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**Analyst Activity and Impact before and During the 2008  
Financial Crisis**

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## **Analyst Activity and Impact before and During the 2008 Financial Crisis**

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### **Abstract**

This study compares pre-‘Global Financial Crisis’(GFC) analyst activity and the impact of the analysts’ recommendations to analysts’ activity and impact on South African share prices during the GFC. The total return market index declined by 45.4% from the peak to the lowest point during the GFC period. Two continual 18-month periods were designated for the comparison, one starting January 2006, and the other starting July 2007. The study uses a variety of techniques to analyse daily price data and analyst recommendations from DataStream and I/B/E/S respectively. The study is free from survivorship bias, and uses total returns to include the effect of dividends on prices. The results show that, on average, the incidence of an immediate risk-adjusted returns with the wrong expected signs did not increase significantly, indicating that the accuracy and influence of analysts did not vary from directly before to within the GFC. A regression analysis also revealed that only the market-premium factor of the Fama-French three-factor model was able to explain the risk-adjusted returns during the GFC period for all buys and all sells respectively, while the immediate impact of sell recommendations almost doubled during the GFC. Analysts unexpectedly did not increase the number of strong sell and sell recommendations when comparing the pre-crisis period to the GFC, and a one-month price impact analysis during the GFC only showed two revision categories with statistically significant unexpected results.

**Keywords:** Analyst recommendations, upgrade, downgrade, abnormal impact, global financial crisis (GFC).

## **Introduction**

Although some analysts may exhibit great skill in forecasting what prices are going to do in the future (Hobbs, Kovacs and Sharma, 2012), they do not have the proverbial ‘magic crystal ball’ through which they can look to make entirely accurate predictions all the time. The 2007/2008 ‘Global Financial Crisis’ (GFC from here) represents a suitable case-study period during which the forecasting accuracy and activity of analysts can be investigated, because it contained strong and largely unexpected up- and down movements of all international stock market indices. While the basic question echoed by academics, politicians, investors and newspapers alike was why it seemed that no one saw the GFC coming (Krugman, 2009), Cochrane (2011) argued that such a crisis was unprecedented and therefore unpredictable by investors and analysts alike.

Many investors, particularly those who invest in shares, actively search for forward-looking information and advice from specialists, and may rely on others to make investment decisions (Mikhail, Walters and Willis, 2004). Investors who have access to information before others do and can interpret how it will affect prices, can then position their portfolios or execute their trades in a way that will maximise the short- or longer term profits. Security analysts are professionals who interpret financial and economic information as a vocation, and can be very influential when issuing recommendations and reports (Loh and Stulz, 2011) because investors may act upon the advice contained in their reports. Investors, in turn, may follow the analysts in a private or public forum, and are often willing to pay for the information if they deem the analyst to be skilful.

This study specifically asked if analysts’ influence on share prices changed from prior to the GFC to during the GFC. The analysis often distinguished between positive- and negative sentiment recommendations, and the paper investigated the activity levels of analysts as they issued advice regarding their future expectations of price moves. While most of the study evaluated short term risk-adjusted price moves in order to limit the influence of noise, the article ends off with an analysis of raw price movements that followed revisions over a longer period.

## **Literature Overview**

Analysts are not alone in issuing financial information or interpretations, but form part of a global network of information distributors including newspapers, television, social media, etc. While analysts may react to information issued by other parties, like the companies themselves or whistle-blowers, they may also be the first entity to interpret information in a certain way, or be the first to release information that was previously private (Hanousek and Kopřiva, 2013). Analysts may issue a report, a new price target,

an earnings forecast, or a recommendation as a means to distribute the new information.

### *Analyst Recommendations*

A recommendation is a summary of all the other information in the analyst's possession and advises an action on an investor's part. Recommendations are issued according to a five-point scale that includes strong buy, buy, hold, sell, and strong sell recommendations. An analyst can either initiate, revise, or end their recommendations and coverage of a company (Barber, Lehavy, McNichols, and Trueman, 2000).

A recommendation can be upward (e.g. from a sell to a buy) or downward (e.g. from a hold to a strong sell). The recommendation level and the direction of a revision can convey analyst sentiment. Both hold recommendations and a stoppage of coverage while a share is listed are interpreted as negative signals by market participants, and are often followed by negative abnormal returns (Malmendier and Shanthikumar, 2007; McNichols and O'Brien; 1997).

