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DOES THE ACCRUAL ANOMALY EXIST ON THE JSE?

by

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A RESEARCH REPORT PRESENTED IN PARTIAL FULFILMENT (50%) OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF COMMERCE IN BUSINESS ECONOMICS (FINANCE)

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ABSTRACT

Utilising the seminal work of Sloan (1996) this study investigates the accrual anomaly in South Africa. Utilising all firms listed on the All Share Index (ALSI) for the period 2002 to 2016, this study employs various tests surrounding the accrual anomaly. A regression analysis highlights a low persistence of earnings and the popular Mishkin (1983) test fails to prove a sufficient market reaction following changes in earnings. Accruals could pre-empt dramatic changes in future earnings but the observed stock price adjustment was only implicit in firms that suffered a drop in earnings. Additionally, the presence of post-earnings announcement drift (PEAD) meant the market reaction following an earning's announcement was gradually reflected in the stock price. The accrual anomaly relies on an overreaction following an earning's surprise in the month that financials are released. All the previously mentioned meant that a simple fundamental-based (cash flow) investment strategy far outperformed a strategy based on earnings' fixation (accruals). This study failed to find conclusive evidence of the accrual anomaly on the JSE.

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1 INTRODUCTION

1.1 BACKGROUND

Sloan (1996) first introduced the accrual anomaly. Earnings fixation, defined as the ability of reported earnings to effectively summarise the performance of a firm's stock, was a popular approach to value firms at the time. The shortfall in this approach was that investors would use current reported earnings to forecast future earnings. If a firm failed to meet earnings expectations for the subsequent period, it would cause the stock price to depreciate, alternatively, if it outperformed its expectations, it would be rewarded with an appreciating stock price. Decomposing current earnings into two components, namely the accrual and cash flow components, formed the starting point in more accurately predicting future earnings.

"Earnings and cash flow differ because modern accounting conventions' timing and magnitude regarding revenues and expenses are not necessarily based on cash inflows or outflows, similarly, certain expenses such as depreciation are deducted from revenues even though they entail no cash outlay" (Chan, Chan, Jegadeesh, & Lakonishok, 2006, p. 1042). The discrepancy between a firm's cash flow and its earnings is the accrual component. Cash flow is considered a more reliable measure of earnings as it ignores accounting principles and only considers money that has been received or payed. Accrual accounting depicts that revenues and expenses are recorded when they are incurred, regardless of when cash is exchanged. For this reason, accruals stem largely from working capital (payables, receivables and inventories) and depreciation. Whilst these factors affect a firm's overall profit, they can possibly be delayed or incorrectly estimated. For example, taking on a large amount of unreliable credit-based business would boost profits but it is questionable whether this money listed in accounts receivable will be realised in the future. The same could apply for delaying the expensing of large stockpiles of unsellable inventory to prevent deflating profits leading up to a financials release.[1]

Investigating the persistence of the two components. Accruals can often inflate earnings and be less persistent in subsequent earnings' announcements whereas cash flow, a more manipulation-proof measure, would exhibit more persistence in future earnings' announcements. The low persistence of accruals in future earnings meant that high accrual firms were likely to underperform future earnings' expectations whereas low accrual firms were likely to exceed future earnings expectations.

[1] More formal definitions for cash flows and accruals are addressed in the methodology section.

Earning's fixation was an important assumption on which the accrual anomaly was based. Bernard and Thomas (1990) provided evidence that stock prices fail to reflect the implications of current earnings for future earnings. Additionally, De Bondt and Thaler (1985) indicated that the stock market tends to overreact to unexpected earnings' announcements. Decomposing current earnings into the accrual and cash flow components was then the next step in identifying the accrual anomaly. Investors would ignore the persistence of accruals and the subsequent earnings' announcement would not be as high or as low as expected. In a market fixated on earnings, the incorrect interpretation of current earnings and the later correction for this misinterpretation form the basis of the anomaly. For this reason, firms with high (low) reported accruals in a fiscal period will tend to have lower (higher) stock returns in subsequent periods. The emphasis an investor places on current earnings in their forecast evaluation is subject to a later correction.

1.2 RESEARCH QUESTIONS

To the best knowledge, this would be the first study focusing extensively and solely on the accrual anomaly within South Africa. The overarching research question is simply to investigate if the anomaly does exist on the Johannesburg Securities Exchange (JSE). Considering the anomaly as a violation of market efficiency means that its existence would have massive implications for all investors and can contribute greatly to the wealth of literature on market efficiency in emerging markets. In investigating the overarching research question, the empirical analysis in this study seeks to investigates four sub questions. Questions 1.2.1 and .1.2.2 are as set out by Sloan (1996)'s original hypotheses. Question 1.2.3 and 1.2.4 have been added as extensions to this study.

1.2.1 Earning's persistence on the JSE

Looking at current earnings, were they likely to persist into the future based on their underlying make-up? Sloan (1996) reported results where the persistence of earnings attributable to the accrual component was lower relative to than the persistence of earnings attributable to the cash flow component. This was verified through regression analysis and using a popular econometric test introduced by Mishkin (1983). This question will be explored in Sections 4.2 (Earning's Persistence and Market Correction) and Section 4.3 (Accruals' Ability to Predict Future Changes in Earnings).

1.2.2 A change in earning's effect on the stock price

This will investigate the effect of an incorrect earning's expectation on the future stock price. Sloan (1996) noted that the overpricing of high accrual stocks and under-pricing of low accrual stocks meant that a trading strategy comprising of a long position in low accrual stocks and a short position in high accrual stocks would yield significantly higher stock returns over and above that of the market. This

question will be explored in Section 4.4 (Stock Price Adjustments Following Earning's Announcements) and Section 4.5 (Portfolio Tests: Accruals and Cash Flow).

1.2.3 Post-earnings announcement drift (PEAD)

Whilst not an inherent theme of this study, PEAD was identified as an anomaly that would inhibit the presence of the accrual anomaly on the JSE. This question will be explored in Section 4.4 (Stock Price Adjustments Following Earning's Announcements).

1.2.4 Cross-section of stock returns on the JSE

A cross-section of stock returns at lagged financial year-ends was added to this study as a means validate the data set used, draw insights for future research and explore other well-known market anomalies on the JSE. This question will be explored in Section 4.6 (Cross-section of Stock Returns at Lagged Financial Year-ends).

1.3 DELIMITATIONS

Before proceeding with the analysis, this section will address any shortcomings to the data set and tests performed in this study. These topics will be explored more extensively in their respective sections.

Firstly, only annual financial statements are used. Many larger firms will release interim or even quarterly results. These were ignored due to data constraints and to best mimic the analysis employed in most of accrual-based works. The assumption that the market will not adjust accordingly at the release of any performance-based results is a naïve one. In an efficient market, any publicly available information is considered in revising the markets expectations for the upcoming annual financial results.

The size-adjusted returns are used by Sloan (1996) were ignored due to the smaller size of quintiles creating spurious results. Instead, market-adjusted returns are used in this analysis to assess the performance across multiple year-ends. The exclusion of financial stocks was imperative due to the difficulty in interpreting their earning's components. They are however still included in the J203 and J203T which was used to arrive at market-adjusted returns for the respective firms. For this reason, a period where financials performed exceptionally could result in the average market-adjusted return for the sample used being less than zero or alternatively greater than zero if financials performed particularly badly. Additionally, whilst the J203 and J203T are market capitalisation weighted indices, the portfolios created were equally weighted.

Unlike many market indicators or ratios used in stock return analysis, accruals, earnings and cash flow components in this study only change once annual financial statements are released. Many ratios are fixed to the market such as market-to-book or price-to-earnings and so can fluctuate throughout the year because they possess a variable tied with their pricing. Earnings, accruals and cash flow components are tied to average total assets, which is additionally only released at the financial year-end. For this reason, this study presents the time-series means of market-adjusted stock returns following portfolio formation and ignores a specific rebalancing period that is often the norm when assessing the performance of trading strategies. For this same reason, transaction costs that are involved in the shorting portfolio are ignored.

1.4 STUDY OUTLINE

The rest of the study is set out as follows. Section 2 presents the literature review, surveying local and international contributions to the accrual anomaly. Section 3 outlines the research methodologies for the data sorting and variable classification used for stocks listed on the JSE. Section 4 outlines the empirical results from this study. It begins with the summary statistics for the data gathered on accruals, earnings and cash flow within South Africa to address any trends that might be transparent. It then explores earning's persistence through a regression analysis and the Mishkin (1983) tests. The cross-section of accrual and earnings ranked firms investigates the effects on changes in earnings and stock price adjustments. The results from a hedged portfolio test is looked at to see whether trading on the accrual anomaly would be profitable in an emerging market setting with results being compared to the profitability of a cash flow based trading strategy. The cross-section of stock returns following financial year-ends is included to contrast a more recent data set with other well-known market anomalies. Lastly, Section 5 concludes and provides recommendations for future research.

2 LITERATURE REVIEW

The following literature review analyses the key contributions surrounding research important to this study. The first section focuses solely on accrual-based works. The second section focuses on some South African studies which have managed to shed some light on to whether the accrual anomaly could be evidenced in South Africa.

2.1 INTERNATIONAL EVIDENCE

Key papers to the accrual anomaly are discussed chronologically with various offtakes to other papers if deemed consistent with ideas or thoughts presented in the main discussion paper first introduced. All main works considered relevant are post Sloan (1996)'s original work.

Collins and Hribar (2000a) confirmed whether Sloan (1996)'s original accrual anomaly held for quarterly data and if it was distinct from the PEAD anomaly. Additionally, was it possible to combine the two anomalies, namely PEAD and accruals, into a hedged portfolio strategy that would generate greater returns above that of any one of the anomalies in isolation? "PEAD is classified as the phenomenon where stock prices continue to drift in the direction of the initial price response to an earnings announcement" (Collins & Hribar, 2000a, p. 1). One can see how these anomalies could share an apparent link. If reported earnings was reliable in summarising a stock's performance, then these two anomalies will mainly differ by the time it takes for the market to fully adjust to a change in earnings. The stock price adjustment experienced under PEAD will be slower than the adjustment experienced under the accrual anomaly. Despite utilizing quarterly data instead of the annual approach to test the accrual anomaly, another key distinction from the original Sloan (1996) was the calculation of accruals using a Cash Flow Statement Approach instead of the Balance Sheet Approach as recommended from their previous research (Collins & Hribar, 1999).[2] Collins and Hribar (2000a) confirmed that the accrual anomaly held under quarterly earnings and it was independent of the PEAD phenomena. This meant that the trading strategy they implemented by combining PEAD and accruals earned greater abnormal returns than trading on either anomaly in isolation.

Xie (2001) examined the market pricing of discretionary and non-discretionary accruals to test whether stock prices rationally reflect the one-year-ahead earnings implication of these accruals. "The nondiscretionary (normal) component captures the impact of business conditions and the discretionary (abnormal) component reflects choices by management" (Chan, Chan, Jegadeesh, &

[2] A detailed analysis on how the Balance Sheet Approach and Cash Flow Statement approach vary will appear in the Research Methodology Section.

Lakonishok, 2006, p. 1063). Whereas Sloan (1996) decomposed earnings into two components, Xie (2001) decomposed accruals into the two previously mentioned components hence arriving at three components of earnings. Making use of the Mishkin (1983) regressions and hedged portfolio test method of Sloan (1996), it was found that the market overestimates the persistence of abnormal accruals, and consequently overprices these accruals. This suggested that the overpricing of total accruals documented by Sloan (1996) is due largely to abnormal accruals. Hence, stocks with negative abnormal accruals were undervalued and stocks with positive abnormal accruals were overvalued. The summarised finding is consistent with the notion that the market overprices the portion of abnormal accruals stemming from managerial choices. Richardson, Sloan, Soliman, and Tuna (2002, 2005) extended Sloan (1996)'s research in a similar fashion to Xie (2001) and later, Chan et al. (2006) who looked at the reliability and information contained in different accruals. These further studies went on to decompose accruals into more separate components to see whether some components exhibited stronger persistence than others. Additionally, new and improved methods for calculating accruals were discussed. This was the trend for numerous works following Sloan (1996) in terms of trying to identify which items in accruals was responsible for the anomaly and how to better measure them. Because of the limited work conducted on accruals in South Africa, this study looks purely at overall accruals, ignoring a lot of these extensions and more complex measures. Once a more holistic understanding of the anomaly is gained, extensions in research can follow some of these more critical ideas.

Desai, Rajgopal and Venkatachalam (2004) investigated whether the accrual anomaly was a manifestation of the popular value-glamour phenomenon that was already well documented in finance literature. This paper proceeded an argument demonstrated in Beaver (2002, p 468): "The mispricing of accruals may in fact be the 'glamour stock' phenomenon in disguise". Intuitively speaking, a firm with a high cash flow relative to earnings would have lower accruals whereas a firm with low cash flow relative to earnings would have higher accruals. In context then, accruals and cash flows naturally have an inverse relationship. However, cash flow, leading up to this paper was defined as earnings plus depreciation and not as cash flow from operations as used in testing for the accrual anomaly. The results concluded that accruals were still related to future earnings after controlling for four different value-glamour proxies, namely sales growth, book-to-market, earnings-to-price and traditional cash flow-to-price. However, the new cash flow-to-price variable they introduced which used operating cash flows (CFO/P) subsumed abnormal returns relating to both accruals and the other common value-glamour proxies. They concluded that if CFO/P was accepted as a value-glamour proxy, then one could argue that the value-glamour anomaly subsumes the accrual anomaly. Whilst

the relationship between accruals and cash flows does create links between these anomalies, the intuition behind the anomalies is quite different. The value-glamour anomaly generally relies on fundamental-to-price ratios to detect mispricing whereas the accrual anomaly focuses of earnings fixation through the persistence of the components of current earnings.

Pincus, Rajgopal and Venkatachalam (2005) looked at international firm data for 20 countries, not including South Africa, to test whether the accrual anomaly could be explained by differences in accounting and institutional structures. The summarized context of their findings suggested that the accrual anomaly is more likely to occur in countries under Common Law, more extensive use of accrual accounting and lower levels of share ownership. Looking at the country's legal tradition, namely Common versus Civil Law, it was found the accrual anomaly was more prevalent in countries following the Common Law tradition. La Porta, Lopez-de-Silanes, Shleifer and Vishny (2000) compared the differences in legal investor protection among countries and the possible causes or origins of these differences. One of the criteria for ranking investor protection was that of accounting standards. An index on how well annual reports followed the correct accounting standards in the preparation of their financial statements was one of the metrics presented. Common Law countries outperformed all Civil Law countries except those following Scandinavian Civil Law.[3] One could assume that better reporting standards would make the accrual anomaly less likely but clearly this was not the case. Better standards often make way for more extensive use of accruals and hence financial reports could be subject to earnings management (Hung, 2001)[4]. Pincus et al. (2005) considered their most intriguing finding to be that the accrual anomaly was more likely to occur in countries with capital markets that were the most efficient as characterized by the availability of investor information. The evidence behind this finding supported earning's management using accruals as a key explanation because investors are less likely to question the reliability of these earnings.

