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29 May 2013

Quantamentals

Positively Persuasive

Analyzing the Tone of Earnings Conference Calls

Applying textual analysis to earnings conference calls: We build on our Quantamentals: Camouflaged in Complexity note and use text analysis methods to examine the tone of earnings conference calls.

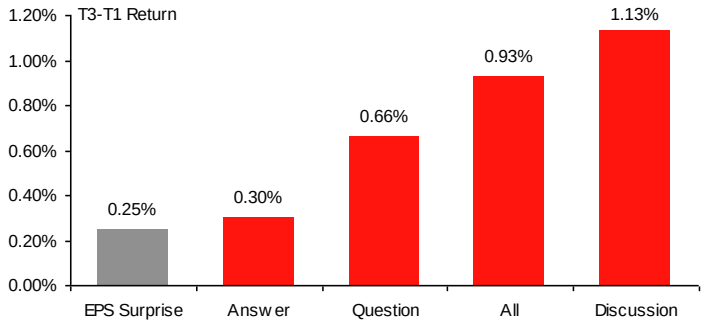
Why is tone important?: We explore whether the positive and negative language used in earnings conference calls is incremental to the actual earnings result. We believe tone used by management could be used to convey additional information, or be used as a management tool to raise (or lower) investor expectations.

Constructing measures of conference call tone: We collect a sample of 6000 quarterly earnings conference call transcripts from Factset. We then use three separate dictionaries from Linguistic Inquiry and Word Count, Diction, and Loughran and McDonald (2011) to measure the proportion of positive and negative words in each section of a conference call (i.e. discussion, questions, answers).

Implications of conference call tone: Our key findings are (1) There is negligible return drift following an earnings surprise; (2) In contrast, changes in call tone are positively related to returns following an earnings announcement; (3) Changes in the tone of the discussion section generate the strongest results; (4) A combined signal from the three dictionaries produces more powerful return drifts; and (5) There are signs of return reversals at longer holding periods (12 months).

Usage by investors: Our findings can be used by fundamental and quant investors to better understand an earnings result. The tone signal is best exploited over shorter holding periods (<3 months).

Fig 1 Earnings Surprise v Change in Tone (3 Month Return Drift)



Source: Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

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Positively Persuasive

Analyzing Tone of Earnings Conference Calls

We build on our complexity research and examine the tone of earnings conference calls.

In our Quantamentals: Camouflaged in Complexity note we used text analysis to extract stock selection signals from the Management Discussion and Analysis (MD&A) section of annual reports. These signals related to complexity, or readability, and were aimed at capturing effects around management deception. We now build on this earlier research and use textual analysis methods to examine the tone of quarterly earnings conference calls.

The aim of the research is to determine whether the positive and negative language used in a conference call is incremental to the actual earnings result. We believe the tone used by management could be used to convey additional information, or be used as a management tool to raise (or lower) investor expectations.

Tone is a function of both content and word choice.

When we discuss tone, we refer to tone as the affect or feeling of a communication. This is a function of both content and word choice. Consequently positive tone can be achieved by focusing on positive outcomes and/or describing outcomes in a positive way (Henry, 2008).

As an example of positive conference call tone created by focusing on specific outcomes, a large multinational organization can focus on results from specific business segments. While the overall business may have struggled, management may highlight good performance of a particular segment/product. Similarly, while the firm may have reported a loss for the quarter, management may highlight improvements in other metrics such as cash balances or receivables.

For our research we focus on measuring tone by word choice.

Tone portrayed in the form of specific outcomes is hard to capture using textual analysis methods. Rather the common approach in empirical research is to focus on word choice. That is, positive and negative words. This is the approach we take in our research.

For our research we collect a sample of 6000 quarterly earnings conference call transcripts from Factset. We collect these for the largest 200 companies in the S&P500 index. We then use three separate dictionaries from Linguistic Inquiry and Word Count, Diction, and Loughran and McDonald (2011) to measure the proportion of positive and negative words in each section of a conference call (i.e. discussion, questions, answers).

We aim to determine whether tone is a useful signal, and more specifically what part of the call is most important, along with the best way to measure tone.

Academic Insights

Academics have found relationships between tone of corporate information disclosures and announcement returns.

There are indications from academic research that tone could be a useful signal. With regards to formal corporate disclosures, Demers and Vega (2008), Henry (2008) and Davis *et al*. (2011) find the level of optimism in earnings press releases is positively associated with the market's short-term response to the announcement. Focusing on other formal corporate disclosures, Loughran and McDonald (2011) examine 10-Ks, and find that tone measures computed from word lists customized in a financial context are significantly related to announcement returns. While Feldman *et al*. (2010) explore changes in tone of the MD&A section of Forms 10-Q and 10-K, they also document a significant market reaction around the filings that is associated with the tone change of the MD&A section.

In other communications with investors, there is evidence of negative words in chairmans' letters in annual reports being associated with negative stock returns (Abrahamson and Amir, 1996) and firm bankruptcy (Smith and Taffler, 2000). Related, Uang *et al*. (2005) find that the tone of auditors' growing concern narrative predicts the severity of future outcomes such as bankruptcy.

Tone of stock-specific news is also related to stock performance.

Outside of corporate information disclosures, Tetlock (2007) and Tetlock *et al*. (2008) examine tone of media news. They find that the proportion of negative words in firm-specific news stories predicts low firm earnings and downward pressure on stock prices.

Company-specific tone has been examined in other forums. Antweiler and Frank (2004) look at internet stock message boards. They find that message posting bullishness is contemporaneously associated with returns. Das and Chen (2007) also examine internet message boards and document weak evidence of the sentiment in stock message board postings being able to predict individual stock returns.

Tone of central bank communications has been found useful in predicting rate moves.

Tone has also been examined in other contexts. Lucca and Trebbi (2008) measure the contents of central bank communications about future policy rate moves and find that medium-term and long-term government bond yields react to their soft information measure.

In terms of focusing on earnings conference calls, Larcker and Zakolyukina (2012) examine the Question and Answer section of quarterly conference calls and find CEO and CFO narratives significantly improves in the detecting deception. Certain tone measures are incorporated in their analysis, but for the purpose of identifying deception.

Key Findings & Next Steps

We find that increases in the tone of the discussion section of conference calls are associated with future stock outperformance.

This note is our second foray into the textual analysis space. Building on the encouraging work we did relating to annual report readability, we find the tone of earnings conference calls to also be a useful signal. Our main findings are:

- In our sample, there is negligible return drift following an earnings surprise;
- In contrast, changes in earnings conference call tone are positively related to returns following an earnings announcement;
- Changes in the tone of the discussion section of calls generate the strongest results;
- A combined signal from the three dictionaries produces more powerful return drifts; and
- There are signs of return reversals at longer holding periods (12 months).

Overall, we think this is a promising area for quantitative research. This is best highlighted by the fact that we find negligible drift to signals based on the actual earnings surprise, yet we see drift associated with soft information. We are confident that extending the analysis into a broader universe (and away from the largest large cap names) would strengthen results further.

Outline of the note

Our note proceeds as follows. We first provide an overview of the sample of conference call transcripts used in our research. We then provide details on how we measure tone and the software we use to do so. Next, we provide insights into the tone measures we compute. We then start our backtesting – first by looking at market reactions to earnings and tone. This backtesting is then expanded to a cross-sectional framework. We finish the analysis by exploring changes in tone of the MD&A section of annual reports.

Earnings Conference Call Transcripts

Getting the Data and Sample Selection

We collect transcripts of earnings conference calls for 200 stocks from Factset.

The starting point for our analysis is to get transcripts of earnings conference calls. We get transcripts from Factset.

To access the conference call transcripts, we access them through Factset's desktop product. The limitation of this is that it is only possible to access transcripts for currently listed stocks.

With this in mind we construct a sample of firms that have been in the S&P500 index continuously since the start of 2006. We then identify the top 200 stocks that have had the largest average index weight from 2006 to present. We do replace 6 stocks due to issues with their transcripts (e.g. Walmart does not have a Q&A section). Also in selecting our sample we exclude Financials and Utility stocks. Please contact us for a full list of stocks in our sample.

Our sample gives a good balance across sectors, in proportion to each sector's size.

In Fig 2 we show what percentage of the S&P500 and Russell 1000 we cover by index weight. The proportion of the index covered is quite stable across our sample, hovering around the 55% and 65% mark for the R1000 and S&P500 respectively. In Fig 3, we break down our sample by sector. In terms of straight number of stocks in our sample, the Energy, Material and Telecommunication sectors have the lowest representation.

However, in Fig 4 and Fig 5 we show the proportion of each sector we cover based on number of stocks and index weight. When examining the proportion of the sector covered based on number of stocks, we see coverage is close to 50% for all sectors, other than notable deviations for Consumer Discretionary and Consumer Staples. We see similar solid sampling across sectors when examining sector coverage based on index weight in Fig 5.

For each company we collect 30 quarters of transcripts.

For the 200 companies in our sample we collect 30 quarters of earnings conference calls covering calendar Q4 2005 to Q1 2013 (i.e. 6000 in total).

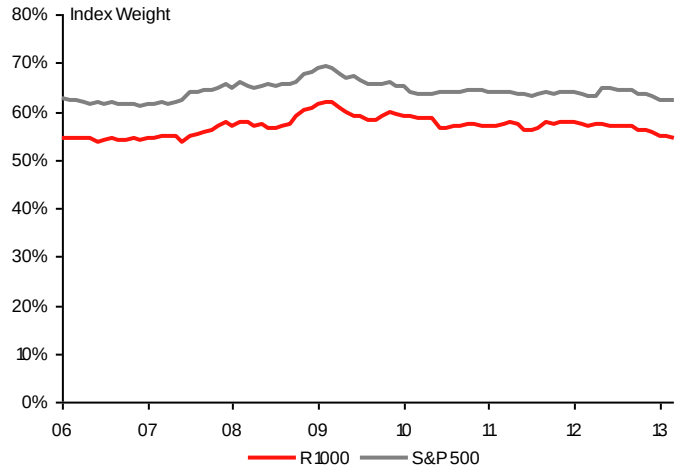
For each earnings call, we collect the discussion section along with the Q&A. We then break the Q&A into a Question and Answer section, meaning we have 3 parts for a conference call. This enables us in our analysis to examine tone of prepared management comments (i.e. Discussion section), tone of spontaneous (or at least less prepared) management comments (i.e. Answer section), and tone of market participants (i.e. Question section).

