herding effect that has the consequence of past returns continuing into the future. Other arguments relate to investor over-confidence. Investors are very quick to dismiss information that is in conflict with their prior beliefs, and therefore contributes to the success of momentum strategies.



7.5. CONCLUSION

Jegadeesh and Titman (1993) were the first to show that abnormal large profits could be generated by implementing a trading strategy of longing stocks with recent high returns and shorting stocks with recent low returns. This phenomenon soon became known as the price momentum anomaly.

In this chapter, we tested whether price momentum exists in the South African context. We found that two types of price momentum could be observed. One relies on positive auto correlation in stock returns, i.e. positive return periods that are again proceeded by positive return periods and vice versa, while the other relies on negative auto correlation in stock returns, i.e. positive return periods proceeded by negative return periods and vice versa. Strategies relying on the former are known as price momentum strategies, and on the latter contrarian strategies. We showed that price momentum strategies tend to be extremely profitable when rebalancing occurs once every six months. On the other hand, contrarian strategies are the most profitable when rebalancing occurs frequently. This suggests that stock returns in South Africa exhibit positive autocorrelation over the medium term and negative autocorrelation over the short term. Both strategies were able to outperform the benchmark portfolio in most cases.

We also mentioned the implication of transaction costs. Authors have argued that these have the ability to render such strategies fruitless. The use of options was also proposed as a tool by which transaction costs may be reduced. An interesting study would be induced when the profitability of the strategies are investigated after the introduction of transaction costs and taxes.

Various different theories exist that aim to explain the effect. We discussed a number of those which largely relate to investor psychology. However, no uniformity exists amongst authors regarding a convincing, rational explanation. Fama, the famous author of the EMH, proclaims that many of the financial market anomalies can be explained by the efficient markets paradigm via his three-factor model. However, even Fama concedes

that the price momentum puzzle is a robust and persistent anomaly that still poses a threat to the EMH.

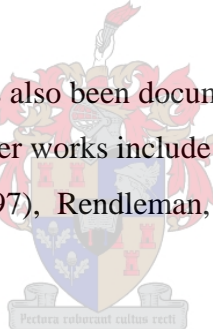


8. EARNINGS MOMENTUM

8.1. INTRODUCTION

Earnings momentum is very similar in nature to price momentum. The earnings momentum phenomenon refers to the tendency of stocks exhibiting abnormal positive returns after subsequent large positive earnings announcements, and, moreover, exhibiting large negative returns after large negative earnings announcements. The phenomenon is often also referred to as post-earnings announcement drift. Ball and Brown (1968) were the first to identify this effect in the US.

Evidence of earnings momentum has also been documented in the US by Bernard (1993), in the UK by Hew *et al* (1996). Earlier works include Jones and Litzenberger (1970), Joy, Litzenberger, and MacEnally (1997), Rendleman, Jones and Latane (1982), Foster, Olsen, and Shevlin (1984).



Similar to the price momentum strategies, two sides to the coin exist regarding earnings momentum strategies. Once again, you have your pure earnings momentum strategists. These traders change their positions at rebalancing horizons in the same direction as the preceding earnings announcements. On the other hand, you have your contrarian strategist that does exactly the opposite, i.e. buying after negative and selling after positive earnings announcements. Along with price momentum, evidence of earnings momentum in security markets evokes doubt about the validity of the efficient market hypothesis.

In this chapter we explore whether a strategy can be profitable in the South African context, by using only past earnings growth as input for stock selection. Two sets of

portfolios are again constructed, one based on a pure earnings methodology, and the other on the contrarian methodology.

8.2. DATA AND METHODOLOGY

Two sets of portfolios are constructed based on past earnings growth. We restrict our investment universe to the exact same basket of shares used to construct the portfolios in *Chapter 7*, and also test the strategies over the same time frame. This will allow us to compare the profitability of earnings momentum strategies to that of price momentum strategies.

The methodology remains the same as described in *Chapter 7*. The only difference is the manner in which winner and loser shares are selected. Using the earnings data of our investment universe, we rank the performance of our stocks in a descending order based on their 1-, 2-, 3-, 4- and 6-month earnings growth. The top ten shares with the highest earnings growth over the past period will be our winner shares, and the ten worst performing shares based on earnings growth, our loser shares. The strategy of buying the winner shares at rebalancing horizons will be referred to as the earnings momentum strategy, and the strategy of buying the loser shares the, contrarian earnings momentum strategy. For each strategy, the ranked values will be used to construct portfolios with rebalancing schemes ranging from 1 to 6 months.

8.3. ANALYSIS AND EMPIRICAL FINDINGS

Figure 11 represents the performance of the earnings momentum portfolios:

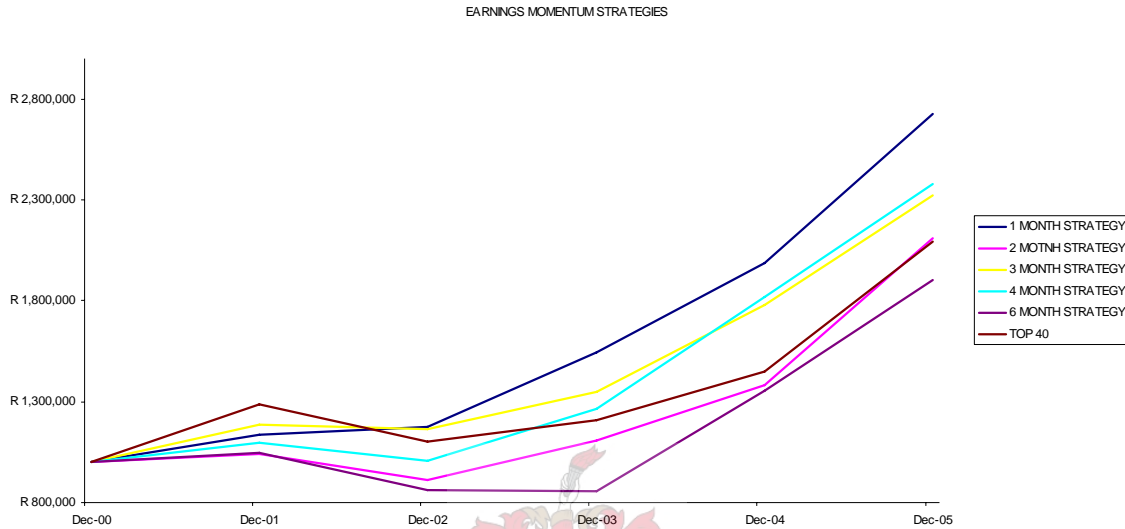


Figure 11. Earnings Momentum Strategy Portfolio Performance

In contrast to the price momentum portfolios, we see that the earnings momentum portfolios tend to be more profitable over shorter rebalancing horizons. We notice that during the first year after initiation, the Top 40 portfolio was able to outperform all the earnings momentum strategies. Over the five-year period though, only the 6-month strategy portfolio underperformed the Top 40 portfolio. The final portfolio values are less impressive when compared to the price momentum portfolios.