Koerniadi and Tourani-Rad (2005) investigated the accrual anomaly in New Zealand. Following prior work from Pincus et al. (2005), it seemed conceivable that the accrual anomaly would be prevalent

[3] South Africa follows a mixed legal system with offtakes of British Common Law, Dutch Civil Law as well as African Customary Law making it quite a unique and difficult case if one hope to explore the accrual anomaly from a legal tradition viewpoint and so was ignored in this study.

[4] Better standards in this context could typically imply a more extensive use of updated IAS and/or IFRS principles. This for instance might involve reporting to new accounts or procedures that might not be explicitly understood by investors. An example could include the recent changes to IFRS 16 (leases) whereby a lessee can recognise almost all leases on their balance sheet as an asset. This change is only effective has on 1 January 2019 but many firms will choose to adopt such a standard sooner. This would imply a lower accrual component as compared to a firm that has not yet implemented the standard because accruals are deflated by average total assets as you will see in the Research Methodology section.

in New Zealand. Whilst they found that firms with high accruals in their reported earnings experienced significantly negative future stock returns, the main conclusion of their findings supported more of a cash flow anomaly as opposed to an accrual anomaly. Sorting stocks based on cash flows rather than accruals yielded a greater positive return over the 17 years in which they tested the two separate trading strategies. The inverse relationship between cash flows and accruals does mean they are considered largely interchangeably and the explanations of the two different anomalies follow a similar intuition. Using these considerations however, the hedged portfolio test conducted on ranked accruals returns in this study also looked at cash flow trading strategy.

Chan, Chan, Jegadeesh and Lakonishok (2006) explored how the quality or reliability of earnings differed under different levels of accruals. Under the notion of investor's likelihood to fixate on bottom line income, they were often temporarily fooled. This market mentality to single-mindedly fixate on earnings and not the underlying quality of those earnings once again highlights the premise for the accrual anomaly. By using earnings surprise as an explanatory variable for future stock price movements, accruals would explain these earnings surprises. Additionally, evidence suggested that high accruals could be associated with manager's manipulation of earnings in the form of buying on credit or delaying the purchase of inventory till after the financial year-end. Various distinctions from Sloan (1996)'s original work included looking at accrual phenomena on the U.K. stock market, recognising the fact that accruals could differ across industries and that the information contained in different accruals is an important consideration. The bulk of predictive power in accruals was observed in inventory and accounts receivable change. For instance, to explain further, one could look at a company stockpiling a large amount of inventory in the anticipation of a future growth in sales or a company having a large amount of credit based sales realised as a proxy for taking on reliable business.

Richardson, Tuna and Wysocki (2009) conducted an extensive study on the recent advances into the field of accounting anomalies as a form of fundamental analysis. The topic was initially explored comprehensively starting with a thorough review of recent advances in academic literature using a citation analysis procedure. The 'Publish or Perish" software (Harzing, 2007) was used to attain a list of the most highly-cited articles on Google Scholar using the filters "accounting anomalies" and "fundamental analysis". Of importance is that many of these papers pertained to the 'accrual anomaly' showing its prominence to fall under both accounting anomalies and as a form of fundamental analysis. Accrual based papers have featured extensively throughout finance as well as accounting journals for this reason. The survey analysis focused on the use of accounting numbers to forecast a

firm's earnings, cash flows, and stock returns, with the view that financial statements can help investors make better portfolio allocation decisions. It highlighted the importance of improving forecasts for future earnings within fundamental analysis. The accrual anomaly was also explored empirically by Richardson, Tuna and Wysocki (2009) confirming that the negative relationship between accruals and future stock returns remained robust to the treatment of risk and transaction costs. However, it was evident that the relationship had largely diminished over time since Sloan (1996) and the authors concluded that it has been now fully priced into the market. Lewellen (2010) relied very heavily on ideas proposed in Richardson, Tuna and Wysocki (2009) and provided five arguments that he deemed key in the analysis of any accounting based anomaly. Three points are relevant to this study. Firstly, the difference between risk and mispricing.[5] Secondly, the assumptions implied by the Mishkin (1983) tests.[6] Thirdly, they stated how an anomaly may still be interesting even if it not profitable from a trading context because of transaction costs and/or other factors.

Green, Hand and Soliman (2009) documented the demise of the accrual anomaly by reconstructing Sloan (1996)'s original work with a larger data set. Following the trend of the decline of many accounting-based anomalies since their publications, Green, Hand and Soliman (2009) wanted to see if the same held true for the accrual anomaly. An important consideration with the accrual anomaly was that the profitability from Sloan (1996)'s portfolios was mostly realised by large returns earned on the short-side of the trading strategy. This meant the anomaly was more exploited by hedge funds rather than mutual funds or fundamental traders. The important question was whether this assisted in the longevity of the strategy. Extending Sloan (1996)'s sample size, the authors attained a pre-and post-comparison around the publication of his original findings. From the results, it was concluded that the hedge returns to the accrual anomaly had decayed in U.S. capital markets to the point that returns were no longer positive. Green, Hand and Soliman (2009) went further in their analysis to propose explanations for what could have caused the demise. The key explanation was centred on the emergence of hedge funds and their ability to exploit anomalies by both longing and shorting. The rapid growth in the number of hedge funds on U.S. markets could explain the demise of many accounting-based anomalies. Green, Hand and Soliman (2009) concluded the reason for the demise was the decline in the mispricing signal between the accrual and cash flow components and the rapid increase in the amount of capital invested by hedge funds to exploit this signal.

[5] Many studies calculate abnormal returns on the basis that the pricing model they select is efficient and any price deviation from this model is indicative of an anomaly. For this reason, this study will steer clear of using any asset pricing models to calculate abnormal returns; instead, simple market-adjusted returns are used.
[6] These will be discussed in the Mishkin Tests section.

Shi and Zhang (2010) tested four explanations for the accrual anomaly using a vast amount of supporting literature. The first explanation is that of the original earnings fixation hypothesis as proposed by Sloan (1996). Investor fixation on earnings and a collective inability to realise the lower persistence of accruals compared to cash flows underlies Sloan (1996)'s earnings fixation hypothesis. The second explanation is an offtake of the popular value versus growth anomaly. Previous literature such as Desai, Rajgopal and Venkatachalam (2004) and Zhang (2007) find evidence to suggest the accrual anomaly captures a similar cause and effect to that of the future underperformance of stock returns demonstrated under the growth anomaly. The third explanation attributes the accrual anomaly to risk in that a considerable portion of the variation in average returns of high and low accrual firms can be motivated through the popular Capital Asset Pricing Model (Kahn, 2008). The final explanation linked the anomaly to limits in arbitrage in that the accrual anomaly was concentrated amongst firms with high levels of idiosyncratic risk and high transaction costs (Mashruwala, Rajgopal, & Shevlin, 2006). Shi and Zhang (2010) concluded that the original earnings fixation hypothesis as proposed by Sloan (1996) was the dominant explanation of the accrual anomaly.

2.2 RELATED SOUTH AFRICAN CONTRIBUTIONS TO THE ACCRUAL ANOMALY

Various South African papers have touched on ideas that can be considered relevant to the accrual anomaly. Even if the accrual anomaly was not explicitly stated in these papers, the variables tested and the methodologies used are still important to this study.

Hoffman (2012) investigated the presence of stock return anomalies for stocks listed on the JSE covering the period from 1985 to 2010. Whilst a vast amount of research for anomalies and market efficiency has been conducted in larger financial markets, a considerable less amount has been published on the behaviour of financial markets in developing countries. With the previous statement in mind, Hoffman (2012) looked at most of larger phenomena extensively tested in larger markets and applied similar methodologies and styles in a South African context. The well-known anomalies looked at included value versus growth, momentum and the size effect. One of the seven variables used in this study was accruals. It was defined as the proportional increase in operating assets (accounts receivable, inventory, cash etc.) over the past 12 months. Ranking stocks by size according to market capitalisation, three categories were obtained, namely large, small and micro. Results pertaining to micro stocks were given less consideration due to the inability for large portfolios to invest in them. The key finding of interest for this study was that small and big stocks were rewarded for an increase in operational assets whilst micro stocks were penalised. Taking this in context, ignoring micro stocks, rewarding a company for an increase in accruals is much like the premise on

which the accrual anomaly is based. An increase in accruals bringing an over stated earnings figure is misinterpreted by investors. As for micro stocks, the case is probably that an increase in accruals proxies for an increased level of financial distress and going concerns for the business. As mentioned, although accruals were not a central theme in this paper, in terms of South African research done on the accrual anomaly, this was one of very few papers to shed some light in this area even if it was not intended by the author.

Hoffman and Swart (2013) investigated the PEAD anomaly on the JSE. The relationship between earnings surprise directly following an earnings announcement and the subsequent drift in the same direction of the price change for the next 120 days was confirmed. Additionally, it was concluded that the anomaly was distinct from size, value and momentum anomalies. To proxy for earnings surprise, various measures including the normalised change in EPS and market reaction in the price measured two days after an earnings announcement. This is positive for the accrual anomaly solely from the perspective that failing to meet earnings expectations is subject to a stock price adjustment.[7]

Deisting, Sehgal and Subramaniam (2014) conducted a comprehensive study of equity market anomalies in six emerging markets, namely Brazil, China, India, Indonesia, South Korea and South Africa. The list of anomalies included size, value, momentum, mean reversion, liquidity, profitability, stock repurchases and accruals. The approach used was hedged portfolio returns, hence longing or shorting the upper or lower 20% of the respective anomaly. Using the Fama French Model (FFM), excess returns for a portfolio were calculated as the return over and above that of matching risk, size and value portfolios. Of significance to this study was the finding of the accrual anomaly in South Africa. In fact, considering the previous list, the only anomaly not evidenced in South Africa was size and mean reversion. Even in their own words, they noted that as of 2014, "South Africa seems to be the most exciting destination for portfolio managers" (Deisting, Sehgal and Subramaniam, 2014, p. 27). Concluding it was deemed that South Africa was the most inefficient market as explained by the FFM model and anomalous returns could be earned through various trading strategies.[8]

[7] Alternative measures of earnings surprise are looked at in the cross-section of accrual and earnings ranked firms to corroborate the findings of Hoffman and Swart (2013).

[8] Various approaches were used in this study different to the methodology by Deisting, Sehgal and Subramaniam (2014). These included using market-adjusted returns as opposed to using the FFM as well as the Statement of Cash Flows Approach as opposed to the Balance Sheet Approach in calculating accruals.

3 RESEARCH METHODOLOGY

3.1 DATA COLLECTION

This study looks at 202 companies listed on the JSE for the period from 2002 to 2016. This was done to incorporate the latest definition of accruals. All financial statement, stock return and market data is gathered using Bloomberg under the line items mentioned in the previous sections. Financial year-ends are attained from INET BFA. Interim financial statements were ignored due to insufficient data and reliability concerns.

Data for this research report followed similar filtering mechanisms to that of Muller and Ward (2013). They conducted a comprehensive analysis of style-based investment strategies on the JSE. Within their study, they explored various financial ratios, market and behavioural finance based styles. Investing based on the accrual anomaly can fit a market based style much like the value versus growth or liquidity phenomena.

Whilst there are an extensive number of shares listed on the main board of the JSE, many are considered largely illiquid for institutional investors. The All Share Index (ALSI), tracked as the J203, comprises of approximately the largest 160 companies as reviewed quarterly and screened through various criteria. For this study, firms were filtered down to the ALSI at the start of each calendar year. These top 160 generally make up around 99% of the total market capitalisation. This helps control for an issue brought forward by Mashruwala et al. (2006) in explaining the accrual anomaly through difficulties to arbitrage. The member participants and weights for the ALSI are taken from Bloomberg. All financial firms were excluded from the analysis due to the difficulty in the interpretation of their accrual components. This study used Bloomberg Industry Classification Standards (BICS) to filter out financial firms at the start of every calendar year. This includes banks, insurance companies, property and investment related firms. This roughly makes up ±50 firms on the ALSI each year.

3.2 VARIABLE CLASSIFICATION

Two dominant approaches to calculating cash flows and accruals have been used extensively in prior research. The original approach is that of the Balance Sheet Approach as first employed by Sloan (1996)'s original study. Whilst this was not the approach used in this paper, it is critical in terms in understanding the various components that make up accruals and so is briefly discussed below.

The Cash Flow Statement Approach was introduced by Subramanyam (1996) and has become the preferred method of choice as substantiated by a large pool of literature. Collins and Johnson (1999)

demonstrated how the Balance Sheet Approach to calculating accruals can lead to serious errors, particularly when a firm has been involved in mergers, acquisitions, or divestitures. When these events occur, the interpretation between changes in working capital balance sheet items and the accrual components of earnings is less reliable. Sloan (1996) documented how he was unable to use this approach in his study as it was only in the last four years of his sample period that the Statement of Financial Accounting Standards (SFAS) was changed to include the necessary information required to calculate the accrual component of earnings from the Statement of Cash Flows.

For the reasons mentioned above, this study makes use of the Cash Flow Approach to compute accruals. It has also become the preferred approach in numerous studies following Sloan (1996)'s original work (Collins & Hribar, 2000a, 2000b, Xie, 2001, Koerniadi & Tourani-Rad, 2005).

3.2.1 Balance Sheet Approach

This approach uses information contained in the Statement of Financial Position and Statement of Comprehensive Income. It involved calculating accruals off the balance sheet before subtracting it from earnings to arrive at a firm's cash flow. Accruals are first calculated as per Equation (1).

$$Accruals = (\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - Dep \quad (1)$$

Where:

$\Delta CA = Change\ in\ Current\ Assets$

$\Delta Cash = Change\ in\ Cash\ and\ Near\ Cash$

$\Delta CL = Change\ in\ Current\ Liabilities$

$\Delta STD = Change\ in\ Short-term\ Debt\ under\ Current\ Liabilities$

$\Delta TP = Change\ in\ Tax\ Payable$

$Dep = Depreciation$

Earnings, accruals and cash flows components are scaled by total assets to enhance cross-section comparability. This was an important consideration as accruals are essentially changes in assets, an increase in accruals associated with an equal increase in total assets is understandable, but a dramatic increase in accruals without any major increase in total assets is a point for concern. From now on, every time this study refers to earnings, accruals or cash flows, it is referring to this scaled version as per Equations (2), (3) and (4).

$$Earnings\ component = \frac{Income\ from\ Operations}{Total\ Assets} \quad (2)$$

$$Accrual\ Component = \frac{Accruals}{Total\ Assets} \quad (3)$$

$$Cash\ Flow\ Component = \frac{(Income\ from\ Operations - Accruals)}{Total\ Assets} \quad (4)$$

Equation (2) is the same as the popular ROA (Return on Assets) used extensively in evaluating firm performance. In later sections, the terminologies for ROA and earnings components are used interchangeably.