Aspects of our sample stack the odds against us finding a signal in the conference call data.

While this sample is small and subject to survivorship issues, we actually think this could bias the likelihood of finding a result against us. Additionally, the fact that we are focusing on the largest (and arguably most efficient) stocks further compounds the odds against us.

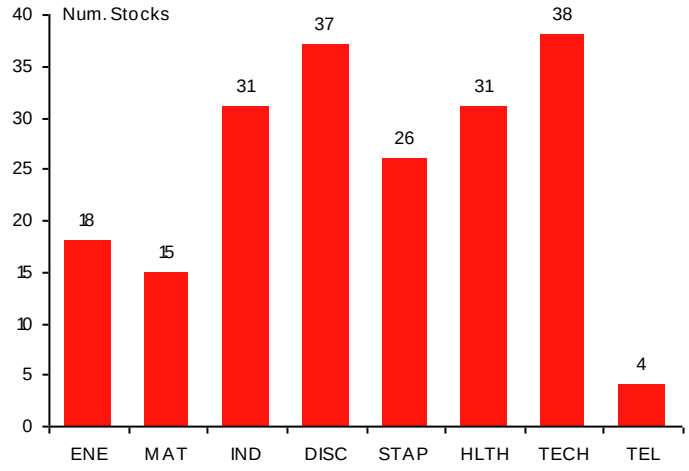
Before we go further, a comment on potentially putting into production any signal from conference call transcripts is necessary. To collect transcripts from Factset, we had to do this manually. This might appear to be a limitation of working with conference call transcripts. However we would like to note it is possible to get machine readable versions of transcripts (and get them globally).

Fig 2 Percentage of Universe in Sample (By Index Weight)



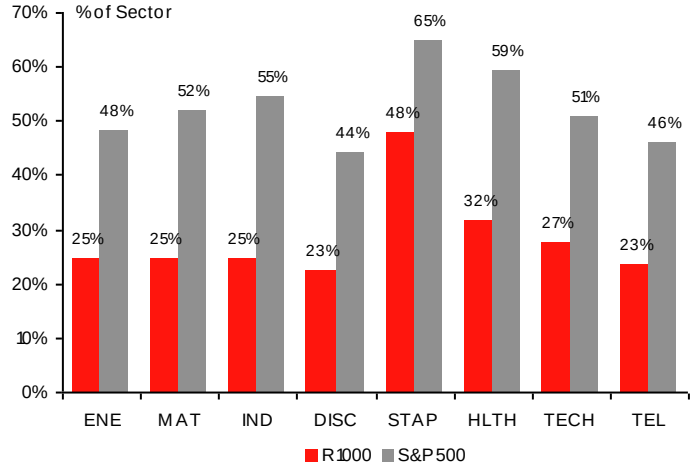
Source: Factset, S&P, Russell, Macquarie Capital (USA), May 2013.

Fig 3 Number of Stocks from each Sector (2006-13)



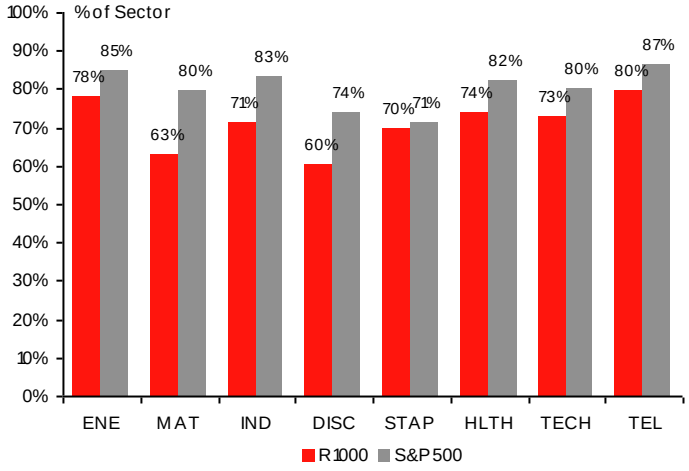
Source: Factset, S&P, Macquarie Capital (USA), May 2013. Key: ENE = Energy, MAT = Materials, IND = Industrials, DISC = Consumer Discretionary, STAP = Consumer Staples, HLTH = Health Care, TECH = Information Technology, TEL = Telecommunication Services.

Fig 4 Average Percentage of Sector Covered (By Number of Stocks) (2006-13)



Source: Factset, S&P, Russell, Macquarie Capital (USA), May 2013. Key: ENE = Energy, MAT = Materials, IND = Industrials, DISC = Consumer Discretionary, STAP = Consumer Staples, HLTH = Health Care, TECH = Information Technology, TEL = Telecommunication Services.

Fig 5 Average Percentage of Sector Covered (By Index Weight) (2006-13)



Source: Factset, S&P, Russell, Macquarie Capital (USA), May 2013. Key: ENE = Energy, MAT = Materials, IND = Industrials, DISC = Consumer Discretionary, STAP = Consumer Staples, HLTH = Health Care, TECH = Information Technology, TEL = Telecommunication Services.

Measuring Tone

How to Measure Tone

Tone is a function of both content and word choice.

Tone, defined as the affect or feeling of a communication, is a function of both content and word choice. Consequently positive tone can be achieved by focusing on positive outcomes and/or describing outcomes in a positive way (Henry, 2008).

Companies can create a positive tone to a call by focusing on specific outcomes. For instance:

- A large multinational organization has multiple segments and product lines from which to select results. While the overall business may have struggled, management may highlight good performance of a particular segment/product.
- While the overall firm may have generated a loss in a quarter, management may highlight improvements in other metrics such as cash balances or receivables.
- Management may focus on a benchmark that creates a more favourable comparison in performance (e.g. earnings ex-this or that).

To convey tone, management may even try to focus attention away from the current period's performance, and express positive or negative future expectations.

For our research we focus on measuring tone by word choice.

Tone portrayed in these ways is hard to capture using textual analysis methods. Rather the common approach in empirical research is to focus on word choice. For example, the usage of upward directional words such as "increase" and "up" have been shown to be more prevalent than downward directional words.

For our research, we focus on measuring tone by word choice.

Software and Dictionaries

To measure tone by word choice we use three separate dictionaries.

To measure tone via management word choice we use three separate dictionaries.

Two of these dictionaries come from off-the-shelf software packages – Diction, and Linguistic Inquiry and Word Count (LIWC). Each has separate word lists to capture positive and negative tone in text. Both Diction and LIWC work by counting the number of words from each word list that appears in a given document. Further, they both standardize the word counts (e.g. percent of total words) allowing comparability across documents.

Diction has dictionaries that allow us to measure optimistic and pessimistic words.

Diction is a well established language processing algorithm that has been used extensively in prior research to analyse the speeches of Federal Reserve policymakers, political speeches, corporate reports and earnings announcements. Diction searches a document for five general semantic features as well as thirty-five sub-features. Qualities that Diction searches for include Certainty, Activity, Optimism, Realism and Commonality. For our research we use the optimism definition of Diction. Optimism is defined as "language endorsing some person, group, concept or event or highlighting their positive entailments" (Digitext Inc, 2012).

The Diction formula for Net Optimism is [Praise + Satisfaction + Inspiration] – [Blame + Hardship + Denial].

We interpret the first component as optimism and the second component as pessimism. Or in the vernacular of our note, optimism is Diction Positive, pessimism is Diction Negative and net optimism is Diction Net Positive.

LIWC has dictionaries that allow us to measure positive and negative emotion words.

The second software package, LIWC is also used extensively in academic research. The standard analysis performed by LIWC produces 4 general descriptor categories (total word count, words per sentence, percentage of words captured by the dictionary, and percent of words longer than six letters), 22 standard linguistic dimensions (e.g., percentage of words in the text that are pronouns, articles, auxiliary verbs, etc.), 32 word categories tapping psychological constructs (e.g., affect, cognition, biological processes), 7 personal concern categories (e.g., work, home, leisure activities), 3 paralinguistic dimensions (assents, fillers, nonfluencies), and 12 punctuation categories (periods, commas, etc).

For our analysis we focus on 2 specific psychological constructs – positive emotion and negative emotion. We denote these LIWC Positive and LIWC Negative.

A third dictionary from academia has positive and negative word lists that have greater relevance in a financial sense.

Complementing the word lists available in Diction and LIWC, we also employ a third dictionary from Loughran and McDonald (2011). Loughran and McDonald derive a list of positive and negative words that have greater relevance in a financial sense. For instance they note that words such as tax, cost, capital, board, liability, foreign and vice appear on other words lists. Yet they frequently appear in annual reports or company disclosures to do no more than detail the board of directors, titles of management or aspects of financial statements. We denote the scores using the Loughran and McDonald lists as LM Positive and LM Negative.

Quantifying Tone

For the Discussion, Question and Answer section of each call we compute the tone using the 3 separate dictionaries.

For the Discussion, Question and Answer sections we compute the positive and negative tone using each of the 3 dictionaries outlined above. We then compute a net positivity measure, defined as Positive minus Negative.

Complementing these measures, we also look at changes in tone. Due to findings of Graham, Harvey and Rajgopal (2006) who report that 85.1% of CFO survey respondents considered earnings in the same quarter of the prior year to be the most important earnings benchmark, we look at changes in tone from the previous corresponding period.

We measure the level of tone, change in tone, and also abnormal tone.

We also compute a measure of abnormal tone. As we will show in the next section, the tone measures are correlated with the contemporaneous earnings and sales surprise. To isolate the component of tone not related to earnings surprise, we regress each tone measure on the corresponding EPS Surprise.

$$Tone_{i,t} = c + \beta_1 EPS\ Surprise_{i,t} + \varepsilon_{i,t} \quad (1)$$

We run this regression cross-sectionally, using information from all other stocks that are known at that point in time. We take $\varepsilon_{i,t}$ to be our measure of 'abnormal' tone.

Understanding the Tone Measures

Our analysis begins by exploring various aspects of conference call tone.

To shed light on the tone measures we look at various aspects:

- Trends in tone over time;
- Variations in tone across sectors;
- Variations in tone across fiscal quarters;
- Autocorrelation of the tone measures;
- Correlations among the tone measures;
- Correlations of the tone measures with earnings and sales surprises;
- Correlations of the tone measures with a range of stock characteristics.