When investors do buy or sell a share after being influenced by a recommendation, the resultant movement in the price is termed the 'impact' of the recommendation. The impact of a recommendation might also be short lived or intra-day if not accompanied by various credible supportive reports (Savor, 2012; Asquith, Mikhail and Au, 2005), or prices may react for a prolonged period of time if emotions like fear and greed are influencing many investors (Shefrin, 2000).

Analyst's reports and specifically their recommendations have been shown to have an impact on prices, both locally for Johannesburg Securities Exchange (JSE) listed companies (Gerritsen and Lötter, 2014; Prayag and Van Rensburg, 2006; Bhana, 1990) and internationally (Barber, Lehavy, McNichols and Trueman, 2000; Stickel, 1995). The extent of the influence does differ from country to country, with one particular study on G8 countries showing the USA as having had the largest reaction to analysts and Italy the smallest (Jegadeesh and Kim, 2006).

The information that various analysts use to make recommendations are also reported to differ widely among analysts. Analysts have also been reported to assign less weight to a company's financial reports than the company's strategic statements (Kerl, Stolper and Walter, 2012), and industry-specific elements are reported to play a strong role in the analysts' opinions (Previts, Bricker, Robinson and Young, 1994). Analysts may further be pay too much attention to macro events and in turn neglect specific information for a company (Peng and Xiong, 2006).

### *Analyst Activity during Crises*

Investors who rely on analysts for advice will invariably want analysts to issue reliable reports during all market movements, whether up, down, or sideways. Market crashes, such as the GFC, do not happen often, but investors

will invariably look for someone to blame if they lose money while they thought that prices would go up.

In a study of the Asian Crisis, Ang and Ma (2001) found that “analysts not only failed to anticipate the weaknesses in the firms they covered before the crash, they also failed to sufficiently adjust their forecasts after these markets crashed”. While their finding here is a negative finding, they did conclude that analysts did not exhibit herding or simultaneous panic. The analysts therefore did not foresee how financial news would affect prices, but as a group they did not exhibit behaviour associated with fear during an ‘unprecedented’ period. The fact that analysts did not ‘herd’ is also positive in the context of Kaminsky and Schmukler’s (1999) conclusion that herd behaviour existed among people trading Asian shares.

Desai, Rajgopal and Yu (2012) also investigated if analysts, auditors, ratings agencies and short-sellers in the USA anticipated the crisis through their access to financial statements. They found that only analysts and short-sellers were sensitive to leading indicators contained in financial statements, with the short-sellers being more sensitive to the data than the analysts.

Another relevant study was conducted by Sidhu and Tan (2011), who investigated analysts’ covering Australian and American shares during the GFC. They found that analysts correctly sharply decreased their earnings forecasts and increased sell/negative sentiment recommendations, but that the forecasting errors of analysts increased. Analysts were also found to have slightly overreacted, while the top-performing analysts before the crisis continued being significantly more accurate than the other analysts after the crisis.

### *The JSE during the GFC*

While the GFC affected every stock exchange in the world, it had varied impact on the various exchanges across the globe. The JSE represented the biggest equity market in Africa and was ranked among the 20 largest exchanges in the world at the time of the GFC. The JSE is a market capitalisation weighted index that contains 160 shares on average, and is characterised by high sectoral concentration in, amongst others, financials (Buseti, F. 2009). The large exposure of the JSE to financials made the JSE especially susceptible to the widespread effects stemming from bad debt in the global banking and housing sectors.

While no prior research has been conducted on analysts’ recommendations during the GFC for the JSE, research on the effects of the GFC on performance concentration and corporate disclosure has been published. Majapa and Gossel (2015) found that the cross-correlations among the Top 100 JSE-listed shares, again measured by market capitalisation, increased significantly during the GFC, while Ntim and Lindop (2013) found that corporate risk disclosure did not meaningfully increase for JSE listed companies during or in the three years after the GFC.

*In Summary*

The GFC caused widespread and unexpected contagion, both among the various global markets and also within the markets or stock exchanges themselves. Analysts, on the other hand, were not proven to exhibit the same herding behaviour as investors and also did not foresee the effects of the crisis. There may therefore exist a mismatch between what analysts deemed as the correct action to take on a share and how investors reacted to the recommendations and the other financial information at their disposal. The contagion on the highly concentrated JSE may also be visible through an increase in the effect of market risk relative to other accepted explanatory variables such as size or relative valuation level.