3.2.2 Statement of Cash Flows Approach

The cash flow approach looks at the Statement of Cash Flows and then calculates accruals as the difference between earnings and operating cash flows.

$$Accruals = Earnings - CFO \quad (5)$$

Where:

$Earnings$ = *Income (Loss) before Extraordinary Items* [9]

CFO = *Cash from Operations* [10]

Once again, total average assets scale all components as per the Equations (2), (3) and (4). [11]

3.2.3 Classifying Returns

This study makes use of logarithmic returns. Respective holding period returns are calculated using cumulative monthly returns. The returns are recorded four-months following the firm's financial year-end. Most firms on the main board publish financial results about three months after year-end so recording the stock price at four months ensures all accounting information is completely publicly available and known. Annual returns are calculated using both a price and gross dividend index from

[9] This line item satisfies the definition from Xie (2001), Collins and Hribar (2000a). The studies made use of income before extraordinary (XO) items reported under SFAS No. 95 (Compustat item #18 under annual data and #8 under quarterly data). Bloomberg defines this item as net income excluding the effects of discontinued operations, accounting standard changes, and natural disasters. This field displays income (loss) before XO items and minority interests. This item represents the income of a company after all expenses, including special items, income taxes, and minority interest – but before provisions for common and/or preferred dividends. This item does not reflect discontinued operations or extraordinary items presented after taxes.

[10] This line item once again satisfies the definition from Xie (2001), Collins and Hribar (2000a). The studies make use of cash flow from operations reported under SFAS No.95 (Compustat item #308 under annual data and #108 under quarterly data). Bloomberg defines this item as the total amount of cash a company generates from its operation. The effect of Changes in Non-Cash Working Capital on Cash from Operations can be either positive or negative. A decrease in current assets or increase in current liabilities, increases Cash from Operations; while an increase in current assets or decrease in current liabilities, decreases Cash from Operations.
Generally calculated as: Net Income + Depreciation & Amortization + Other Noncash Adjustments + Changes in Non-Cash Working Capital

[11] Total Assets: The total of all short and long-term assets as reported on the Balance Sheet. Xie (2001) made use beginning-of-year total assets (Compustat item #6). This study uses total assets as an average of the recorded total at the start and end of the financial period in question. This is more in line with Sloan (1996) as merely using the beginning fails to consider the movement in assets relative to the change in accruals.

Bloomberg.[12] Stocks with a one-year holding period return of greater than 100% are dropped from the sample for that period as measured using firm price return. If a firm delists during the period, it is assumed a 0% holding period return for the subsequent month following its delisting and dropped from the sample in the subsequent period. All price data is adjusted for stock splits, consolidations and repurchases. Any firm that appears in the ALSI in any period is kept in until the end of the study to avoid survivorship bias.

Market-adjusted returns are computed by measuring the buy-hold return more than the buy-hold return of the ALSI. The J203 is used to calculate market-adjusted returns under the price index and the J203T is used for the gross dividend index. The return of the index is matched to the respective firm's year-end accordingly to eliminate the effect of underlying market conditions. Both results are presented as using a total return index does imply the re-investment of dividends which is often not the case for an individual investor. However, as seen in the summary statistics section, the correlation between the two measures is largely similar with total returns being on average 4% higher on firm level due to the compounded effect of reinvested dividends. On a market-adjusted basis, the difference is negligible. In all portfolio tests, equally weighted returns are used to prevent the overinvestment of the Top 40 on the JSE and more include the influence of lower market capitalisation stocks in the ALSI.

[12] Total return index (gross dividends): Monthly total return index as of the indicated date. The start date is one-month prior to the end date (as of date). Gross dividends are used. Return values are hence slightly overstated as they do not consider capital gains and dividend tax.

4 EMPIRICAL ANALYSIS

4.1 DESCRIPTIVE STATISTICS

4.1.1 Summary Statistics

Summary statistics for accruals, cash flows, earnings, one-year holding period returns and one-year market-adjusted holding period returns are presented in Table 1. Results are presented similarly to Xie (2001).

Table 1: Summary Statistics for of Earnings, Cash Flow and Accruals Components and Annual Returns. Sample consists of 1527 firm-years between 2002 and 2016.

	Mean	S. D	Median	Min.	Max.	Range	% Positive
Components:							
Earnings[a]	0.045	0.088	0.043	-1.228	1.086	2.314	87.2
Cash Flow[b]	0.068	0.078	0.064	-0.384	0.708	1.093	85.8
Accruals[c]	-0.023	0.090	-0.023	-0.965	1.094	2.058	32.4
Annual Returns:							
Price[d]	0.098	0.357	0.107	-0.990	0.999	1.990	62.2
MA Price[e]	-0.044	0.324	-0.043	-1.168	0.946	2.114	44.0
Total[f]	0.138	0.369	0.142	-0.968	1.158	2.126	65.8
MA Total[g]	-0.039	0.334	-0.040	-1.088	1.259	2.347	44.8

[a] $Earnings\ component = \frac{Income\ from\ Operations}{Total\ Assets}$

[b] $Cash\ Flow\ Component = \frac{(Income\ from\ Operations - Accruals)}{Total\ Assets}$

[c] $Accrual\ Component = \frac{Accruals}{Total\ Assets}$

[d] $Price\ Returns = \ln\left(\frac{Price\ Index_t}{Price\ Index_{t-1}}\right)$

[e] $Market\ Adjusted\ Price\ Returns = \ln\left(\frac{Price\ Index_t}{Price\ Index_{t-1}}\right) - \ln(\frac{J203_t}{J203_{t-1}})$

[f] $Total\ Returns = \ln\left(\frac{Gross\ Dividend\ Index_t}{Gross\ Dividend\ Index_{t-1}}\right)$

[g] $Market\ adjusted\ Total\ Returns = \ln\left(\frac{Gross\ Dividend\ Index_t}{Gross\ Dividend\ Index_{t-1}}\right) - \ln(\frac{J203T_t}{J203T_{t-1}})$

The overall spread of values as measured by the standard deviation and range is much greater under earnings and accruals as compared to cash flow. This explains why cash flow is often looked at as more of a reliable measure of firm performance especially because of its ability to more easily extrapolate into the future based on historical observations. Looking at annual market-adjusted returns, a concern brought up in the delimitations section earlier regarding the J203 and J203T in the classification for abnormal returns becomes transparent. The negative market-adjusted returns can stem from two reasons. Firstly, firms with annual price changes of greater than 100% were excluded

as seen by the maximum for annual price returns but still naturally remain in the returns for the J203 and J203T. Secondly, financials which were excluded from the analysis, performed notably well over other industries for the sample period. Around 45% of market-adjusted returns were negative as opposed to the 50% that would be expected. Total annual returns included the compounded effect of reinvested dividends and so were around 4% higher than price returns which only consider price change

4.1.2 Correlations

Table 2 illustrates the correlation coefficients for the components and one-year holding period returns following financial year-end (t+1). Starting by analysing the linear relationship between variables presented using the computed Pearson correlation coefficients (above diagonal), as expected; earnings are positively related to cash flow and accruals.

Table 2: Pearson (above diagonal) and Spearman (below Diagonal) Correlation Coefficients for Earnings, Cash Flow and Accruals Components and Annual Returns. Sample consists of 1527 firm-years between 2002 and 2016.

	$Earnings_t$	$Cash\ Flow_t$	$Accruals_t$	$Price_{t+1}$	$MA\ Price_{t+1}$	$Total_{t+1}$	$MA\ Total_{t+1}$
$Earnings_t$		0.413	0.613	0.064	0.061	0.084	0.083
$Cash\ Flow_t$	0.458		-0.467	0.125	0.135	0.140	0.152
$Accruals_t$	0.274	-0.635		-0.046	-0.058	-0.04	-0.051
$Price_{t+1}$	0.155	0.138	-0.024		0.844	0.978	0.824
$MA\ Price_{t+1}$	0.123	0.133	-0.046	0.833		0.820	0.973
$Total_{t+1}$	0.182	0.155	-0.02	0.986	0.819		0.848
$MA\ Total_{t+1}$	0.154	0.152	-0.04	0.82	0.984	0.835	

Cash Flow had the strongest linear relationship across all four return measures whilst accruals had the lowest. The most promising conclusion regarding the coefficients was that accruals exhibited stronger relationships with earnings over cash flows. However, the accrual anomaly relies more on accruals relationship with future earnings as opposed to current earnings. A strong linear relationship is observed across all four return measures justifying that the results across either return measure will be probably produce similar outcomes. Turning to the variables' monotonic relationships using the Ranked-Spearman correlation coefficients (below diagonal), the relationships are somewhat different when relaxing the requirement for a linear relationship. The relationship between accruals with

earnings and cash flow does dramatically decrease when using ranked data. The relationships across all return measures remain positive and strong.

4.1.3 Time-varying Annual Means

To assess the time varying characteristics of the components, Figure 1 indicates the annual means of accruals, cash flows and earnings components over the sample. Under the definitions of earnings and cash flow used in this study, namely operating based, accruals are simply the difference between earnings and cash flow causing it to be mostly negative as in line with Xie (2001). The only year in which earnings exceeds cash flows was in 2007. Leading up to this point, cash flow had also been improving but not as quickly. Rising growth in earnings was eventually halted in 2007 preceding the Global Financial Crisis and reaching major lows in 2009, a year in which South Africa GDP growth rate stood at an all-time low of -6.1% in the first quarter. The only time accruals turned positive was in 2007, possibly pre-empting the future dramatic decrease in earnings. The smoothness of cash flows through time does mean earnings and accruals do follow largely similar trends. For Sloan (1996)'s original proposed hypothesis to stand, one should hope to see low accruals pre-empting a massive spike in earnings or conversely a year of high accruals pre-empting a dramatic decrease in earnings. This implies a convergence of earnings and cash flows before a hypothesized spike in earnings and widening following. Instead, the smoothness of cash flows throughout the sample means the relationship of earnings with accruals is largely concurrent rather than pre-emptive.

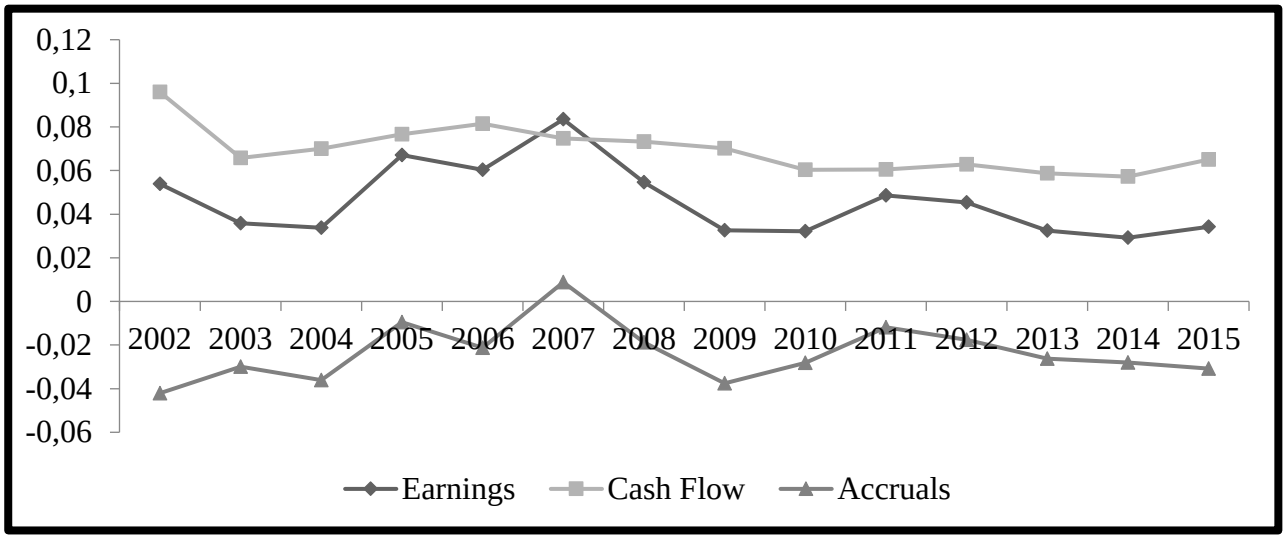


Figure 1: Time-series Annual Means for Accruals, Earnings and Cash Flow Components. Sample consists of 1527 firm-years between 2002 and 2016.

4.2 EARNINGS PERSISTANCE AND MARKET CORRECTION

4.2.1 Regression Analysis

Sloan (1996) examined the relationship between future earnings and the components of current earnings using regression analysis. Breaking up current earnings into accrual and cash flow components and then assessing their explanatory power on future earnings is a key starting point in determining the presence of the accrual anomaly. To do this, this study employs an ordinary least squares regression conducted over the entire sample period. The results are reported in Table 3. The first regression measured the persistence of earnings. The dependent variable is future earnings and the explanatory variable is current earnings as seen in Equation (6).

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + \varepsilon_\gamma \quad (6)$$

The α_1 coefficient is significant with a value of 0.368 which is less than unity confirming that current earnings is mean reverting (Koerniadi & Tourani-Rad, 2005). Only 36.8% of current earnings persist into the next-year's earnings. The adjusted R-squared of 12.82% is very low. The coefficient is far less than what was observed by Sloan (1996). He recorded a coefficient α_1 of 0.841. One could argue that the level of earnings' persistence is far greater in developed markets and future earnings in emerging markets is driven more by other factors not captured in current earnings.

In the next regression, current earnings are broken up into the two separate components as seen in Equation (7). The dependent variable is future earnings and the explanatory variables are current accruals and cash flow.

$$Earnings_{t+1} = \beta_0 + \beta_1 CashFlows_t + \beta_2 Accruals_t + \varepsilon_\delta \quad (7)$$

Sloan (1996) hypothesized that the coefficient of β_1 would be greater than that of β_2 as the persistence of the accrual component should be far less than that of the cash flow component. The $\beta_1$coefficient is significant with a value of 0.469 and the β_2 coefficient is significant with a value of 0.323. Sloan (1996) reported β_1 and β_2 coefficients of 0.855 and 0.765 respectively. Once again, the persistence of current cash flows and accruals is lower than what was evidenced in developed markets and one could argue that future earnings is driven other factors not captured by current cash flows and accruals. A possible explanation could also come from the different accounting standards used the US (GAAP) and South Africa (IAS and IFRS).

An F-test confirms that the variables are statistically significantly different from one another confirming that the persistence of cash flows is greater than accruals. This does provide evidence to support the basic assumption on which the accrual anomaly based in that high (low) accrual firms are likely to experience a lower (higher) future earnings announcement because of this lower persistence. The adjusted R-squared of 14.08% is greater than the previous regression but still very low.

Table 3: Results from Ordinary Least Square Regressions for Future Earnings on Current Earnings, Accruals and Cash Flows.

	Coefficient (t-statistic)[a]	**Adj. R^2**
$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + \varepsilon_\gamma$		12.82%
Constant	0.026(10.94)***	
Earnings$_t$	0.368(15.01)***	
$Earnings_{t+1} = \beta_0 + \beta_1 CashFlows_t + \beta_2 Accruals_t + \varepsilon_\delta$		14.08%
Constant	0.018(6.24)***	
Cash Flows$_t$	0.469(14.62)***	
Accruals$_t$	0.323(12.43)***	
F-test:		
$\boldsymbol{\beta_1 = \beta_2}$	(126.08)***	

[a] Sample consists of 1527 firm-years between 2002 and 2016. *, ** and *** denote the significance at the 10%, 5% and 1% level respectively.