Table 15 represents the annual return statistics for the earnings momentum portfolios:

Table 15. Annual Return Statistics for Earnings Momentum Portfolios

PORTFOLIOS	1 MONTH STRATEGY		2 MONTH STRATEGY		3 MONTH STRATEGY	
DATE	VALUE	RETURN	VALUE	RETURN	VALUE	RETURN
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,133,596	13.36%	R 1,042,805	4.28%	R 1,183,772	18.38%
31-Dec-02	R 1,177,295	3.85%	R 914,101	-12.34%	R 1,161,730	-1.86%
31-Dec-03	R 1,543,314	31.09%	R 1,108,555	21.27%	R 1,350,758	16.27%
31-Dec-04	R 1,986,950	28.75%	R 1,384,359	24.88%	R 1,780,868	31.84%
31-Dec-05	R 2,723,823	37.09%	R 2,110,038	52.42%	R 2,320,133	30.28%
AVERAGE ANNUAL RETURN		22.83%		18.10%		18.98%

PORTFOLIOS	4 MONTH STRATEGY		6 MONTH STRATEGY		TOP 40	
DATE	VALUE	RETURN	VALUE	RETURN	VALUE	RETURN
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,094,158	9.42%	R 1,048,004	4.80%	R 1,285,855	28.59%
31-Dec-02	R 1,006,931	-7.97%	R 861,062	-17.84%	R 1,104,218	-14.13%
31-Dec-03	R 1,265,273	25.66%	R 855,607	-0.63%	R 1,207,711	9.37%
31-Dec-04	R 1,819,511	43.80%	R 1,352,953	58.13%	R 1,450,628	20.11%
31-Dec-05	R 2,380,542	30.83%	R 1,901,767	40.56%	R 2,090,662	44.12%
AVERAGE ANNUAL RETURN		20.35%		17.00%		17.61%

We notice that only the 1-month strategy was able to escape the Top 40 portfolio negative 2002 year. During this year, some strategies exhibited large negative returns. Even though some strategies were able to outperform the benchmark Top 40 portfolio, we see that none of the return averages is significantly different from another. In addition, no relationship appears to exist between return averages and lengths of the rebalancing horizons. Also, note that the 6-month portfolio exhibited three poor years and two extreme positive years. This has the result that the annual return average may give a distorted view of the actual performance of the portfolio. In fact, the median of the annual returns for the 6-month portfolio is equal to 4.8%. The medians for the other portfolios are very similar to their annual return average.

Figure 12 represents the performance of the contrarian earnings momentum portfolios:

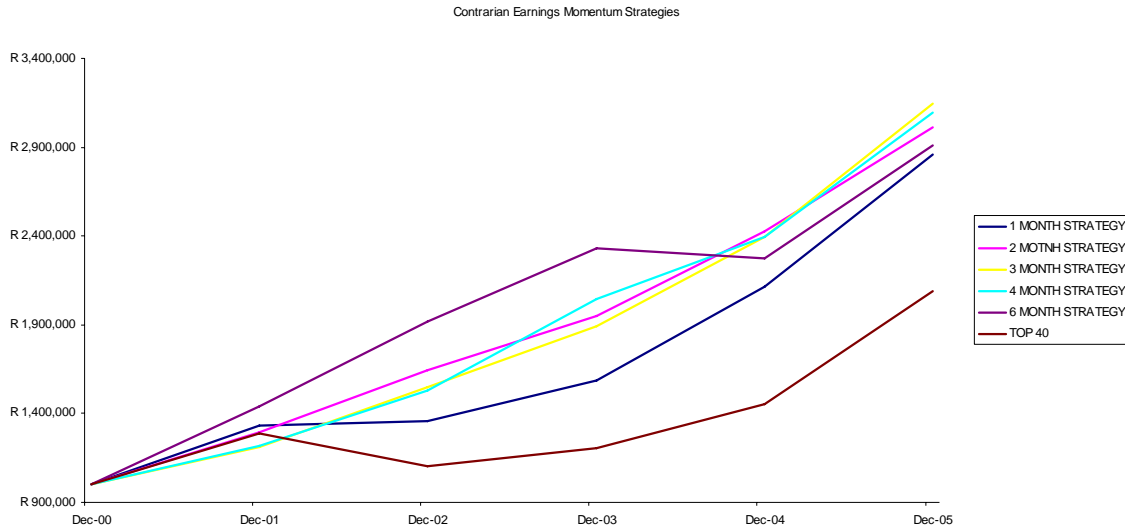


Figure 12. Earnings Momentum Strategy Portfolio Performance

The figure shows that all the contrarian portfolios were able to outperform the Top 40 portfolio by a considerable margin over the five year period. The 3-month portfolio appears to be the most profitable contrarian strategy and exhibited the most consistent growth.