For each part the analysis we show results for the tone measures computed using the three different dictionaries.

Tone over time

We begin our analysis of the tone measures by examining how they vary over time. In Fig 6 to Fig 11 we show descriptive statistics over time for the LIWC tone measures; in Fig 12 to Fig 17 we show the statistics for the Diction tone measures; and in Fig 18 to Fig 23 we show the statistics for the LM tone measures. The statistics shown in each of these figures reflect the percentage of positive and negative words in the document.

We find that positive tone is stable over time.

Across the tone measures computed from the different dictionaries, the notable feature is that positive tone is stable over time. We see that the positive tone in the question section is higher than in the discussion or answer section. While some may expect management to be more positive than analysts, a quick read through the questions in transcripts, you will see how 'congratulatory' analysts are of management for the results.

In terms of differences across the three different dictionaries we note that the percentage of positive words in a call is typically higher using the LIWC and Diction dictionaries as opposed to the LM dictionary.

In contrast to positive tone, we find fluctuations in negative tone around 2008-09.

While the positive tone measures exhibit stability over time, we see some noticeable variation in the negative tone measures. In the discussion section we see an uptick in negative tone through late 2008 and 2009. The increase is larger using the LM dictionary. This is also evident in the Question and Answer sections.

The tone scores also vary across the different sections for each dictionary. The LM dictionary produces an average negative tone score for the discussion section of 0.88, compared to 0.73 and 0.64 for LIWC and Diction respectively. The LM dictionary also produces a higher score for the question section. However, for the answer section the Diction negative tone scores are much higher – on average 1.2 compared to 0.7 and 0.83 for LIWC and LM.

This variation in scores across the dictionaries is part of the reason we wanted to test multiple dictionaries.

One issue to note in comparing the scores across dictionaries is that it is reasonable to expect the scores to vary based on the size of each dictionary.

Fig 6 LIWC Positive Tone for the Discussion Section

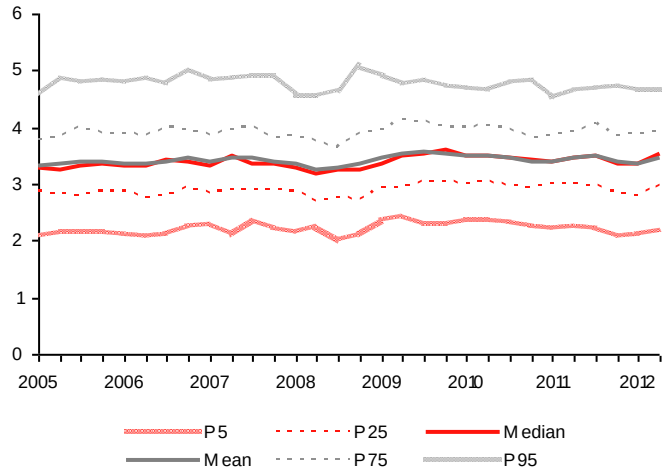


Fig 7 LIWC Negative Tone for the Discussion Section

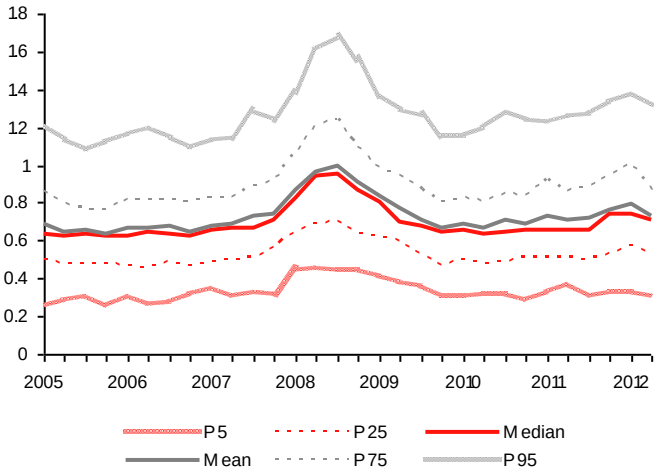


Fig 8 LIWC Positive Tone for the Question Section

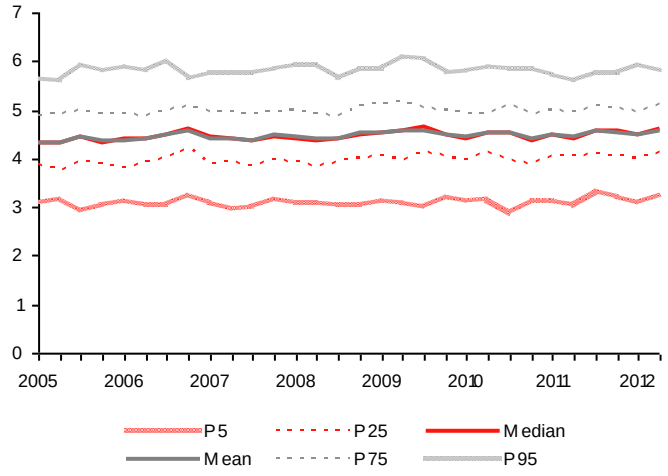


Fig 9 LIWC Negative Tone for the Question Section

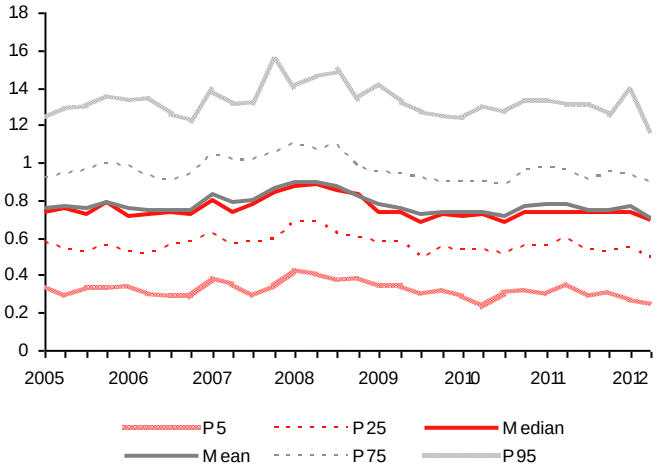


Fig 10 LIWC Positive Tone for the Answer Section

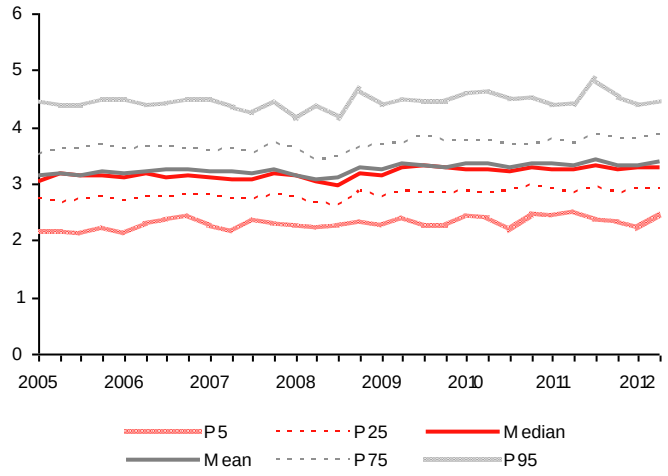
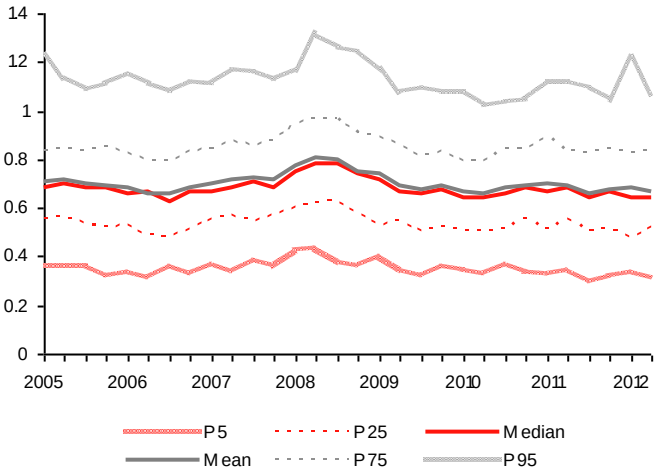


Fig 11 LIWC Negative Tone for the Answer Section



Sources (Fig 8-11): Factset, S&P, Macquarie Capital (USA), May 2013.

