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THE PERFORMANCE OF STOCK SANGOMAS: EVIDENCE FROM THE JSE

by

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

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ABSTRACT

The study explores the performance of following analyst recommendations for equities listed on the Johannesburg Stock Exchange (JSE) during July 2007 to June 2013. Specifically, broker consensus recommendation levels are used to divide a sample of covered stocks into three portfolios. Using a calendar time based approach, the study provides a thorough analysis of raw and risk adjusted portfolio returns in order to establish whether value adding investment strategies can be formed around broker consensus recommendations.

The overarching questions that the study asks of broker consensus recommendations are: can they provide market participants with significant portfolio returns over and above traditional return drivers and transaction costs? Do investors have to respond timeously once they are issued? Do they reliably deliver consistent value through varying economic cycles?

Contrary to the results of Prayag and van Rensburg (2006) and Barber, Lehavy and Trueman (2001), stocks rated with average consensus levels outperformed stocks in the best rating category over the full sample period. However, this result appears to be driven by top rated stocks underperforming in the financial crisis. The study thus highlights that the value of consensus recommendations fluctuates over time. Further evidence of this is provided by examining the return spread between the best and worst rated stocks, which varied drastically, from a mean of 26 basis points during July 2007 – December 2009 to a mean of 138 basis points during the subsequent sub-period of the study ended June 2013.

Whilst prior South African literature only adjusts returns for market risk, this study employs a wider range of asset pricing models, using an Arbitrage Pricing Theory (APT) methodology, so that returns can also be benchmarked in terms of other traditional determinants such as value, growth, size and momentum.

After accounting for the above drivers of stock returns and transaction costs, it was determined that the value that analysts provide investors is likely to be embedded in equities which have

poor (sell) consensus ratings. This is likely the result of the increased reputational cost that analysts face when issuing sell recommendations, as highlighted in Womack (1996).

The study's results suggest that in order for short-sellers to extract value from poorly rated stocks; they need to base their trades on the most recent information as the poor performance of the worst rated stocks were reversed in the long run. Furthermore, the study also casts doubt on the availability of abnormal returns after applying market capitalisation limits to account for short selling restrictions.

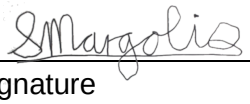
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1 INTRODUCTION AND BACKGROUND

1.1 Introduction

South Africa has been regarded as a central entry point for investment into the continent, mainly because of its relatively stable regulatory environment and well developed capital markets, leading to a strong demand for analyst coverage of Johannesburg Stock Exchange (JSE) listed equities. In turn, this is evidenced by the extent of media exposure afforded to brokerage houses (e.g. Fin 24.com, CNBC Africa and Moneyweb frequently provide analysts a platform to articulate their views on the outlook of financial markets).

Analysts that work for stock broking firms are responsible for producing: individual company reports, industry and sector analysis, corporate earnings forecasts and issuing stock recommendations. This study's focus is on the value that stock recommendations hold for investors. The primary reason why the study of analyst recommendations has gained traction amongst academics is because they prescribe a specific course of action, "buy", "hold" or "sell", the results of which can subsequently be evaluated.

Examining the overall literature, it appears that some academics are interested in the short-medium run performance of stock recommendations in order to assess their informational content within an event study context. Whilst, other literature employs an asset-pricing methodology in order to assess the long-run returns that can be attained by investors when following analyst recommendations[1].

1) Event studies testing the Efficient Markets Hypothesis (EMH):

Currently, retail investors are rapidly becoming more privy to the information generated by research analysts, whilst in the past the dissemination of such information was generally restricted to institutional investors. Coverage of share recommendations in the media is

[1] The research presented here falls into the latter category.
[2] A momentum factor is also used in this report. However, the momentum portfolios were manually constructed

becoming more prominent and consequently smaller investors are accessing a far greater volume of research output than before.

Since security analysis reports reside within the ambit of public information they should arguably not generate abnormal returns for investors who timeously act on their prescribed recommendations, according to the semi-strong form of market efficiency. However, Grossman and Stiglitz (1980) recognise that information gatherers need to be compensated for their work in the form of trading profits, commissions from securities trading and underwriting fees.

Similarly, investors will only pay for analyst research if it provides them with some incremental returns. Womack (1995) and Stickel (1996) support the expanded definition of the EMH proposed by Grossman and Stiglitz (1980) as they find evidence of significant event and post-event returns following recommendation revisions.

As reported by Womack (1996), the magnitude of the event return tends to be greater for unfavourable revisions to stock recommendations. According to Pratt (as cited in Womack, 1996, p.165), this result is commensurate with the issuance of sell recommendations being associated with greater costs: they obtain a negative response by investment bankers because they can potentially harm valuable investment banking relationships, they are less frequent than buy recommendations and are more visible. In sum, the costs of getting a sell recommendation wrong could arguably do greater damage to an analyst's reputation than issuing a poor buy recommendation.

2) The long-run performance of analyst recommendations

A related theoretical path to the event-study literature discussed above, aims to determine the long-term value that analyst recommendations can provide investors. This involves employing a calendar time approach, which incorporates an asset pricing model to test for the significance of incremental returns resulting from following analyst coverage.

A seminal US study by Barber, Lehavy, McNichols and Trueman (2001), demonstrates that a zero-cost strategy that purchases analysts' top rated stocks and shorts their poorest rated stocks delivered an average gross monthly return of 75 basis points per month. In contrast, high book to

market stocks beat low book to market stocks by only 17 basis points per month. Similarly, the size premium was only found to be a mere 16 basis points per month.

However, Barber et al (2001) found the risk adjusted returns from following analyst recommendations were only significant before accounting for transaction costs. Portfolio rebalancing, necessary to ensure that investors hold a portfolio of the most favourably rated stocks, was determined to be very costly and therefore diminished the net returns that investors were able to obtain.

Furthermore, in a follow up study, Barber, Lehavy, McNichols and Trueman (2003), it was found that "after a string of years in which security analysts' stock picks significantly outperformed their pans, the years 2000 and 2001 were disasters." As is well known, this period corresponded to the bursting of the tech bubble in the US. The stark contrast between the results of Barber et al (2003) and Barber et al (2001) thus indicate that the results of following analyst recommendations need to be evaluated during different economic regimes.

1.2 Research Problem

1.2.1 The use of consensus recommendations

It is hard to deny that some share analysts who belong to elite brokerage houses are able to provide superior stock picks for their clients. Hall and Millard (2002) examined recommendations from three brokerage houses covering a sample size of 16 large capitalisation firms from 1994 to 1998. The paper found that buy and hold recommendations delivered significantly positive risk adjusted excess returns. In addition, sell recommendations were able to significantly limit investors' losses.

However, Prayag and van Rensburg (2006) highlight the fact that examining a few brokerage houses is not reflective of the broking community at large. In order to attain a general sense of the value of brokerage recommendations, they contest that it is more useful to look at the aggregate view of the analyst community.

The question therefore arises whether investors can generate abnormal returns by deriving their asset allocations based on consensus recommendations as opposed to the views of individual brokerage houses.

1.2.2 Analyst recommendations as an investment style

Research focusing on evaluating the long run performance of following stock recommendations must ask the question whether one can consistently yield superior returns, over and above other investment strategies. In order to establish this, a vast array of asset pricing models must be used.

South African based research by Hall and Millard (2002) and Prayag and van Rensburg (2006) does not provide a comprehensive picture with regard to the performance of South African analysts' stock recommendations because of their limited use of asset pricing models. Hall and Millard (2002) only used the Capital Asset Pricing Model (CAPM) of Sharpe (1964), whilst Prayag and van Rensburg (2006) also account for the concentration of resource shares on the JSE by using the multivariate model of van Rensburg and Slaney (1997).

By only considering market risk, the above studies do not account for the possibility that the issuance of analyst recommendations can be related to particular investment styles. For example, in the US, buy recommendations have tended to be small growth firms that have experienced high past returns and sell recommendations have tended to be issued for small value firms with poor past returns (Barber et al., 2001).

1.2.3 Reacting to changes in broker consensus vs. transaction costs

Barber et al (2001) found that timely responses are required by investors when reacting to favourable (i.e. "Buy") analyst recommendations. In contrast, a longer response time by market participants to unfavourable (i.e. sell) recommendations was not found to significantly erode their gross returns.

It is therefore necessary to establish whether the same evidence holds for South African equities by quantifying the extent to which investors can delay the updating of their portfolios, following

a change in analyst recommendations. This issue is important in that it determines whether analyst consensus ratings are valuable for a wide, or only a narrow, set of market participants. For example, retail investors are not always able to implement changes to their portfolios with the same ease as traders. There are various possible reasons as to why this would be the case: a lack of access to timely recommendation updates, insufficient cash balances to purchase recently upgraded stocks and exposure to greater transaction costs.

More timely reactions to analyst recommendations may generate higher gross returns. However, they also generally translate in higher portfolio turnover. Therefore, a trade-off exists between the incremental gross returns that can be captured from faster responses to analyst recommendations and portfolio transaction costs.

1.2.4 Limited sample periods

Previous South African studies evaluating the performance of following analyst recommendations examined fairly short sample periods: four years in the case of Hall and Millard (2002) and three years in Prayag and van Rensburg (2006).

Employing a longer sample period is important because research needs to determine whether analyst recommendations deliver consistent returns through time or whether these returns are impacted through fluctuations in the economic cycle. Furthermore, the performance of following recommendations issued for JSE listed stocks during the financial crisis has yet to be quantified and therefore no literature has been presented in this regard.

1.3 Research Objectives

1.3.1 To build on the existing emerging market research of analyst recommendations

This research study primarily focuses on the literature evaluating the long run performance of following stock recommendations. By testing whether the consensus level of recommendations issued for South African equities can consistently yield superior returns, the research presented

here has broader implications for how analysts' insights are able to aid the portfolio management decision for investors who want to deploy their capital to emerging markets.

1.3.2 To use a wider range of asset pricing models in order to better evaluate risk

The study attempts to assess whether following analyst recommendations is able to provide incremental returns over and above traditional investment styles such as value, growth, size and momentum. Risk adjusted returns are therefore calculated using the following models: The Capital Asset Pricing Model of Sharpe (1964), the two factor Arbitrage Pricing Theory (APT) model of van Rensburg and Slaney (1997), as well as three and four factor APT models encapsulating size, momentum and value factors.

1.3.3 Assessing the value of analyst recommendations over a longer sample period

By examining a six year period, that includes the financial crisis, this report aims to account for analyst performance under a wider range of economic conditions. The results of dividing the sample into two sub-periods, a period including the crisis from July 2007 – December 2009 and a post crisis period from January 2010 – June 2013, were that top rated stocks earned positive market adjusted returns of 25.3 basis points per month during the post crisis period. However, during the financial crisis they severely underperformed the market by 61 basis points per month. Furthermore, the results indicate that the spread between top rated and the worst rated stocks was substantially higher during post crisis period.

1.3.4 Examining the impact of transaction costs and portfolio rebalancing

The research aims to establish whether it is necessary to frequently update investment portfolios to reflect the most recent analyst consensus view. Different portfolio rebalancing frequencies are utilised and the resulting net returns are determined in light of the transaction costs that are generated.

1.4 Delimitations

1.4.1 Limitations regarding consensus recommendations

This study does not examine the motives behind the recommendations that security analysts issue: be it to covet investment banking relationships, generating more commissions for brokerage firms or simply to enhance the performance of clients investment portfolios. There may also be a host of behavioural drivers for analyst recommendation patterns. It is interesting to note that a US study by Conrad, Cornell, Landsman and Rountree (2006) shows that an asymmetry between recommendation upgrades and downgrades exists. Following large price increases they found that analysts were equally likely to issue upgrades and downgrades. Following large price declines, downgrades were more likely.

This research study purely examines consensus recommendations – it does not drill down into recommendations at the individual analyst level, therefore asymmetry in analyst recommendations could not be feasibly tested.

In addition, consensus levels take a certain amount of time to compute because each brokerage house's recommendations need to be released. The research presented here therefore does not utilise recommendations issued in real-time to brokerage clients, as was the case in studies such as Green (2006).

Therefore, the focus of this study rests on individuals who make investment decisions solely based on the consensus recommendation level of the stocks in their particular investment universe.

1.4.2 Recommendation changes were not explored

This study only looks at the level of analysts' recommendations (e.g. Buy, Hold or Sell). In contrast, Prayag and van Rensburg (2006) also explored portfolios formed based on changes in the level of recommendations (e.g. stocks that have moved from a "Buy" to a "Sell" constituted a

particular portfolio). However, they encountered a drawback, in that their results were based on a small sample size.