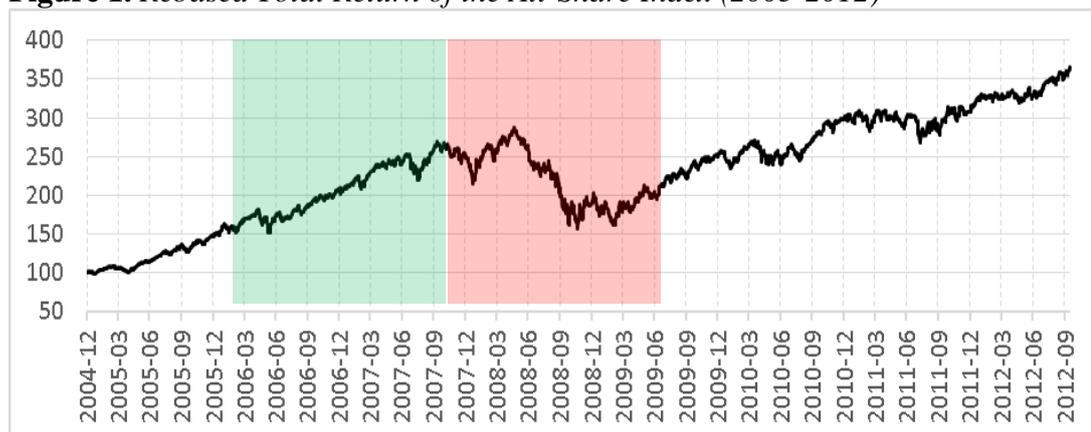
**Methodology**

The description of the methodology is presented in two sections, firstly the selection criteria for the sample period and timeframe is described, and secondly the data and data analysis techniques as relevant to the various research questions are presented.

*Sample Period*

The JSE All-Share Index (ALSI) is a size-weighted index roughly containing the 160 largest capitalisation shares listed in the Republic of South Africa on average. The ALSI from 31 December 2004 to end of 2012 is presented in Figure 1 to allow for a visual interpretation of the impact of GFC on the trend that persisted over the specific period.

**Figure 1. Rebased Total Return of the All-Share Index (2005-2012)**



Source: I-Net Bridge

The rebased total return index in Figure 1 shows that the All-Share Index had a general upward tendency from 2004 to 2012, except for the major downward move during 2008. There were also two shorter downward periods

during mid-2007 and towards the end of 2007, the latter reaching into the start of 2008. Following on Sidhu and Tan (2011), mid-2007 was therefore set as the start of the crisis after the market peaked. The three aforementioned periods all fall within this 18-month period from July 2007 to December 2008.

A comparative analysis was conducted comparing the 18 months during this GFC-period to the 18 months directly preceding it. The 36 months from January 2006 to December 2008 was therefore selected as the main sample for this study to investigate the analysts directly prior to (until June 2007) and during the GFC (from July 2007 onwards). The first 18 months are treated and referred to as the ‘benchmark period’, and the subsequent 18 months during the crisis referred to as the ‘crisis period’ or GFC period. The benchmark period contained 2,574 recommendations and the crisis period 2,367 recommendations in total, for 250 individual shares.

### *Data and Data Analysis*

This study analysed and utilised all analyst recommendations that were (i) issued for JSE listed shares from 1 January 2006 to 31 December 2008, and (ii) available from the Thomson Reuters Institutional Brokers’ Estimate System (I/B/E/S). The full dataset from which the subset was chosen and winsorised contained recommendations from 1993 to 2012. The I/B/E/S database has the following positive characteristics:

- i. It includes international as well as South African analysts’ recommendations;
- ii. It has daily analyst recommendation data according to a five-point recommendation scale, while other databases often only have summarised buy-, hold-, and sell recommendations; and
- iii. It includes delisted shares’ recommendations and therefore has no survivorship bias.

The monthly activity of analysts issuing initiations and revisions across the five-point recommendation scale was calculated, and graphed using a line-chart (see Figure 2).

As a measure of the short term price impact of recommendations this paper followed Gerritsen and Lötter (2014) in calculating the cumulative impact over the day of and the day after the recommendations were issued. The cumulative risk-adjusted abnormal return (CRAR) was calculated as follows:

- i. Firstly, each share’s daily raw total return (thus including the effect of dividends) on the day of and the day after a recommendation was issued was calculated using closing prices downloaded from Datastream; and
- ii. The RAR was calculated by subtracting a risk-adjusted return from each share’s daily total return. As per Gerritsen and Lötter’s (2014) exact methodology, the risk-adjusted return (RAR) was calculated by using a one-year historical training period for the Fama and French

(1992) three-factor model (referred to as ‘FF3’ from here), and subtracted from the daily raw total return. The FF3 contains a market premium factor, a size factor (small-minus-big, or SMB), and a valuation factor (high minus low, or HML). Only recommendations issued after a share was listed for at least one calendar year were therefore included in the calculation of the average RAR per period or recommendation category.