Fig 12 Diction Positive Tone for the Discussion Section

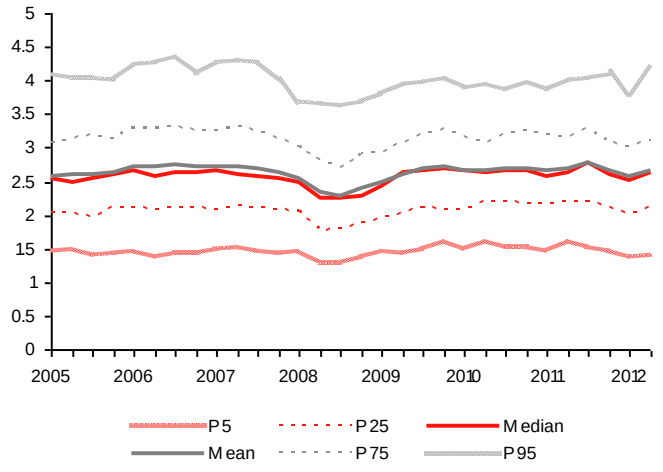


Fig 13 Diction Negative Tone for the Discussion Section

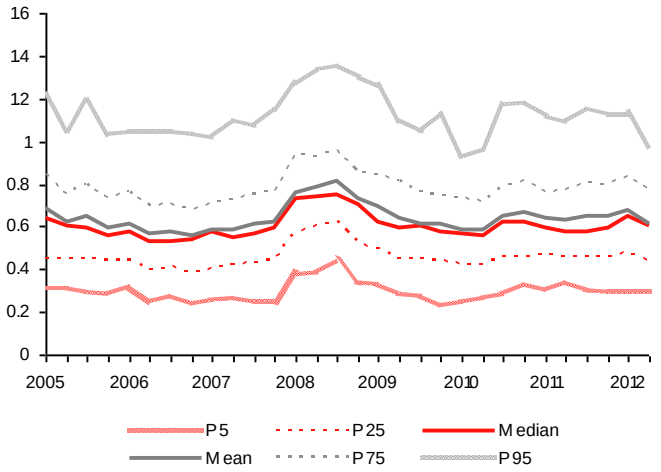


Fig 14 Diction Positive Tone for the Question Section

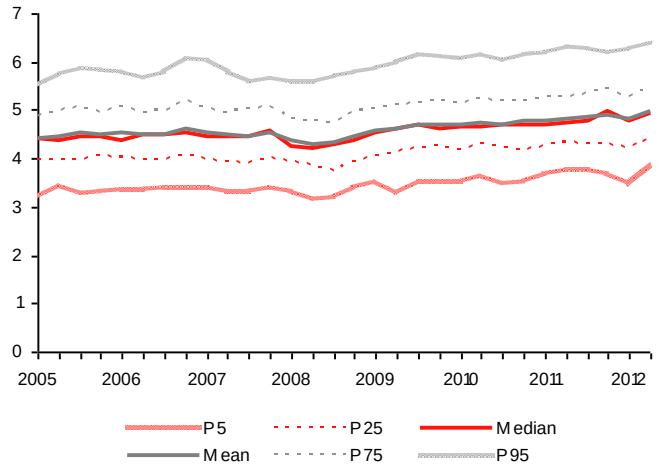


Fig 15 Diction Negative Tone for the Question Section

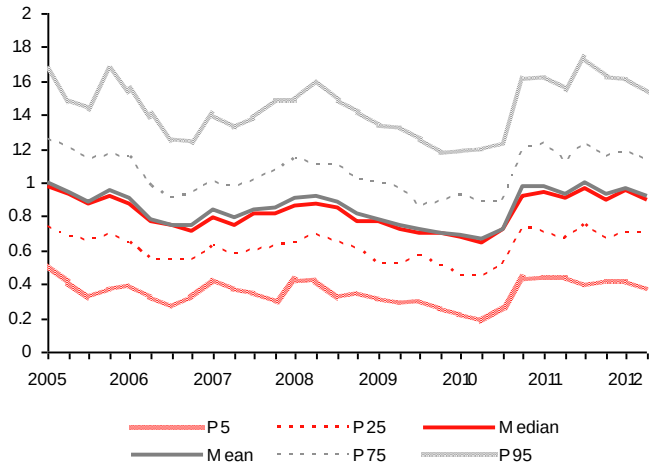


Fig 16 Diction Positive Tone for the Answer Section

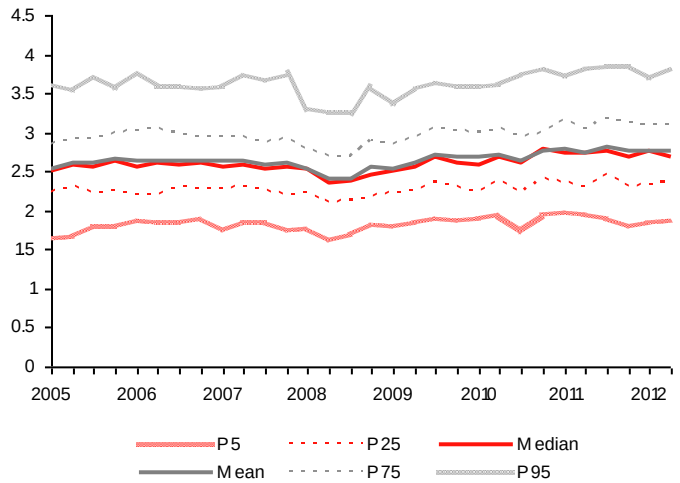
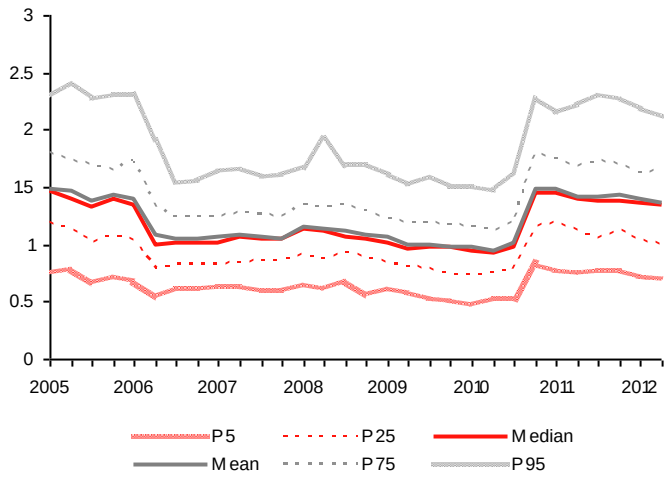


Fig 17 Diction Negative Tone for the Answer Section



Sources (Fig 12-17): Factset, S&P, Macquarie Capital (USA), May 2013.

Fig 18 LM Positive Tone for the Discussion Section

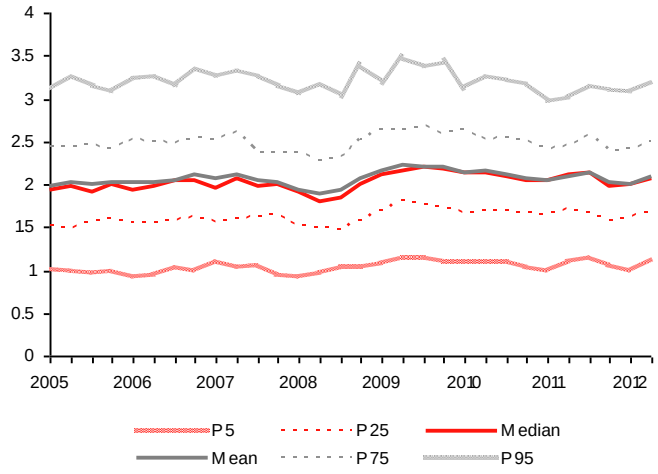


Fig 19 LM Negative Tone for the Discussion Section

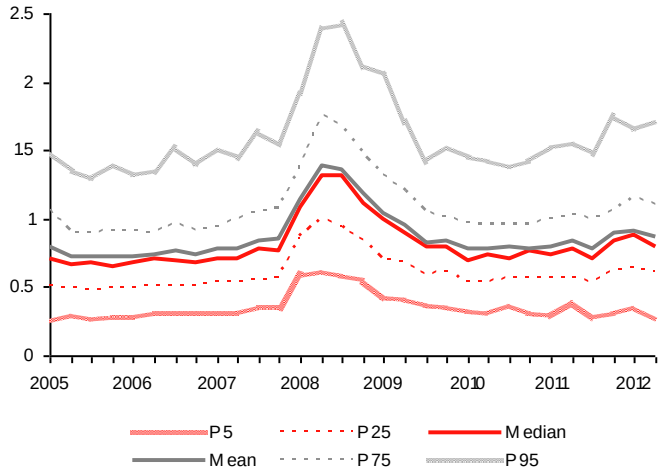


Fig 20 LM Positive Tone for the Question Section

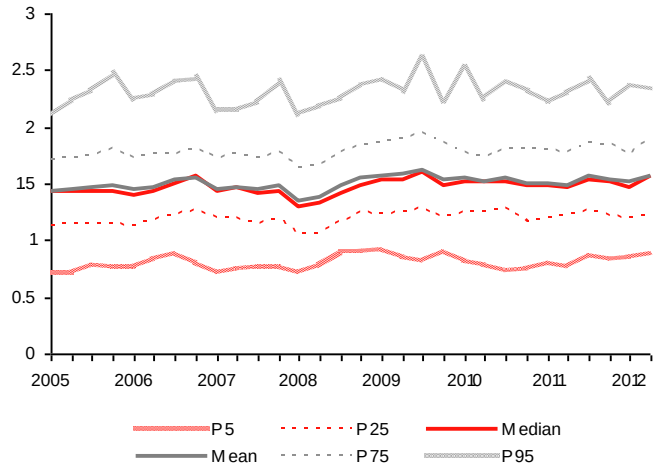


Fig 21 LM Negative Tone for the Question Section

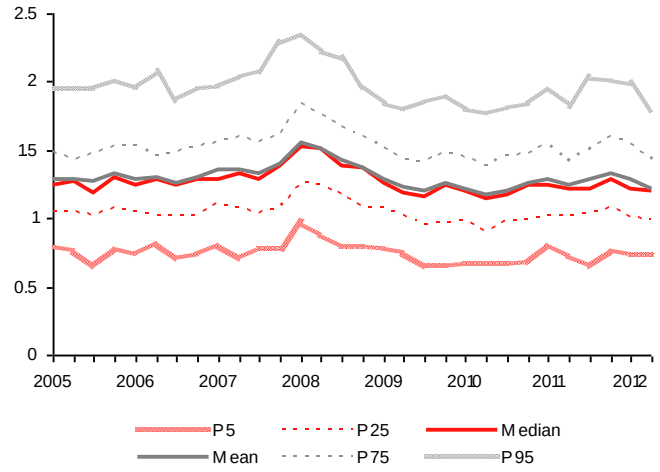


Fig 22 LM Positive Tone for the Answer Section

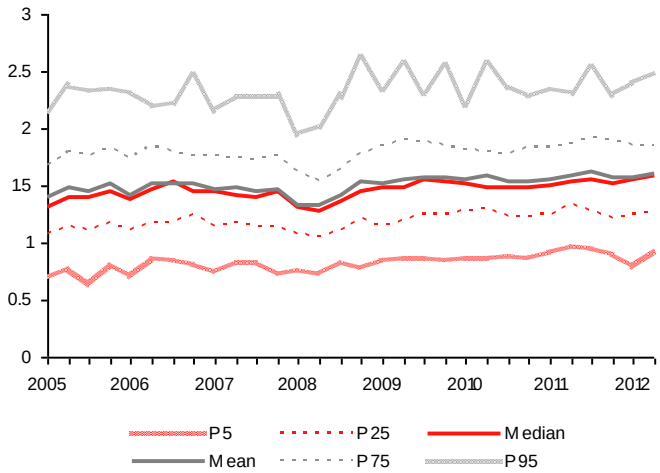
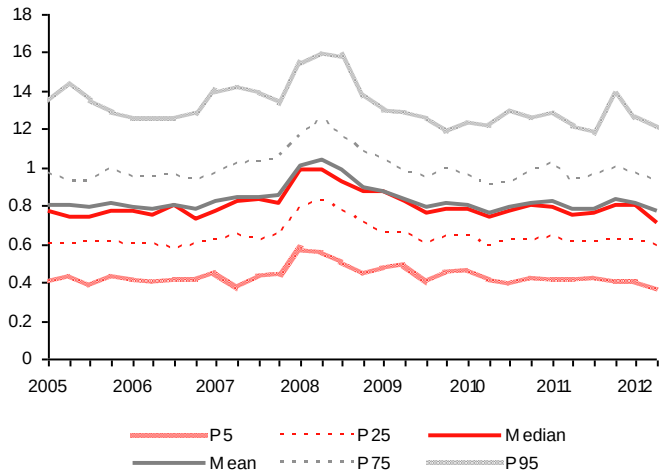


Fig 23 LM Negative Tone for the Answer Section



Sources (Fig 18-23): Factset, S&P, Macquarie Capital (USA), May 2013.