Since this study, also had a similar sample size constraint, it was decided not to pursue an investigation regarding changes in consensus ratings. However, the study still improves upon the scope of testing regarding investment based on the level of analyst recommendations.

1.5 Structure of the thesis

Section 2 of this thesis provides an overview of the relevant literature. Section 3 outlines the research hypotheses to be tested. Section 4, discusses the data and methodology. Section 5, begins with the descriptive statistics and proceeds to discuss the raw and risk adjusted returns. Subsequently, the effect of investment delays and transaction costs is explored. Section 6 concludes by summing up the results and providing guidance for future research.

1.6 Chapter Summary

The scope of the study pertains to examining the long run performance of stock recommendations using a calendar based approach. Whilst prior international work has employed a wide range of asset pricing models in order to evaluate investment strategies, South African literature has only benchmarked returns against market risk. Furthermore, returns from following analyst recommendations need to be viewed under the backdrop of varying economic cycles, thus facilitating the need to extend sample periods used by prior studies.

In addition, questions arise regarding the time-window of availability of abnormal returns to investors who follow consensus recommendations. In order to capture the value of analyst information, investors need to rebalance their portfolios and therefore the resulting transaction costs need to be calculated.

The study thus employs a six year period, from July 2007- June2013 using a range of APT models to evaluate risk. Different rebalancing frequencies are utilised and the transaction costs thereof are evaluated.

2 LITERATURE REVIEW

2.1 Introduction

Analysts' recommendations enhance the informational efficiency of financial markets, which simultaneously reduces their marginal value. Economic forces work dynamically to ensure that such information is incorporated, however at the same time prices cannot reflect all information- otherwise there would be no compensation for analysts to collect and process the relevant facts which they release to the markets (Grossman & Stiglitz, 1980).

Therefore, a fine balance between analyst research and informational efficiency exists which has prompted a series of literature to explore the topic of the value of investment recommendations. This chapter initially reviews the international literature and then proceeds with research relevant to the South African market.

2.2 International literature

2.2.1 The value of brokerage recommendations

Historically, basing an investment strategy on the level of brokerage recommendations has been shown to deliver mixed results. Over the period 1986-1996 in the US, top rated stocks earned an annualised geometric return of 18.8%, whereas the poorest rated stocks and a value weighted investment in the US markets only earned 5.8% and 14.5% respectively (Barber et al, 2001). However, during the bursting of the technology bubble in 2000-2001, buy (sell) recommendations earned negative (positive) abnormal returns (Barber et al, 2003).

Forming an investment strategy around brokerage recommendations has also been compared to investment styles that are based on fundamentals such as size, value and momentum. Barber et al (2001) show that a zero- cost strategy that purchases analysts' top rated stocks and shorts the poorest rated stocks delivered an average gross monthly return of 75 basis points per month. In contrast, the authors found that high book to market stocks beat low book to market stocks by only 17 basis points per month. Similarly, the size premium was also found to be a mere 16 basis points per month.

Another interesting, yet intuitive, result from Barber et al (2001) was that analysts' predictions were found to be far more valuable for smaller companies than for larger companies. Public information is less available for smaller and medium sized companies, therefore any dissemination of analyst research in this regard is likely to have a more pronounced effect.

Jegadeesh, Kim, Krische and Lee (2004) conduct a more thorough analysis for determining when analyst recommendations are valuable. Most favourable recommendations issued by sell-side firms tended to be "glamour" stocks: these are generally stocks of firms with high past earnings and sales growth, positive price and earnings momentum, high trading volume, greater capital expenditures and more expensive valuation multiples. Naive adherence to these recommendations according to their study resulted in poor subsequent investment performance. In fact, the authors found that glamour stocks with unfavourable recommendation levels significantly outperformed those with favourable recommendations.

A key reason for the above result is arguably due to the conflicting incentives that some analysts face. For example, brokerage houses that are affiliated with investment banks may tend to assign favourable recommendations to high growth firms because investment banking relationships with such firms are highly profitable.

Jegadeesh et al (2004) argue that only favourable recommendations which pertain to firms with advantageous quantitative characteristics, i.e. value and contrarian indicators, will unlock the most value for investors. For these stocks favourable recommendations have indeed outperformed unfavourable ones.

As a result of the style bias towards growth stocks that analysts have, Jegadeesh et al (2004) argue that the level of analyst recommendations does not provide significant incremental predictive power in forecasting future stock returns over and above other indicators. Instead they contest that only changes in analyst recommendations hold significant incremental predictive power.

Barber, Lehavy and Trueman (2010) later refute the results of Jegadeesh et al (2004) and again find that significant abnormal returns can be achieved from investing based on the level of analyst recommendations, and that these returns persist when controlling for the magnitude of changes in consensus recommendations. They criticise the credibility of the findings of

Jegadeesh et al (2004) based on the fact that their study only examines the level of consensus recommendations every quarter and does not rebalance their portfolios during the sample period.

2.2.2 Timeliness of reacting to consensus recommendations, portfolio turnover and transaction costs

The seminal US paper by Barber et al (2001) attempted to focus on a wide range of investment strategies surrounding broker consensus recommendations. One of the key issues that their study explored was whether analyst recommendations would be valuable for specialised parties (such as traders) or whether they would hold value for the average retail investor as well.

Traders would be more adept at altering their portfolios on a daily basis and would therefore be able to lock in superior returns from following analyst recommendations, particularly if they result in significant stock price drift, as suggested by Womack (1996). However, smaller retail investors and institutions will generally take longer to become informed of broker consensus changes and/or will be slower to alter their portfolio holdings.

Barber et al (2001) therefore used various portfolio rebalancing frequencies (daily, weekly and monthly basis) in order to establish if analysts' recommendations were valuable for an extended period of time or whether their value deteriorates over time as their informational content is disseminated to the market. The authors found that daily rebalancing yielded annual abnormal gross returns of over 4%, whereas the returns for portfolios rebalanced at lower frequencies was not consistently significant.

Interestingly though, Barber et al (2001) found that daily rebalancing is only crucial in capturing the abnormal gross returns on analysts' most highly recommended stocks. However, it is not as important for poorly rated stocks. It was found that shorting the most poorly rated stocks can yield investors a significant gross abnormal return, even if their shorts were delayed responses to analysts' sell recommendations.

On a net returns basis, Barber et al (2001) found that no strategy with regards to altering the rebalancing frequency generated significant risk - adjusted returns. This is primarily due to the high portfolio turnover that accompanies a strategy of frequently rebalancing a portfolio in order

to capture the gross returns associated with stock recommendation changes. Their results do not imply that analyst recommendations are not useful though. The authors still conclude that a would be purchaser (seller) would still be better off buying (selling) analysts' highly (poorly) rated stocks than their poorly (highly) rated ones.

Green (2006) also provides evidence that having early access to brokerage recommendations is valuable. However, his study departs from previous literature as it examines real-time access to brokerage recommendations (as opposed to access via a newswire service). He documents significant price drift for a period of two hours following the release of recommendations to brokerage firm clients for Nasdaq listed firms. In contrast, an almost instantaneous response takes place when recommendations are broadcast on television (Busse & Green, 2002).

In addition, the quasi private nature of analyst research, through a commitment to exclusivity could underpin the value that analysts generate for clients: Green (2006) finds strong evidence that brokerage clients indeed make use of early access to analyst recommendations. He shows that trading tends to more than double after the release of recommendations to clients; thus constituting a substantial sum in commissions to brokerage houses.

2.2.3 Analyst recommendations at the industry level

Whilst the literature surrounding share analysts is mainly focused on their stock picking ability, there has been less attention, on the role of analysts as industry specialists (Womack, 1996; Boni & Womack 2006).

Proponents of an industry based approach to utilising recommendations argue that it could be highly rewarding: Boni and Womack (2006) found that a long-short strategy based on the relative rankings of the stocks in each industry yielded monthly returns 30% higher and a one month Sharpe ratio double that of a non-industry based approach.

Boni and Womack (2006) concludes that although analysts' recommendations tend to follow price momentum, the true value that they are able to add for investors is buried in their ability to pick winning stocks within a given industry. On the other hand, the authors found that analysts

are not good at predicting returns across industries. This result will obviously disappoint investors who wish to use analysts' guidance to employ an optimal sector-rotation strategy.

2.2.4 Analyst reputation vs. the strength of recommendation revisions

Sorescu and Subrahmanyam (2006) indicate that high quality broking firms delivered better quality output, in the form of more accurate forecasts to investors. The authors argue that this is a consequence of the labour market assigning the most talented analysts to the most experienced firms. They subsequently compare the strength of an analyst's recommendation upgrade or downgrade with its weight (proxied by the reputation and experience of the analyst issuing the recommendation).

The authors found that the magnitude of return persistence following low strength revisions by high quality analysts is significant in the long term. In contrast, high strength revisions to recommendations made by low quality analysts only capture significant abnormal returns in the short run, and they are generally reversed within a one year holding period.

The results of Sorescu and Subramanyam (2006) are thus aligned with cognitive psychological research on decision making conducted by Griffin and Tversky (1992) which holds that individuals overreact to the intensity of a signal and pay less attention to its credibility. The results of the study thus indicated that investors are better off (in the long run) following the recommendations issued by high quality brokerage firms, than the recommendations of lower status brokerage firms who tend to make large revisions to their recommendations.

2.2.5 Analysts affiliated with investment banking firms

There may often be questionability with regard to the recommendations of analysts who are affiliated with investment banking firms. However, much has been done in order to allay the market's fears that these analysts' issue favourable recommendations purely to covet investment banking deals for their firms.

In the US, the Securities and Exchange Commission (SEC) passed the Global Analyst Research settlement in April 2003. Investment banking firms, implicated in interfering with the independence of research analysts were ordered to pay fines totalling to approximately $1.4bn. In addition to this payment, certain regulatory measures were passed such as: physically isolating banking and analysis departments and the implementation of Chinese walls; ensuring independent budget allocations; prohibiting research analysts from attending roadshows with bankers during the promotion of IPOs; and finally ensuring that equity analysts' historical ratings are disclosed to the public (Securities and Exchange Commission, 2003).

The results of some studies advocate the implementation of regulation in order to deal with the problem (Michaely & Womack, 1999). Whilst other studies argue that such legislation may be superfluous as financial markets are already able to discern the biases that analysts face as a result of their relationship with investment banking firms (Chen, Liu & Qian, 2006).

Chen et al (2006) assures that institutional investors associated with investment banking firms tend to listen to their analysts when making investment decisions- therefore indicating that such recommendations are credible. The authors used the Institutional Brokers Estimate System (IBES) as their database of recommendations. Since this study also uses the IBES database, it is expected to some degree, that the recommendations that were used are generally free of bias.

2.3 South African literature

Initial studies within a South African context, such as Bhana (1990) and Hall and Millard (2002) were mainly focussed on the performance of analyst recommendations from a select few brokerage houses (two and three brokerage houses, respectively). In particular, Hall and Millard (2002) only examine the top three brokerage houses as ranked by the Financial Mail Analyst of the year Awards. Therefore, despite the fact that their results point towards the outperformance of certain analysts, the result may not be reflective of the performance of the broking community as a whole.

In a later study, Prayag and van Rensburg (2006) examine the performance of three portfolios formed on the basis of analysts' buy, hold and sell recommendations. As opposed to earlier

South African studies, the recommendations that they examine are consensus recommendations – composite recommendations from across the broking community. This allowed them to make general inferences about the aggregate value of information generated by South African analysts.

Their initial results were not overly convincing though: on a mean- raw returns and market-adjusted returns basis the outperformance (underperformance) of their Buy (Sell) portfolio was not significant. On a risk adjusted basis, the Buy portfolio had superior performance when a two-factor APT model was used (The two factors being; the excess return on the ALSI excluding resources and the Resources indices, respectively).

Prayag and van Rensburg (2006) also examined the performance of portfolios formed on the permutations of changes in analyst recommendations, namely: upgrades, downgrades, initiation and recurrence of coverage. Similarly, to Jegadeesh et al (2004), they found that investors could achieve greater excess returns by acting on changes in analysts' recommendations versus investors who simply focus on the level of those recommendations (i.e. Buy, Hold or Sell).

Prayag and van Rensburg (2006), although providing a relatively more complete analysis than Hall and Millard (2002); still leave some unanswered questions with regard to the fairly limited use of asset pricing models. Hall and Millard (2002) only make use of the Capital Asset Pricing Model (CAPM) as defined by Sharpe (1964). Prayag and van Rensburg (2006), by using the two-factor APT model of van Rensburg and Slaney (1997), refine the CAPM by introducing separate factor loadings to account for the dichotomy of financials and industrials and resource stocks. However, their study did not explore whether investing in analyst recommendations exposes a size, value or momentum tilt. In addition, transaction costs and investment delays were also not examined.