4.2.2 Mishkin Tests

Sloan (1996) was the first who made use of the Mishkin Test to test for the capacity of stock prices to reflect different properties of accrual and cash flow components of earnings. Mishkin (1983) developed his test to be used in macro-econometrics to test the hypothesis of market efficiency in various settings. In testing the accrual anomaly, the setting implied for market efficiency is that any change in the stock price stems from an incorrect forecast of future earnings. Since appearing in Sloan (1996), the Mishkin test has appeared in several accrual-based works (Collins & Hribar, 2000a, Xie, 2001, Chan et al., 2006, Koerniadi & Tourani-Rad, 2005, Pincus, Rajgopal, & Venkatachalam, 2005). The Mishkin Test compares the error between an unconstrained regression and a constrained regression to see if the market adjusts rationally from its prior misspecification. Once again, this is testing market efficiency under the rationale that the stock price will adjust accordingly to an unexpected change in earnings and not to be confused with other tests of market efficiency.

As common in most accrual anomaly literature, tests begin with the earning's persistence model under rational pricing expectations. Initially, abnormal returns (AR) are calculated as per Equation (8). AR_{t+1} is the stocks abnormal return as defined by the difference between the stocks one-year holding period return (R_{t+1}) following its lagged financial year-end and the return of the market as matched to the correct time horizon. For this section, only the abnormal change in price is used. Therefore, abnormal returns are just the annual market-adjusted annual price return.[13]

$$AR_{t+1} = R_{t+1} - E(R_{t+1}) \tag{8}$$

Utilising Equation (8), a new regression for AR_{t+1} is formed. It now considers the effect of the change in the stock price following a change in earnings. Under earnings fixation, it is proposed that any change in the stock price is because of an incorrect forecast for future earnings. Equation (9) is now introduced to examine this prior statement. Equation (9) in its simplest form is arguing that the residuals (ε_γ) from Equation (6) can through λ_1 explain AR_{t+1}. [14]

$$Earnings_{t+1} = \alpha_0 + \alpha_1 Earnings_t + \varepsilon_\gamma \tag{6}$$
$$AR_{t+1} = \lambda_1(Earnings_{t+1} - \alpha_0 - \alpha_1^* Earnings_t) + \varepsilon_\eta \tag{9}$$

Sloan (1996) and Xie (2001) would often refer to α_1 as 'forecasting coefficients' and α_1^* as 'valuation coefficients'. This was because one assesses current earnings impact on future earnings and the other assesses current earnings impact on the stock price. In Equations (6) and (9), the constraint imposed for market efficiency is that,$\alpha_1 = \alpha_1^*$ which implies the market adjusts to errors in earnings' expectations. The identical procedure is now carried out using current accruals and cash flows.[15]

$$Earnings_{t+1} = \beta_0 + \beta_1 CashFlows_t + \beta_2 Accruals_t + \varepsilon_\delta \tag{7}$$
$$AR_{t+1} = \lambda_1(Earnings_{t+1} - \beta_0 - \beta_1^* CashFlows_t - \beta_2^* Accruals_t) + \varepsilon_\vartheta \tag{10}$$

[13] $Market\ Adjusted\ Price\ Returns_{t+1} = \ln\left(\frac{Price\ Index_{t+1}}{Price\ Index_t}\right) - \ln(\frac{J203_{t+1}}{J203_t})$

[14] To avoid confusion, put simply, the Mishkin Test implies that $(Earnings_{t+1} - \alpha_0 - \alpha_1^* Earnings_t)$ in Equation (9) is the error term (ε_x) from Equation (6).

[15] Once again, under the Mishkin Tests, $(Earnings_{t+1} - \beta_0 - \beta_1^* CashFlows_t - \beta_2^* Accruals_t)$ in Equation (10) is the error term (ε_δ) from Equation (7).

Now, market efficiency implies two constraints such that $\beta_1 = \beta_1^*$ and $\beta_2 = \beta_2^*$. Under the Mishkin Test, using the residuals essentially implies the constraint. This effectively means that the market rationally prices the impact of both current accruals and cash flows on future earnings through AR_{t+1}. Following tests of earnings persistence in the regression analysis section, it was hypothesized that $\beta_1 > \beta_2$, therefore, in Equation (5) one should once again see that $\beta_1^* > \beta_2^*$. These two coefficients will be equal if investors fail to distinguish between the accrual and cash flow components of earnings. Simplifying the previous statements, if the market rationally bases earnings' forecasts on accruals and cash flows, then the residuals from Equation (7) should explain the change in price under earnings fixation.

To test this, it is important to test whether the estimates from Equation (9) and (10) using a nonlinear least squares estimation procedure. Next, an additional regression is run under the same procedure imposing a restriction for the coefficients to be equal, hence $\beta_1 = \beta_1^*$ and $\beta_2 = \beta_2^*$, for this, the residuals (ε_{t+1}) from Equation (6) and (7) are used. Mishkin (1983) makes use of the likelihood statistic in Equation (11) following a $\chi^2(q)$ distribution.[16] The null hypothesis of market efficiency is that the market rationally prices the components of earnings with respect to their relationship with AR. It effectively compares the sum of squared residuals between the constrained and unconstrained regressions. Sloan (1996) failed to reject the null of market efficiency in an earnings sense but not in an accrual and cash flow sense. Taking this in context, investors fail to anticipate the persistence of that separated components that earnings make up and rather fixate on earnings alone.

$$2NLn(\frac{SSR^c}{SSR^u}) \qquad (11)$$

Where:

$N = number\ of\ observations$

$Ln = natural\ log$

$SSR^c = sum\ of\ squared\ residuals\ in\ the\ constrained\ regression\ (2nd\ regression)$

$SSR^u = sum\ of\ squared\ residuals\ in\ the\ unconstrained\ regression\ (1nd\ regression).$

Table 4 shows the results from the Mishkin Tests. The left-hand side shows the results for the unconstrained regression for Equations (9) and (10). The right-hand side shows the constrained regressions in which the residuals from Equations (6) and (7) are used.

[16] $(q) = number\ of\ restrictions\ imposed\ in\ the\ regression$

Table 4: The Mishkin Test for the Market Pricing of Earnings Components with Respect to Their Implications for One-Year-Ahead Earnings.[a]

	Unconstrained Regressions*		Constrained Regressions	
	Coefficients	**SSR**	**Coefficients**	**SSR**
Panel A: $AR_{t+1} = \lambda_1(Earnings_{t+1} - \alpha_0 - \alpha_1 Earnings_t) + \varepsilon_\eta$				
		144.97		147.33
α_1	0.215		0.368	
	Test:	$\alpha_1 = \alpha_1^*$		
	Likelihood ratio statistic	49.34		
	Significance level	0.000***		
Panel B: $AR_{t+1} = \lambda_1(Earnings_{t+1} - \beta_0 - \beta_1^* CashFlows_t - \beta_2^* Accruals_t) + \varepsilon_\vartheta$				
		143.68		148.20
β_1	-0.141		0.469	
β_2	0.367		0.323	
	Test:	$\beta_1 = \beta_1^*$ and $\beta_2 = \beta_2^*$		
	Likelihood ratio statistic	94.51		
	Significance level	0.000***		

[a] Sample consists of 1527 firm-years between 2002 and 2016. *, ** and *** denote the significance at the 10%, 5% and 1% level respectively.

Panel A looks at earnings fixation using current earnings. Sloan (1996) failed to reject the null of market efficiency and concluded, "Stock Prices correctly reflect the implications of current annual earnings for future annual earnings" (Sloan (1996), pg. 303). This meant the market was efficient in the sense that any incorrect forecast in future earnings could be rationally explained by a change in the stock price. This is not the same result evidenced in this study. Instead, the market attaches a lower coefficient to current earnings in the unconstrained regressions (0.215 versus 0.368) meaning that it under-prices the effect current earnings has on future earnings relative to the change in the stock price. For success in earnings fixation to work, one would hope that the markets experience a shift in price equal in magnitude to that of the incorrect earnings forecast. Put in an alternative form, if the coefficient from the unconstrained regression is smaller than constrained coefficient, one can argue that the market under-prices that variable relative to its ability to forecast one-year ahead earnings (Xie, 2001). Even though current earnings exhibited poor persistence in future earnings, the

market still under prices its' ability to forecast future earnings and it is concluded the market is inefficient in an earnings fixation sense. To better support the anomaly, one would have needed to prove market efficiency in an earnings' fixation sense. This will make more sense in the subsequent sections where it is evidenced that stocks with large earnings components are likely to suffer poor future earnings, which affect negatively on the stock price.

Moving on the Panel B of Table 4, current earnings are split into accruals and cash flow to investigate the idea the market rationally prices the cash flow and accrual components on their ability to forecast future earnings. The null hypothesis of market efficiency is rejected. Sloan (1996) also witnessed that the market was inefficient in this sense but efficient in an earnings sense, this meant that superior gains could be made from understanding the varying persistence of the different components of earnings. As mentioned earlier, market efficiency now implies two constraints such that $\beta_1 = \beta_1^*$ and $\beta_2 = \beta_2^*$. The accruals and cash flows coefficients change dramatically when moving from the constrained to the unconstrained regression. The coefficient for cash flows (β_1) decreases from 0.469 to -0.141 indicating the market under-prices cash flow in its ability to predict earnings. The fact it became negative meaning as it enters the equation means it will have a positive effect on the abnormal return. The coefficient of accruals (β_2) increases from 0.323 to 0.367 when going from the constrained to the unconstrained regression meaning that the market slightly overprices accruals in its ability to predict future earnings. However, because the market was declared inefficient in both instances does signal that it is unlikely an investor could make superior profits from better forecasting earnings than that of his counterparts.

4.3 ACCRUALS ABILITY TO PREDICT FUTURE CHANGES IN EARNINGS

Part of the success of the accrual anomaly lies in its ability to pre-empt a drastic change in earnings. This section looks at the future earnings performance of accrual ranked firms. Additionally, it investigates whether this change in earnings is greater than the change in earnings when firms are ranked on their earnings components. If the natural mean reversion in the extreme quintiles of earnings ranked firms is greater than the change in earnings of the extreme quintiles for accrual ranked firms, one could argue that accruals is not an adequate measure in pre-empting a large change in future earnings.

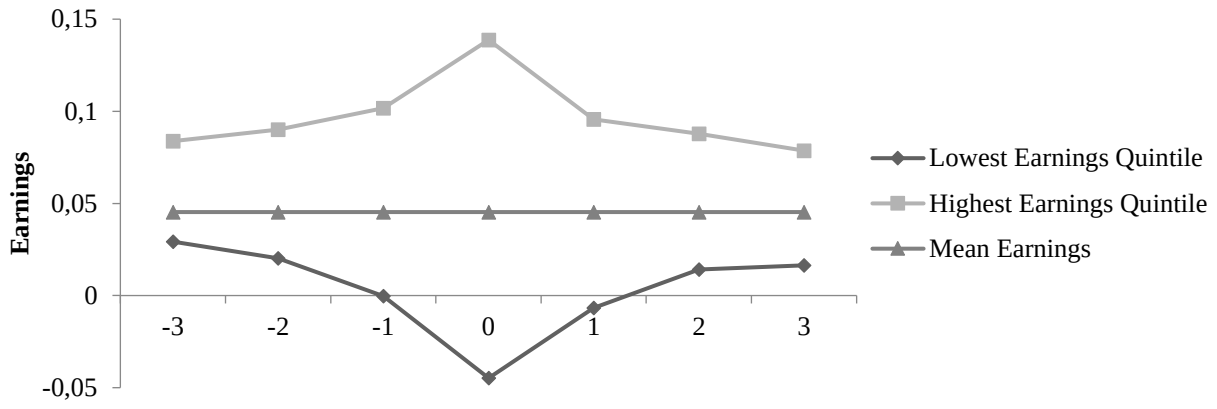
4.3.1 Time Series Properties of Earnings Performance

Sloan (1996) tracked earnings leading up to and following the firms in the extreme deciles of the earnings, accruals and cash flow components. Five years prior to the event date and five years following the event date were taken into consideration. This compared the individual effect each

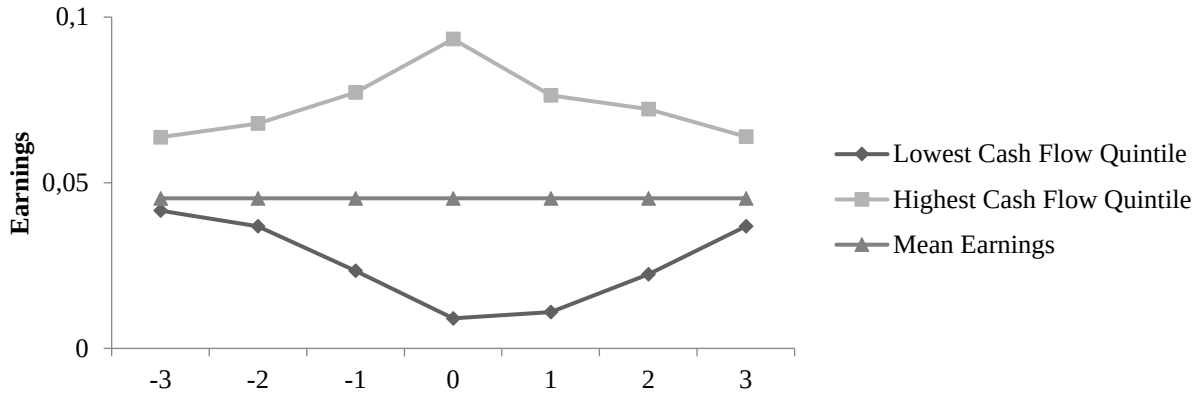
component could have on earnings performance around the event year in which the firms were ranked. It was observed that the firms in the extreme deciles for earnings and accruals exhibited a much larger spike and dip in earnings leading up to and following the event year. On the other hand, the ranked extreme deciles for the cash flow firms exhibited a far smoother and consistent trend in earnings leading up to and following the event year. For this reason, under an earnings fixation strategy, investing in the extreme accrual deciles on the basis the subsequent years change in earnings would be greater than expected by the market would lead to superior profits.

To mimic Sloan (1996), this section uses accrual, cash flow and earnings ranked quintiles to assess the effects on earnings performance leading up to and following the event year in which portfolios are ranked based on their respective component (year 0). Figure 2 graphically presents the means of the earnings components for a three-year window leading up to and following the year in which firms are ranked in the extreme quintiles for the years 2005-2012. For sake of comparison, mean earnings for the entire sample is presented as well. The extreme upper quintiles for earnings and cash flow in Panel A and Panel B respectively return to the same levels three-years following their ranking as they were three years prior to their ranking. The mean reversion however is not equally evident in the lowest quintiles for earnings and cash flow. These poor earnings following a reported year low earnings or cash flow shows how poor performers struggle to regain their earnings potential.[17]
The firms in the lowest quintile of accruals mean revert almost instantly in year 1 to the level of earnings they experienced leading up to the year in which they were ranked. Whilst the mean reversion is potentially quicker relative to its past performance, one could argue it is still less in the absolute change in earnings measured by the extreme earnings quintiles. Alternatively, the highest accrual quintile dramatically under performs in year 1 following the ranking year relative to its past performance leading up to the ranking year. The question remains whether the absolute change in earnings is greater evidenced in the extreme earnings quintiles. This is like Sloan (1996) in that the much faster mean reversion is evidenced in the high and low accrual deciles. This is positive in terms that most of profit from implementing a trading strategy based on earnings fixation as it will rely on these dramatic changes in earnings being subject to a market correction through the stock price. What needs to be assessed in the next section is whether the market is concerned with dramatic changes compared across firms or dramatic changes compared to an individual's firms previous performance.