Table 16 represents the annual returns statistics for the contrarian earnings momentum portfolios:

Table 26. Annual Return Statistics for Contrarian Earnings Momentum Portfolios

<i>PORTFOLIOS</i>	<i>1 MONTH STRATEGY</i>		<i>2 MONTH STRATEGY</i>		<i>3 MONTH STRATEGY</i>	
<i>DATE</i>	<i>VALUE</i>	<i>RETURN</i>	<i>VALUE</i>	<i>RETURN</i>	<i>VALUE</i>	<i>RETURN</i>
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,334,710	33.47%	R 1,292,415	29.24%	R 1,212,445	21.24%
31-Dec-02	R 1,357,422	1.70%	R 1,645,926	27.35%	R 1,549,052	27.76%
31-Dec-03	R 1,588,446	17.02%	R 1,946,580	18.27%	R 1,894,095	22.27%
31-Dec-04	R 2,113,468	33.05%	R 2,423,718	24.51%	R 2,396,692	26.53%
31-Dec-05	R 2,861,787	35.41%	R 3,009,944	24.19%	R 3,143,368	31.15%
AVERAGE ANNUAL RETURN		24.13%		24.71%		25.79%

<i>PORTFOLIOS</i>	<i>4 MONTH STRATEGY</i>		<i>6 MONTH STRATEGY</i>		<i>TOP 40</i>	
<i>DATE</i>	<i>VALUE</i>	<i>RETURN</i>	<i>VALUE</i>	<i>RETURN</i>	<i>VALUE</i>	<i>RETURN</i>
31-Dec-00	R 1,000,000		R 1,000,000		R 1,000,000	
31-Dec-01	R 1,218,527	21.85%	R 1,440,998	44.10%	R 1,285,855	28.59%
31-Dec-02	R 1,532,286	25.75%	R 1,915,922	32.96%	R 1,104,218	-14.13%
31-Dec-03	R 2,043,339	33.35%	R 2,328,547	21.54%	R 1,207,711	9.37%
31-Dec-04	R 2,393,616	17.14%	R 2,275,739	-2.27%	R 1,450,628	20.11%
31-Dec-05	R 3,096,386	29.36%	R 2,912,370	27.97%	R 2,090,662	44.12%
AVERAGE ANNUAL RETURN		25.49%		24.86%		17.61%

All the contrarian strategies exhibited an annual return average exceeding that of the Top 40 portfolio, but the outperformance is far from abnormal. Again, no relationship appears to exist between annual return averages and the length of the rebalancing horizon. The performance of the contrarian portfolios were rather uniform, all averaging annual returns around 24.5%. The contrarian strategy was able to escape the negative 2002 Top 40 year in all instances, but produced a negative return year during 2004 with the 6-month portfolio. Most of the annual return averages corresponded with their median, with the exception of the 1-month strategy whose median was equal to 33%.

With both of the earnings strategies we've lost a considerable amount of diversification without gaining the abnormal returns as we did with the price momentum strategies. It appears that some post-earnings drift exists, but the effect is subtle.

8.4. DISCUSSION AND PROPOSED EXPLANATIONS

Behavioural explanations of the earnings-effect are similar to those of the price-effect and mostly relate to investor underreaction and over confidence.

Some authors believe that price momentum and earnings momentum are in fact related. They suggest that the predictability of future returns based on past returns are subsumed by changes in stock earnings. Hong, Lee and Swaminathan (2003) conducted a study on eleven international security markets and found that price momentum strategies only tend to be profitable in countries where earnings momentum strategies are profitable. We found a similar situation in the South African market, where both earnings and price momentum strategies were profitable. They believe that these two phenomena are in fact the same anomaly.

Other arguments relate to the speed at which the market incorporates new information. The market does not adjust instantaneously to new earnings announcements, and this may indeed cause a lead-lag effect between earnings announcements and subsequent price changes.

Some also suggest a more EMH friendly explanation. They argue that stock prices are the discounted value of all expected future earnings of the underlying company. Therefore, a sudden change in earnings has the effect that the pre-announcement stock price is now in fact a miss-pricing. The post-earnings drift is therefore the market mechanism by which miss-pricings are corrected and fundamental values are restored.

8.5. CONCLUSION

The earnings momentum phenomenon refers to the tendency of stocks exhibiting abnormal positive returns after subsequent large positive earnings announcements, and, moreover, exhibiting large negative returns after large negative earnings announcements. The effect has been documented in various countries.

We investigated whether a similar phenomenon exists in the South African context. We tested this by constructing two sets of portfolios based only on past earnings growth. The first set of portfolios was based on a standard earnings momentum strategy, i.e. where shares with recent high earnings growth were included into the portfolio. The other set of portfolios was based on the contrarian strategy, where shares with recent poor earnings growth were included. We found that most of the portfolios were able to outperform the benchmark portfolio, but the results were far less remarkable compared to the price momentum strategies of *Chapter 7*. In addition, in contrast to the price momentum strategies, we found that the contrary strategy was more profitable than the conventional earnings momentum strategy.

Arguments were discussed which suggest that the price momentum and earnings momentum anomalies are in fact the same. Some proposed explanations were mentioned, but the earnings momentum anomaly still lacks a convincing rational explanation.

9. CONCLUSIONS

This study examine whether calendar-based return patterns, price momentum and earnings momentum can be found in the South African context. Although ample studies documenting these effects in numerous international markets exist, few empirical studies are available on the South African market. This study's empirical results suggest that calendar-effects, price momentum and earnings momentum do exist in South Africa.

We found that there is a strong tendency for market returns to be positive during Mondays, the turn-of-the-month, January months and after index inclusions. The positive Monday-effect is a strange phenomenon, since this is the inverse of the pattern documented internationally. In addition, we found that the market return during January is a poor predictor of returns during the rest of the year, in contrast to the S&P 500's ability to successfully predict market direction in the US. Various behavioural arguments were proposed as explanations for the effects, many relating to cash flow and investor buying and selling pressure during specific stages of the year. Warnings were cited, since many authors have reported that some patterns do in fact disappear after a period of time. We also proposed the use of index futures as a more cost-effective strategy when seeking to exploit the patterns. Other calendar-effects found in international marks and not discussed include holiday-effects, weather-effects and weekend-effects amongst many. The scope of further calendar-effect studies are almost endless and remains only confined to the creativity of the analyst.

We then turned to momentum-based anomalies and assessed the profitability of portfolios using only past price returns and past earnings growth as criterion for stock selection. Transaction costs and taxes were ignored. In both cases it was found that the strategies were successful. The price momentum strategies were more profitable than the earnings momentum strategies, and were able to generate abnormally large returns. We therefore documented the existence of price and earnings momentum in the South African market.