The remainder of the South African literature is more focused on the forecasts of analysts than recommendations. Hodnett, Hsieh and van Rensburg (2012) find that over the period 1999- 2007 firms with higher future earnings forecasts growth had superior performance. Analyst forecasts are also often used to generate a well-known valuation ratio known as Price-to-Earnings Growth (PEG). Tions and Ward (2012) found that their best performing PEG ratio strategy could yield annual abnormal returns of 13.7% over the period 2005-2010.

2.4 Chapter Summary

The international literature highlights that the performance of following share analysts' recommendations has been compared to various investing styles such as size, value, momentum, growth. In order to properly assess the value of investment recommendations these factors therefore need to be incorporated into asset pricing models to determine whether they add incremental value to other investment styles. The value of analyst recommendations must also be examined during different economic cycles, bearing in mind the reputational pedigree of the brokerage house that issues the recommendation

Whilst, the international literature has been more rigorous in employing a great number of approaches in assessing risk adjusted returns, previous South African studies have resorted to more simplistic methods of modelling risk adjusted returns. In addition, there has also not been an investigation into the transactional costs associated with forming investment strategies around broker consensus.

3 RESEARCH HYPOTHESES

3.1 Introduction

This section highlights three broad hypotheses that are made with regard to analyst recommendations. These hypotheses were chosen given the field of literature as well as scope of available data which could enable the applicable hypothesis testing.

3.2 Hypotheses to be tested

Hypothesis 1: The value of consensus recommendations

H0: Consensus level recommendations do not provide significant risk adjusted returns

H1: All consensus level recommendations or at least a subset of consensus level recommendations provide returns over and above market risk and other traditional drivers of stock returns and transaction costs

So far the literature has not comprehensively supported H1. Jegadeesh et al (2004) found that only changes in consensus recommendations are valuable and that consensus levels are not able to add alpha to investor's portfolios. Whilst, Barber et al (2001) found that on a gross returns basis H1 holds, however this was not the case in the presence of transaction costs.

Hypothesis 2: Investment Delays

H0: Returns from following broker consensus are not related to investment delays

H1: Investment delays and returns from acting on broker consensus are negatively related

Barber et al (2001) found supported H1 for stocks with favourable consensus recommendations. However, they conclude that for stocks with poor consensus ratings, investors can still capture abnormal returns after lengthy investment delays.

Hypothesis 3: The impact of the financial crisis

H0: The performance of following analyst consensus does not vary over time

H1: The performance of analyst consensus portfolios is significantly different economic cycles

Splitting the data into two distinct sub-periods, namely; a pre and a post financial crisis period, allows some insight as to whether analyst recommendations performed better in one period than another or whether their risk adjusted returns are uniform over time.

3.3 Chapter Summary

Three broad research hypotheses form the crux of the research explored in this study. In sum, Hypothesis 1 to Hypothesis 3 aim to determine if a viable investment strategy can be derived from following consensus recommendations.

Hypothesis 1, examines whether additional returns can be generated after traditional drivers of stock returns. It aims to determine whether some profitable strategy exists as a result of the issuance of consensus ratings.

Contingent on a profitable strategy existing, Hypothesis 2 asks whether the incremental value of consensus recommendations is a short lived opportunity or whether investors can afford to wait a period of time before acting on the views of analysts. Finally Hypothesis 3 asks whether consistent performance is delivered across different economic regimes. The study therefore contrasts returns in pre and post financial crisis sub periods.

4 DATA AND METHODOLOGY

4.1 Introduction

This chapter provides a breakdown of the data and methodology used in the study. Section 3.2 - 3.3 describes the necessary data inputs used for construction of consensus portfolios. Section 3.4 and Section 3.5 describe the asset pricing methodology used. Section 3.6 provides an overview of the portfolio turnover and transaction cost calculations and finally Section 3.7 concludes.

4.2 Broker Consensus Portfolios

A history of broker consensus recommendations was obtained from the Institutional Brokers Estimate System (IBES) module found on Thomson Reuter's DataStream. Over this study's six year period, July 2007 – June 2013, the database contained a set of recommendations that covers two hundred Johannesburg Stock Exchange (JSE) listed companies that received at least one broker consensus recommendation.

The broker consensus recommendations that DataStream report are essentially an average analyst rating from across the broking community for each covered firm. These recommendations were extracted on a weekly basis along with weekly price data and the free floating market capitalisations for each sampled firm. The consensus recommendations range from 1 (strong buy) to 5 (strong sell).

This study merges the broker consensus recommendations into three portfolios according to the weekly broker consensus score:

1. Top rated: Stocks rated with a consensus score from 1 to 2.32
2. Average rated: Stocks rated with a consensus score of greater than 2.32 to 3.66
3. Lowest rated: Stocks with a consensus score of greater than 3.66 to 5.

4.3 Portfolio Rebalancing

Initially, the investment portfolios are rebalanced timeously, so that they fully reflect the monthly consensus score for each stock in the IBES database. Thereafter, the portfolios are rebalanced such that investors react with a delay (1, 2, 4, 8 and 12 weeks).

The comparisons between the returns of these various portfolio rebalancing frequencies are intended to assess the importance of responding timeously to changes in analyst's recommendations.

4.4 Performance Evaluation: Raw returns

All price data used in this study has been adjusted for capital events and dividends. Using this data, a value weighted return is calculated for each of the three recommendation portfolios. A reason for focusing on value weighted returns, as opposed to equally weighted returns, is because value weighted returns are more heavily influenced by larger firms. This would lend more economic credibility to this study's results. The raw value weighted returns are thus represented by:

$$r_{pt} = \sum_{i=1}^{n_{pt-1}} x_{it-1}\, r_{it} \qquad (1)$$

Where:

r_{pt} = The value weighted daily return of portfolio p (where: p = 1, 2 or 3) for day t.

x_{it-1} = Share i's free float market capitalisation as a proportion of its corresponding portfolio's cumulative free float market capitalisation at date t-1.

r_{it} = The daily return of Share i on date t calculated as $\frac{P_{it}-P_{it-1}}{Pit-1}$. Where P_{it} represents the market price of company i's stock on day t, adjusted for dividends and capital events.

n_{pt-1} = The number of firms in portfolio p at the close of trade on day t-1.

Monthly returns, $R_{pt,}$ are then obtained by compounding the above daily returns in (1) over the number of trading days in month t.

$$R_{pt} = \prod_{t=1}^{n}(1 + r_{pt}) - 1 \quad (2)$$

4.5 Market and Risk adjusted returns

4.5.1 Fundamental Stock Return Predictors and Index Proxies

The risk adjustment evaluation that this research follows takes the form of an Arbitrage Pricing Theory (APT) approach to performance evaluation, which was pioneered by Stephen Ross in 1976. The APT holds that the expected return of a financial asset can be linearly modelled by a set of macro-economic factors or theoretical market indices; where the sensitivity to factor innovations is represented by factor-specific beta coefficients.

The APT does not offer an exact specification with regards to the identity of the relevant risk factors and therefore the selection process followed may differ amongst researchers. For this study, the FTSE/JSE series of indices provides a suitable set of risk factors which are thus able to facilitate the employment of an APT type approach to performance evaluation.

In order to link this research to other equity analyst performance evaluation studies, the risk factors that have been selected resemble stock market factors that can be linked to various investment styles (small cap and value investing, or a sector specific type of investment such as in the financials and industrials or resources).

Even though this study uses an APT type methodology for performance evaluation, the majority of the selection of the APT factors was actually motivated by studies that use a portfolio sorting methodology to construct mimicking risk factor portfolios such as Fama and French (1992, 1993). Whilst, Fama and French (1993) perform independent two-way cross sectional size and book-to-market sorts to construct their size and value factors; this study uses the applicable stock indices to create the risk factors.

For example, the size and value factors are thus calculated as: SMB (small minus big) = JSE Small Cap Index Total Return - Top 40 Index Return, VMG (value minus growth) = JSE All Share Value Style Index Total Return – JSE All Share Growth Style Index Total Return. In order to ensure independent size and value effects, the size and value premia are orthogonalised on one

another. A list of the indices used to construct the respective risk factor proxies is shown in Table 1[2].

TABLE 1: RISK FACTORS AND INDEX PROXIES

VARIABLE	**FTSE/ JSE TOTAL RETURN INDEX PROXIES**
MARKET RISK	ALL SHARE (J203TR)
SIZE	TOP 40 (J200TR) SMALL CAP INDEX (J202TR)
VALUE	ALL SHARE VALUE STYLE INDEX (J330TR)
GROWTH	ALL SHARE GROWTH STYLE INDEX (J331TR)
RESOURCES	RESOURCE INDEX (J258TR)
FINANCIALS & INDUSTRIALS	FINDI 30 INDEX (J213 TR)
PRICE MOMENTUM	Constructed using a 12 month prediction period and a 12 month holding period using a subset of the 200 most liquid stocks.

The FTSE/JSE methodology for calculating the above indices was formulated in 2002.The main feature of the methodology is that weights are determined using free floating market capitalisations[3]. The total return (TR) indices were used for this research report because they reflect returns earned from capital gains as well as from dividends.

- All Share, Top 40 and Small Cap Indices:

The All Share Index represents 99% of the full market value of all shares listed on the main board (before any investibility weighting adjustments). However, as explained above, the weights are calculated using a free float methodology. Similarly, the Top 40 Index comprises the

[2] A momentum factor is also used in this report. However, the momentum portfolios were manually constructed since no applicable indices could be used in this regard.
[3] Free float is the number of shares available to investors, it excludes shares where ownership is restricted to certain parties.

largest 40 shares by full market capitalisation – with each share weighted according to its free float market capitalisation. The Small Capitalisation Index includes stocks that are included in the All Share, but are not large enough to be included in the mid-cap and Top 40 indices (FTSE/JSE, 2014).

- Value and growth indices:

The variables used to construct the value and growth indices are a subset of value and growth factors. Where the book-price, dividend yield, sales-price and cash flow-price ratios, comprise the value factors. Whilst, the growth factors include, the historic (three year) and forward (two year) earnings and sales growth multiples as well as an accounting based earnings growth rate (calculated as the return on equity multiplied by the plough back ratio).

The value ranking (VR) and growth ranking (GR) are calculated by a simple averaging of the relevant value and growth factors. Using the average of the VR and GR, an overall style ranking (OSR) is calculated. The OSR determines the percentage of the free-float market capitalisation of each stock that is included in each of the value and growth style indices. Where; the OSR is calculated on a linear scale from 0 (pure value) to 100 (pure growth). A stock with an OSR of 50 will thus contribute equally to the market capitalisation of the value and growth style indices (FTSE/JSE, 2014).

4.5.2 Market risk

Market adjusted returns, $R_{pt} - R_{mt}$, are obtained by calculating the difference between the monthly return on the JSE All Share Index (ALSI) and the monthly return on each of the broker consensus portfolios; where R_{mt} represents the return on the ALSI for month t. Subsequently, the Capital Asset Pricing model (CAPM) is used to benchmark the portfolio returns according to their level of market risk.

The van Rensburg and Slaney (1997) two factor APT model is also examined as an alternative to the CAPM because of its ability to account for the ALSI's heavy resource weighting. The

following monthly time series regressions are therefore estimated for each of the consensus portfolios:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p\left(R_{mt} - R_{ft}\right) + \varepsilon_{pt} \quad (3.1)$$

$$R_{pt} - R_{ft} = \alpha_p + \beta_r(RESI) + \beta_f(FINDI) + \varepsilon_{pt} \quad (3.2)$$

Where:

R_{ft} = the effective 1 month rate corresponding to the 3 month Jibar

α_p = The estimated intercept term, or Jensen's Alpha (Jensen,1968).

β_p - Represents the estimated market beta

ε_{pt} = regression error term

RESI and FINDI = the excess returns on the Resources and Financials and Industrial indices respectively.

$\beta_r \; and \; \beta_f$ - Represent the estimated factor loadings on the RESI and FINDI indices respectively.

4.5.3 Size and value risk

This study employs an APT variation of the Fama and French (1993) three factor model (FF3), in order to adjust the portfolio returns for firm characteristics. This model was selected because of its general feasibility in explaining the size and value effects on the JSE.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p\left(R_{mt} - R_{ft}\right) + s_p(SMB) + h_p(VMG) + \varepsilon_{pt} \quad (4)$$

Where:

SMB - represents the monthly return on a zero cost portfolio which purchases stocks in firms with the smallest market capitalisations and sells stocks in firms with the largest market capitalisations; where the relevant portfolios are the FTSE/JSE Small Cap and Top 40 indices respectively.