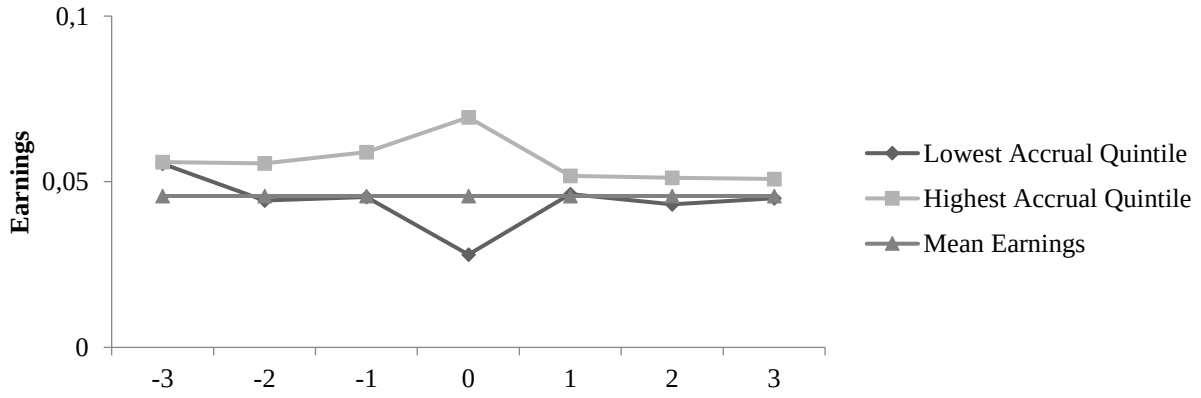
[17] This idea does share some ties with that fact PEAD on the JSE. The consistent decline in the stock price following a poor earnings announcement is justified by the expectation that the firm will fail to regain its earnings in subsequent announcements. In the next section, stock price adjustments following changes in earnings, this topic will be explored further.



Panel A: Past and Future Mean Earnings Components for the Extreme Earnings Quintiles Ranked in Year 0.



Panel B: Past and Future Mean Earnings Components for the Extreme Cash Flow Quintiles Ranked in Year 0.



Panel C: Past and Future Mean Earnings Components for the Extreme Accrual Quintiles Ranked in Year 0.

Figure 2: Time-series plots of Annual Mean Earnings Components Three Years Prior and Three Years Following Firms Ranked in The Extreme Quintiles of Earnings, Cash Flow and Accrual Components (Ranked in Year 0).

4.3.2 Cross-section of Accrual and Earnings Ranked Firms

As seen in Figure 2, the extreme accrual quintiles are subject to dramatic changes in their earnings components following the year in which they are ranked relative to their past earnings components before the year in which they are ranked. This section looks more in depth at the future earnings performance of accrual ranked firms and will compare if it is greater that the natural mean reversion that already occurs in the extreme quintiles of earnings. Table 5 looks at the earnings components in the current and following year of firms ranked according to their accrual components. The same features are brought forward in the Figure 2 is confirmed. A test of differences is conducted on the difference between the high and low quintiles and the significance level noted. Earnings components decline by 27.17% on average post ranking. The lowest accrual ranked firms improve their earnings components by 58.75% post ranking.

Table 5: Cross Section of Accrual Ranked Firms Earnings Performance.

	Quintiles					
	Lowest	**2**	**3**	**4**	**Highest**	**HML (t-statistics)[a]**
Accrual Component[b]	-0.130	-0.050	-0.022	0.006	0.084	0.214 (28.435)***
Earnings Component in ranking year[c]	0.028	0.043	0.043	0.049	0.070	0.043 (8.687)***
Earnings Component year following ranking[d]	0.045	0.046	0.038	0.046	0.051	0.007 (1.575)
Change in Earnings Components[e]	0.016	0.003	-0.005	-0.003	-0.019	-0.035 (-7.508)***
% Change in Earning Components[f]	58.75%	7.23%	-12.60%	-6.66%	-27.17%	-85.9% (-2.384)**

[a] *, ** and *** denote the significance at the 10%, 5% and 1% level respectively. T-statistics based on a two-tailed t-test for difference of means for the highest and lowest quintiles for the entire time-series covering 14 years from 2003-2016.

[b] $Accrual\ Component_t = \frac{Accruals_t}{Total\ Assets_t}$

[c] $ROA_t = \frac{Income\ from\ Operations_t}{Total\ Assets_t}$

[d] $ROA_{t+1} = \frac{Income\ from\ Operations_{t+1}}{Total\ Assets_{t+1}}$

[e] $ROA_{t+1} - ROA_t$

[f] $(ROA_{t+1} - ROA_t)/ROA_t$

Whilst the above is consistent Sloan (1996) in the ability for low and high accrual ranked firms to pre-empt drastic changes in earnings. The argument now proceeds as to whether or not this was greater than the natural recovery or decline in ordinary earning's ranked quintiles. For this reason, Table 6 ranks firms on their earnings components and tracks the subsequent year's earnings components. Earnings components in the highest quintile decline by 29.96% on average post ranking. This is not dramatically different from the drop-in earnings evidenced in Table 5. However, the lowest earnings ranked quintile improve their earnings by 86.38% on average post ranking. This is approximately 30% better than the lowest quintile of accruals. If one was to invest under earnings fixation hoping that a firm would improve their earnings in the subsequent year, they would be better off investing in the lowest quintile of earnings. However, the point for concern is that the following years earnings are still negative despite a substantial improvement. To further the contrast the findings, Figure 2 highlighted that poor earnings firms fail to recover the earnings potential post ranking that they experienced pre-ranking. The cross-section of stock returns ranked on various earnings measures in Section 8 will address some of these concerns.

Table 6: Cross Section of Earnings Ranked Firms Earnings Performance.

	Quintiles					
	Lowest	**2**	**3**	**4**	**Highest**	**HML (t-statistics)[a]**
Earnings Component	-0.045	0.026	0.044	0.064	0.137	0.182 (22.671)***
Earnings Component year following ranking	-0.006	0.030	0.042	0.056	0.096	0.102 (10.95)***
Change in Earnings Components	0.039	0.004	-0.002	-0.008	-0.041	-0.080 (-6.944)***
% Change in Earning Components	86.38%	15.14%	-5.40%	-12.78%	-29.96%	-1.163 (-3.355)***

[a]*, ** and *** denote the significance at the 10%, 5% and 1% level respectively. T-statistics based on a two-tailed t-test for difference of means for the highest and lowest quintiles for the entire time-series covering 14 years from 2003-2016.

[c] $ROA_t = \frac{Income\ from\ Operations_t}{Total\ Assets_t}$

[d] $ROA_{t+1} = \frac{Income\ from\ Operations_{t+1}}{Total\ Assets_{t+1}}$

[e] $ROA_{t+1} - ROA_t$

[f] $(ROA_{t+1} - ROA_t)/ROA_t$

4.4 STOCK PRICE ADJUSTMENTS FOLLOWING EARNINGS ANNOUNCEMENTS

"The cumulative share returns of companies which announce higher (lower) than expected earnings tend to drift upwards (downwards) for a period after the information has been made public, this under-reaction phenomenon is more commonly known as the post-earnings announcement drift (PEAD) anomaly" (Hoffman & Swart, 2013, pg. 17). As discussed earlier, this section will discuss various aspects of PEAD in testing whether the stock price adjusts to changes in earnings.

Most PEAD anomaly studies measure an earnings surprise as a change in the stock price two days following an earnings announcement. The earnings component utilised in this study, namely one equivalent to a change in ROA, potentially measures earnings surprise from a different approach.[18] One could assume any deviation from a previous year's earnings component or ROA is an earnings' surprise at the time of the current earnings announcement.[19]

Table 7 evaluates the total market-adjusted return for firms ranked on earnings components and different measures of changes in earnings components. Market-adjusted returns are equally weighted within each quintile. Returns are evaluated corresponding to four-months following the firm's financial year-end for all information to be public and absorbed by the stock price as discussed in the previous section. Since most firms release their financial statements in between three and four months following their financial year-end, the return for that month is also recorded. Under Sloan (1996)'s original hypothesis, investors failed to account for the persistence of the different components of earnings and the stock price corrected when their expectation for the following years earnings were not met. This highlights an important point in that all the annual returns to this strategy are accumulated in the month of the firm's earning's announcement. The PEAD anomaly is synonymous with a slight change in the stock price following an earning's announcement and the drift of the stock price in the same direction for some time after.

[18] Due to the calculation of the earnings components employed in this study, ROA and earnings components are the same and so the different terminology is used interchangeably throughout the study (refer to the Variable Classification Section for additional notes). In results not shown for firms ranked on size through time, the means for ROA of the lowest size quintile did have the smallest ROA but the other four were approximately equal so it can be assumed that ROA is largely independent of size and constant over time, even as firms grow, it is not an unreasonable assumption that their assets and earnings should grow at equal rates.

[19] PEAD is not extensively examined as it is not a central topic of this paper but it does confirm the findings of Hoffman and Swart (2013) with regards to the PEAD on the JSE using an alternative measure and different time horizons. This study utilises a financial statement based measure for earnings surprise as opposed to market reaction measure. Additionally, market-adjusted returns as opposed to Jensen's alphas are used.

Table 7: Market-Adjusted Total Returns (t-statistics)[a] of Firms Ranked on Different Measures of Earnings.

	Lowest	2	3	4	Highest
Panel A: Earnings Component	**-0.045**	**0.026**	**0.044**	**0.064**	**0.137**
Month of Release	-0.018	-0.010	0.000	-0.003	0.001
	(-2.407)**	(-2.306)**	(0.053)	(-0.75)	(0.167)
1-Month Following	-0.018	-0.004	0.007	0.003	0.006
	(-2.387)**	(-0.973)	(1.693)*	(0.755)	(1.238)
3-Months Following	-0.046	-0.017	0.013	0.004	0.010
	(-3.371)***	(-2.244)**	(1.683)*	(0.519)	(1.24)
6-Months Following	-0.090	-0.016	0.029	0.018	0.024
	(-4.329)***	(-1.134)	(2.06)**	(1.512)	(2.103)**
1-Year Following	-0.106	-0.031	0.023	0.027	0.010
	(-3.383)***	(-1.582)	(1.156)	(1.391)	(0.578)
Panel B: Change in Earnings Components[b]	**-0.048**	**-0.013**	**-0.001**	**0.010**	**0.043**
Month of Release	-0.014	-0.010	0.002	-0.004	-0.003
	(-2.204)**	(-1.918)*	(0.411)	(-0.91)	(-0.458)
1-Month Following	-0.010	-0.003	0.007	0.002	0.001
	(-1.61)	(-0.631)	(1.575)	(0.446)	(0.21)
3-Months Following	-0.038	-0.023	0.012	0.009	-0.004
	(-3.802)***	(-2.758)***	(1.098)	(1.226)	(-0.339)
6-Months Following	-0.050	-0.036	0.032	0.023	-0.001
	(-3.038)***	(-2.775)***	(1.737)*	(1.83)*	(-0.039)
1-Year Following	-0.082	-0.029	0.033	0.027	0.001
	(-3.442)***	(-1.387)	(1.481)	(1.473)	(0.04)
Panel C: % Change in Earnings Component[c]	**-196.3**	**-35.9**	**7.3**	**16.2**	**212.5**
Month of Release	-0.014	-0.007	-0.002	0.001	-0.007
	(-2.009)**	(-1.314)	(-0.426)	(0.221)	(-1.318)
1-Month Following	-0.012	-0.001	0.005	0.007	-0.003
	(-1.704)*	(-0.125)	(0.928)	(1.659)*	(-0.539)
3-Months Following	-0.035	-0.033	0.009	0.008	0.008
	(-2.947)***	(-3.96)***	(1.03)	(1.07)	(0.706)
6-Months Following	-0.070	-0.027	0.016	0.022	0.024
	(-3.847)***	(-1.948)*	(1.26)	(1.86)*	(1.208)
1-Year Following	-0.088	-0.046	0.032	0.026	0.013
	(-2.93)***	(-2.378)**	(1.681)*	(1.455)	(0.531)

Panel D: **% Change in Actual Earnings[d]**	**-62.3**	**-26.1**	**7.4**	**33.5**	**216.7**
Month of Release	-0.016	-0.010	0.002	0.003	-0.008
	(-2.203)**	(-2.204)**	(0.416)	(0.783)	(-1.367)
1-Month Following	-0.013	-0.004	0.009	0.009	-0.004
	(-1.796)*	(-0.953)	(1.823)*	(2.139)**	(-0.716)
3-Months Following	-0.039	-0.021	0.012	0.002	0.010
	(-3.307)***	(-2.316)**	(1.478)	(0.222)	(0.9)
6-Months Following	-0.077	-0.012	0.020	0.019	0.017
	(-4.331)***	(-0.824)	(1.535)	(1.613)	(0.89)
1-Year Following	-0.100	-0.028	0.014	0.037	-0.001
	(-3.433)***	(-1.377)	(0.742)	(1.891)*	(-0.024)

[a] *, ** and *** denote the significance at the 10%, 5% and 1% level respectively. T-statistics based on a two-tailed t-test for the entire time-series covering 14 years from 2003-2016. Results remained robust using market-adjusted price returns with the J203 as a benchmark.

[b] $ROA_t - ROA_{t-1}$

[c] $(ROA_t - ROA_{t-1})/ROA_{t-1}$

[d] $(Earnings_t - Earnings_{t-1})/Earnings_{t-1}$

Looking across all the panels in Table 7, the returns witnessed in the month of the financials release in the lowest quintiles was greater than the month following but they don't point to any dramatic overreaction.[20] For instance, when a firm releases an earnings figure in their financials with low (high) accruals, Sloan (1996) hypothesised that it would outperform (underperform) earning's expectation in the next period, and the appreciating (depreciating) stock price following the next financials would mean a significant positive one-year holding period return by longing (shorting) the respective quintile. The slow adjustment in the stock price means that the effect of a surprise earnings announcement disseminates more slowly into the stock price and the market's reaction is more gradual as opposed to instantaneous.

Looking at purely the earnings components in Panel A, firms in the lowest quintile based on their earnings components experienced statistically significant negative market-adjusted return across all time horizons. This highlights how a poor ROA proxies for future underperformance regardless of prior performance. Firms with strong reported earnings characterized by the fourth and fifth quintiles, although having mostly positive market-adjusted returns, do not perform as well as the middle

[20] The methodology employed by Sloan (1996) implied that a dramatic change in the stock price should be seen in the month of the financials release. The trading strategy employed used a one-year return starting four-months following a firm's financial year-end. This captures the change in the stock price because of the change in the earnings figure reported from one set of financials to the next.

quintile. These asymmetric results highlight that firms seem to be punished following a period with poor reported earnings but not as equally rewarded following a period with high reported earnings. In fact, the best quintile was that of the third with medium reported earnings.