In addition, we found that positive autocorrelation between stock returns tend to exist over the medium time horizon, i.e. 6 months, and that negative auto correlation tends to exist over the very short-term, i.e. 1-4 weeks. Skeptics argue that momentum based strategies are transaction intensive. Authors have proposed the use of options to attain the same level of exposure at a much lower cost. It has also been argued that price momentum is the result of earnings momentum, and therefore they are the same anomaly. Behavioural explanations of the earnings-effect were discussed that largely relate to investor underreaction and over confidence. Many other momentum anomalies could also possibly exist. It would be intriguing to investigate volume momentum, dividends momentum and P/E- ratio momentum to name a few.

It would be interesting to see future studies exploring strategies which incorporate all the realities of market trading, and test whether any of the calendar based patterns are exploitable. If some strategies are indeed profitable, a daring challenge would be provoked that attempts to fine-tune and optimise these strategies.

Financial market anomalies remain a fascinating phenomenon. They are easy to identify, but very difficult to understand and to explain. It is taking a long time for analysts to accept the idea that stock markets are driven by human behaviour that is not always rational, efficient or optimal. The emergence of behavioural finance may just lead to a revolution in financial economics, paving the way to a clearer understanding of the dynamics of financial markets. In the words of Thaler (1999): “What other kind of finance is there?”

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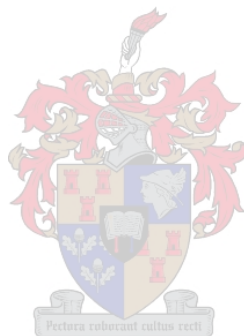
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APPENDIX

A



Table A1. Details of securities included and excluded from FTSE/JSE Indices during September 2002 – December 2005. Rows with a #N/A PRICE AD value were removed from the sample. The share NAN was also removed.

JSE CODE	LONG NAME	INDEX	TYPE	AD	ED	PRICE AD
ARI	AFRICAN RAINBOW MINERAL	MID CAP	INCL	11-Sep-02	20-Sep-02	R 38.00
CHEX	CHEMICAL SERVICES	MID CAP	INCL	11-Sep-02	20-Sep-02	R 18.50
SGGX	SAGE GROUP	MID CAP	EXCL	11-Sep-02	20-Sep-02	R 3.65
WLO	WOOLTRU ORD	MID CAP	EXCL	11-Sep-02	20-Sep-02	R 0.26
WLN	WOOLTRU -N-	MID CAP	EXCL	11-Sep-02	20-Sep-02	R 0.26
SYC	SYCOM PROPERTY	SMALL CAP	INCL	11-Sep-02	20-Sep-02	R 8.11
RNG	RANDGOLD AND EXPLORATION	SMALL CAP	INCL	11-Sep-02	20-Sep-02	R 17.60
HCI	HOSKEN CONS INVEST	SMALL CAP	INCL	11-Sep-02	20-Sep-02	R 2.10
ATN	ALLIED ELECTRONICS	SMALL CAP	INCL	11-Sep-02	20-Sep-02	R 7.75
NAI	NEW AFRICA INVESTMENT	SMALL CAP	INCL	11-Sep-02	20-Sep-02	#N/A
IFR	IFOUR PROPERTIES	SMALL CAP	INCL	11-Sep-02	20-Sep-02	R 4.01
ARI	AFRICAN RAINBOW MINERAL	RESOURCES 20	INCL	11-Sep-02	20-Sep-02	R 38.00
BPL	BARPLATS INVESTMENT	RESOURCES 20	EXCL	11-Sep-02	20-Sep-02	R 4.01
CRNXX	CORONATION HLDGS -N-	FINANCIAL 15	INCL	11-Sep-02	20-Sep-02	R 52.00
CRHX	CORONATION HLDGS	FINANCIAL 15	INCL	11-Sep-02	20-Sep-02	R 51.75
MUR	MURRAY AND ROBERTS H	INDUSTRIAL 25	INCL	11-Sep-02	20-Sep-02	R 10.65
WLO	WOOLTRU ORD	INDUSTRIAL 25	EXCL	11-Sep-02	20-Sep-02	R 0.26
WLN	WOOLTRU -N-	INDUSTRIAL 25	EXCL	11-Sep-02	20-Sep-02	R 0.26
AVGX	AVGOLD LTD	TOP40	INCL	11-Dec-02	20-Dec-02	R 8.95
CRNXX	CORONATION HLDGS LTD -N-	TOP40	EXCL	11-Dec-02	20-Dec-02	R 53.20
CRHX	CORONATION HOLDINGS LTD	TOP40	EXCL	11-Dec-02	20-Dec-02	R 52.50
CRNXX	CORONATION HLDGS LTD -N-	MID CAP	INCL	11-Dec-02	20-Dec-02	R 53.20
CRHX	CORONATION HOLDINGS LTD	MID CAP	INCL	11-Dec-02	20-Dec-02	R 52.50
ATN	ALLIED ELECTRONICS CORP	MID CAP	INCL	11-Dec-02	20-Dec-02	R 8.60
USVX	UNITED SERV TECHNOLOGIES	MID CAP	INCL	11-Dec-02	20-Dec-02	R 26.60
SYC	SYCOM PROPERTY FUND	MID CAP	INCL	11-Dec-02	20-Dec-02	R 8.60
CRM	CERAMIC INDUSTRIES LTD	MID CAP	INCL	11-Dec-02	20-Dec-02	R 77.50
AVGX	AVGOLD LTD	MID CAP	EXCL	11-Dec-02	20-Dec-02	R 8.95
BAT	BRAIT S.A.	MID CAP	EXCL	11-Dec-02	20-Dec-02	R 9.00
MHHX	MIH HOLDINGS	MID CAP	EXCL	11-Dec-02	20-Dec-02	R 10.95
CAT	CAXTON PUBLISHING AND PRINT	MID CAP	EXCL	11-Dec-02	20-Dec-02	R 5.45
SLUX	INVESTMENT SOLUTIONS	MID CAP	EXCL	11-Dec-02	20-Dec-02	R 6.04
APA	APEXHI PROPERTIES -A-	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 7.20
APB	APEXHI PROPERTIES -B-	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 5.40
PAP	PANGBOURNE PROP LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 5.69
AFL	AFRIKANDER LEASE LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	#N/A
JCD	JCI LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 0.46
BAT	BRAIT S.A.	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 9.00
OMN	OMNIA HOLDINGS LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 18.30
ARL	ASTRAL FOODS LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 15.50
SUR	SPUR CORPORATION LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 3.00
MELX	METTLE LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 0.50
BDS	BRIDGESTN FIRESTN MAXIPR	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 1.71
BJM	BARNARD JACOBS MELLET	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 2.40
CPL	CAPITAL PROPERTY FUND	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 2.00
NWL	NU-WORLD HOLDINGS LTD	SMALL CAP	INCL	11-Dec-02	20-Dec-02	R 11.20
ATN	ALLIED ELECTRONICS CORP	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 8.60
SYC	SYCOM PROPERTY FUND	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 8.60
CRM	CERAMIC INDUSTRIES LTD	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 77.50
IFR	IFOUR PROPERTIES LTD	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 4.40
CPI	CAPITEC BANK HLDGS LTD	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 2.70
WLO	WOOLTRU LTD	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 0.24
WLN	WOOLTRU LTD-N-	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 0.24
AAA	AST GROUP LTD	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 2.40
ITVX	INTERVID LTD	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 1.21
GLTX	GLOBAL TECHNOLOGY LTD	SMALL CAP	EXCL	11-Dec-02	20-Dec-02	R 0.17
BPL	BARPLATS INVESTMENTS ORD	RESOURCES 20	INCL	11-Dec-02	20-Dec-02	R 4.96
SNT	SANTAM	FINANCIAL 15	EXCL	11-Dec-02	20-Dec-02	R 32.82
NPN	NASPERS LTD -N-	TOP40	INCL	12-Mar-03	24-Mar-03	R 21.65