Tone Measures by Sector

We examine variations in tone across sectors.

We now move onto examining variations in tone across sectors. In Fig 24 we examine variations in length of the transcript sections across sectors. In Fig 25 to Fig 30 we show the average of each tone measure across sectors. The statistics shown in each of these figures reflect the percentage of positive and negative words in the document.

When examining the length of an earnings call, we see that the Energy sector has a shorter discussion and answer section. Whereas the Health Care sector has a longer discussion and answer section, potentially reflecting the higher complexity of their products. Interestingly, Industrials and Information Technology have shorter discussion sections, but provide much longer answers.

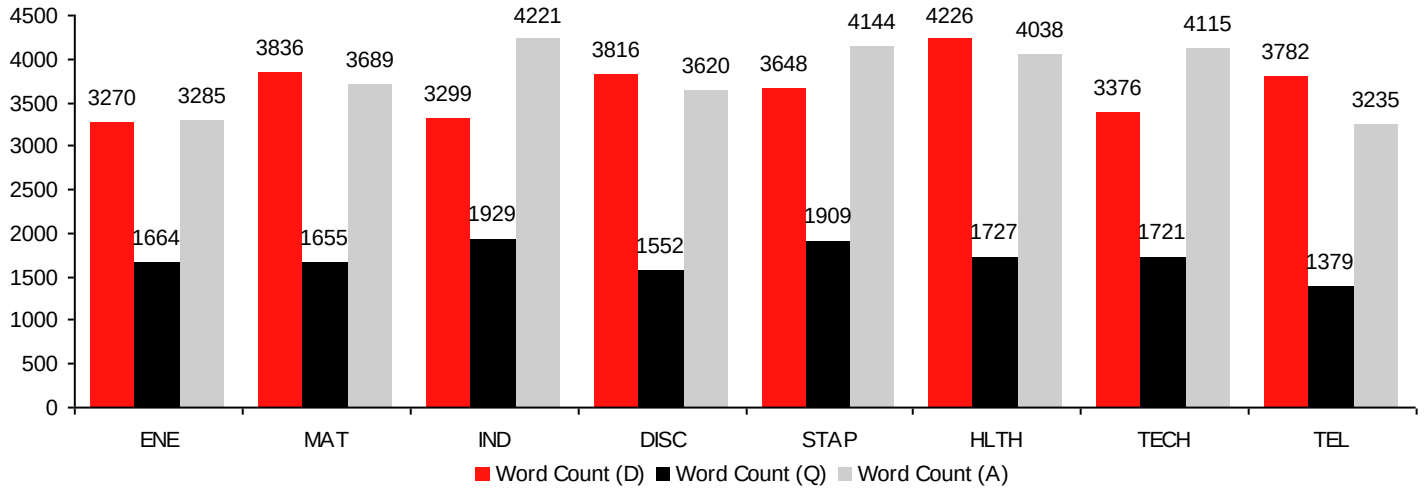
The discussion section tends to have lower positive tone for the Energy sector, and higher positive tone for Consumer Staples.

Focusing on tone, the discussion section of the Energy sector tends to be the least positive, with the Consumer Staples sector most positive. We see this come through in the answer section as well. Similar to earlier observations, the LIWC and Diction dictionaries produce higher positive tone scores compared to the LM dictionary. This holds across all three sections.

Turning our attention to the negative tone measures, we see again that the LM dictionary produces higher scores for the discussion and question sections, while the Diction dictionary produces higher scores for the answer section.

In terms of differences in negative tone across sectors, we see the discussion section is more negative for the Energy, Materials and Industrial sectors. This also comes through in the answer section, particularly when looking at the Diction tone measures.

Fig 24 Length of Transcript Sections by Sector



Source: Factset, S&P, Macquarie Capital (USA), May 2013.

Fig 25 Positive Tone for the Discussion Section

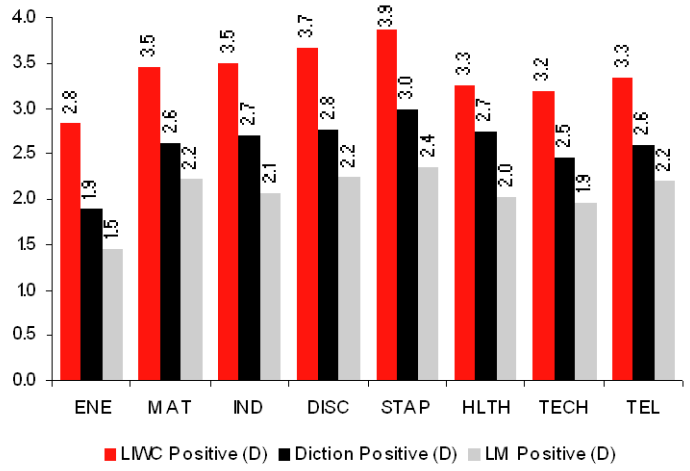


Fig 26 Negative Tone for the Discussion Section

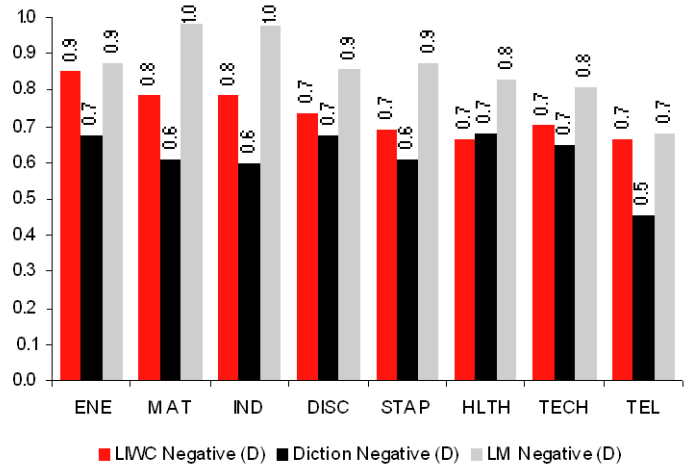


Fig 27 Positive Tone for the Question Section

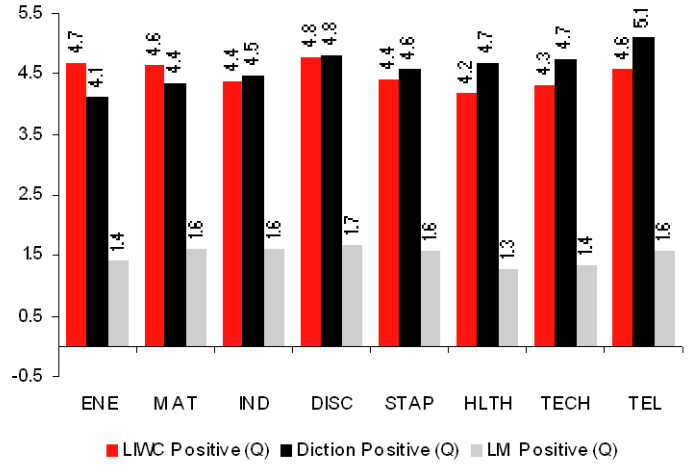


Fig 28 Negative Tone for the Question Section

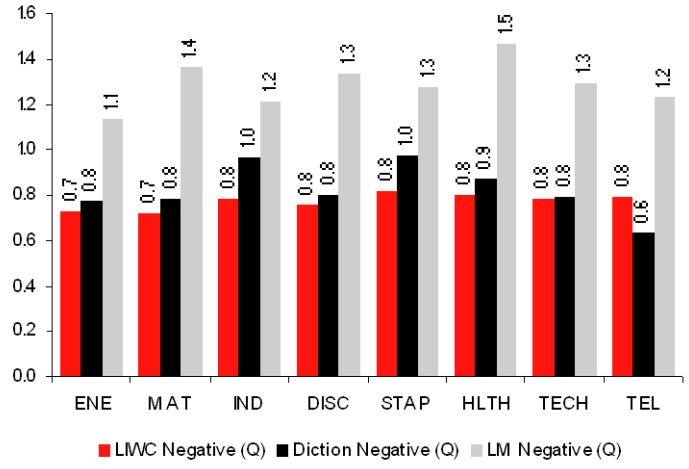


Fig 29 Positive Tone for the Answer Section

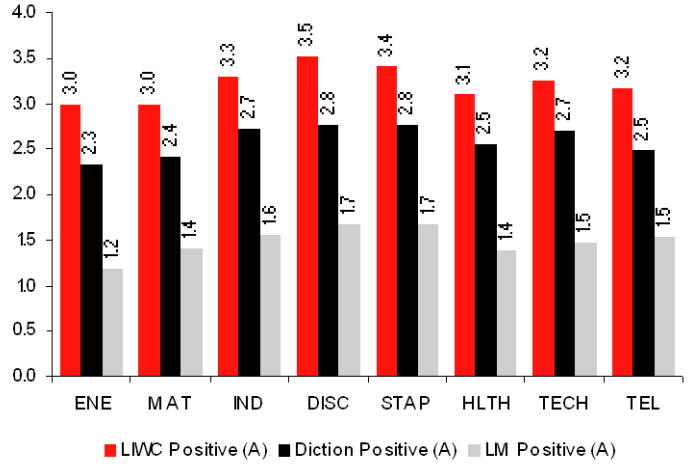
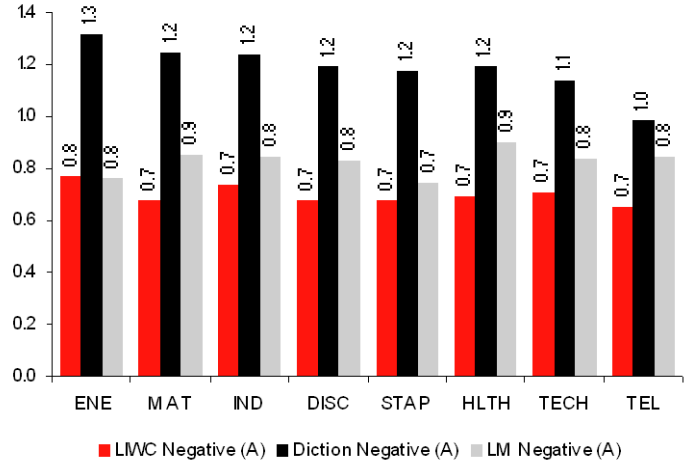


Fig 30 Negative Tone for the Answer Section



Sources (Fig 25-30): Factset, S&P, Macquarie Capital (USA), May 2013.