Equations 1 shows the conversion of the RAR on day t and day t+1 into the cumulative form, in other words the Cumulative Risk-Adjusted Return (CRAR):

$$CRAR_i = (1 + RAR_t) \times (1 + RAR_{t+1}) - 1 \quad (\text{Eq. 1})$$

The CRARs were winsorised to reduce the effect of spurious outliers falling outside of the 0.5% and 99.5% percentiles of the full data sample’s results. The upper and lower percentile limit values were -16.053% and 16.853% for the CRAR over the full 1993 to 2012 sample, implying that these values now become the maximum and minimum values for the respective calculation sets.

#### *Monthly average CRAR Tests*

The average two-day CRARs per recommendation category was calculated per month, and the results for the 18-month benchmark- and crisis periods presented separately to investigate if certain months had unexpected results due to the GFC. To help with visually navigating the two large tables, months with a statistically significant average CRAR were coloured yellow, and months where recommendation categories had a CRAR with the wrong expected sign were coloured green. Positive CRARs are expected in the ‘Strong buy’ and ‘Buy’ categories, while negative CRARs are expected in the ‘Strong sell’, ‘Sell’ and ‘Hold’ categories (Malmendier and Shanthikumar, 2007; and McNichols and O’Brien; 1997).

One-tailed t-tests were used to evaluate whether the average CRAR impact of the individual recommendation categories were significantly greater than zero (less than zero) for positive recommendations (negative recommendations). Results are marked with an \* and \*\* throughout the paper to indicate statistical significance at the 10 per cent and five per cent levels respectively.

#### *‘Regimechange’ Regression Tests*

The benchmark and GFC periods’ recommendations’ raw returns on the day of the recommendations were regressed against the FF3’s factors’ returns to measure if a ‘regime change’ occurred around analyst recommendations from the benchmark period to the crisis period. For the purposes of this study a regime change is defined as a change in the explanatory factors from one

period to another, implying that the drivers of returns around analysts' recommendations varied across the two periods.

The adjusted R-square value, the F-value, and the 'Significance F' values were used as an indication of the overall ordinary least-squares (OLS) linear regression model's accuracy. The adjusted R-squared values were used because a multiple regression was performance, as opposed to the R-squared that would have been used if it were a single factor regression that was carried out. The individual factors' betas as calculated in the regressions are displayed alongside their respective p-values. To end the regression tests, only the 'Strong buy' and 'Buy' recommendations were regressed against the FF3 factors to isolate positive signals from the analysts, and similarly the 'Strong sell' and 'Sell' recommendations were regressed against the FF3 factors to isolate definite negative signals from the analysts across the two test-periods.

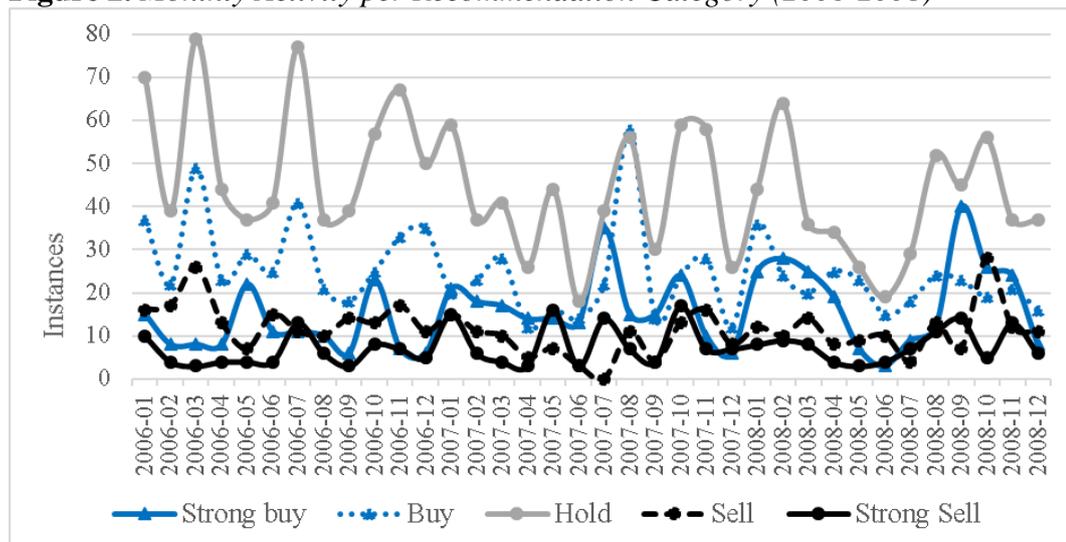
*Raw Returns of Revisions during the GFC*