Table A2. Details of securities included and excluded from FTSE/JSE Indices during September 2002 – December 2005. Rows with a #N/A PRICE AD value were removed from the sample. The share NAN was also removed.

JSE CODE	LONG NAME	INDEX	TYPE	AD	ED	PRICE AD
AFB	ALEXANDER FORBES LTD	TOP40	EXCL	12-Mar-03	24-Mar-03	R 9.70
AFB	ALEXANDER FORBES LTD	MID CAP	INCL	12-Mar-03	24-Mar-03	R 9.70
NPN	NASPERS LTD -N-	MID CAP	EXCL	12-Mar-03	24-Mar-03	R 21.65
RNG	RANDGOLD AND EXP CO	RESOURCES 20	INCL	12-Mar-03	24-Mar-03	R 22.35
BPL	BARPLATS INVESTMENTS ORD	RESOURCES 20	EXCL	12-Mar-03	24-Mar-03	R 2.10
NPN	NASPERS LTD -N-	INDUSTRIAL 25	INCL	12-Mar-03	24-Mar-03	R 21.65
AEG	AVENG LTD	INDUSTRIAL 25	INCL	12-Mar-03	24-Mar-03	R 8.25
MSM	MASSMART HOLDINGS LTD	INDUSTRIAL 25	INCL	12-Mar-03	24-Mar-03	R 17.00
RLO	REUNERT ORD	INDUSTRIAL 25	EXCL	12-Mar-03	24-Mar-03	R 16.00
SHP	SHOPRITE HLDGS LTD ORD	INDUSTRIAL 25	EXCL	12-Mar-03	24-Mar-03	R 5.90
SNT	SANTAM LTD	FINANCIAL 15	INCL	12-Mar-03	24-Mar-03	R 30.50
AFB	ALEXANDER FORBES LTD	FINANCIAL 15	EXCL	12-Mar-03	24-Mar-03	R 9.70
WHL	WOOLWORTHS HOLDINGS	TOP40	INCL	11-Jun-03	23-Jun-03	R 5.70
DUR	DURBAN ROODEPT DEEP	TOP40	EXCL	11-Jun-03	23-Jun-03	#N/A
RNG	RANDGOLD AND EXP CO	MID CAP	INCL	11-Jun-03	23-Jun-03	R 32.00
DUR	DURBAN ROODEPT DEEP	MID CAP	INCL	11-Jun-03	23-Jun-03	#N/A
WHL	WOOLWORTHS HOLDINGS	MID CAP	EXCL	11-Jun-03	23-Jun-03	R 5.70
RAH	REAL AFRICA HLDGS LTD	MID CAP	EXCL	11-Jun-03	23-Jun-03	R 2.00
RAH	REAL AFRICA HLDGS LTD	SMALL CAP	INCL	11-Jun-03	23-Jun-03	R 2.00
RES	RESILIENT PROP INC FD LD	SMALL CAP	INCL	11-Jun-03	23-Jun-03	R 5.65
RNG	RANDGOLD AND EXP CO	SMALL CAP	EXCL	11-Jun-03	23-Jun-03	R 32.00
JCD	JCI LTD	RESOURCES 20	INCL	11-Jun-03	23-Jun-03	R 0.63
PAM	PALABORA MINING CO ORD	RESOURCES 20	EXCL	11-Jun-03	23-Jun-03	R 38.65
JDG	JD GROUP LTD	INDUSTRIAL 25	INCL	11-Jun-03	23-Jun-03	R 24.75
MTC	METRO CASH AND CARRY	INDUSTRIAL 25	INCL	11-Jun-03	23-Jun-03	#N/A
AEG	AVENG LTD	INDUSTRIAL 25	EXCL	11-Jun-03	23-Jun-03	R 8.56
TNT	TONGAAT-HULETT GROUP ORD	INDUSTRIAL 25	EXCL	11-Jun-03	23-Jun-03	R 35.06
AFB	ALEXANDER FORBES LTD	FINANCIAL 15	INCL	11-Jun-03	23-Jun-03	R 11.10
SNT	SANTAM LTD	FINANCIAL 15	EXCL	11-Jun-03	23-Jun-03	R 34.50
AHH	AFROX HEALTHCARE LTD	MID CAP	INCL	10-Sep-03	22-Sep-03	#N/A
CML	CORONATION FUND MNGRS LD	MID CAP	EXCL	10-Sep-03	22-Sep-03	R 3.10
CML	CORONATION FUND MNGRS LD	SMALL CAP	INCL	10-Sep-03	22-Sep-03	R 3.10
HCI	HOSKEN CONS INVEST LTD	SMALL CAP	EXCL	10-Sep-03	22-Sep-03	R 3.50
DSY	DISCOVERY HOLDINGS LTD	FINANCIAL 15	INCL	10-Sep-03	22-Sep-03	R 9.10
AFB	ALEXANDER FORBES LTD	FINANCIAL 15	EXCL	10-Sep-03	22-Sep-03	R 10.90
ECO	EDGARS CONS STORES LTD	INDUSTRIAL 25	INCL	10-Sep-03	22-Sep-03	R 8.70
MTC	METRO CASH AND CARRY	INDUSTRIAL 25	EXCL	10-Sep-03	22-Sep-03	#N/A
ATNP	ALLIED ELECT COR PARTPRF	MID CAP	INCL	10-Dec-03	22-Dec-03	R 10.00
MTP	MARTPROP PROPERTY FUND	MID CAP	INCL	10-Dec-03	22-Dec-03	R 2.40
ENR	ENERGY AFRICA LTD	MID CAP	EXCL	10-Dec-03	22-Dec-03	#N/A
TRE	TRENCOR LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 10.25
HYP	HYPROP INVESTMENTS LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 13.25
MTA	METAIR INVESTMENTS ORD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 130.00
ILA	ILIAD AFRICA LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 5.00
APK	ASTRAPAK LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 6.55
IFR	IFOUR PROPERTIES LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 6.20
AMA	AMALGAMATED APPL HLD LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 2.30
CSB	CASHBUILD LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 19.50
MTX	METOREX LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 2.30
BRC	BRANDCORP HOLDINGS LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 4.25
CMH	COMBINED MOTOR HLDGS LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 17.05
CPI	CAPITEC BANK HLDGS LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 4.80
FRO	FRONTRANGE LIMITED	SMALL CAP	INCL	10-Dec-03	22-Dec-03	#N/A
PMM	PREMIUM PROPERTIES LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 3.55
OCT	OCTODEC INVEST LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 4.30
IDI	IDION TECHNOLOGY HLDGS	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 2.25
DAW	DISTRIBUTION AND WAREHSG	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 1.50
SPE	SPEARHEAD PROP HLDGS LTD	SMALL CAP	INCL	10-Dec-03	22-Dec-03	R 13.55
BEL	BELL EQUIPMENT LTD	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 6.75