Tone Measures by Fiscal Quarter

Examining conference call length by fiscal quarter we see the Q4 call is longer.

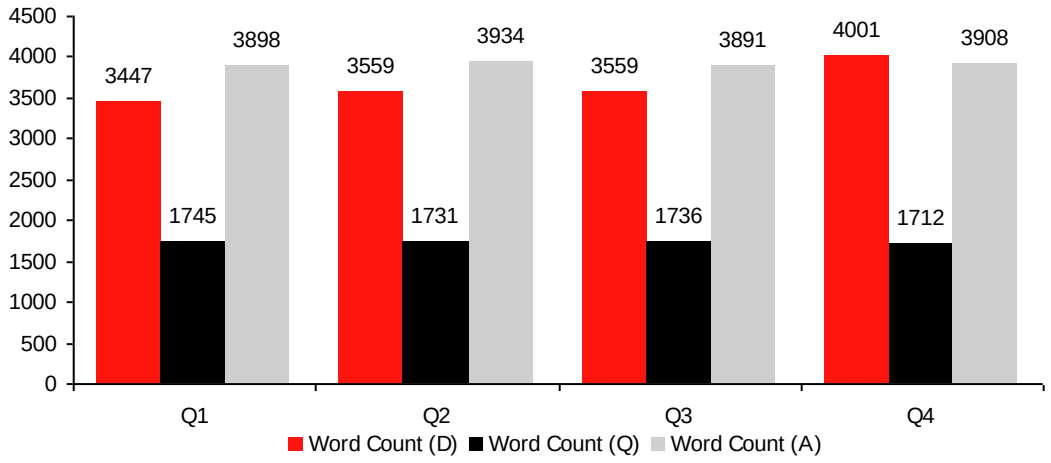
Given we are working with quarterly earnings conference calls it is also useful to understand how the tone measures and other aspect of the calls vary across fiscal quarters.

In Fig 31 we examine the length of the each section of the conference call by fiscal quarter. The length of questions and answers do not vary noticeably by fiscal quarter. However, the length of the discussion section does, particularly in Q4. This corresponds with extra discussion around the annual result. The discussion section in Q4 is approximately 500 words longer than other quarters.

However, there is little variation in tone across fiscal quarters.

We examine how tone varies across quarters in Fig 32 to Fig 37. It is clear for the tone measures computed from the three different dictionaries for the discussion, question and answer sections there is little difference across fiscal quarters.

Fig 31 Total Words by Fiscal Quarter



Source: Factset, S&P, Macquarie Capital (USA), May 2013.

Fig 32 Positive Tone for the Discussion Section

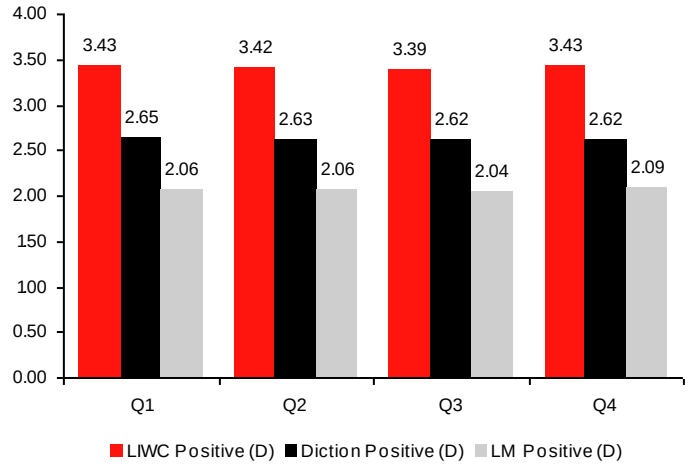


Fig 33 Negative Tone for the Discussion Section

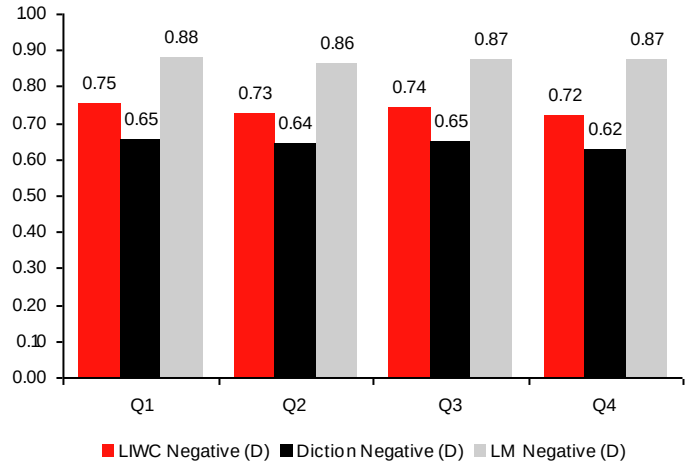


Fig 34 Positive Tone for the Question Section

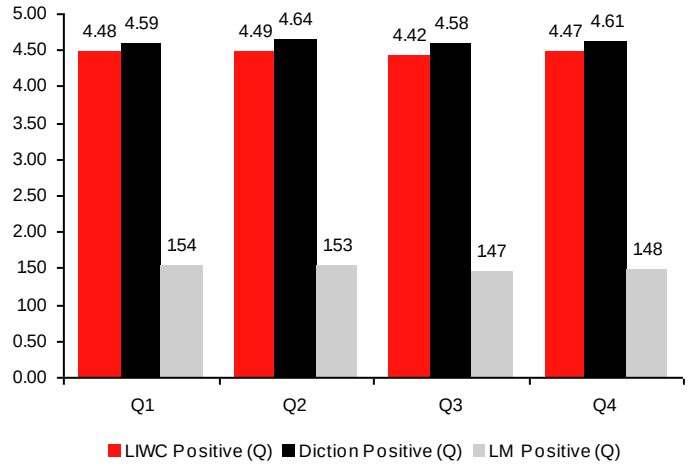


Fig 35 Negative Tone for the Question Section

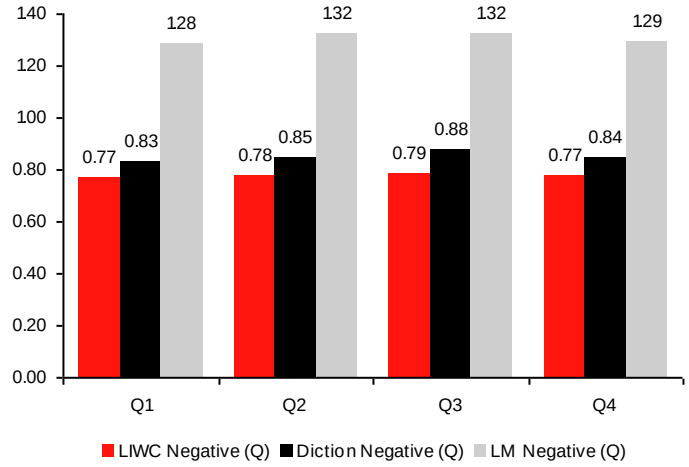


Fig 36 Positive Tone for the Answer Section

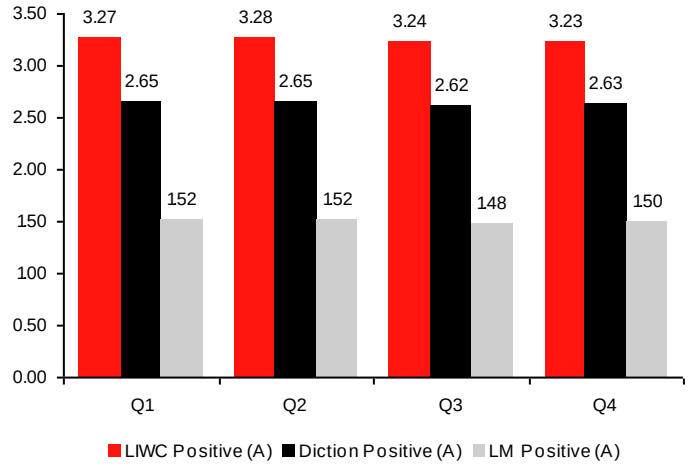
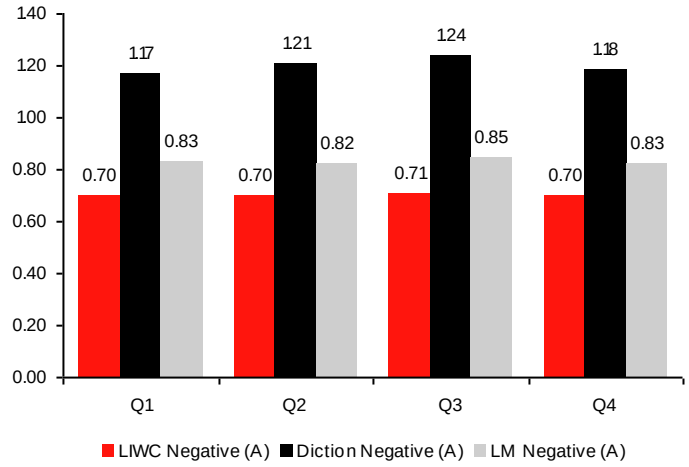


Fig 37 Negative Tone for the Answer Section



Sources (Fig 32-37): Factset, S&P, Macquarie Capital (USA), May 2013.

Autocorrelation of Tone Measures

We find high levels of persistence in the tone measures.