VMG- represents the monthly return on a zero cost portfolio that purchases stocks with cheaper valuation metrics (E/P, dividend yield, book to price, sales-price, cashflow-price) (value stocks) and shorts stocks that are relatively more expensive (growth stocks); where the relevant portfolios are the FTSE/JSE All Share Value and Growth Style indices respectively.

s_p and h_p - represent the estimated size and value factor loadings.

In order to ensure that there are independent size and value effects, an orthogonalisation process is performed as shown in Equations 5 and 6. The orthogonalised value (VMG) and size (SMB) factors are subsequently represented by the summation of the intercept and error terms obtained from each of these equations. Where SMB' and VMG' are the non-orthogonal size and value risk factors.

$$VMG' = c + k(SMB') + e_i \quad (5)$$

$$SMB' = c + z(VMG') + v_i \quad (6)$$

4.5.4 Momentum

Since there are no relevant indices that were able to proxy for a momentum factor, momentum portfolios had to be constructed. Using the 200 most liquid stocks (following Basciewicz and Auret, 2010) the breakpoints of the portfolios were determined. Liquidity was measured as the average volume of stock over a 12 month period divided by the proportion of the firm's outstanding stock.

The momentum factor was calculated by taking the return differential between the top 10% and bottom 10% of stocks sorted on their prior twelve month performance. The relevant portfolios were subsequently held for the duration of one year. Basciewicz and Auret (2010), argue that annual rebalancing is preferable because it guards against confounding the model's risk premia with the short-term reversal effect of Jegadeesh (1990).

The final risk adjusted model that will be used in the analysis was an APT variation of the Carhart (1997) four factor model. The model was constructed by using the above premia (the

market risk premium, size and value premia) in conjunction with the constructed momentum factor, described above.

$$R_{pt} - R_{ft} = \alpha_p + \beta_p\left(R_{mt} - R_{ft}\right) + s_p(SMB) + h_p(VMG) + m_p(MOM) + \varepsilon_{pt} \quad (7)$$

Where:

m_p - represents the estimated loading on the momentum factor

PMOM- represents the momentum factor.

4.6 Turnover

The raw and risk adjusted return calculations above are reflective of gross returns. In order to assess the magnitude of the relevant trading costs when rebalancing portfolios to update them for changes in broker consensus recommendations, a turnover measure is computed as follows:

$$G_{it} = \frac{x_{it-1}(1+r_{it})}{\sum_{i=1}^{n_{pt-1}} x_{it-1}(1+r_{it})} \quad (8)$$

G_{it} represents the proportion that stock i would have comprised in Portfolio P at date t, if no rebalancing took place between t-1 and t. Comparing G_{it} to x_{it} (the actual fraction that stock i comprised of Portfolio P) allows one to compute the proportion of stock i that has been turned-over, u_{it}. When summing u_{it} over all of the stocks, U_{it} represents the turnover for the portfolio at the close of trading day t.

Multiplying U_{it} by the number of trading days in a year allows one to subsequently compute an annual turnover measure, which can then be used to adjust the gross return measures for trading costs. This will allow an assessment of whether there is a net benefit from updating portfolios sooner to reflect analyst expectations (since more frequent portfolio rebalancing increases portfolio turnover).

$$U_{it} = \sum_{i=1}^{n_{pt}} \max \{G_{it} - x_{it,} 0\}$$ [4] (9)

4.7 Chapter Summary

This chapter describes the methodology used to evaluate the performance of stock recommendations issued on JSE listed shares from 2007 – 2013. This time period was chosen in order to reflect a pre and post financial crisis regime so that a richer examination of investing based on the three constructed consensus portfolios could be conducted.

In addition to an evaluation conducted purely on raw returns, various APT models were highlighted in order to evaluate returns under the backdrop of market, size, value and momentum factors. These factors were constructed Ftse/ Jse total return indices. The APT models essentially mimic the CAPM of Sharpe (1964), the van Rensburg and Slaney (1997) two-factor model, the Fama and French.

Different rebalancing frequencies were also used in order to assess the importance of timely reactions to consensus changes. Timelier rebalancing should result in higher portfolio turnover and thus transaction costs through the portfolio turnover measure described in equations (8) and (9) above.

[4] By only considering positive turnover, double counting is avoided. Therefore the "Max" function has been utilised.

5 RESULTS

5.1 Introduction

The performance of the three broker consensus portfolios are presented in this chapter. Section 5.2 examines the nature of the differences between stocks with top consensus ratings and contrasts them to the descriptive statistics of stocks with average and the poorest ratings. Section 5.3 highlights the full and sub-period raw returns. Univariate and multivariate regressions are presented in Section 5.4, whilst the effect of investment delays and transaction costs are examined in sections 5.5 to 5.6. Section 5.7 provides a brief chapter summary.

5.2 Descriptive Statistics

5.2.1 Recommendations by market capitalisation

Descriptive statistics of the data are presented in Table 2 through to Table 6. The cumulative free floating market capitalisation of covered firms is shown in Table 2: The IBES database reflects a moderate increase of around 34% in analyst coverage of JSE listed firms by total free floating market capitalisation between July 2007 (R1.86 trillion) and June 2013 (R2.5 trillion).

As is evident from Table 2, the majority of the coverage corresponds to stocks that have been assigned an average rating ($2.32 < X < 3.66$). Top rated firms ($1<X<2.32$) comprise around 25% to 50% of covered firms by market capitalisation. In contrast, not more than 5% of the sample attains a rating within the worst rated stocks category (consensus recommendation of greater than 3.66).

Out of the sample of 200 stocks that receive coverage over the period, Table 4 illustrates that the firms that receive coverage in a given year tend to be substantially larger than firms that do not (the average market capitalisation of unrated stocks is roughly only R1bn-R1.5bn); this indicates that equity analysts tend to only initiate coverage when a firm's market capitalisation exceeds a certain level.

Amongst covered firms, the worst rated stocks tend to be much smaller than top rated stocks (the worst rated stocks have average free float market capitalisations of roughly R3bn - R6bn, whilst the market capitalisations of average and top rated stocks are generally in the order of R12bn-

R19bn). This finding may be due to the fact that larger companies present more significant investment banking opportunities for analysts' firms (Michaely and Womack, 1999; Barber et al 2001).

5.2.2 Number of covered firms and analysts per firm:

Two hundred different firms that received analyst coverage at one point or another during the period of study are examined. However, in any given year approximately only 60- 70% of this number of firms received analyst coverage. The average number of covered firms per year appears relatively stable at around 135-145 firms, but during the 2007/2008 financial crisis slightly less analyst activity took place with only 125 and 130 JSE listed firms receiving coverage.

Whilst the cumulative free market capitalisation of covered firms falls from R1.86 trillion to R1.47 trillion over 2007- 2009, the median number of covered firms actually rises from 125 to 143. This is indicative of analysts either initiating coverage of relatively smaller firms and/or a fall in the market values of firms that were previously within the ambit of analysts' coverage (Table 4 illustrates that the market capitalisation per covered firm falls over 2007-2009, except for the least favoured stocks).

The number of analysts per firm is reported in Table 6. The table highlights that stocks in the average rating category are the most covered with a following of 5 -8 analysts per firm; versus only 3 - 5 and 2 - 4 analysts for equities in the top and worst rated portfolios. Barber et al (2003) explains that stocks followed by a large number of analysts tend to only attain average consensus ratings. This occurs because stock selection methods differ amongst analysts.

For example, a stock with low PE (price-to-earnings) and book-to market ratios might attain a good rating if a value orientated analyst is following it; however as more analysts cover the stock the likelihood of there being some growth orientated analysts increases, thus reducing the consensus rating on the stock.

TABLE 2: CUMULATIVE FREE FLOATING MARKET CAPITALISATION PER PORTFOLIO (RBn)

MEAN CUMULATIVE MARKET CAPITALISATION VALUES R(Bn)							
Year	**TOP**	**%**	**AVE**	**%**	**WORST**	**%**	**TOTAL**
2007	**697**	37.4	**1133**	60.9	**31**	1.7	**1861**
2008	**836**	49.6	**821**	48.7	**29**	1.7	**1685**
2009	**489**	33.2	**921**	62.5	**63**	4.2	**1473**
2010	**635**	36.6	**1015**	58.5	**85**	4.9	**1734**
2011	**721**	38.6	**1070**	57.3	**78**	4.2	**1868**
2012	**568**	25.8	**1560**	70.9	**73**	3.3	**2201**
2013	**618**	24.7	**`1795**	71.8	**88**	5.5	**2501**

MEDIAN CUMULATIVE MARKET CAPITALISATION VALUES R(Bn)							
Year	**TOP**	**%**	**AVE**	**%**	**WORST**	**%**	**TOTAL**
2007	**706**	37.3	**1154**	61.1	**30**	1.6	**1890**
2008	**789**	47.5	**846**	50.9	**26**	1.6	**1660**
2009	**479**	34.7	**847**	61.4	**53**	3.9	**1380**
2010	**637**	37.3	**986**	57.7	**85**	5	**1707**
2011	**736**	39.3	**1060**	56.5	**80**	4.3	**1876**
2012	**564**	26	**1552**	71.6	**52**	2.4	**2168**
2013	**616**	24.8	**`1789**	72	**81**	3.3	**2486**

TABLE 3: ANALYSIS OF NUMBER OF COVERED FIRMS

MEAN NUMBER OF COVERED FIRMS							
Year	**TOP**	**%**	**AVE**	**%**	**WORST**	**%**	**TOTAL**
2007	**45**	35.9	**71**	57.1	**9**	7.0	**125**
2008	**57**	43.4	**64**	49.0	**10**	7.6	**131**
2009	**50**	35.5	**75**	53.6	**15**	10.9	**141**
2010	**40**	28	**82**	57.3	**21**	14.7	**143**
2011	**47**	34.7	**72**	52.8	**17**	12.5	**136**
2012	**45**	32.6	**82**	59.6	**11**	7.8	**137**
2013	**39**	26.5	**`94**	64.7	**13**	8.8	**145**

MEDIAN NUMBER OF COVERED FIRMS							
Year	**TOP**	**%**	**AVE**	**%**	**WORST**	**%**	**TOTAL**
2007	**45**	36.0	**71**	56.8	**9**	7.2	**125**
2008	**56**	42.9	**65**	49.4	**10**	7.7	**131**
2009	**51**	35.7	**77**	53.8	**15**	10.5	**143**
2010	**42**	29.2	**82**	56.9	**21**	13.9	**144**
2011	**49**	34.8	**74**	52.5	**17**	12.8	**141**
2012	**45**	32.8	**82**	60.5	**11**	6.6	**136**
2013	**35**	24.6	**95**	66.9	**13**	8.5	**142**

TABLE 4: PORTFOLIO MEAN AND MEDIAN MARKET CAPITALISATIONS

MEAN FREE FLOATING MARKET CAPITALISATION PER FIRM (Rmil)				
Year	**TOP**	**AVE**	**WORST**	**Not covered**
2007	15,641	15,939	3,756	1,422
2008	14,848	12,692	2,890	1,304
2009	9,846	12,099	3,976	1,006
2010	15,871	14,905	4,036	1,103
2011	15,239	19,100	5,079	1,093
2012	12,729	19,239	6,555	1,252
2013	16,206	19,198	6,812	1,376

MEDIAN FREE FLOATING MARKET CAPITALISATION PER FIRM (Rmil)				
Year	**TOP**	**AVE**	**WORST**	**Not covered**
2007	16,088	15,939	3,756	1,508
2008	14,414	13,300	3,055	1,280
2009	9,794	11,436	4,057	1,010
2010	15,100	14,998	4,040	1,081
2011	14,871	19,100	4,390	1,071
2012	12,670	19,230	6,004	1,264
2013	16,207	19,190	6,736	1,375

TABLE 5: CONSENSUS RECOMMENDATION LEVELS

MEAN PORTFOLIO CONSENSUS RECOMMENDATION LEVELS			
Year	**TOP 1<X<2.32**	**AVE 2.32<X<3.66**	**WORST 3.66<X<5**
2007	1.86	2.80	4.40
2008	1.88	2.82	4.09
2009	1.81	2.87	4.12
2010	1.81	2.86	4.28
2011	1.85	2.85	4.00
2012	1.79	2.86	4.05
2013	1.67	2.89	4.06

MEDIAN PORTFOLIO CONSENSUS RECOMMENDATION LEVELS			
Year	**TOP 1<X<2.32**	**AVE 2.32<X<3.66**	**WORST 3.66<X<5**
2007	1.88	2.80	4.37
2008	1.88	2.82	4.11
2009	1.83	2.85	4.10
2010	1.81	2.86	4.31
2011	1.85	2.85	4.07
2012	1.80	2.86	4.05
2013	1.68	2.91	4.07

TABLE 6: NUMBER OF ANALYSTS PER COVERED FIRM

MEAN NUMBER OF ANALYSTS			
Year	**TOP 1<X<2.32**	**AVE 2.32<X<3.66**	**WORST 3.66<X<5**
2007	3.81	4.63	2.11
2008	4.34	4.75	2.21
2009	3.94	5.84	2.78
2010	4.66	6.13	2.90
2011	4.57	6.15	3.24
2012	3.84	7.62	4.08
2013	3.43	6.76	3.66

MEDIAN NUMBER OF ANALYSTS			
Year	**TOP 1<X<2.32**	**AVE 2.32<X<3.66**	**WORST 3.66<X<5**
2007	3.79	4.63	2.22
2008	4.27	4.70	2.21
2009	4.09	5.93	2.82
2010	4.62	6.13	2.90
2011	4.49	6.20	2.90
2012	3.76	7.65	3.93
2013	3.42	7.04	3.42

5.3 Raw returns

5.3.1 Full period results:

The raw returns on each of the recommendation portfolios are reported in Table 7. An initial observation reveals that over the full sample period (July 2007- June 2013) the arithmetic mean monthly returns for the top, average and worst rated stocks are 73, 76 and -19 basis points respectively. The slight outperformance of average rated stocks portfolio over the top portfolio is interesting. This result also contrasts with Prayag and van Rensburg (2006) which finds that buy recommendations outperformed hold recommendations. In the US, Barber et al (2001) found that their top rated quintile of stocks outperformed the third quintile by roughly 30 basis points per month over the 11 year period from 1985-1996.