Table A3. Details of securities included and excluded from FTSE/JSE Indices during September 2002 – December 2005. Rows with a #N/A PRICE AD value were removed from the sample. The share NAN was also removed.

JSE CODE	LONG NAME	INDEX	TYPE	AD	ED	PRICE AD
CLE	CLIENTELE LIFE ASSURANCE	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 13.30
DLV	DORBYL LTD ORD	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 17.00
GND	GRINDROD LTD	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 2.30
SRL	SA RETAIL PROPERTIES LTD	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 5.55
TDH	TRADEHOLD LTD	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 3.61
MTP	MARTPROP PROPERTY FUND	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 2.40
BJM	BARNARD JACOBS MELLET	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 2.10
BDS	BRIDGESTN FIRESTN MAXIPR	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	R 1.20
ARP	ARNOLD PROPERTY FUND	SMALL CAP	EXCL	10-Dec-03	22-Dec-03	#N/A
SCE	SOUTH AFRICAN CHROME	RESOURCES 20	INCL	10-Dec-03	22-Dec-03	#N/A
ENR	ENERGY AFRICA LTD	RESOURCES 20	EXCL	10-Dec-03	22-Dec-03	#N/A
ABL	AFRICAN BANK INVESTMENTS	FINANCIAL 15	INCL	10-Dec-03	22-Dec-03	R 8.92
NAC	NEW AFRICA CAPITAL LTD	FINANCIAL 15	EXCL	10-Dec-03	22-Dec-03	#N/A
SHP	SHOPRITE HLDGS LTD ORD	INDUSTRIAL 25	INCL	10-Dec-03	22-Dec-03	R 9.50
MUR	MURRAY AND ROBERTS H ORD	INDUSTRIAL 25	EXCL	10-Dec-03	22-Dec-03	R 12.40
APL	NET 1 APPLIED TECHNOLOGY	MID CAP	INCL	10-Mar-04	23-Mar-04	#N/A
CRM	CERAMIC INDUSTRIES LTD	MID CAP	EXCL	10-Mar-04	23-Mar-04	R 58.65
ABT	AMBIT PROPERTIES LTD	SMALL CAP	INCL	10-Mar-04	23-Mar-04	R 1.93
CRM	CERAMIC INDUSTRIES LTD	SMALL CAP	INCL	10-Mar-04	23-Mar-04	R 58.65
EMI	EMIRA PROPERTY FUND	SMALL CAP	INCL	10-Mar-04	23-Mar-04	R 5.28
APL	NET 1 APPLIED TECHNOLOGY	SMALL CAP	EXCL	10-Mar-04	23-Mar-04	#N/A
MET	METROPOLITAN HLDGS LTD	FINANCIAL 15	INCL	10-Mar-04	23-Mar-04	R 7.80
ABL	AFRICAN BANK INVESTMENTS	FINANCIAL 15	EXCL	10-Mar-04	23-Mar-04	R 10.80
PMA	PRIMEDIA LTD	MID CAP	INCL	9-Jun-04	21-Jun-04	R 9.00
PMN	PRIMEDIA LTD -N-	MID CAP	INCL	9-Jun-04	21-Jun-04	R 8.40
BCX	BUSINESS CONNEXION GROUP	MID CAP	EXCL	9-Jun-04	21-Jun-04	R 3.63
BCX	BUSINESS CONNEXION GROUP	SMALL CAP	INCL	9-Jun-04	21-Jun-04	R 3.63
PMA	PRIMEDIA LTD	SMALL CAP	EXCL	9-Jun-04	21-Jun-04	R 9.00
PMN	PRIMEDIA LTD -N-	SMALL CAP	EXCL	9-Jun-04	21-Jun-04	R 8.40
ABL	AFRICAN BANK INVESTMENTS	FINANCIAL 15	INCL	9-Jun-04	21-Jun-04	R 11.49
MET	METROPOLITAN HLDGS LTD	FINANCIAL 15	EXCL	9-Jun-04	21-Jun-04	R 7.60
RLO	REUNERT ORD	INDUSTRIAL 25	INCL	9-Jun-04	21-Jun-04	R 24.10
DDT	DIMENSION DATA HLDGS PLC	INDUSTRIAL 25	EXCL	9-Jun-04	21-Jun-04	R 3.74
ECO	EDGARS CONS STORES LTD	TOP40	INCL	8-Sep-04	20-Sep-04	R 17.90
DSY	DISCOVERY HOLDINGS LTD	TOP40	EXCL	8-Sep-04	20-Sep-04	R 14.30
DSY	DISCOVERY HOLDINGS LTD	MID CAP	INCL	8-Sep-04	20-Sep-04	R 14.30
RBW	RAINBOW CHICKEN LTD	MID CAP	INCL	8-Sep-04	20-Sep-04	R 5.75
ECO	EDGARS CONS STORES LTD	MID CAP	EXCL	8-Sep-04	20-Sep-04	R 17.90
RNG	RANDGOLD AND EXP CO	MID CAP	EXCL	8-Sep-04	20-Sep-04	R 12.30
RNG	RANDGOLD AND EXP CO	SMALL CAP	INCL	8-Sep-04	20-Sep-04	R 12.30
RBW	RAINBOW CHICKEN LTD	SMALL CAP	EXCL	8-Sep-04	20-Sep-04	R 5.75
BPL	BARPLATS INVESTMENTS ORD	RESOURCES 20	INCL	8-Sep-04	20-Sep-04	R 5.00
AFL	AFRIKANDER LEASE LTD	RESOURCES 20	EXCL	8-Sep-04	20-Sep-04	#N/A
FOS	FOSCHINI LTD ORD	INDUSTRIAL 25	INCL	8-Sep-04	20-Sep-04	R 25.85
TRU	TRUWORTHS INTERNATIONAL	INDUSTRIAL 25	INCL	8-Sep-04	20-Sep-04	R 11.60
RLO	REUNERT ORD	INDUSTRIAL 25	EXCL	8-Sep-04	20-Sep-04	R 27.20
SHP	SHOPRITE HLDGS LTD ORD	INDUSTRIAL 25	EXCL	8-Sep-04	20-Sep-04	R 9.80
GRT	GROWTHPOINT PROP LTD	MID CAP	INCL	8-Dec-04	20-Dec-04	R 7.39
LEW	LEWIS GROUP LTD	MID CAP	INCL	8-Dec-04	20-Dec-04	R 34.50
PAM	PALABORA MINING CO ORD	MID CAP	EXCL	8-Dec-04	20-Dec-04	R 38.00
JCM	JOHNNIC COMMUNICATIONS	MID CAP	EXCL	8-Dec-04	20-Dec-04	R 32.50
PMA	PRIMEDIA LTD	MID CAP	EXCL	8-Dec-04	20-Dec-04	R 12.00
PTG	PEERMONT GLOBAL LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 6.39
WES	WESCO INVESTMENTS LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 192.79
PAM	PALABORA MINING CO ORD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 38.00
VKE	VUKILE PROPERTY FUND LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 5.77
FBR	FAMOUS BRANDS LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 7.00
ART	ARGENT INDUSTRIAL LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 9.83
BEL	BELL EQUIPMENT LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 5.81

Table A4. Details of securities included and excluded from FTSE/JSE Indices during September 2002 – December 2005. Rows with a #N/A PRICE AD value were removed from the sample. The share NAN was also removed.