As seen in the cross-section of accrual ranked firms, the extreme quintiles of accruals do experience a sharp increase or decrease in earnings post ranking although not as severe in absolute terms as the change in earnings in the cross-section of earnings ranked firms. It is now important to see whether the market will reward or punish a firm based on outperforming or underperforming their earnings expectations. Panels B and C evaluate the ongoing stock performance of firms ranked on changes in earnings.[21] To confirm PEAD, one would expect the stock return to continually worsen when moving from the one-month, three-month and six-month time horizon. This is contrasting to most PEAD studies which only look at 120 days following earnings announcements. Table 7 confirms PEAD because the initial change in the month release generally continues in the same direction as you progress to longer time horizons.

In Panel B and C, a value of zero signifies no change in ROA and hence, no earnings surprise. A negative value implies failing to maintain expectations whereas a positive value implies exceeding expectations. In Panel B and C, the two worst performing quintiles showcase statistically significant market-adjusted returns across most time horizons. The best performing quintile failed to earn positive market-adjusted returns. In fact, firms that merely sustained earnings (third and fourth quintiles) performed far better. Using Panel C and D, one observes PEAD in the sense that the initial underperformance, in the lowest quintile at least, does seem to continually worsen when moving to longer time horizons.

To provide contrast, Panel D shows the percentage change in reported earnings opposed to the scaled earnings components used throughout this study. Whilst scaling earnings by total average assets does enhance cross-section comparability, it does imply that an investor fixates on earnings only after considering that firms growth in assets.[22] For this reason, Panel D serves as a robustness check by displaying the cross-section of returns ranked according to percentage change in headline earnings. The results in Panel D are slightly more severe than seen in Panel C but the same results hold. The

[21] Panel B is the absolute change in the earnings components whereas Panel C is the percentage change in the earnings components.
[22] Earnings components do give a more accurate indication of capital investment performance because it is essentially the ROA. A measure that is popular in fundamental and cross-sectional analysis.

lowest quintile experiences a negative market-adjusted return across all time horizons with the other quintiles.

The results from Table 7 are like what has been witnessed in dividend studies surrounding signalling theory. For instance, Brav et al. (2005) benchmarked divided policy in the 21st century to the earlier work of Lintner (1956). What was found in line with Lintner (1956) was that managers targeted a long-term pay-out ratio in line with future sustainable earnings and executives are reluctant to change dividend pay-out ratios. In contrast to Lintner (1956), dividend decisions are made conservatively, implying that firms avoid reducing or initiating dividends because the penalties of cutting are far worse than the benefits of initiating. For this reason, dividends for the most part are 'sticky downwards' or 'downward inelastic'. This downward inelasticity is evidenced in Table 7 as almost all firms in the lowest quintile of Panel B, C and D show a statistically significant negative market-adjusted return following a decrease in earnings. Additionally, the middle and fourth quintile in Panel B, C and D outperformed the highest quintile. The dramatic increase in ROA sends a different message to the market as compared to developed markets. Whereas a dramatic increase in earnings should mean a greater earnings surprise and an appreciation in the stock price, one can see such intuition does not hold in the South African context. Instead, it could proxy for a firm possibly growing too fast and unsustainably making it likely to underperform in the future and is interpreted more apprehensively by the market.

4.5 PORTFOLIO TESTS: ACCRUALS AND CASH FLOW

To further corroborate the findings in the previous section, firms are grouped into quintiles in Table 8 based on their cash flow and accrual components to conduct hedged portfolio tests. This test was a common one employed in various studies testing the trading profitability of accruals (Sloan, 1996, Xie, 2001, Koerniadi & Tourani-Rad, 2005, Pincus, Rajgopal, & Venkatachalam, 2005, Chan et al. 2006, Sehgal, Subramaniam, & Deisting, 2014). The accrual hedged portfolio goes long in the lowest ranked quintile of accruals and short in highest ranked quintile of accruals. Conversely, the cash flow hedged portfolio goes long in the highest ranked quintile of cash flows and short in lowest ranked quintile of cash flows. The returns from the accrual anomaly are compared to cash flow to contrast the findings of Koerniadi and Tourani-Rad (2005) who concluded that the cash flow anomaly outperformed the accrual anomaly in New Zealand. Cash flow is widely used in many South African cross-sectional and portfolio tests studies as CF/P so it will be interesting to see if similar results hold for ranking quintiles on the cash flow components used in this study. The results are recorded in a similar fashion to Xie (2001). Portfolios are formed in year t using a one year look back period and evaluated for the subsequent three years. Transaction costs are ignored as the performance is evaluated following year t and not on a rolling basis in which the portfolio is rebalanced annually. To control for different year ends, this study follows Xie (2001) in which an average from all the different year-ends is collected using market-adjusted returns.

The accrual-based portfolio results are presented in Panel A. As expected following Sloan (1996), the highest accrual portfolio does underperform in years t+1 and t+2 under both return measures. However, despite the lowest accruals quintile ability to improve the subsequent years earnings by 58.75% as evidenced in the cross-section of accrual ranked firms, such does not reflect in the stock price. In fact, the lowest quintile of accruals almost performs as badly as that of the highest quintile. The best performing quintile in year t+1 is quintile three although not statistically significant. It could be possible that although low accrual stocks can outperform future earnings expectations, the low earnings figure reported with low accruals does result in significantly negative returns that cannot be recouped in time following a better year of financials. If anything, the most consistent finding in Panel A is the consistent poor performance of both high and low accrual stocks. This indicates that a firm with high absolute accruals can proxy for future underperformance.[23] High absolute accruals proxies for large changes in future earnings, in the cross-section of firms ranked on different changes in

[23] Absolute accruals is the amount to which earnings deviates from cash flows, it considers magnitude rather than direction. The low persistence of accruals in future earnings means any stock with high absolute accruals is potentially subject to a future change in earnings.

earnings, it was seen that investors remain sceptical following a drastic increase in earnings as it often signifies a future decrease because it is unsustainable. This idea of absolute accruals as opposed to accruals will be explored in the cross-section of returns. Hedged market-adjusted returns from the accrual strategy balance out at around zero contradicting the results witnessed in other studies. These results contradict the findings of Sehgal, Subramaniam and Deisting (2014) who confirm the accrual anomaly in South Africa using hedged returns.[24] An important consideration with the accrual anomaly was that the profitability from Sloan (1996)'s portfolios was mostly realised by large returns earned on the short side of the trading strategy in the U.S. data set (Green, Hand, & Soliman, 2009). This enables hedge funds to exploit the accrual anomaly through shorting but it remains impossible for long only investors such as pension funds. Although returns can be made on the short side of the accrual anomaly, they are minimal and likely to dwindle sharply once the effects of transaction costs are considered.

Moving on to Panel B, the results are far more favourable with portfolios ranked on Cash flows as opposed to accruals. The lowest cash flow quintile significantly underperformed on a market-adjusted basis for both price and total returns. This underperformance holds for ongoing years and is far more severe compared to what was seen in the highest quintile of accruals. Cash Flow does proxy excellently for assessing the cash management and going concern of many firms. The underperformance from these low cash flow firms was largely responsible for statistically significant hedge returns. In fact, the large negative return does contradict the profitability of earnings fixation strategy completely as the lowest quintile of cash flows improved their earnings following the ranking year as seen in the time series properties of earnings performance section. Once again, the third quintile of cash flow as seen in accruals performed the best in all subsequent years except t+1 in which the second quintile performed the best. The fact that the highest portfolio of cash flow return turned negative in year t+2 highlights an interesting point. The higher earnings figure associated with the highest cash flow quintile is likely to decrease post ranking as the firm struggles to sustain the high level of earnings.

[24] The methodologies employed in this study did vary from that of Sehgal, Subramaniam and Deisting (2014). They utilized the Balance Sheet Approach to calculating accruals as opposed to the Statement of Cash Flows Approach used in this study. Abnormal returns were measured based on the FFM and CAPM frameworks and not as market-adjusted returns used in this study.

Table 8: Time Series Means (t-statistics)[a] of Annual Total Market-Adjusted for Each Portfolio in Three Years after Portfolio Formation.

Portfolio Ranking	Year t+1	Year t+2	Year t+3	Year t+1	Year t+2	Year t+3
Panel A:	**Accrual Price Returns**			**Accrual Total Returns**		
Lowest (-)	-0.036	-0.051	-0.033	-0.027	-0.041	-0.015
	(-1.935)*	(-2.459)**	(-1.533)	(-1.438)	(-1.874)*	(-0.535)
2	0.018	-0.003	-0.023	0.022	0.017	-0.027
	(0.953)	(-0.16)	(-1.072)	(1.118)	(0.647)	(-1.225)
3	0.023	-0.012	-0.018	0.034	-0.010	-0.015
	(0.994)	(-0.61)	(-0.932)	(1.252)	(-0.484)	(-0.748)
4	-0.025	0.001	-0.005	-0.025	0.001	-0.001
	(-1.285)	(0.064)	(-0.204)	(-1.261)	(0.03)	(-0.057)
Highest (+)	-0.039	-0.030	-0.039	-0.028	-0.024	-0.024
	(-1.892)*	(-1.355)	(-1.937)*	(-1.308)	(-1.056)	(-1.218)
Hedge Returns[b]	0.003	-0.021	0.006	0.000	-0.017	0.010
	(0.157)	(-1.286)	(0.374)	(0.02)	(-0.987)	(0.543)
Panel B:	**Cash Flow Price Returns**			**Cash Flow Total Returns**		
Lowest (-)	-0.114	-0.061	-0.031	-0.117	-0.052	-0.030
	(-4.783)***	(-2.331)**	(-1.153)	(-4.817)***	(-1.726)*	(-1.091)
2	0.027	-0.002	-0.046	0.039	0.002	-0.039
	(1.192)	(-0.095)	(-2.483)**	(1.511)	(0.073)	(-2.109)**
3	0.019	0.024	0.019	0.023	0.028	0.022
	(0.985)	(1.455)	(0.96)	(1.127)	(1.658)*	(1.078)
4	0.020	-0.024	-0.025	0.026	-0.015	-0.022
	(1.116)	(-1.228)	(-1.264)	(1.379)	(-0.75)	(-1.081)
Highest (+)	0.003	-0.034	-0.034	0.019	-0.021	-0.013
	(0.186)	(-1.835)*	(-1.813)*	(1.102)	(-1.077)	(-0.522)
Hedge Returns	0.117	0.027	-0.004	0.136	0.031	0.017
	(7.246)***	(1.633)	(-0.235)	(8.037)***	(1.793)*	(0.948)
n	1760	1666	1562	1760	1666	1562

[a] *, ** and *** denote the significance at the 10%, 5% and 1% level respectively. T-statistics based on a two-tailed t-test for the entire time-series covering 14 years from 2003-2016. Market-adjusted Price Returns make use of the price data utilizing the J203 as a benchmark. Market-adjusted Total returns make use of the price data utilizing the J203T as a benchmark.

[b] Hedged returns are formed by taking a long (short) position in lowest quintile of accruals (cash flows) and short (long) position in the highest quintile of accruals (cash flows).

Figure 3 illustrates the hedged total market-adjusted annual mean returns through time. Returns for the cash flow hedge remains positive throughout the entire sample with the lowest returns being in 2009 and 2015 where it managed to equal that of the market. The accrual strategy was positive only seven out of the 13 years and failed to outperform the cash flow strategy in any year except 2015. Figure 4 simply verifies what has been said by looking at the growth of R1 invested in the respective hedged portfolio since 2003 and grown annually at the annual mean return.

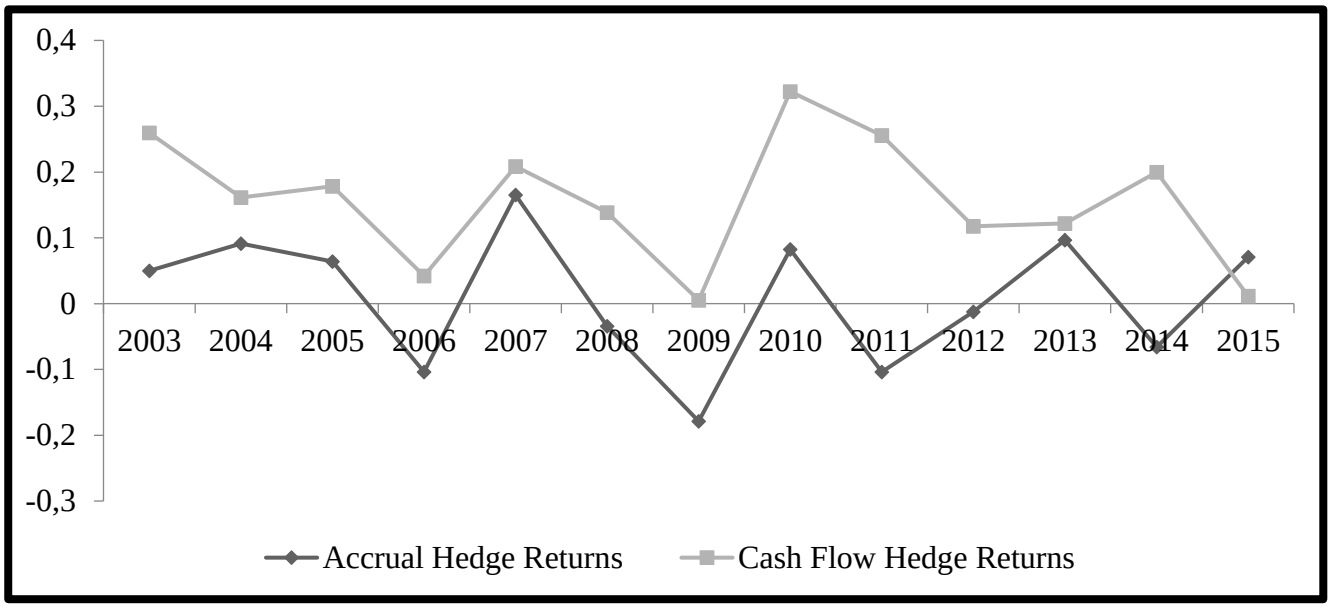


Figure 3: Hedged Total Market-Adjusted Annual Mean Returns through Time

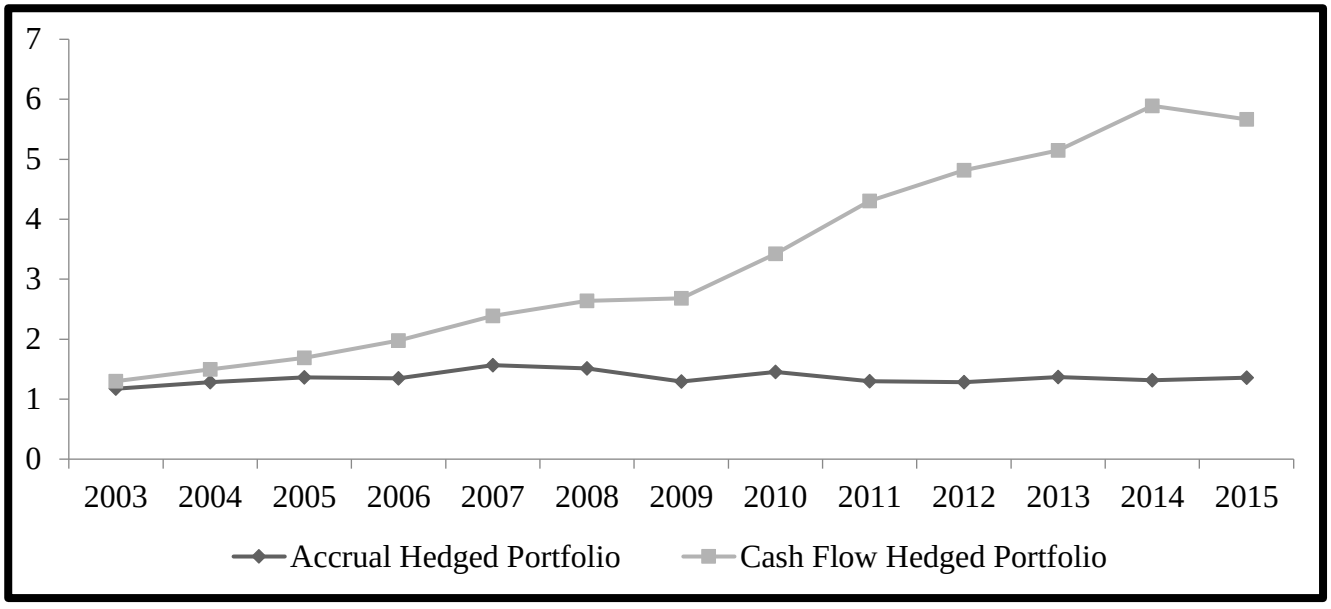


Figure 4: Growth of R1 Invested in Accrual and Cash Flow Hedged Portfolios

4.6 CROSS-SECTION OF STOCK RETURNS AT LAGGED FINANCIAL YEAR-ENDS

This section was included in this study to validate the data set used as well as provide potential avenues for future research. It reviews this study's components as well as variables that relate to three notable anomalies on the JSE. These include the size effect, value versus glamour and lastly, momentum anomalies.[25] The size effect documented is largely characterised by a premium for firms with smaller market capitalisation.[26] . The value-glamour anomaly argues that value stocks with high ratios of fundamentals-to-price ratios such as B/M, E/P or CF/P outperform glamour stocks with correspondingly low fundamentals-to-price ratios.[27] Momentum based strategies rely on the basis that past performance is indicative of future performance. Stocks that have performed well, will continue to do so in the future and stocks that have performed poorly, will continue to do so. Stock price momentum typically uses formation periods that can vary from months to years to identify the best and worst performers and then a subsequent investment period.[28]