However, despite the above result the return differential between the top and worst rated stocks is a healthy 92 basis points per month. Using broker consensus information to construct a long-short strategy in the stocks that analysts cover; thus yields a cumulative gross return of 74.5% for the full sample period. In comparison, similar zero cost portfolios constructed to capture value and size premia only earn cumulative returns of 16.33% and -1.45%.

Each of the recommendation portfolios in Table 7 noticeably underperforms the FTSE/JSE All Share Index. The mean monthly market adjusted returns for the entire investment period are -11,-8 and -103 basis points for the top, average and worst rated stocks respectively. In comparison with the other indices listed in Table 7, the recommendation portfolios also generally show underperformance. Stocks in the All Share Growth Style and Value Style indices achieved full period returns that exceeded the average rated recommendation portfolio by 3 and 12 basis points per month respectively. Large capitalisation stocks (proxied by the JSE TOP 40) outperformed small capitalisation stocks by 8 basis points per month on average.

Interestingly, an investment in the Small Cap Index stocks and the top rated recommendation portfolio achieve strikingly similar full period and sub period mean (arithmetic) monthly

returns[5]. This is probably due to top rated portfolio having a greater exposure to small capitalisation stocks, in comparison to stocks that fall in the average rated category.

Financial and industrial stocks in the FINDI 30 have evidently been amongst the best performers in recent years, generating a cumulative return of approximately 130% for the six year period ending on June 2013. In contrast, resource stocks have performed rather poorly achieving a negative cumulative return of -8.6% over the same period. According to the factor loadings in Table 9, the underperformance of the worst rated stocks could partly be due to their relatively larger resource exposure.

5.3.2 Sub Period Results:

The data was divided into two sub-periods (July 2007 – December 2009 and January 2010 – June 2013) so that the performance of the consensus portfolios could be separately analysed during the 2007/2008 financial crisis.

From the results in Table 7 it indeed appears that the full-period results (namely, the underperformance of the top rated consensus portfolio relative to the average- rated consensus portfolio and the ALSI) are primarily driven by the financial crisis. During the period January 2010 until June 2013, superior results from investing in analyst consensus recommendations ensued: top rated stocks outperformed their average rated counterparts which in turn performed better than the worst rated stocks. Furthermore, top rated stocks also earned positive market adjusted returns of 25.3 basis points per month (which translates into a 16.74 % cumulative market risk adjusted return over the second sub-period).

Overall, it appears that zero cost consensus recommendation portfolios also performed far better during the latter sub-period of the study: The return differential between the top and worst rated stocks was 26 basis points per month during the first sub-period including the crisis (July 2007 – December 2009). In contrast, in the post crisis period (January 2010 – June 2013) this return differential was strikingly higher at 138 basis points per month.

[5] Notice how the green (top rated stocks) and yellow (the small cap index) lines track each other fairly closely in Figure 1.2.

Consistent with expectations, this study also finds that the returns are more volatile in the crisis period. This is particularly evident in Figure 1, which graphs the monthly returns for each of the consensus portfolios along with the ALSI.

The contrasting sub-period performance of investing in analyst recommendations, either from a zero- cost portfolio perspective, or from a positively weighted investment in one of the consensus portfolios, seems to be a direct result of analysts being able to provide better recommendations and forecasts during periods of lower market volatility.

5.4 Risk adjusted returns

5.4.1 Univariate regressions

Single factor APT models were initially estimated in order to assess the individual importance of each of the explanatory variables. From Table 8, it is apparent that the excess returns on the market are a highly significant explanatory variable for determining the returns on each of the respective consensus portfolio categories. Interestingly, the portfolio market betas are all below one, suggesting that the stocks covered by analysts tend to be defensive stocks. Furthermore, the worst rated stocks have a slightly higher portfolio market beta indicating, that they are riskier than the other covered stocks.

The additional market risk associated with the portfolio of the worst rated stocks, as depicted in the one factor APT (also known as the CAPM), could be caused by its exposure to South Africa's highly volatile resource sector - since the Resi factor loading for the worst rated stocks is marginally higher than the other consensus portfolios.

The significantly negative size factor loadings for the consensus portfolios indicate that the type of stocks covered by analysts tend to be larger than stocks that are not covered. In comparison, the portfolio representing the subset of stocks not covered by analysts had a size factor loading of 0.2 (not shown).

A slightly surprising result relates to the relatively more negative size factor loading on the worst rated stocks portfolio – this contradicts the descriptive statistics in Table 4 which show that the mean and median market capitalisations of firms in the worst rated stocks portfolio are smaller.

In contrast to the sector (Findi and Resi), size and market factors; the value and momentum factors do not appear play a significant role within a one factor APT context. However, the value factor does contain significant additional explanatory power when it is combined with some of the other factors when a multifactor APT approach is used, as discussed in Section 4.3.3.

Turning attention to the performance of each of the consensus portfolios; the intercept coefficients indicate that the value that analysts provided investors on the JSE was determined by their ability to identify a subset of stocks that will significantly underperform on a raw and risk adjusted returns basis. The worst rated portfolio of stocks thus displays an alpha of approximately -1% and -1.4% per month when the ALSI and FINDI are used as the respective benchmarks. In contrast, the top and average rated stocks do not significantly underperform/outperform any of the one factor APT model benchmarks in Table 8.

5.4.2 Correlations

Correlations between the regressors are displayed in the upper panel of Table 9. Correlations above 0.8 are generally an indication of a multicollinearity problem. In the presence of high multicollinearity, it is difficult to discern the significance of a regressor because a large portion of its variability can be explained by the factors with which it is correlated.

From Table 9, the Spearman rank correlations do not indicate a multicollinearity problem. Although the Findi and Resi indices display high full period correlations with the market risk premium, this does not pose a problem because these indices have not been used in combination with the market factor.

An additional collinearity check is presented in the Appendix where the variance inflation factors for each variable in the regression specifications are computed. Whilst a slight collinearity problem may be present, the results do not point towards a violation of the Ordinary Least Squares assumption of no perfect collinearity.

On the whole, the risk factor correlations appear to be relatively stable across sub-periods. However, comparing the full-period correlations with those during the financial crisis, (dated in this study as all observations occurring in the period July 2007 – December 2008) there are some noticeable differences worth mentioning:

1. The market risk premium and size risk factors had a lower correlation during the financial crisis (-0.14), compared to the full sample period (-0.55).

2. Excess returns on the financials and resources indices were far less correlated with each other and with the market premium during the crisis.

Paying particular attention to the second finding above indicates that diversification amongst financials and resources would have offered investors some shelter during the financial crisis. It therefore supports the industry diversification argument, as outlined by Tavares (2009).

In comparison, country diversification within today's globalised economy may be less effective: Hyde, Bredin and Nguyen (as cited in Eptas and Leger ,2010) found that during the Asian financial crisis the correlations between the Asian Pacific markets, the EU and the US peaked thus exposing investors who decided to employ an international diversification strategy.

TABLE7: PORTFOLIO RETURNS

Portfolio / Period	**TOP** 1 ≤ X ≤ 2.32	**AVE** 2.33≤ X≤3.66	**WORST** 3.67≤ X ≤5	**Not covered sample**	**Top - Worst**	**All Share Index J203**	**Small Cap Index J202**	**Growth Style index J331**	**Value Style index J330**	**Top 40 index J200**	**Resources J258**	**Findi 30 J213**	**3m Jibar**
Jul - Dec 07	-0.20%	1.37%	-0.21%	0.45%	0.01%	0.65%	0.55%	0.25%	0.64%	0.72%	0.97%	0.60%	0.87%
Jan - Dec 08	-2.48%	-1.47%	-3.38%	-3.12%	0.90%	-1.93%	-2.89%	-1.50%	-2.14%	-1.93%	-2.06%	-1.61%	0.98%
Jan - Dec 09	1.97%	1.89%	2.21%	0.52%	-0.24%	2.53%	2.18%	2.18%	2.91%	2.54%	2.86%	2.35%	0.65%
Jan - Dec 10	1.86%	1.74%	1.31%	0.77%	0.55%	1.58%	1.90%	1.35%	1.81%	1.47%	1.16%	1.79%	0.52%
Jan - Dec 11	0.16%	0.17%	-0.39%	-0.02%	0.55%	0.27%	0.11%	0.05%	0.48%	0.25%	-0.46%	0.83%	0.46%
Jan - Dec 12	2.11%	1.77%	0.49%	0.89%	1.62%	2.02%	2.16%	2.28%	1.67%	1.99%	0.37%	3.01%	0.44%
Jan - Jun 13	1.69%	-0.48%	-2.56%	0.60%	4.25%	0.47%	1.40%	0.47%	0.50%	0.49%	-2.71%	2.06%	0.42%
Mean % (p.m)	**0.73%**	**0.76%**	**-0.19%**	**-0.07%**	**0.92%**	**0.84%**	**0.74%**	**0.79%**	**0.88%**	**0.82%**	**0.17%**	**1.28%**	**0.62%**
Jul 07 - Dec 09	-0.24%	0.44%	-0.51%	-0.95%	0.26%	0.37%	-0.17%	0.32%	0.44%	0.39%	0.51%	0.42%	0.83%
Jan 10 - Jun 13	1.42%	0.98%	0.04%	0.55%	1.38%	1.17%	1.39%	1.12%	1.20%	1.13%	-0.08%	1.90%	0.46%
Value of R100	**153.73**	**158.87**	**74.24**	**92.30**	**79.49**	**166.03**	**160.05**	**156.67**	**173.00**	**161.50**	**91.40**	**229.96**	**155.50**
Jul 07 - Dec 09	87.93	107.55	75.63	73.48	12.30	105.03	90.71	102.02	107.25	104.69	101.87	107.33	127.99
Jan 10 - Jun 13	174.82	147.72	98.16	125.61	76.67	158.08	176.44	153.57	161.30	154.26	89.72	214.26	121.49
Std dev % (p.m)	**5.12%**	**4.75%**	**6.76%**	**2.76%**	**4.78%**	**5.14%**	**4.03%**	**5.76%**	**4.90%**	**5.53%**	**7.61%**	**4.89%**	**0.21%**
Jul 07 - Dec 09	6.15%	6.41%	9.36%	3.80%	6.42%	6.51%	5.49%	7.32%	6.41%	6.91%	9.52%	6.05%	0.16%
Jan 10 - Jun 13	4.18%	3.15%	4.12%	1.43%	3.15%	3.93%	2.40%	4.39%	3.50%	4.35%	6.02%	3.83%	0.05%