JSE CODE	LONG NAME	INDEX	TYPE	AD	ED	PRICE AD
ADH	ADVTECH LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 1.22
PHM	PHUMELELA GAME LEISURE LTD	SMALL CAP	INCL	8-Dec-04	20-Dec-04	R 6.92
ABT	AMBIT PROPERTIES LTD	SMALL CAP	EXCL	8-Dec-04	20-Dec-04	R 2.25
SPE	SPEARHEAD PROP HLDGS LTD	SMALL CAP	EXCL	8-Dec-04	20-Dec-04	R 18.00
CPA	CORPCAPITAL LTD	SMALL CAP	EXCL	8-Dec-04	20-Dec-04	#N/A
IDI	IDION TECHNOLOGY HLDGS	SMALL CAP	EXCL	8-Dec-04	20-Dec-04	R 1.45
NAN	NEW AFRICA INVESTMNT-N-	SMALL CAP	EXCL	8-Dec-04	20-Dec-04	R 0.01
MVG	MVELAPHANDA GROUP LTD	MID CAP	INCL	9-Mar-05	22-Mar-05	R 6.35
DRD	DRDGOLD LTD	MID CAP	EXCL	9-Mar-05	22-Mar-05	R 5.00
DRD	DRDGOLD LTD	SMALL CAP	INCL	9-Mar-05	22-Mar-05	R 5.00
MVG	MVELAPHANDA GROUP LTD	SMALL CAP	EXCL	9-Mar-05	22-Mar-05	R 6.35
AFL	AFLEASE GOLD AND URANIUM	RESOURCES 20	INCL	9-Mar-05	22-Mar-05	#N/A
JCD	JCI LTD	RESOURCES 20	EXCL	9-Mar-05	22-Mar-05	R 0.28
APN	ASPEN PHARMACARE HLDGS	INDUSTRIAL 25	INCL	9-Mar-05	22-Mar-05	R 21.90
AVI	AVI LTD	INDUSTRIAL 25	EXCL	9-Mar-05	22-Mar-05	R 15.51
MTX	METOREX LTD	RESOURCES 20	INCL	8-Jun-05	20-Jun-05	R 3.75
RNG	RANDGOLD AND EXP CO	RESOURCES 20	EXCL	8-Jun-05	20-Jun-05	R 10.40
MKL	MAKALANI HOLDINGS LTD	MID CAP	INCL	7-Sep-05	19-Sep-05	R 95.00
TSX	TRANS HEX GROUP LTD	MID CAP	EXCL	7-Sep-05	19-Sep-05	R 17.15
TSX	TRANS HEX GROUP LTD	SMALL CAP	INCL	7-Sep-05	19-Sep-05	R 17.15
JCD	JCI LTD	SMALL CAP	EXCL	7-Sep-05	19-Sep-05	R 0.16
RNG	RANDGOLD AND EXP CO	SMALL CAP	EXCL	7-Sep-05	19-Sep-05	R 8.90
SUI	SUN INTERNATIONAL LTD	INDUSTRIAL 25	INCL	7-Sep-05	19-Sep-05	R 72.64
AFX	AFRICAN OXYGEN LTD ORD	INDUSTRIAL 25	EXCL	7-Sep-05	19-Sep-05	R 23.00
JCM	JOHNNIC COMMUNICATIONS	MID CAP	INCL	7-Dec-05	19-Dec-05	R 46.50
PMA	PRIMEDIA LTD	MID CAP	INCL	7-Dec-05	19-Dec-05	R 14.10
DRD	DRDGOLD LTD	MID CAP	INCL	7-Dec-05	19-Dec-05	R 8.60
DEL	DELTA ELECTRICAL IN	MID CAP	EXCL	7-Dec-05	19-Dec-05	R 32.99
OMN	OMNIA HOLDINGS LTD	MID CAP	EXCL	7-Dec-05	19-Dec-05	R 37.00
SRL	SA RETAIL PROPERTIES LTD	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 9.50
DEL	DELTA ELECTRICAL IN	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 32.99
OMN	OMNIA HOLDINGS LTD	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 37.00
KGM	KAGISO MEDIA LTD	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 12.00
KAP	KAP INTERNATIONAL HLDGS	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 3.90
CLE	CLIENTELE LIFE ASSURANCE	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 43.00
IVT	INVICTA HOLDINGS LTD	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 14.50
PRM	PRIMA PROPERTY TRUST	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 1.43