Lastly, as a summary of how the market generally reacted following analysts' recommendations during the GFC, the average one month raw returns per revision category were calculated. The raw returns are not stated relative to anything else, and represent investors' reaction incorporating all the various specific risks of the company as well as the systematic risks. Again, results were marked with an \* and \*\* to indicate statistical significance at the 10 per cent and five per cent levels respectively.

**Results and Discussion**

The monthly activity of analysts issuing initiations and revisions across the five-point recommendation scale are displayed in Figure 2.

**Figure 2. Monthly Activity per Recommendation Category (2006-2008)**



Source: Thomson Reuters I/B/E/S

**Table 1. Benchmark Period CRARs per recommendation Category**

	<b>Strong buy</b>	<b>Buy</b>	<b>Hold</b>	<b>Sell</b>	<b>Strong Sell</b>
<b>2006/01</b>	0.76% (1.16)	1.64% ** (2.94)	-0.23% (-0.73)	0.70% (1.21)	-1.50% (-1.37)
<b>2006/02</b>	0.25% (0.22)	0.56% (1.08)	-0.19% (-0.30)	-0.68% (-1.20)	-3.95% * (-2.23)
<b>2006/03</b>	2.23% (1.11)	0.76% ** (2.08)	0.37% (1.13)	-0.41% (-0.68)	0.99% * (2.02)
<b>2006/04</b>	-0.91% (-0.79)	0.62% * (1.71)	-0.20% (-0.46)	-0.58% (-0.48)	-1.92% ** (-4.74)
<b>2006/05</b>	-0.04% (-0.09)	0.60% (1.13)	-1.18% ** (-3.06)	1.63% ** (2.00)	-1.09% (-1.51)
<b>2006/06</b>	-0.59% (-0.69)	-1.42% ** (-2.29)	-1.00% * (-1.67)	-0.23% (-0.18)	-3.97% * (-1.78)
<b>2006/07</b>	0.45% (0.46)	-0.49% (-1.28)	-0.27% (-0.98)	-1.25% * (-1.81)	-0.05% (-0.08)
<b>2006/08</b>	1.11% * (1.72)	0.49% (0.49)	-0.23% (-0.43)	-1.50% (-0.98)	-0.47% (-1.15)
<b>2006/09</b>	1.52% (1.28)	0.35% (0.51)	0.47% (1.30)	0.70% (1.29)	-0.15% (-0.61)
<b>2006/10</b>	0.02% (0.05)	0.81% (1.24)	0.69% ** (1.85)	0.24% (0.30)	0.42% (0.43)
<b>2006/11</b>	-0.05% (-0.05)	1.26% ** (2.35)	0.26% (0.90)	-0.32% (-0.64)	0.31% (0.81)
<b>2006/12</b>	0.10% (0.06)	-0.03% (-0.10)	-0.53% * (-1.64)	-2.19% (-1.29)	-0.34% (-0.33)
<b>2007/01</b>	1.10% ** (2.22)	0.65% (0.86)	0.49% * (1.59)	-0.22% (-0.36)	-0.58% (-1.19)
<b>2007/02</b>	0.36% (0.75)	0.16% (0.35)	0.27% (0.54)	-0.79% ** (-2.58)	-1.16% (-0.51)
<b>2007/03</b>	0.42% (0.46)	-0.11% (-0.18)	0.17% (0.43)	-1.1% ** (-2.19)	-1.15% (-1.29)
<b>2007/04</b>	-0.09% (-0.20)	4.44% ** (2.30)	-0.49% (-1.21)	1.36% (0.95)	0.09% (0.06)
<b>2007/05</b>	0.76% (0.83)	-0.49% (-1.04)	-0.13% (-0.43)	0.41% (0.70)	-0.31% (-0.73)
<b>2007/06</b>	1.33% (1.02)	-0.9% (-1.16)	-1.51% ** (-2.20)	-1.33% (-1.15)	-2.74% (-0.82)

Source: Thomson Reuters I/B/E/S

Note: The cells with a statistically significant average CRAR with the expected sign are coloured yellow. Grey cells represent months where a statistically significant CRAR with a wrong expected sign occurred. Cells with CRARs with the wrong expected sign were coloured green if the values were not statistically significant to indicate that the market reacted in the opposite direction than advised by the analysts.