Of predominant interest is the study by Muller and Ward (2013) because it utilised the most similar set of firms to this study. They tested the profitability of various trading strategies on the JSE from 1985-2013. Their portfolio approach utilised the top 160 companies listed on the JSE. Most other studies tested a far greater sample of firms and so it is expected that their results should vary. Each variable they used was ranked into quintiles at the start of each quarter and compounded through time. Financial ratio based styles, market based styles and behavioural finance based styles were looked at.[29] No size effect was observed, in fact, their lowest market capitalisation quintile dramatically underperformed since the Global Financial Crisis and ended as the worst performing portfolio at the end of the sample. For the value-glamour anomaly, the style lost persistence since 2004 and it was questioned whether such a strategy continues to add value. Their most significant

[25] The liquidity anomaly in which illiquid stocks demand a premium for being less traded was overlooked in this study. This was largely because the entire sample looked at was all relatively liquid. Muller and Ward (2013) who used a similar sample to this study indicated that the later part of their sample indicated no illiquidity premium.

[26] Banz (1981) was one of the earliest contributions to the 'size effect'. He tested the empirical relationship between the return and the total market value of equity on the New York Stock Exchange. The size effect he recorded was not linear with market value, the effect occurred mostly for very small firms and there was very little difference in return between average sized and large firms.

[27] Lakonishok, Shleifer and Vishny (1994) attributed the under-pricing of value firms to have originated from errors in expectations about the future growth prospects of the firm because of the extrapolation of poor past growth rates. Alternatively, the overly optimistic expectations of glamour stocks future earnings are likely to mean revert in the future for the same reason.

[28] Jegadeesh and Titman (1993) was one of the earlier works to document that a hedged strategy of buying stocks that have performed well in the past (winners) and selling stocks that have performed badly in the past (losers) was able to generate positive significant positive returns.

[29] Financial ratio styles included return on capital, return on equity, interest coverage ratio and net asset growth. Market based styles included size, price to NAV, dividend yield, industry, earnings yield, cash-flow/price and liquidity. Behavioural finance based styles included momentum and mean reversion.

returns were made through a momentum based strategy of 12-month formation and a subsequent 3-month holding period which persistently out-performed the ALSI by around 9% per annum. To validate the authenticity of the data set used in this study, the results from this cross-section should conclude similar findings.

The findings of Muller and Ward (2013) are very specific to the fact their study was limited to the ALSI. In terms of some of the greater cross-section works on the JSE, Van Rensburg and Robertson (2003) concluded that size and P/E better explain the cross-section of returns than that of the original CAPM. Auret and Sinclaire (2006) document that book-to-market equity exhibits a strong role in explaining stock returns. Auret and Basiewicz (2009) confirmed both size and value effects on the JSE after accounting for transaction costs and liquidity considerations. Hoffman (2012) concluded his results were consistent with previous studies thus far with the prevalence of size, value and momentum effects. He concluded the three most significant explanatory variables to be market capitalisation, book-to-market and momentum.

Table 9 shows the cross-section of firms sorted on their total annual market-adjusted return one year following their lagged financial year-end. Different time horizon returns, such as the month of release, one-month, three-month and six-month for total market-adjusted returns are included in the appendix. All variables are adjusted as to correlate with accruals, earnings and cash flow data, that being, factors are considered only at lagged financial year-ends. This looks at the relationships of various factors at the point when their financial results become public. There is little point looking at a different time horizon as this study hopes to see what factors could have potentially performed better compared to our earnings components. Variable definitions appear at the bottom of Table 9.

Starting with the components of earnings, the accrual component has no significant differences between the high and low quintiles across all time horizons. The idea of absolute accruals introduced in the portfolio tests section proved insignificant in explaining the cross-section of annual stock returns any better than accruals. However, the HML t-statistic was significant in the cross-section of returns pertaining to the month of release and the month following the lagged financial year-end. The idea of absolute accruals could potentially be explored in future research in explaining stock returns around lagged financial year-ends. The earnings and cash flow components was consistently the lowest in the worst performing quintile but components did not improve consistently when moving

up quintiles. This highlights the asymmetric effect of poor cash flow and earnings in that firms are punished for a low component more so than being rewarded for a higher one.

Size effects are likely to be negligible due to the fact this study only utilised the ALSI. The most consistent result seen across all time horizons is that the worst performing quintile was the smallest by market capitalisation. This is in line with Muller and Ward (2013) who documented that the smallest size quintile in their sample had been underperforming considerably since the 2008 Global Financial Crisis. This latter time overlaps with a significant portion of their sample. The size effect is more evidenced in much smaller firms that do not appear in the sample of firms included in this paper and so was concluded to be insignificant.

The results surrounding the value-glamour anomaly are spurious and do not hold across quintiles nor time horizons. Muller and Ward (2013) observed that since 2004, there was very little evidence to support that a trading strategy based on P/B still adds values. The M/B ratio remained significant as evidenced by the HML t-statistic across all time horizons following the lagged financial year-end. However, the results were not consistent with the proposed theories of the value-glamour anomaly. Instead, the lowest quintiles in the cross-section of stock returns are synonymous with value (low M/B) stocks.

For momentum, firms were ranked according to their performance both pre-and post the actual holding period return being looked at in the cross-section. The results in this section are the most consistent across quintiles out of all the other observed anomalies. The one-year ranking period was significant in explaining the cross-section of returns across every time horizon at the 1% level. This was expected in the shorter time horizons but the fact it remained significant in explaining 6-month and annual returns goes to show that the effects of momentum are long lasting. The one-month formation periods proved too short in explaining the subsequent three-month performance. However, a three-month formation period was significant at the 5% level, the six-month and annual formation periods were significant at the 1% level. Additionally, the average ranking consistently decreased when moving down to the worst performing quintiles.

To summarise, the results in this section are somewhat open to ambiguity because of timing issues when looking at stock returns only following a firm's lagged financial year-end. Whilst market-adjusted returns do partially control for this, ratios are best compared at the same moment in time. The size effect and value-glamour results are consistent with Muller and Ward (2013) in that the

strategies no longer add value if one is investing solely using the ALSI. Poor earnings components can explain subsequent negative stock returns but poor in explaining higher stock returns. Results indicate that the most prominent anomaly currently present on the JSE is that of momentum. The results from all holding periods are significantly explained by the annual historical mean percentile ranking. As little as a three-month formation period could produce superior gains for the following three-months. Lastly, accruals exhibited no significant HML t-statistics across all time horizons.

Table 9: Quintile Ranked Total Annual Market-adjusted Returns against Earnings, Value, Size and Momentum Variables. Following Lagged FYE.[a]

	Quintiles					HML
	Lowest	**2**	**3**	**4**	**Highest**	**(t-statistics)[b]**
Total Annual Market-Adjusted Return (t+1)	-0.452	-0.181	-0.018	0.157	0.466	
Earnings Make-up:						
Accrual Components	-0.018	-0.020	-0.024	-0.025	-0.028	-0.01 (-1.217)
Absolute Accrual Components	0.069	0.056	0.055	0.056	0.059	-0.01 (-1.522)
Earning Components	0.032	0.048	0.049	0.056	0.047	0.015 (3.685)***
Cash Flow	0.049	0.070	0.071	0.076	0.076	0.027 (5.273)***
Size:[c]	22.048	22.434	22.482	22.465	22.309	0.261 (2.069)**
Value Glamour Anomaly (price-to-fundamentals):[d]						
P/E	16.431	15.301	14.255	13.902	15.040	-1.392 (-1.166)
P/CF	15.603	13.303	12.586	12.050	12.375	-3.228 (-1.914)*
M/B	2.295	2.744	2.825	3.026	3.004	0.709 (4.215)***
Momentum:[e]						
1-year prior HP return percentile ranking	0.421	0.482	0.520	0.546	0.552	0.132 (6.226)***
3-month following HP return percentile ranking	0.438	0.484	0.498	0.516	0.566	0.128 (5.754)***

[a] To achieve a more accurate representation of the time series means, extreme observations are eliminated as measured by the highest and lowest 0.05% of values appearing over the entire time series regardless of year.

[b] *, ** and *** denote the significance at the 10%, 5% and 1% level respectively. T-statistics based on a two-tailed t-test for difference of means for the highest and lowest quintiles for the entire time-series covering 14 years from 2003-2016.

[c] Size is the natural logarithm of market capitalisation as measured at the firm's lagged financial year-end.

[d] Variables acquired at lagged FYE from Bloomberg are defined as follows:

- Market-to-book (M/B) ratio is defined as Market Capitalisation divided Book Value of Equity.
- Price-to-earnings (P/E) ratio is defined as Last Price divided by Trailing 12M Special EPS.
- Price-to-cash flow (P/CF) ratio is defined as stock's price divided by the cash flow per share. Average shares outstanding are used when calculating cash flow per share. Cash Flow per Share is calculated on a trailing 12-month basis where available. Trailing values are calculated by adding the most recent four quarters.

[e] Stocks returns are ranked in ascending order according to their performance leading up to and following the holding period return analysed in the cross-section. The values presented relate to the average percentile ranking observed in each quintile.

5 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

This study provides insufficient evidence to prove the accrual anomaly exists on the JSE. Returning to the Research Questions as outlined in Section 1.2.

Looking at Question 1.2.1 relating to earnings persistence, were current earnings likely to persist into the future based on their underlying make-up. The earnings persistence year-to-year in South Africa is very low in contrast to Sloan (1996). This study reported that only 36.8% of current earnings components persist into the next-year's earnings components as compared to 84.1% evidenced in Sloan (1996). This lower persistence implies that investors are unlikely to utilise current earnings as a sufficient predictor in forecasting future earnings. To speculate, investors might base forecasts on other factors such as interim financials, current macro-economic conditions, industry news or individual firm announcements. This highlights the first shortfall in evidencing the accrual anomaly, the low persistence of current earnings questions whether earning's fixation would even be prevalent in the South African market due to its unreliability. Market efficiency was defined as a market which exhibits earnings fixation on the basis that an incorrect forecast leads to an abnormal change in the stock price. Sloan (1996) concluded the market to be efficient in this sense, however, this paper rejected market efficiency based on earning's fixation. Whilst decomposing current earnings into accruals and cash flows did highlight the lower persistence of accruals relative to cash flows in future earnings, the persistence of both factors was nowhere as high as the persistence seen in Sloan (1996). The Mishkin (1983) tests once again confirmed the market did not adjust following an incorrect forecast using current accruals and cash flows. This pre-emptive test for the accrual anomaly hoped to prove market efficiency under earning's fixation. This would have meant superior gains could be made through improved forecasting of future earnings such as the decomposition used by Sloan (1996). This was further tested in the cross-section of ranked accruals and earnings. The premise of finding the lower persistence in the regression analysis was to identify if firms in the extreme quintiles of ranked accruals would experience large changes in earnings in the year post ranking. For the highest accrual quintile, earnings components declined by 27.17% on average post ranking and the lowest accrual quintile improved their earnings components by 58.75% post ranking. Whilst this supports the premise, the changes were not as drastic as when firms were ranked on the earnings components. The highest quintile declined by 29.96% on average post ranking whilst the lowest earnings ranked quintile improved their earnings by 86.38% on average post ranking. If one was to base a trading strategy on pre-empting drastic future changes in earnings, they could simply invest

based on earnings components. However, the time series properties of earnings performance showed how the lowest quintile of earnings ranked firms (despite improving earnings by so much) was still unable to regain its prior earnings potential that it had pre-ranking. The lowest accrual quintile outperformed post ranking compared to pre-ranking. Therefore, speaking relative to past performance, the mean reversion exhibited by the extreme quintiles accruals was far better. All this mentioned, the notion of accruals to pre-empt drastic changes in earnings does hold in line with Sloan (1996)'s initial hypothesis and Research Question 1 of this study.

Research Question 2 looked at the effect of an incorrect earnings expectation on the future stock price. The initial overpricing of high accrual stocks and under-pricing of low accrual stocks meant that a trading strategy comprising of a long position in low accrual stocks and a short position in high accrual stocks would yield significantly higher stock returns over and above that of a buy and hold strategy. Initially, in the cross-section of firms ranked on changes in earnings, the market did react negatively to reductions in earnings but not equivalently to improved earnings. However, the confirmation of PEAD (Research Question 3) on the JSE means stock prices initially underreact to changes in earnings and not enough returns are evidenced in the month of the financials release to make provide significant returns even if the change in earnings is drastic. The accrual anomaly is largely premised on an overreaction when a surprise in earnings is realised. The slow adjustment evidenced from PEAD meant returns are experienced over a longer period which the methodology employed in this study does not account for. Additionally, because firms were not rewarded for an increase in earnings does mean how in an earnings fixation sense, a long strategy of investing in firms who are expected to exceed earnings expectations will not yield any significant profits. Finally, the hedged portfolio test for accrual ranked firms indicated no significant market-adjusted return and was far outperformed by that of a simple cash flow strategy. Whilst on the short side, the highest quintile of accruals did experience an annual market-adjusted price return of -3.9%, the fact the highest quintile yielded an annual return of -3.6% meaning that a hedged strategy failed to yield any significant positive return. A simple cash flow hedged strategy yielded a significantly positive market-adjusted annual price return of 11.7%. This was largely due to significant profits on the short side. This study rejects that a trading strategy of longing low accruals firms and shorting high accrual firms will yield positive returns. This is attributed firstly to the slow asymmetric effects evidenced between firms out or underperforming earnings expectations, and secondly, the slow adjustment of earnings surprises into the stock price (PEAD).