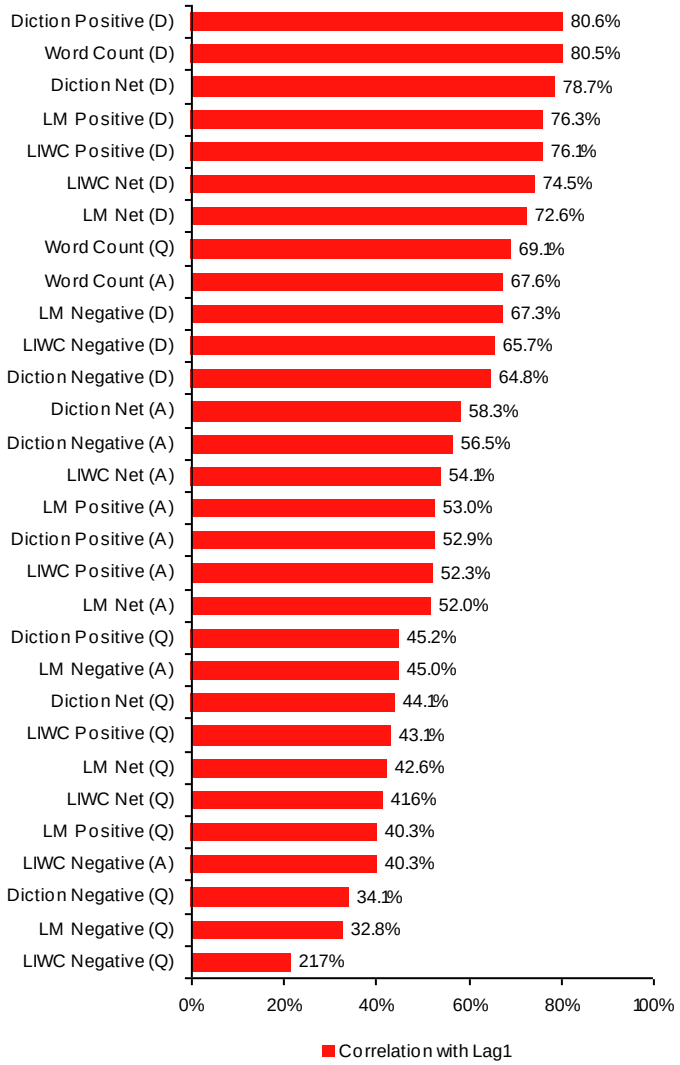
An aspect we have not touched on yet is changes in tone. In Fig 38 and Fig 39 we show the correlations of the tone measures with tone measures from one quarter ago and also from the previous corresponding period.

Across both figures it is clear there is higher persistence in the tone measures for the discussion section. Whereas the correlations are much lower when looking at the tone measures for the question section.

We use tone measures from the previous corresponding period to compute changes in tone.

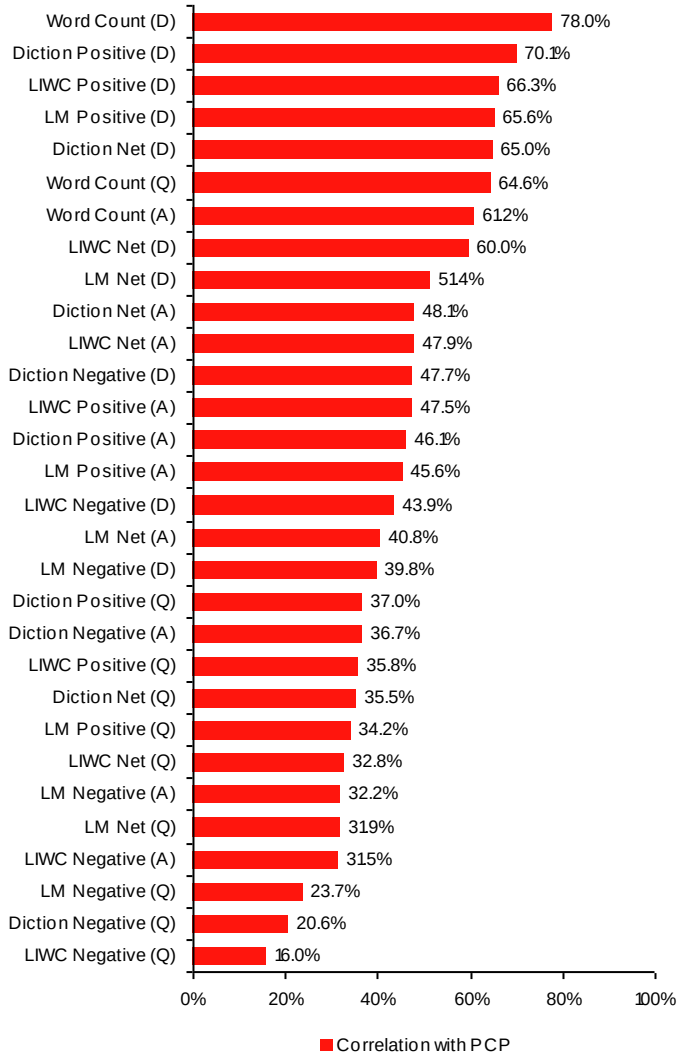
Overall, the correlations are higher when comparing to one quarter ago than the previous corresponding period. However, Graham, Harvey and Rajgopal (2006) report that 85.1% of CFO survey respondents considered earnings in the same quarter of the prior year to be the most important earnings benchmark. Consequently, even though correlations are higher with tone from one quarter ago, when we compute changes in tone we do so by differencing with tone measures from the previous corresponding period.

Fig 38 Correlation of Level Measures of Tone with One Quarter Lagged Measures



Source: Factset, S&P, Macquarie Capital (USA), May 2013.

Fig 39 Correlation of Level Measures of Tone with Previous Corresponding Period Measures



Source: Factset, S&P, Macquarie Capital (USA), May 2013.

Correlations among the Tone Measures

In Fig 40 and Fig 41 we examine the correlations among the tone measures in levels and changes.

Longer discussions lead to shorter Q&As, while longer Q's lead to longer A's.

Beginning with Fig 40, we examine the relationship among the length of each section. We see that the length of the discussion section is negatively correlated with the length of the questions and answers at -27% and -17% respectively. This is not surprising. Many calls have a fixed time. So if the discussion section is longer, it uses up more of the allotted time for the call, meaning there is less time for Q&A. However, the question and answers are correlated at 55%. This is intuitive – a longer question could be multipart and thus require a longer answer.

The tone measures from the different dictionaries are not perfect substitutes.

With regards to the tone measures we see that the LIWC Positive tone scores for the discussion section are positively correlated the equivalent LM and Diction tone scores at 77% and 69%. The corresponding correlations for the negative tone scores are lower at 49% and 51%. Examining the Question section, we note that the correlations of the LIWC Positive tone score are correlated with the LM and Diction scores at 58% and 50%. The LIWC Negative tone score exhibits an even lower correlation at 24% and 49% with the LM and Diction scores. Focusing on the Answer section, we observe correlations increase for the Positive tone scores. The LIWC Positive tone score is correlated at 70% and 69% with the LM and Diction tone scores. Interestingly, the correlations of the LIWC Negative tone score are the lowest at 32% and 38%. These correlations suggest the tone measures from the different dictionaries are not perfect substitutes.

We note that the tone measures are not highly correlated across sections.

Taking a look at the correlations of the tone measures between sections reveals a positive correlation, but a level that may not be as high as would be expected. For instance, focusing on the LIWC discussion positive tone measures, we find a correlation of 7% and 35% with the Question and Answer section. The corresponding correlations for the negative tone measures are 22% and 27%. With the correlations between sections being relatively low, to capture the tone of the overall call it may be necessary to examine each section. That is, there could be incremental information from each section.

In Fig 41 we examine the correlations among the tone measures in changes. Changes in positive tone exhibit a similar correlation across the different sections as we observed in levels. Changes in LIWC Positive tone is correlated with changes in LM and Diction Positive measures at ~60% for each of the discussion, question and answer sections.

In contrast, the correlations between the Negative tone measures across the different sections vary. This is consistent with what we observed in Fig 40. For instance, correlations between the negative tone scores are highest for the discussion section, and lower for the question and answer sections.

The take away from these correlations is that there appears to be less overlap in the negative word lists across the different dictionaries, suggesting there is more scope for the different negative tone scores to complement each other, rather than act as a substitute.