**Table 2. Crisis Period CRARs per Recommendation Category**

	<b>Strong buy</b>	<b>Buy</b>	<b>Hold</b>	<b>Sell</b>	<b>Strong Sell</b>
<b>2007/07</b>	-0.34% (-0.74)	0.33% (0.51)	-0.75% ** (-2.02)		-1.21% * (-1.49)
<b>2007/08</b>	1.09% (1.33)	-0.15% (-0.38)	-0.27% (-0.57)	-4.59% ** (-2.13)	-0.40% (-0.26)
<b>2007/09</b>	-0.77% ** (-2.33)	0.03% (0.05)	-0.28% (-0.32)	-0.06% (-0.02)	0.95% (0.64)
<b>2007/10</b>	0.41% (0.85)	0.17% (0.27)	-0.92% ** (-3.01)	0.92% (0.90)	-0.66% (-1.30)
<b>2007/11</b>	-0.58% (-0.59)	0.61% (1.23)	-0.25% (-0.95)	-0.58% (-0.94)	0.73% (0.73)
<b>2007/12</b>	0.06% (0.07)	0.09% (0.18)	0.09% (0.17)	0.59% (1.07)	-0.10% (-0.15)
<b>2008/01</b>	0.41% (0.57)	1.81% ** (2.38)	0.28% (0.44)	-1.61% ** (-1.91)	-1.64% (-0.71)
<b>2008/02</b>	-0.11% (-0.20)	0.46% (0.60)	-1.14% ** (-2.29)	-0.47% (-0.35)	-0.51% (-0.43)
<b>2008/03</b>	1.63% ** (2.47)	1.66% * (1.71)	1.06% * (1.57)	-1.89% ** (-1.81)	0.50% (0.77)
<b>2008/04</b>	-0.55% (-1.11)	0.15% (0.17)	-1.62% ** (-3.79)	-1.69% (-0.94)	-2.01% (-1.00)
<b>2008/05</b>	0.17% (0.27)	-0.05% (-0.07)	1.05% (1.21)	-1.33% (-0.73)	0.92% (0.78)
<b>2008/06</b>	3.44% (0.90)	-0.14% (-0.25)	-0.83% (-1.07)	0.61% (0.44)	0.06% (0.03)
<b>2008/07</b>	1.89% (1.28)	0.47% (0.73)	1.11% ** (2.01)	-1.14% * (-1.8)	-0.85% (-1.22)
<b>2008/08</b>	0.91% (0.59)	-0.54% (-0.64)	0.33% (0.59)	0.19% (0.23)	0.13% (0.12)
<b>2008/09</b>	0.67% (1.14)	-0.9% (-0.76)	0.69% (1.27)	2.62% ** (3.79)	0.25% (0.47)
<b>2008/10</b>	1.43% ** (1.71)	1.69% (1.09)	-0.56% (-0.67)	-2.96% ** (-2.00)	0.72% (0.16)
<b>2008/11</b>	0.75% (1.01)	0.00% (0.00)	0.58% (0.8)	-2.33% ** (-3.38)	-1.82% (-0.85)
<b>2008/12</b>	2.37% ** (2.45)	1.32% (1.33)	-0.41% (-0.58)	1.45% * (1.38)	-1.59% (-0.77)

Source: Thomson Reuters I/B/E/S

Note: The cells with a statistically significant average CRAR with the expected sign are coloured yellow. Grey cells represent months where a statistically significant CRAR with a wrong expected sign occurred. Cells with CRARs with the wrong expected sign were coloured green if the values were not statistically significant to indicate that the market reacted in the opposite direction than advised by the analysts.

The hold recommendation category was the predominant choice for analysts over both the benchmark- and the crisis periods, except for August in 2007 after the JSE All Share dipped for the first time (refer to Figure 1). The analysts seems to have timed their buys correctly during August 2017 because the overall market index recovered relative to the low point reached just before it. The two blue lines representing the positive recommendations were generally higher than the two sell categories, except for October in 2008 when sell recommendations outpaced both buy categories.

The CRAR for the benchmark period and the crisis periods are shown in Table 1 and Table 2 respectively.

The benchmark period had four different monthly instances of a statistically significant positive average CRAR for negative sentiment categories, and only one month where a positive recommendation category was associated with a statistically significant negative abnormal CRAR. The GFC period had exactly the same distribution among the monthly measurements of the recommendation categories. When disregarding statistical significance, the negative recommendation categories had 17 instances where negative recommendation categories were associated with average CRARs with the wrong sign during the benchmark period in Table 1, whereas these occurrences increased slightly to 21 during the crisis period in Table 2.