ATS	ATLAS PROPERTIES LTD	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 14.25
BRN	BRIMSTONE INVESTMENT -N-	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 3.60
SCN	SCHARRIG MINING LTD	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 5.85
FSP	FREESTONE PROPERTY HLDGS	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 6.00
SPE	SPEARHEAD PROP HLDGS LTD	SMALL CAP	INCL	7-Dec-05	19-Dec-05	R 27.25
DRD	DRDGOLD LTD	SMALL CAP	EXCL	7-Dec-05	19-Dec-05	R 8.60
COM	COMAIR LTD	SMALL CAP	EXCL	7-Dec-05	19-Dec-05	R 1.80
NWL	NU-WORLD HOLDINGS LTD	SMALL CAP	EXCL	7-Dec-05	19-Dec-05	R 30.51
OCT	OCTODEC INVEST LTD	SMALL CAP	EXCL	7-Dec-05	19-Dec-05	R 8.65
PHM	PHUMELELA GAME LEISURE	SMALL CAP	EXCL	7-Dec-05	19-Dec-05	R 8.00
GMB	GLENRAND M.I.B. LTD	SMALL CAP	EXCL	7-Dec-05	19-Dec-05	R 2.30
AGI	AG INDUSTRIES LTD	SMALL CAP	EXCL	7-Dec-05	19-Dec-05	R 2.80
RLO	REUNERT ORD	INDUSTRIAL 25	INCL	7-Dec-05	19-Dec-05	R 52.05
SUI	SUN INTERNATIONAL LTD	INDUSTRIAL 25	EXCL	7-Dec-05	19-Dec-05	R 74.05

APPENDIX

B



Table B. Investment Universe for Momentum-Based Strategies

JSE CODE	LONG NAME	SECTOR
ASA	ABSA GROUP LIMITED	Banks
FSR	FIRSTRAND LIMITED	Banks
NED	NEDCOR LIMITED	Banks
RMH	RMB HOLDINGS LIMITED	Banks
SBK	STANDARD BANK GROUP LTD	Banks
LGL	LIBERTY GROUP LIMITED	Life Assurance
OML	OLD MUTUAL PLC	Life Assurance
SLM	SANLAM LIMITED	Life Assurance
REM	REMGRO LIMITED	Investment Companies
VNF	VENFIN LIMITED	Investment Companies
INL	INVESTEC LIMITED	Speciality and Other Finance
INP	INVESTEC PLC	Speciality and Other Finance
PPC	PRETORIA PORTLAND CEMENT COMPANY LD	Construction and Building Materials
SAP	SAPPI LIMITED	Forestry and Paper
BAW	BARLOWORLD LIMITED	Diversified Industrials
IPL	IMPERIAL HOLDINGS LIMITED	Diversified Industrials
RCH	RICHEMONT SECURITIES AG	Household Goods and Textiles
SHF	STEINHOFF INTERNATIONAL HOLDINGS LD	Household Goods and Textiles
NTC	NETWORK HEALTHCARE HOLDINGS LIMITED	Health
SAB	SABMILLER PLC	Beverages
TBS	TIGER BRANDS LIMITED	Food Producers and Processors
BVT	THE BIDVEST GROUP LIMITED	Support Services
ECO	EDGARS CONSOLIDATED STORES LIMITED	General Retailers
JDG	JD GROUP LIMITED	General Retailers
NPK	NAMPAK LIMITED	Support Services
NPN	NASPERS LIMITED	Media and Entertainment
WHL	WOOLWORTHS HOLDINGS LIMITED	General Retailers
MTN	MTN GROUP LIMITED	Telecommunication Services
PIK	PICK N PAY STORES LIMITED	Food and Drug Retailers
ANG	ANGLOGOLD ASHANTI LIMITED	Mining
GFI	GOLD FIELDS LIMITED	Mining
HAR	HARMONY GOLD MINING COMPANY LIMITED	Mining
IMP	IMPALA PLATINUM HOLDINGS LIMITED	Mining
AGL	ANGLO AMERICAN PLC	Mining
BIL	BHP BILLITON PLC	Mining
SOL	SASOL LIMITED	Oil and Gas
LBT	LIBERTY GROUP LIMITED	Life Assurance