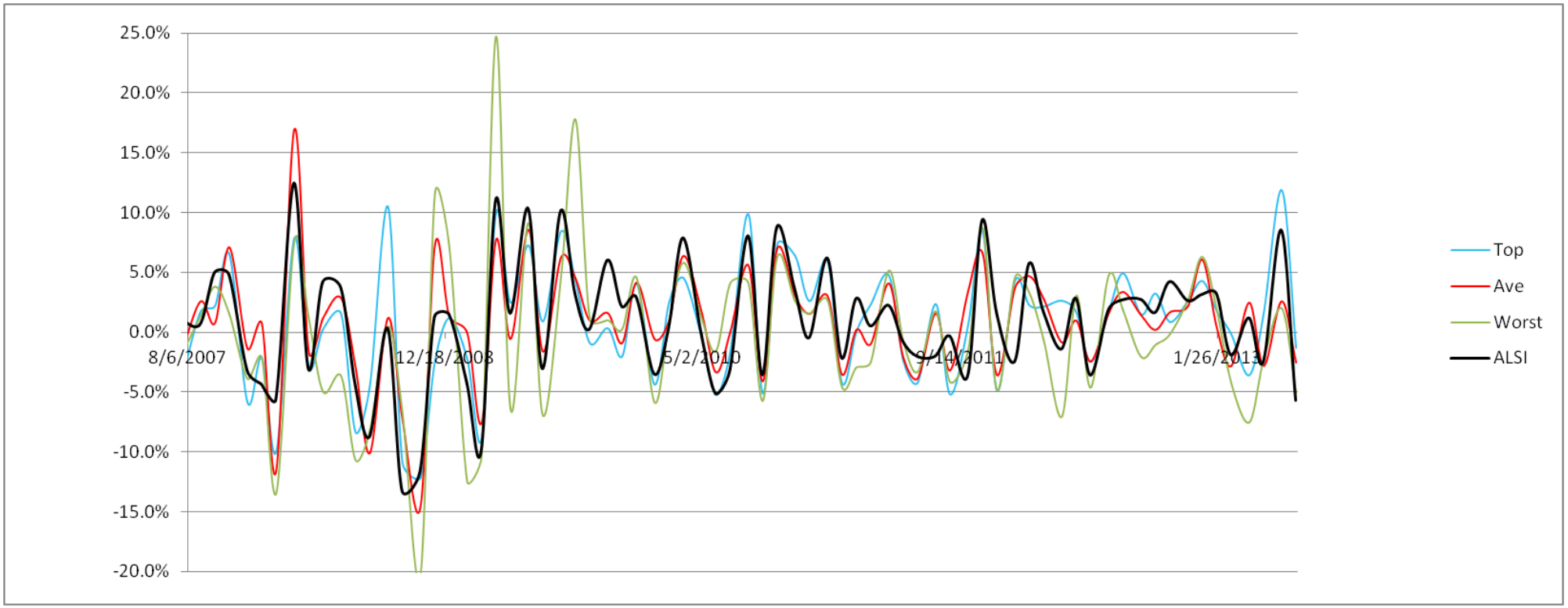


FIGURE 1: MONTHLY RETURNS FOR CONSENSUS PORTFOLIOS AND THE ALSI

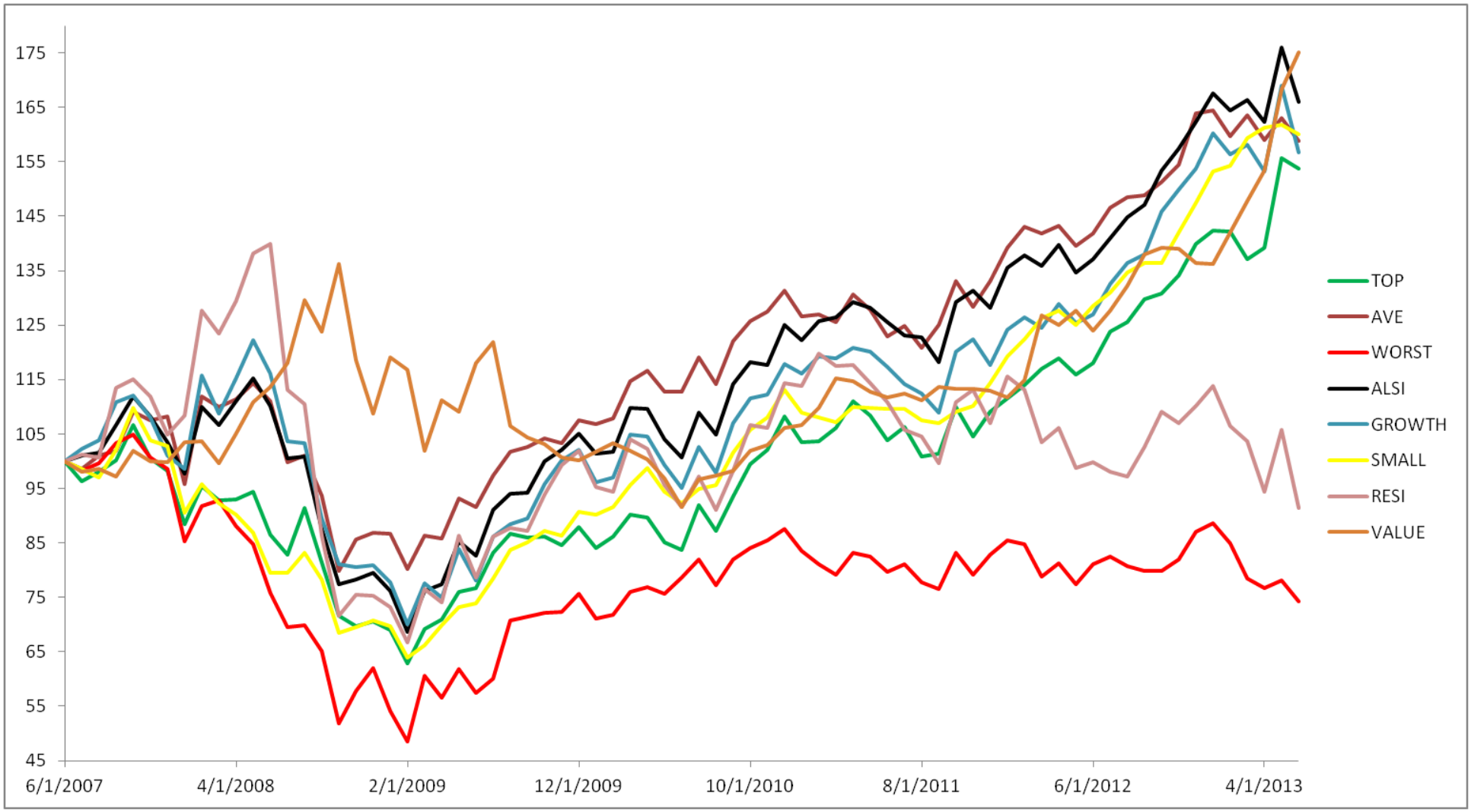


FIGURE 2: CUMULATIVE RETURNS FOR CONSENSUS PORTFOLIOS AND INDEX BENCHMARKS (initial value R100)

TABLE 8: UNIVARIATE REGRESSIONS

Coefficients:

PORTFOLIO	**Rm-Rf**	**Findi - Rf**	**Resi-Rf**	**SMB**	**VMG**	**PMOM**
TOP: 1≤X≤2.32	**0.83**	**0.86**	**0.427**	**-0.38**	0.17	0.14
	1.0e-18	1.4e-18	3.7e-9	0.03	0.48	0.22
AVE: 2.33≤X≤3.66	**0.78**	**0.69**	**0.46**	**-0.38**	0.10	0.15
	1.7 e-19	4e-12	7.6e-13	0.02	0.67	0.17
WORST:3.67≤X≤5	**0.93**	**0.85**	**0.55**	**-0.62**	0.44	0.05
	5.7e-12	8.8e-9	1.5e-8	0.01	0.20	0.77

Intercepts:

PORTFOLIO	**Rm-Rf**	**Findi - Rf**	**Resi-Rf**	**SMB**	**VMG**	**PMOM**
TOP: 1≤X≤2.32	-0.001	-0.005	0.003	0.001	0.001	-0.001
	0.70	0.19	0.55	0.87	0.92	0.87
AVE: 2.33≤X≤3.66	-0.001	-0.004	0.003	0.001	0.001	-0.001
	0.72	0.39	0.43	0.85	0.88	0.86
WORST:3.67≤X≤5	**-0.010**	**-0.014**	-0.006	-0.007	-0.008	-0.008
	0.08	0.039	0.36	0.405	0.339	0.345

Adjusted R-Squared:

PORTFOLIO	**Rm-Rf**	**Findi - Rf**	**Resi-Rf**	**SMB**	**VMG**	**PMOM**
TOP: 1≤X≤2.32	67%	67%	39%	6%	1%	2%
AVE: 2.33≤X≤3.66	69	49%	52%	7%	<1%	3%
WORST:3.67≤X≤5	**49%**	**37%**	37%	8%	3%	<1%

TABLE 9: REGRESSOR CORRELATIONS

Full Sample Correlations: (July 2007- June 2013)						
	MKTPREM	**SMB**	**VMG**	**PMOM**	**FINDI**	**RESI**
MKTPREM	1					
SMB	-0.55	1				
VMG	-0.33	0.51	1			
PMOM	0.05	-0.00	0.00	1		
FINDI	0.85	-0.34	-0.16	-0.08	1	
RESI	0.87	-0.70	-0.46	-0.02	0.59	1

Crisis Correlations: (July 2007 – December 2008)						
	MKTPREM	**SMB**	**VMG**	**PMOM**	**FINDI**	**RESI**
MKTPREM	1					
SMB	-0.14	1				
VMG	-0.32	0.58	1			
PMOM	0.09	0.20	0.22	1		
FINDI	0.49	0.18	-0.19	0.15	1	
RESI	0.69	-0.49	-0.46	-0.08	0.15	1

- MKTPREM, FINDI and RESI represent the excess returns on the JSE All Share, Financial and Industrial, and Resource Indices.

- VMG, SMB, PMOM represent zero-cost portfolios which replicate value, size and momentum premia respectively.

5.4.3 Multivariate Regressions

The results of the multifactor models are displayed in Table 10. Models 1-3 represent: the two factor APT model of van Rensburg and Slaney (1997), and APT variations of the Fama and French (1993) three factor model (FF3) and the Carhart (1997) four factor model (FF4).

In relation to the performance of share analyst recommendations, the same conclusion can be drawn as the univariate regressions: top and average consensus rated stocks do not earn a significantly different return on a risk adjusted basis – the alpha coefficient is around -0.3% to -0.4% per month for top rated stocks and 0% to -0.3% per month for average rated stocks depending on the risk adjustment model used. In contrast, shorting a portfolio of stocks with the worst consensus ratings yields an investor with an abnormal return of 1.1 % per month when the van Rensburg and Slaney (1997) model is used and 1.2% per month for the three and four factor APT models.

Interestingly, some of the factor loadings vary drastically between the univariate and multivariate regression specifications. This is however not unusual from an econometrics perspective and it is caused as a result of the univariate regressions omitting key regressors (Slinker and Glantz, 2008). Some of the differences in the factor loadings are:

1. The size factor loadings are negative in the univariate specifications; however they are positive in the multivariate regressions. Despite this, the relative magnitudes of the size factor loadings are consistent with theory, in that the size premium for average rated firms is slightly smaller than the size premia for the top and worst rated stocks. This is also consistent with Table 4 which shows that average rated firms have higher free floating market capitalisations

2. When controlling for the other APT factors, the relative valuation factor is significant. All of the consensus portfolios appear to be significantly tilted towards value stocks as VMG > 0, with the loading on VMG being highest for the worst consensus rated stocks, indicating that this portfolio has the greatest value tilt.

As in the univariate regressions, the 12 month price momentum factor was again not found to be significantly different from zero for any of the portfolios. The negative loading on PMOM for the portfolio of least favourably rated stocks however indicates that it may be tilted towards stocks that have that have the lowest price momentum, which is consistent with Jegadeesh et al (2004). Furthermore, the worst rated stocks by analyst consensus also have a higher loading on the resources index (0.35 vs. 0.16 and 0.3 for top and average rated stocks).

5.5 The Effect of Investment Delays

Thus far, it has been established that the level of the brokerage recommendation consensus aids investors in their decision on what stocks to sell, however it does not provide them significant abnormal returns in relation to buy and hold decisions[6]. In contrast, the abnormal returns from shorting the least favourable stocks persist even after controlling for market and sector risk, value, size and momentum premia.

The question now examined is whether these abnormal returns can be captured by market participants who update their portfolios with a predetermined delay: therefore, instead of making investment decisions based on the consensus recommendation in week t, the investment portfolios are formed based on the universe of consensus recommendation levels that were available in week t + k, where k represents the magnitude of the investment delay measured in weeks.