The two positive sentiment recommendation categories had 11 instances with the wrong sign during the benchmark period of which one was statistically significant, which reduced to nine instances during the crisis period with only one significant. Overall, the instances where a recommendation category produced a statistically significant result with the correct sign decreased slightly from 17 to 16.

The average daily CRARs of all the initiations, revisions and stops issued during the benchmark- and crisis periods were regressed against the three factors used in the FF3 model. The results are displayed in Table 3.

**Table 3. All Recommendations 18-month Regression Analyses**

	<b>Benchmark period (n=1,815)</b>		<b>Crisisperiod (n=1,677)</b>	
	<b>Model results</b>		<b>Model results</b>	
<b>Adjusted R-Square</b>	0.003		0.000	
<b>F</b>	2.912**		1.135	
<b>Significance F</b>	0.033**		0.334	
	<b>Result</b>	<b>P-values</b>	<b>Result</b>	<b>P-values</b>
<b>Intercept</b>	0.035%	0.492	0.036%	0.636
<b>Alsi-Rf beta</b>	-0.030	0.492	-0.027	0.586
<b>SMB beta</b>	-0.108**	0.013	-0.131	0.107
<b>HML beta</b>	-0.038	0.590	0.019	0.907

Source: Thomson Reuters I/B/E/S

The benchmark period's overall linear regression model had a statistically significant F-value. The Significant F-value thus indicates that factors together

had a significant explanatory power over the 18 months preceding the crisis. The crisis period's regression model does however not have a significant F-value. None of the three factors contained any explanatory power during the 18 month crisis period, while the SMB factor did have a statistically significant beta for the benchmark period and the HML factor changed from negative to positive. The overall regression results therefore indicate that two slightly different factorial regimes were operating during the benchmark and the crisis period when considering the full sample.

There are, however, minor similarities between the two regression models. For both models (i) a positive, practically similar intercept was calculated, (ii) the ALSI and SMB factors had negative betas, and (iii) the adjusted R-squared values were very low.

The regression was repeated over the benchmark- and the crisis periods, but this time only positive sentiment recommendations were evaluated. The results are shown in Table 4.

**Table 4. Strong Buy and Buy Regression Analyses**

	<b>Benchmark period: Buys and strong buys (n=669)</b>		<b>Crisis period: Buys and Strong buys (n=679)</b>	
	<b>Model results</b>		<b>Model results</b>	
<b>Adjusted R-Square</b>	0.014		0.012	
<b>F</b>	4.134**		3.710**	
<b>Significance F</b>	0.006**		0.050**	
	<b>Result</b>	<b>P-values</b>	<b>Result</b>	<b>P-values</b>
<b>Intercept</b>	0.300%**	0.001	0.215%**	0.043
<b>(Alsi – Rf)beta</b>	-0.153**	0.041	0.178**	0.014
<b>SMB beta</b>	-0.275**	0.001	0.008	0.943
<b>HML beta</b>	0.018	0.885	0.002	0.994

Source: Thomson Reuters I/B/E/S

The regression analysis of the positive recommendation categories firstly indicate that analysts did generate a significant RAR on the day of the recommendations during both periods, albeit 0.085% lower during the crisis period than the 0.3% during the preceding benchmark period. The market factor also had a significant explanatory contribution during both the periods, being negative pre-crisis and positive during the GFC. Similarities to the overall model include the negative SMB factor pre-crisis and that the HML factor again provided no explanatory contribution to the model.

The regression was also carried out for the two sell recommendation categories over both the benchmark and the crisis periods to evaluate if the regression factors' explanatory power was the same as or different from those of the buy recommendations. The results are displayed in Table 5.