Lastly, Research Question 4 which looked at the cross-section of stock returns was simply a means of comparing the findings of Muller and Ward (2013) when looking at firm's stock returns following their lagged financial year-ends. Additionally, it serves as providing potential avenues for future research. The accruals component exhibited no significant HML t-statistics across all time horizons and is concluded to be insignificant when looking at the cross-section of stock returns at lagged FYE. Absolute accrual components did explain the cross-section of stock returns better than that of accrual components but was not significant across all time horizons. In terms of other notable anomalies, findings are the most significant around momentum in line with Hoffman (2012) and Muller and Ward (2013) when comparing firm returns at their lagged FYE.

Overall this study fails to find support for the accrual anomaly as evidenced in U.S by Sloan (1996), New Zealand by Koerniadi and Tourani-Rad (2005) and the U.K by Chan et al. (2006). This is attributed to various factors including the lack of earning's fixation, the low persistence of earnings, asymmetric stock price effects following earnings surprises and PEAD.

5.2 FUTURE RESEARCH OPPORTUNITIES

Research surrounding the asymmetric effects of changes in earnings can be further investigated. Whilst it was undeniable that the stock price reacts negatively following a decline in earnings, what remains to be the cause for no increase following an improvement in earnings? If the market reacts in this way then firms have no incentive to grow their original ROA and would be better off maintaining earnings in line with their respective asset base. If anything, firms that sustain earnings year-to-year are better rewarded. The idea of absolute accruals and cash flow to screen out firms likely to most sustain earnings was not investigated completely in this paper. The cross-section of stock returns did show how high absolute accruals did proxy for poor future stock returns but could not explain positive market-adjusted returns. A variable that can better predict a firm's ability to maintain its ROA in the long run would certainly have value in identifying long-term investment opportunities. If anything, financials for the mean time remain a good indicator of future negative stock returns. A proposed theory could be the effect news, analyst's predictions or announcements have on stock price throughout the year. One could argue, good or optimistic views leading up to a firm's FYE are adjusted in the stock price immediately, however, is it possible that bad or pessimistic views leading up to a firm's FYE are only adjusted into the stock price once they are verified by the firm's financials? Might an investor be positive to buy a share leading up to a perceived positive financials release but apprehensive to sell out until his fears are realised by the financial results. PEAD was far more prominent following poor financials compared to good financials. The cross-section of

stock returns did highlight momentum as one of the more prominent anomalies currently evidenced on the JSE. The significance of momentum in using shorter formation and longer holder periods certainly highlights how contrarian investing is fast becoming too bold of a style. All these ideas considered give shape to an interesting idea. Currently, is the best hedged strategy on the JSE one that goes short on poor fundamentals and long on momentum?

The idea of industry adjusted accruals was overlooked in this study. It is not unlikely that some industries will naturally operate require different sizes of working capital and was overlooked in this study due to the small sample size of some of the industries used. Chan et al. (2006) highlighted how the accrual effect varies across industries and separate types of accruals. Additionally, the accrual anomaly in this study was solely explored from an earnings fixation perspective. Various studies have opted to more highlight the idea of earnings management with earnings fixation. Xie (2001) for instance identified the portion of accruals that should fluctuate with market conditions and a separate portion that was under the discretion of management. The discretionary component better explained the accrual anomaly. There does certainly exist future research opportunities surrounding the explanatory power of further decomposed accrual components such as discretionary or non-discretionary as well as looking individual working capital components.

6 REFERENCES

Auret, C., & Basiewicz, P. (2009). Another look at the cross-section of average returns on the JSE. *Investment Analysts Journal, 69*, 23-38.

Auret, C., & Sinclaire, R. (2006). Book-to-market ratio and returns on the JSE. *Investment Analysts Journal, 63*, 31-38.

Banz, R. (1981). The relationship between return and market value for common stocks. *Journal of Financial Economics, 9*, 3-18.

Beaver, W. (2002). Perspectives on recent capital market research. *The Accounting Review, 77*(2), 453-474.

Bernard, V., & Thomas, J. (1990). Evidence that stock prices do not fully reflect the implications of current earnings for future earnings. *Journal of Accounting and Economics, 13*, 305-340.

Brav, A., Graham, J., Harvey, C., & Michaely, R. (2005). Payout Policy in the 21st Century. *Journal of Financial Economics, 77*, 483-527.

Chan, K., Chan, L., Jegadeesh, N., & Lakonishok, J. (2006). Earnings Quality and Stock Returns. *Journal of Business, 79*(3).

Collins, D., & Hribar, P. (1999). The Balance Sheet Approach to Estimating Accruals:. *Working Paper*.

Collins, D., & Hribar, P. (2000a). Earnings-based and accrual-based anomalies: One effect or two? *Journal of Accounting and Economics, 29 (1)*, 101-123.

Collins, D., & Hribar, P. (2000b). Errors in estimating accruals: Implications for empirical research. *Working Paper*.

De Bondt, W., & Thaler, R. (1985). Does the stock market overreact? *Journal of Finance, 40(3)*, 793-805.

Desai, H., Rajgopal, S., & Venkatachalam, M. (2004). Value-Glamour and Accruals Mispricing: One Anomaly or Two? *The Accounting Review, 79*(2), 355-385.

Green, J., Hand, J., & Soliman, M. (2009). Going, going, gone? The demise of the accruals anomaly. *Management Science, 57 (5)*, 797-816.

Harzing, A. (2007). Publish or Perish. Retrieved from http://www.harzing.com/pop.htm

Hoffman, A. (2012). Stock return anomalies: Evidence from the Johannesburg Stock Exchange. *Invetsments Analysts Journal, 75*, 21-41.

Hung, M. (2001). Accounting standards and value relevance of financial statements: An international analysis. *Journal of Accounting and Economics, 30*, 401-420.

Jegadeesh, N., & Titman, S. (1993). Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency. *Journal of Finance, 48 (1)*, 65-91.

Kahn, M. (2008). Are accruals mispriced? Evidence from tests of an intertemporal capital asset pricing model. *Journal of Accounting and Economics, 45 (1),* 55-77.

Koerniadi, H., & Tourani-Rad, A. (2005). Accruals and Cash Flow Anomalies: Evidence from the New Zealand Stock Market. *Research Paper Series*.

La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2000). Investor protection and corporate governance. *Journal of Financial Economics 58*, 3-27.

Lakonishok, J., Shleifer, A., & Vishny, R. (1994). Contrarian investment, extrapolation and risk. *Journal of Finance, 49*(5), 1541-1578.

Lewellen, J. (2010). Accounting anomalies and fundamental analysis: An alternative view. *Journal of Accounting and Economics, 50*, 455-466.

Lintner, J. (1956). Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes. *The American Economic Review, 46 (2),* 97-113.

Mashruwala, C., Rajgopal, S., & Shevlin, T. (2006). Why is the accrual anomaly not arbitraged away? The role of idiosyncratic risk and transaction costs. *Journal of Accounting and Economics, 42 (1),* 3-33.

Mishkin, F. (1983). A Rational Expectations Approach to Macroeconometrics: Testing Policy Effectiveness and Efficient Market Models. *University of Chicago Press for the National Bureau of Economic Research*.

Muller, C., & Ward, M. (2013). Style-based effects on the Johannesburg Stock Exchange: A graphical time-series approach. *Investments Analysts Journal, 77*.

Pincus, M., Rajgopal, S., & Venkatachalam, M. (2005). The Accrual Anomaly: International Evidence. *The Accounting Review, 82*(1), 169-203.

Richardson, S., Tuna, I., & Wysocki, P. (2009). Accounting Anomalies and Fundamental Analysis: A Review of Recent Research Advances. *Journal of Accounting and Economics*.

Sehgal, S., Subramaniam, S., & Deisting, F. (2014). Tests of Equity Market Anomalies for Select Emerging Markets. *The International Journal of Business and Fiannce Research, 8*(3), 27-46.

Shi, L., & Zhang, H. (2010). Can the earnings fixation hypothesis explain the accrual anomaly? *Review of Accounting Studies, 17 (1),* 1-22.

Sloan , R., Richardson, S., Soliman, M., & Tuna, I. (2005). Accural reliability, earnings persistance and stock prices. *Journal of Accounting and Economics, 39*, 437-485.

Sloan, R. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows about Future Earnings. *The Accounting Review, 71*(3), 289-315.

Sloan, R., Richardson, S., Soliman, M., & Tuna, I. (2002). Information in Accruals About Earnings Persistence and Future Stock Returns.

Subramanyam, K. (1996). The pricing of discretionary accruals. *Journal of Accounting and Economics, 22*, 249-281.

Swart, D., & Hoffman, A. (2013). Analysis of the post-earnings announcement drift anomaly on the JSE. *Investments Analysts Journal, 77*.

Van Rensburg, P., & Robertson, M. (2003). Size, Price-to-Earnings and Beta on the JSE Securities Exchange. *Investment Analysts Journal, 58*(1), 7-16.

Xie, H. (2001). The Mispricing of Abnormal Accruals. *The Accounting Review, 76* (3), 357-373.

Zhang, X. (2007). Accruals, investment, and the accrual anomaly. *The Accounting Review, 82 (5)*, 1333-1363.

7 APPENDIX

Table 10: Quintile Ranked Total One-Month Market-adjusted Returns against Earnings, Value, Size and Momentum Variables in the Month of Their Financial Statements Release.

	Quintiles					HML
	Lowest	**2**	**3**	**4**	**Highest**	**(t-statistics)**
Total One-Month Market-Adjusted Return (t+1)	-0.125	-0.046	-0.005	0.036	0.125	
Earnings Make-up:						
Accrual Components	-0.026	-0.020	-0.025	-0.023	-0.022	0.004 (0.452)
Absolute Accrual Components	0.071	0.053	0.060	0.055	0.055	-0.016 (-2.25)**
Earning Components	0.033	0.047	0.051	0.052	0.043	0.01 (2.289)**
Cash Flow	0.056	0.069	0.074	0.074	0.065	0.008 (1.661)*
Size:	21.865	22.541	22.303	22.536	22.302	0.437 (3.464)***
Value Glamour Anomaly (price-to-fundamentals):						
P/E	14.967	13.562	14.381	16.308	15.769	0.802 (0.716)
P/CF	13.761	12.645	12.848	13.963	13.685	-0.076 (-0.048)
M/B	2.210	2.637	2.883	3.171	2.852	0.642 (3.874)***
Momentum:						
1-year prior HP return percentile ranking	0.377	0.474	0.487	0.566	0.597	0.22 (10.752)***
3-month following HP return percentile ranking	0.465	0.521	0.490	0.506	0.491	0.026 (1.2)

Table 11: Quintile Ranked Total One-Month Market-adjusted Returns against Earnings, Value, Size and Momentum Variables Following Lagged FYE.

	Quintiles					HML
	Lowest	**2**	**3**	**4**	**Highest**	**(t-statistics)**
Total One-Month Market-Adjusted Return (t+1)	-0.121	-0.041	0.001	0.041	0.130	
Earnings Make-up:						
Accrual Components	-0.024	-0.021	-0.026	-0.023	-0.022	0.001 (0.175)
Absolute Accrual Components	0.070	0.059	0.057	0.055	0.055	-0.015 (-2.229)**
Earning Components	0.032	0.049	0.050	0.052	0.044	0.011 (2.534)**
Cash Flow	0.053	0.069	0.078	0.074	0.065	0.012 (2.399)**
Size:	21.851	22.409	22.427	22.592	22.253	0.402 (3.165)***
Value Glamour Anomaly (price-to-fundamentals):						
P/E	15.394	13.585	14.496	15.971	15.220	-0.175 (-0.159)
P/CF	13.906	11.862	12.669	13.667	13.451	-0.455 (-0.308)
M/B	2.225	2.635	2.941	3.122	2.811	0.586 (3.602)***
Momentum:						
1-year prior HP return percentile ranking	0.375	0.476	0.490	0.566	0.588	0.213 (10.361)***
3-month following HP return percentile ranking	0.475	0.521	0.494	0.508	0.481	0.007 (0.306)

Table 12: Quintile Ranked Total Three-Month Market-adjusted Returns against Earnings, Value, Size and Momentum Variables Following Lagged FYE.

	Quintiles					HML
	Lowest	**2**	**3**	**4**	**Highest**	**(t-statistics)**
Total Three-Month Market-Adjusted Return (t+1)	-0.213	-0.072	-0.002	0.065	0.218	
Earnings Make-up:						
Accrual Components	-0.024	-0.024	-0.028	-0.025	-0.017	0.007 (0.802)
Absolute Accrual Components	0.066	0.055	0.053	0.059	0.060	-0.006 (-0.884)
Earning Components	0.032	0.046	0.050	0.052	0.050	0.017 (3.871)***
Cash Flow	0.054	0.069	0.075	0.074	0.067	0.013 (2.535)**
Size:	22.057	22.416	22.529	22.509	22.060	0.003 (0.025)
Value Glamour Anomaly (price-to-fundamentals):						
P/E	15.969	15.851	14.797	14.102	14.191	-1.778 (-1.771)*
P/CF	14.832	12.760	12.287	13.308	12.773	-2.059 (-1.378)
M/B	2.431	2.751	2.884	2.949	2.758	0.327 (1.872)*
Momentum:						
1-year prior HP return percentile ranking	0.404	0.498	0.520	0.541	0.533	0.129 (6.144)***
3-month following HP return percentile ranking	0.483	0.481	0.499	0.490	0.534	0.051 (2.33)**

Table 13: Quintile Ranked Total Six-Month Market-adjusted Returns against Earnings, Value, Size and Momentum Variables Following Lagged FYE.

	Quintiles					HML
	Lowest	**2**	**3**	**4**	**Highest**	**(t-statistics)**
Total Six-Month Market-Adjusted Return (t+1)	-0.317	-0.110	-0.005	0.101	0.341	
Earnings Make-up:						
Accrual Components	-0.029	-0.025	-0.020	-0.016	-0.028	0.002 (0.19)
Absolute Accrual Components	0.068	0.059	0.052	0.055	0.060	-0.008 (-1.174)
Earning Components	0.028	0.048	0.051	0.055	0.046	0.018 (4.053)***
Cash Flow	0.050	0.072	0.073	0.073	0.072	0.022 (4.203)***
Size:	22.042	22.337	22.534	22.488	22.161	0.119 (0.937)
Value Glamour Anomaly (price-to-fundamentals):						
P/E	17.461	14.993	13.449	14.289	14.851	-2.61 (-2.015)**
P/CF	14.677	14.394	11.896	12.736	12.232	-2.445 (-1.647)
M/B	2.308	2.746	2.873	3.030	2.794	0.486 (2.842)***
Momentum:						
1-year prior HP return percentile ranking	0.400	0.498	0.515	0.548	0.536	0.136 (6.42)***
3-month following HP return percentile ranking	0.439	0.490	0.492	0.520	0.535	0.096 (4.273)***