The arithmetic mean monthly returns are presented in Table 11; cumulative portfolio investment values in Table 12 and intercepts coefficients in Table 13. Overall, it appears that implementing an investment delay generally causes the returns on top rated stocks to marginally increase when following consensus recommendations two or three months after their release. In contrast, the

[6] Assuming that the stocks grouped in the top, average and worst rated consensus portfolios, generally correspond to analysts issuing buy, hold and sell recommendations

returns on average rated stocks tend to marginally decline when an investment delay is implemented.

The standout result relates to the worst rated stocks, where there generally appears to be a substantial improvement in returns when an investment delay is implemented. A two week delay increases the cumulative full sample return by roughly 11%, whilst for an eight and twelve week delay cumulative returns improve by 33% and 56.29% respectively.

The conclusions from Table 11 are two-fold:

1. One needs to act timeously if they intend to employ a short-strategy. If a short position is initiated based on an "old" sell recommendation, the results suggest that it will perform comparatively worse than a short position taken based on a "fresher" sell-consensus recommendation.

2. If one happens to have a long position in a stock (or portfolio of stocks) with an unfavourable consensus recommendation, they should avoid panic and not sell immediately. For stocks that receive a poor analyst outlook, the negative returns that may be experienced in the short-run will be reversed as the market "forgets" the sell signals previously issued by brokerage houses.

Furthermore, it can be seen from Table 11 that the cumulative returns of a zero-cost strategy, purchasing the highest rated stocks and shorting the lowest rated stocks, decline as the investment delay increases. The results of this report are therefore consistent with Barber et al (2003) in that they suggest that investment delays reduce the value of consensus recommendations.

An interesting exception to the above result is that implementing a one month investment delay still provides investors with a significant abnormal return differential on the zero cost recommendation portfolio, Top – Worst. This is largely driven by significant abnormal returns derived from shorting the worst rated stocks.

5.6 Transaction Costs

Forming value weighted portfolios based on analysts' consensus recommendations, involves a varying degree of portfolio turnover (Table 14). Due to the nature of the average rated stocks having larger market capitalisations, the portfolio is susceptible to greater portfolio turnover (332%p.a) than the other portfolios (115% and 131%p.a for portfolios of the top and worst rated stocks). The substantially higher portfolio turnover for the average rated stocks portfolio could also be an artefact of the chosen consensus rating cut-offs.

Barber et al (2003) reports portfolio turnover measures of roughly 450%p.a for each of their portfolios. The reason for their portfolio turnover measures being significantly higher is due to the fact that they examined narrower cut-off ranges for their consensus levels (they formed five consensus portfolios versus the three portfolios in this report). Furthermore, their portfolios were rebalanced on a daily basis, whereas the portfolios in this report are only rebalanced on a monthly basis.

A flat transaction cost of 0.5% was initially applied for each of the portfolios. This assumes that stocks are fairly liquid and that an investor only pays a relatively small bid-ask spread[7]. Table 14 displays the net annual abnormal returns achievable from holding long positions in a portfolio of top and average rated stocks, and holding a short position in the worst rated stocks. The net annual abnormal returns range between -0.5% and -5% for the top and average rated portfolios. In general, these returns are not likely to be economically significant.

The abnormal returns achievable from selling the least favourable stocks appear to be far more sizeable. Even after accounting for transaction costs, investors could theoretically obtain a risk adjusted return of approximately 13.4% p.a after accounting for market, size, valuation and momentum drivers of equity returns.

One important caveat to the above result is the absence of short selling restrictions. Taking into account such restrictions raises questionability with regard to an investor's ability to capture abnormal returns on the least favourable stocks. Furthermore, the fact that the worst rated stocks tend to have smaller market capitalisations (refer to Section 4.1) may suggest that they are less liquid. If one increases the transaction costs on the worst rated stocks portfolio to reflect this, the

[7] Which would likely be the case for stocks with larger market capitalisations.

abnormal returns would be more modest. For example, if a 2% transaction cost is applied the abnormal returns under the FF4 (APT) specification fall to approximately 11% per annum.

Appendix 2, reports the risk-adjusted performance of the consensus portfolios after restricting the sample to companies which have free floating market capitalisations of R2bn or greater. Given the size restriction, the portfolio of stocks with the most bearish consensus ratings no longer delivers significant abnormal returns under any of the APT models. In sum, this may point towards a limitation in capturing the excess returns from selling analysts' worst rated stocks when short selling restrictions are applicable.

5.7 Chapter summary and hypothesis findings

The chapter presents evidence relating to the three hypotheses explored in Chapter 3; testing whether: consensus recommendations (or at least a subset of consensus recommendations) are value adding in that they provide investors with risk adjusted returns after transaction costs (Hypothesis 1); their value is negatively impacted upon with investment delays (Hypothesis 2), and finally if consistent performance is delivered across different economic cycles (Hypothesis 3).

On a raw and risk adjusted returns basis, top and average rated stocks could not deliver significant abnormal returns even before accounting for transaction costs. The value of consensus ratings for top rated stocks is questionable in that they slightly underperformed top rated stocks over the full sample period.

Hypothesis 1 findings:

The results highlight that the value of following consensus recommendations pertains to stocks that are least favoured by analysts. Even after accounting for transaction costs, investors could theoretically obtain a risk adjusted return of approximately 13.4% p.a after accounting for market, size, valuation and momentum drivers of equity returns when holding a short position in the worst consensus portfolio.

Therefore, in the absence of short selling restrictions, the null hypothesis can be rejected that consensus recommendations are not valuable, in favour of the alternative hypothesis that at least

a subset (in this case the portfolio with the worst consensus ratings) of recommendations adds alpha to investors portfolios.

When employing a R2bn market capitalisation restriction, in order to attempt to account for short selling restrictions, none of the portfolios delivered significant risk adjusted returns after transaction costs. Accounting for short selling restrictions, the study fails to reject the null hypothesis.

Hypothesis 2 findings:

Employing investment delays of varying frequencies (1, 2, 4, 8 and 12 weeks) it was determined that employing a short-strategy to generate abnormal returns from stocks with the poorest consensus ratings is only viable if market participants react swiftly because the returns of poorly rated stocks substantially improved with increased delays.

As per the results of this study, investment delays had a substantial impact on the value of consensus recommendations. The study therefore rejects the null hypothesis that investment delays do not impact the returns of strategies formed around consensus analyst recommendations. The alternative hypothesis that investment delays reduce returns is thus supported.

Hypothesis 3 findings:

Splitting the results over a pre and post crisis sub-period highlights the variable performance of following consensus recommendations; whilst top rated stocks underperformed average rated stocks in the first sub-period (which included the 2008 financial crisis), top rated stocks outperformed in the second sub-period. Furthermore, when examining the return spread between top and the worst rated stocks by analyst consensus indicates superior performance during the post financial crisis period. A long-short zero cost portfolio delivered returns of 138bps per month from January 2010 to July 2013 versus only 26bps from June 2007 – December 2009.

Therefore in relation to Hypothesis 2, the null hypothesis that the value of analyst recommendations is constant over time is rejected in favour of the alternative hypothesis that the economic cycle impacts a strategy of forming investment portfolios on consensus recommendations.

TABLE 10: MULTIVARIATE REGRESSIONS

	Model	Rm-rf	Findi-rf	Resi-rf	SMB	VMG	PMOM	Alpha Full Period	Adj RSq	F (Pval)
TOP: 1 ≤ X ≤ 2.32	**(1)**		**0.714**	**0.163**				-0.003	70.46%	2.01E-19
			8.22E-13	0.002				0.373		
	(2)	**1.050**			**0.747**	**0.664**		-0.003	75.19%	3.52E-21
		8.35E-22			4.54E-06	0.001		0.327		
	(3)	**1.043**			**0.742**	**0.663**	0.065	-0.004	75.29%	1.75E-20
		1.72E-21			5.08E-06	0.0010	0.262	0.219		
AVE: 2.33≤ X≤3.66	**(1)**		**0.428**	**0.295**				0.000	64.54%	1.09E-16
			2.27E-06	4.30E-07				0.901		
	(2)	**0.953**			**0.533**	**0.471**		-0.002	74.08%	1.55E-20
		7.93E-21			0.0001	0.0157		0.430		
	(3)	**0.945**			**0.526**	**0.385**	0.077	-0.003	74.46%	5.22E-20
		1.34E-20			0.0001	0.018	0.159	0.263		
WORST: 3.67≤ X ≤5	**(1)**		**0.556**	**0.352**				**-0.011**	47.25%	1.34E-10
			0.0002	0.0004				0.051		
	(2)	**1.146**			**0.713**	**0.789**		**-0.012**	53.45%	8.58E-12
		6.69E-12			0.011	0.019		0.030		
	(3)	**1.153**			**0.751**	**0.824**	-0.049	**-0.012**	52.91%	4.47E-11
		8.86E-12			0.011	0.019	0.638	0.046		

TABLE 11: MEAN PORTFOLIO RETURNS (% p.m) INCORPORATING INVESTMENT DELAYS

Portfolio / Delay (weeks)	**TOP** $1 \leq X \leq 2.32$	**AVE** $2.33 \leq X \leq 3.66$	**WORST** $3.67 \leq X \leq 5$	**Top - Worst**
0	0.73%	0.76%	-0.19%	0.92%
1	0.73%	0.76%	-0.16%	0.89%
2	0.71%	0.72%	0.02%	0.69%
4	0.68%	0.73%	-0.26%	0.94%
8	0.83%	0.64%	0.30%	0.53%
12	0.78%	0.64%	0.57%	0.21%

TABLE 12: CUMULATIVE PORTFOLIO VALUES INCORPORATING INVESTMENT DELAYS

Portfolio / Delay (weeks)	**TOP** $1 \leq X \leq 2.32$	**AVE** $2.33 \leq X \leq 3.66$	**WORST** $3.67 \leq X \leq 5$	**Top - Worst**
0	153.73	158.87	74.24	79.49
1	154.25	159.57	76.69	77.56
2	151.25	156.12	85.03	66.22
4	148.43	156.03	70.31	78.12
8	165.21	143.66	107.67	57.54
12	158.56	142.89	130.53	28.03

Table 12 assumes that R100 is invested in the Top, Average and Worst portfolios. *Top- Worst* is the resulting zero cost investment portfolio when R100 is invested in top rated stocks and a short position of R100 is taken in the Worst portfolio.

TABLE 13: MODEL INTERCEPTS COMPARISONS

Panel A: Model Intercepts, No Investment Delay				
	CAPM	**RESI**	**FF3**	**FF4**
TOP	-0.14%	-0.31%	-0.30%	-0.39%
	0.70	0.37	0.33	0.22
AVE	-0.11%	-0.04%	-0.23%	-0.34%
	0.72	0.90	0.43	0.26
WORST	**-1.03%**	**-1.06%**	**-1.24%**	**-1.18%**
	0.08	0.08	0.03	0.05
TOP- WORST	**1.02%**	0.732%	**1.02%**	0.91%
	0.08	0.19	0.09	0.14
Panel B: Model Intercepts, 1 week Delay				
	CAPM	**RESI**	**FF3**	**FF4**
TOP	-0.06%	-0.29%	-0.08%	-0.15%
	0.86	0.39	0.79	0.63
AVE	-0.03%	-0.01%	-0.04%	-0.12%
	0.94	0.98	0.90	0.67
WORST	**-0.97%**	**-1.05%**	**-0.99%**	**-0.99%**
	0.09	0.08	0.07	0.08
TOP- WORST	**0.95%**	0.77%	**0.95%**	0.88%
	0.08	0.17	0.09	0.13
Panel C: Model Intercepts, 2 week Delay				
	CAPM	**RESI**	**FF3**	**FF4**
TOP	-0.09%	-0.32%	-0.11%	-0.19%
	0.80	0.35	0.72	0.54
AVE	-0.06%	-0.03%	-0.07%	-0.14%
	0.84	0.92	0.81	0.61
WORST	-0.79%	-0.89%	-0.83%	-0.89%
	0.23	0.19	0.18	0.17
TOP-WORST	0.73%	0.56%	0.79%	0.77%
	0.25	0.39	0.22	0.25
Panel D: Model Intercepts, 4 week Delay				
	CAPM	**RESI**	**FF3**	**FF4**
TOP	-0.12%	-0.35%	-0.13%	-0.20%
	0.75	0.32	0.67	0.52
AVE	-0.06%	-0.02%	-0.07%	-0.16%
	0.86	0.96	0.82	0.58
WORST	**-1.10%**	**-1.17%**	**-1.11%**	**-1.10%**
	0.06	0.05	0.04	0.05
TOP - WORST	**1.04%**	0.86%	**1.10%**	**0.99%**
	0.05	0.11	0.04	0.07