**Table 5. Strong Sells and Sells Regression Analyses**

	<b>Benchmark Period: Sells and Strong Sells (n=320)</b>		<b>Crisis Period: Sells and Strong Sells (n=306)</b>	
	Model results		Model results	
<b>Adjusted R Square</b>	-0.001		0.029	
<b>F</b>	0.872		4.080**	
<b>Significance F</b>	0.456		0.007**	
	<b>Result</b>	<b>P-values</b>	<b>Result</b>	<b>P-values</b>
<b>Intercept</b>	-0.268%**	0.022	-0.452%**	0.012
<b>Alsi-Rf Beta</b>	-0.149	0.110	-0.399**	0.001
<b>SMB Beta</b>	-0.071	0.470	-0.361*	0.069
<b>HML Beta</b>	0.033	0.836	0.110	0.775

Source: Thomson Reuters I/B/E/S

The explanatory power of the overall regression model for the negative recommendations was only significant during the GFC-period, as opposed to the buy recommendations' regression that was significant in both periods in Table 4. Both intercepts were significantly negative, and the intercept reduced by almost 2% during the GFC when compared to the benchmark period. This shows that negative recommendations had even more of an impact during the crisis and were in line with market sentiment and the timing of investors' reaction, while the impact of buy recommendations reduced. The benchmark period did not have any significant explanatory factors, where after the market-premium factor and the SMB factor were both negative and statistically significant during the GFC.

Similar to the results in Table 3, Tables 4 and 5 also indicate the anticipated regime change for the analyst's positive and negative recommendations. During the GFC negative recommendations had a much larger immediate price impact than positive recommendations, and the market-premium factor was a strong explanatory variable for both sentiment groups. The HML factor produced no explanatory power during both periods, indicating that neither over- nor undervaluation explained returns around the analyst's recommendations. The size factor, SMB, had strong explanatory power for buys during the benchmark period, and only weakly significant explanatory power for sells during the GFC. The market factor was also the strongest explanatory factor overall, indicative of the market risk that could be assumed to have driven returns.

Lastly, the raw returns for revision categories over a 1-month period were calculated for the various revision categories to investigate if the recommendations and the subsequent price moves were misaligned during the GFC. Outliers were winsorised to reduce the effect of spurious outliers, and the results are shown in Table 6.

**Table 6.** Average GFC Period 1-month Raw Price Impact of revisions (n=1,078)

		To recommendation (active recommendation)				
		Strong buy	Buy	Hold	Sell	Strong sell
From recommendation: (prior recommendation)	Strong buy			-0.90% (-1.07)		-0.51% (-0.2)
	Buy	-6.74%* (-1.74)		-3.4%** (-3.28)	9.21%* (1.61)	
	Hold	2.26%** (2.9)	1.42%** (1.97)		-2.4%** (-1.69)	0.88% (0.88)
	Sell		13.13%** (2.09)	2.22%* (1.54)		-4.24% (-0.44)
	Strong sell	-2.97% (-1.14)		2.00%* (1.9)		

Note: Categories with no values did not have any analyst activity.

Source: Thomson Reuters I/B/E/S

Overall, only two of the 14 revision categories with analyst activity produced a statistically significant average raw return with the wrong sign at a 10% confidence level, and none at the 5% confidence level. Six of the revision categories were associated with average 1-month price movements that were in the intended direction and significant at the 5% level. All upgrades to hold performed positively, while upgrades and downgrades from buy both had wrong sign for strong buy- and sell revisions respectively. Analysts seems to have mistimed or to have been premature on revisions from buy to strong buy and from buy to sell. Upgrades from sell to buy produced the best 1-month returns overall.

## Conclusion

The comparison of the pre-GFC period to the GFC period yielded some expected and some unexpected results. Analysts continued issuing more positive than negative recommendations during the GFC, and the number of recommendations issued for all buys and all sell did not change substantially among the two periods. The number of negative (positive) recommendations would have been expected to increase (decrease). The number of recommendation categories that had an average CRAR with a wrong sign increased slightly during the GFC compared to before, albeit that most of these instances were not statistically significant. Overall, the number of statistically significant months where recommendation categories had both the right and the wrong sign remained fairly constant and an increase or decrease in analyst influence or accuracy cannot be proven.

The regression analyses that used the FF3-factors however indicated that analysts' sell and strong sell recommendations did increase in their accuracy and impact on the day of issuance during the GFC. The market-premium factor explained most of the returns during the GFC for both the positive- and the negative sentiment regression analyses, signifying that, as expected, market

risk also drove the contagion among all sizes of companies and across various valuation levels around the recommendations. The one-month cumulative raw return analysis further showed that, except for two revision categories, analysts' revisions were in line with the general market sentiment. The two aforementioned revision categories may have produced these returns due to investors holding on to existing sentiments because of fear or greed, and not listening to new information presented to them by analysts.

Analysts therefore did not show any marked changes in behaviour or influence except for the immediate impact of their sell and strong sell recommendations. The analysts may therefore have been immune to some of the contagion of fear and panic (similar to findings by Ang and Ma, 2001), but further analysis of this specific behavioural trait is needed to confirm the suspicion.

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