Panel E: Model Intercepts, 8 week Delay				
	CAPM	**RESI**	**FF3**	**FF4**
TOP	0.05%	-0.22%	0.01%	-0.08%
	0.90	0.51	0.97	0.81
AVE	-0.16%	-0.12%	-0.17%	-0.25%
	0.63	0.74	0.59	0.42
WORST	-0.50%	-0.58%	-0.53%	-0.54%
	0.37	0.31	0.32	0.33
TOP-WORST	0.59%	0.36%	0.59%	0.52%
	0.27	0.52	0.29	0.36
Panel F: Model Intercepts, 12 week Delay				
	CAPM	**RESI**	**FF3**	**FF4**
TOP	0.00%	-0.24%	-0.05%	-0.14%
	0.99	0.47	0.86	0.67
AVE	-0.16%	-0.13%	-0.19%	-0.27%
	0.63	0.73	0.52	0.39
WORST	-0.24%	-0.31%	-0.27%	-0.23%
	0.66	0.58	0.60	0.66
TOP - WORST	0.29%	0.09%	0.28%	0.18%
	0.57	0.87	0.58	0.74

TABLE 14: THE EFFECT OF TRANSACTION COSTS

Portfolio	**Raw monthly return**	**Intercept (% p.m) from:**				**Portfolio Turnover (%p.a)**	**Net Annual Risk Adjusted Return after 0.5% transaction cost:**			
		CAPM	**FINDI/ RESI**	**FF3**	**FF4**		**CAPM**	**FINDI / RESI**	**FF3**	**FF4**
TOP: 1 ≤ X ≤ 2.32	0.73%	-0.14%	-0.31%	-0.30%	-0.39%	115%	-2.2%	-4.2%	-4.2%	-5.3%
AVE: 2.33≤ X≤3.66	0.76%	-0.11%	-0.04%	-0.23%	-0.34%	332%	-3.0%	-2.2%	-4.4%	-5.7%
WORST: 3.67≤ X ≤5	0.19%	1.03%	1.06%	1.24%	1.18%	131%	11.7%	12.0%	14.2%	13.4%
Top - Worst	0.92%	0.89%	0.75%	0.94%	0.78%	246%	9.4%	7.8%	10.0%	8.1%

Table 14 displays the net returns on consensus portfolios after applying a 0.5% transaction cost. The returns assume long positions in the top and average rated stocks portfolios and a short position in a portfolio of the worst rated stocks. The returns on the worst consensus rated portfolio are thus opposite in sign to Table 7 and Table 10.

The net annual risk adjusted return was calculated by:

$$[model\ intercept(\%)\ x\ 12] - [(portfolio\ turnover\%/100)x0.5\%]$$

6 CONCLUSION

The study explores an investment based insight into the value that analysts are able to provide in terms of the level of the recommendations that they issue on JSE listed stocks over a six year period which incorporates the 2008 financial crisis.

In addition to consensus recommendation levels, the literature attempts to further dichotomise the value of analyst recommendations by focussing on changes in analyst consensus ratings, namely: upgrades, downgrades, initiations and resumptions of analyst coverage. Changes in analyst recommendations involve a greater number of permutations and consequently imply the analysis of a far greater number of portfolios than simply focussing on the level of analyst recommendations. Given the structure of the available data, the number of stocks covered by South African analysts and the relatively smaller number of migrations of stocks between the specified consensus portfolios; an analysis of portfolio recommendation changes was not feasible.

In light of the research limitations, some of the key questions that were posed are: Is there any variation in the performance of portfolios constructed based on analyst consensus? What are the risk drivers responsible for causing this variation (if any)? Does the value of analysts' recommendations erode as they are disseminated to the market? –i.e. does one need to form their investment decisions based on the most recent consensus recommendations available? What is the impact of transaction costs?

The research employed various APT approaches in order to conduct the performance evaluation. In general, the lack of variation in the factor loadings across the three consensus portfolios that were constructed, indicate that analysts have not tilted their views based on systematic return drivers (e.g. momentum, value, size). Therefore, the results of this study are in line with Jegadeesh et al (2004), who argue that the analysts' views on particular stocks are largely determined by their analysis of other firm specific factors.

Whilst, the loadings across the three brokerage consensus portfolios are largely similar in sign, there are however a few notable differences that may be responsible for at least some performance variation of the consensus portfolios: stocks with the most bullish and bearish

outlooks have greater loadings on the small firm size risk factor than stocks with an average consensus rating. In addition, stocks with the worst consensus ratings display a greater loading on the resources index- which has been amongst the poorest performing indices of recent times.

Turning to performance evaluation; the available universe of analyst recommendations relating to South African firms indicated that stocks in the most highly rated portfolio underperformed the market during the financial crisis and subsequently outperformed the market in the post crisis period until June 2013.

However, due to their economically substantial (but not statistically significant) underperformance during the financial crisis, equities with the highest consensus ratings actually achieved a slightly smaller cumulative return in comparison to those with average consensus ratings. This contrasts with Prayag and van Rensburg (2006) which finds that buy recommendations outperformed hold recommendations – however, their study was only conducted over a three year period and thus arguably failed to capture the performance of analyst recommendations over varying market regimes.

Overall, the results of this study do not indicate that the incremental value that analysts provide investors is related to the buy and hold recommendations that they issue (assuming that buy and hold recommendations are proxied by the top and average consensus rating levels that were constructed).

During the selected period of study, investors on the JSE however were able to generate significant net returns (after accounting for transaction costs) from heeding the calls to sell stocks with the most bearish analyst outlooks. A possible reason for this result may indicate that analysts have more to lose when issuing unfavourable recommendations, therefore these recommendations are more valuable to investors (Womack, 1996).

However, it was also found that an investment delay beyond two months greatly diminishes the value of analysts' sell recommendations. Furthermore, in the presence of short-sale restrictions (see Appendix 2), there is also some doubt that investors can capture significant abnormal returns. These findings indicate that it may be less costly for analysts to issue sell recommendations if they "know" that the market will not act on them immediately/ if there is a restriction on their application.

Given that the factor loadings on the traditional risk return drivers were not able to offer an entirely adequate explanation for the differential returns between top, average and the worst rated stocks; future research perhaps needs to test for other firm specific factors that influence an analyst's opinions on various South African stocks. In addition, a larger dataset of share recommendations must be obtained so that a deeper examination of changes in the levels of analyst recommendations can also be conducted.

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8 APPENDIX 1: VARIANCE INFLATION FACTORS

The centred Variance Inflation Factor (VIF) is the ratio between the variance of the regressor's coefficient in the specified multivariate model (FF4) and its variance in a univariate model. The uncentered VIF is computed in the same manner; however univariate regression is estimated without a constant.

A VIF exceeding 5 is indicative of a severe multicollinearity problem. Clearly none of the VIFs exceed this level for any of the models used in this research. However, this is not to say that a slight multicollinearity problem does not exist, some of the VIFs are quite high, in particular- the orthogonal size factor has a VIF that exceeds 2 in the three and four factor APT specifications.

TABLE A1: FOUR FACTOR APT MODEL (FF4) VIFS:

Top Rated Stocks

Sample: 2007M07 2013M06
Included observations: 72

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.35E-05	1.082974	NA
MKTPREM	0.019460	1.667834	1.661755
SMB_ORTHVMG	0.057358	2.104982	2.101328
VMG_ORTHSMB	0.074181	1.388825	1.386906
PMOM	0.010760	1.077796	1.010610

Average Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	8.97E-06	1.085654	NA
MKTPREM	0.004982	1.578866	1.574044
SMB_ORTHVMG	0.014307	2.177105	2.177105
VMG_ORTHSMB	0.019650	1.567763	1.558359
PMOM	0.002893	1.081840	1.009278

Worst Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.35E-05	1.082974	NA
MKTPREM	0.019460	1.667834	1.661755
SMB_ORTHVMG	0.057358	2.104982	2.101328
VMG_ORTHSMB	0.074181	1.388825	1.386906
PMOM	0.010760	1.077796	1.010610

TABLE A2: THREE FACTOR APT MODEL (FF3) VIFS:

Top Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	9.48E-06	1.018459	NA
MKTPREM	0.005574	1.567974	1.563186
SMB_ORTHVMG	0.016102	2.175354	2.175354
VMG_ORTHSMB	0.022089	1.564556	1.555172

Average Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	8.54E-06	1.018459	NA
MKTPREM	0.005023	1.567974	1.563186
SMB_ORTHVMG	0.014512	2.175354	2.175354
VMG_ORTHSMB	0.019908	1.564556	1.555172

Worst Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.13E-05	1.022034	NA
MKTPREM	0.019039	1.650946	1.644929
SMB_ORTHVMG	0.056543	2.099428	2.095784
VMG_ORTHSMB	0.073247	1.387425	1.385509

TABLE A3: TWO FACTOR APT MODEL (FF2) VIFS

Top Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.16E-05	1.044781	NA
FINDI	0.006646	1.483613	1.456973
RESI	0.002806	1.462066	1.456973

Average Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	1.20E-05	1.044781	NA
FINDI	0.006881	1.483613	1.456973
RESI	0.002905	1.462066	1.456973

Worst Rated Stocks

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3.61E-05	1.041466	NA
FINDI	0.020492	1.470894	1.439268
RESI	0.008949	1.440979	1.439268

9 APPENDIX 2: SHORT SALE RESTRICTIONS

To what extent can investors capture the abnormal returns reported above from selling short the least favourably rated stocks? In order to answer this question, stocks with very small market capitalisations were excluded from the analysis as it is unlikely that investors would be able to short such stocks. A free floating market capitalisation cut-off for eligible stocks was arbitrarily selected at R2bn[8]. This will still allow for the inclusion of some small cap stocks; however it will ensure the elimination of highly illiquid micro cap stocks from the analysis.

Incorporating the above restriction, the results in Table 10 were recalculated and are presented in Table A4. When the analysis is restricted to a larger market capitalisation, the most portfolios of stocks with the most bearish consensus ratings no longer achieves a significantly negative risk-adjusted abnormal return. The result seems to suggest that in the presence of short-selling restrictions, market participants will not be able to add alpha to their portfolios by acting on consensus sell recommendations.

In contrast, the top and average rated stocks display slightly better risk adjusted performance in comparison to when no size restriction is applied (See Table 9). On a gross returns basis, average rated stocks display positive abnormal returns for both the two and three factor APT model specifications. However, after transaction costs the portfolio's abnormal returns do not persist (refer to the high portfolio turnover of the average stocks portfolio in Table 14)[9].

[8] Initially a cut-off of R5bn was used, however this did not provide for suitable analysis: as this value led to typically only 1-5 stocks being included in the worst rated consensus portfolio.

[9] The turnover of the restricted portfolios are largely in line with the unrestricted consensus portfolios and are therefore not reported.

TABLE A4: RISK ADJUSTED PERFORMANCE EVALUATION INCORPORATING A R2BN MARKET CAP RESTRICTION

	Model	Rm-rf	Findi-rf	Resi-rf	SMB	VMG	PMOM	Alpha	Adj RSq	F (Pval)
TOP: 1 ≤ X ≤ 2.32	**(1)**		**0.701**	**0.168**				0.003	69.58%	5.47E-19
			0.01	0.0024				0.321		
	(2)	**1.034**			**0.703**	**0.633**		**0.005**	0.73785	2.27E-20
		1.58E-20			1.44E-05	0.00052		0.090		
	(3)	**1.026**			**0.697**	**0.631**	**0.052**	0.005	0.75194	1.37E-19
		4.44E-20			1.73E-05	5.5E-04	0.36997	0.147		
AVE: 2.33≤ X≤3.66	**(1)**		**0.412**	**0.301**				**0.006**	0.626	6.85E-16
			7.27E-06	7.21E-07				0.081		
	(2)	**0.921**			**0.490**	**0.440**		**0.006**	0.71818	2.62E-19
		8.46E-11			0.00	0.01		0.057		
	(3)	**0.909**			**0.482**	**0.438**	**0.078**	0.005	0.73788	8.51E-19
		1.76E-18			0.0014	0.0106	0.1626	0.119		
WORST: 3.67≤ X ≤5	**(1)**		**0.617**	**0.340**				-0.004	0.46419	1.67E-10
			1.35E-04	1.04E-03				0.549		
	(2)	**1.165**			**0.636**	**0.684**		-0.004	0.50187	5.75E-11
		6.61E-11			0.03	0.05		0.542		
	(3)	**1.176**			**0.643**	**0.687**	**-0.072**	-0.003	0.50%	2.60E-10
		7.52E-11			0.03	0.05	0.52476	0.655		