Fig 40 Correlation among the Tone Measures in Levels

	Word Count (D)	Word Count (Q)	Word Count (A)	LIWC Positive (D)	LIWC Negative (D)	LIWC Positive (Q)	LIWC Negative (Q)	LIWC Positive (A)	LIWC Negative (A)	LM Positive (D)	LM Negative (D)	LM Positive (Q)	LM Negative (Q)	LM Positive (A)	LM Negative (A)	Diction Positive (D)	Diction Negative (D)	Diction Positive (Q)	Diction Negative (Q)	Diction Positive (A)	Diction Negative (A)	LIWC Net (D)	LIWC Net (Q)	LIWC Net (A)	LM Net (D)	LM Net (Q)	LM Net (A)	Diction Net (D)	Diction Net (Q)	Diction Net (A)
Word Count (D)	1	-0.27	-0.17	0.03	-0.04	-0.08	0.01	-0.01	-0.04	0.12	0.00	-0.02	0.05	0.03	0.05	0.11	-0.03	0.01	-0.04	-0.02	-0.13	0.03	-0.08	0.01	0.09	-0.04	-0.01	0.09	0.02	0.07
Word Count (Q)	-0.27	1	0.55	0.03	0.12	-0.10	0.14	-0.08	0.12	0.01	0.11	-0.09	0.02	-0.06	-0.03	-0.03	0.06	-0.19	0.25	-0.06	0.22	-0.01	-0.13	-0.10	-0.04	-0.09	-0.03	-0.04	-0.29	-0.18
Word Count (A)	-0.17	0.55	1	-0.01	0.12	-0.08	0.10	-0.13	0.08	-0.04	0.05	-0.04	0.01	-0.05	-0.03	0.03	0.10	-0.01	0.15	-0.03	0.11	-0.04	-0.10	-0.14	-0.04	-0.04	-0.02	0.00	-0.08	-0.09
LIWC Positive (D)	0.03	0.03	-0.01	1	-0.18	0.07	-0.02	0.35	-0.14	0.77	-0.10	0.22	-0.05	0.38	-0.11	0.69	-0.17	0.13	0.01	0.28	-0.13	0.94	0.06	0.34	0.67	0.19	0.36	0.67	0.09	0.27
LIWC Negative (D)	-0.04	0.12	0.12	-0.18	1	-0.02	0.22	-0.14	0.27	-0.22	0.49	-0.05	0.11	-0.19	0.19	-0.30	0.51	-0.20	0.15	-0.22	0.15	-0.47	-0.09	-0.21	-0.42	-0.10	-0.24	-0.43	-0.22	-0.25
LIWC Positive (Q)	-0.08	-0.10	-0.08	0.07	-0.02	1	-0.11	0.15	-0.04	0.02	-0.09	0.58	-0.16	0.09	-0.15	-0.01	-0.06	0.50	-0.13	0.07	0.00	0.07	0.93	0.14	0.06	0.50	0.14	0.00	0.48	0.05
LIWC Negative (Q)	0.01	0.14	0.10	-0.02	0.22	-0.11	1	-0.09	0.29	-0.04	0.14	-0.10	0.24	-0.08	0.13	-0.04	0.14	-0.15	0.49	-0.08	0.12	-0.09	-0.43	-0.17	-0.10	-0.22	-0.12	-0.10	-0.34	-0.14
LIWC Positive (A)	-0.01	-0.08	-0.13	0.35	-0.14	0.15	-0.09	1	-0.26	0.30	-0.16	0.23	-0.09	0.70	-0.13	0.26	-0.13	0.19	-0.07	0.69	-0.21	0.36	0.17	0.95	0.32	0.22	0.61	0.26	0.19	0.63
LIWC Negative (A)	-0.04	0.12	0.08	-0.14	0.27	-0.04	0.29	-0.26	1	-0.17	0.21	-0.10	0.14	-0.22	0.32	-0.16	0.22	-0.14	0.21	-0.22	0.38	-0.22	-0.13	-0.53	-0.23	-0.15	-0.33	-0.21	-0.22	-0.39
LM Positive (D)	0.12	0.01	-0.04	0.77	-0.22	0.02	-0.04	0.30	-0.17	1	-0.12	0.23	-0.03	0.43	-0.09	0.73	-0.24	0.16	-0.05	0.27	-0.17	0.75	0.03	0.32	0.87	0.18	0.39	0.71	0.14	0.29
LM Negative (D)	0.00	0.11	0.05	-0.10	0.49	-0.09	0.14	-0.16	0.21	-0.12	1	-0.07	0.26	-0.17	0.36	-0.21	0.41	-0.18	0.15	-0.20	0.13	-0.25	-0.13	-0.21	-0.57	-0.20	-0.31	-0.32	-0.21	-0.22
LM Positive (Q)	-0.02	-0.09	-0.04	0.22	-0.05	0.58	-0.10	0.23	-0.10	0.23	-0.07	1	-0.20	0.34	-0.16	0.16	-0.11	0.44	-0.12	0.18	-0.08	0.22	0.56	0.23	0.22	0.80	0.35	0.16	0.38	0.16
LM Negative (Q)	0.05	0.02	0.01	-0.05	0.11	-0.16	0.24	-0.09	0.14	-0.03	0.26	-0.20	1	-0.08	0.35	-0.04	0.14	-0.11	0.25	-0.08	0.11	-0.09	-0.23	-0.12	-0.15	-0.71	-0.24	-0.07	-0.17	-0.11
LM Positive (A)	0.03	-0.06	-0.05	0.38	-0.19	0.09	-0.08	0.70	-0.22	0.43	-0.17	0.34	-0.08	1	-0.17	0.36	-0.18	0.22	-0.09	0.60	-0.22	0.40	0.11	0.67	0.43	0.29	0.86	0.36	0.20	0.55
LM Negative (A)	0.05	-0.03	-0.03	-0.11	0.19	-0.15	0.13	-0.13	0.32	-0.09	0.36	-0.16	0.35	-0.17	1	-0.09	0.19	-0.13	0.15	-0.11	0.22	-0.17	-0.18	-0.22	-0.26	-0.31	-0.61	-0.14	-0.15	-0.20
Diction Positive (D)	0.11	-0.03	0.03	0.69	-0.30	-0.01	-0.04	0.26	-0.16	0.73	-0.21	0.16	-0.04	0.36	-0.09	1	-0.22	0.25	-0.02	0.36	-0.14	0.71	0.01	0.28	0.70	0.14	0.33	0.93	0.19	0.33
Diction Negative (D)	-0.03	0.06	0.10	-0.17	0.51	-0.06	0.14	-0.13	0.22	-0.24	0.41	-0.11	0.14	-0.18	0.19	-0.22	1	-0.14	0.17	-0.15	0.23	-0.31	-0.10	-0.19	-0.39	-0.15	-0.23	-0.49	-0.18	-0.25
Diction Positive (Q)	0.01	-0.19	-0.01	0.13	-0.20	0.50	-0.15	0.19	-0.14	0.16	-0.18	0.44	-0.11	0.22	-0.13	0.25	-0.14	1	-0.16	0.27	-0.10	0.18	0.50	0.21	0.22	0.37	0.24	0.26	0.88	0.24
Diction Negative (Q)	-0.04	0.25	0.15	0.01	0.15	-0.13	0.49	-0.07	0.21	-0.05	0.15	-0.12	0.25	-0.09	0.15	-0.02	0.17	-0.16	1	-0.03	0.35	-0.05	-0.28	-0.13	-0.11	-0.23	-0.14	-0.08	-0.53	-0.23
Diction Positive (A)	-0.02	-0.06	-0.03	0.28	-0.22	0.07	-0.08	0.69	-0.22	0.27	-0.20	0.18	-0.08	0.60	-0.11	0.36	-0.15	0.27	-0.03	1	-0.14	0.32	0.10	0.66	0.31	0.18	0.53	0.36	0.22	0.79
Diction Negative (A)	-0.13	0.22	0.11	-0.13	0.15	0.00	0.12	-0.21	0.38	-0.17	0.13	-0.08	0.11	-0.22	0.22	-0.14	0.23	-0.10	0.35	-0.14	1	-0.16	-0.04	-0.30	-0.19	-0.11	-0.28	-0.19	-0.22	-0.65
LIWC Net (D)	0.03	-0.01	-0.04	0.94	-0.47	0.07	-0.09	0.36	-0.22	0.75	-0.25	0.22	-0.09	0.40	-0.17	0.71	-0.31	0.18	-0.05	0.32	-0.16	1	0.09	0.38	0.74	0.20	0.40	0.74	0.15	0.32
LIWC Net (Q)	-0.08	-0.13	-0.10	0.06	-0.09	0.93	-0.43	0.17	-0.13	0.03	-0.13	0.56	-0.23	0.11	-0.18	0.01	-0.10	0.50	-0.28	0.10	-0.04	0.09	1	0.18	0.09	0.52	0.17	0.04	0.55	0.10
LIWC Net (A)	0.01	-0.10	-0.14	0.34	-0.21	0.14	-0.17	0.95	-0.53	0.32	-0.21	0.23	-0.12	0.67	-0.22	0.28	-0.19	0.21	-0.13	0.66	-0.30	0.38	0.18	1	0.36	0.24	0.64	0.30	0.23	0.67
LM Net (D)	0.09	-0.04	-0.04	0.67	-0.42	0.06	-0.10	0.32	-0.23	0.87	-0.57	0.22	-0.15	0.43	-0.26	0.70	-0.39	0.22	-0.11	0.31	-0.19	0.74	0.09	0.36	1	0.25	0.47	0.74	0.21	0.34
LM Net (Q)	-0.04	-0.09	-0.04	0.19	-0.10	0.50	-0.22	0.22	-0.15	0.18	-0.20	0.80	-0.71	0.29	-0.31	0.14	-0.15	0.37	-0.23	0.18	-0.11	0.20	0.52	0.24	0.25	1	0.39	0.15	0.37	0.18
LM Net (A)	-0.01	-0.03	-0.02	0.36	-0.24	0.14	-0.12	0.61	-0.33	0.39	-0.31	0.35	-0.24	0.86	-0.61	0.33	-0.23	0.24	-0.14	0.53	-0.28	0.40	0.17	0.64	0.47	0.39	1	0.36	0.23	0.53
Diction Net (D)	0.09	-0.04	0.00	0.67	-0.43	0.00	-0.10	0.26	-0.21	0.71	-0.32	0.16	-0.07	0.36	-0.14	0.93	-0.49	0.26	-0.08	0.36	-0.19	0.74	0.04	0.30	0.74	0.15	0.36	1	0.22	0.37
Diction Net (Q)	0.02	-0.29	-0.08	0.09	-0.22	0.48	-0.34	0.19	-0.22	0.14	-0.21	0.38	-0.17	0.20	-0.15	0.19	-0.18	0.88	-0.53	0.22	-0.22	0.15	0.55	0.23	0.21	0.37	0.23	0.22	1	0.29
Diction Net (A)	0.07	-0.18	-0.09	0.27	-0.25	0.05	-0.14	0.63	-0.39	0.29	-0.22	0.16	-0.11	0.55	-0.20	0.33	-0.25	0.24	-0.23	0.79	-0.65	0.32	0.10	0.67	0.34	0.18	0.53	0.37	0.29	1

Source: Factset, S&P, Macquarie Capital (USA), May 2013.

Fig 41 Correlation among the Tone Measures in Changes

	Word Count (D)	Word Count (Q)	Word Count (A)	LIWC Positive (D)	LIWC Negative (D)	LIWC Positive (Q)	LIWC Negative (Q)	LIWC Positive (A)	LIWC Negative (A)	LM Positive (D)	LM Negative (D)	LM Positive (Q)	LM Negative (Q)	LM Positive (A)	LM Negative (A)	Diction Positive (D)	Diction Negative (D)	Diction Positive (Q)	Diction Negative (Q)	Diction Positive (A)	Diction Negative (A)	LIWC Net (D)	LIWC Net (Q)	LIWC Net (A)	LM Net (D)	LM Net (Q)	LM Net (A)	Diction Net (D)	Diction Net (Q)	Diction Net (A)
Word Count (D)	1	-0.14	-0.12	-0.06	0.03	-0.01	0.01	-0.05	0.04	-0.05	0.07	-0.04	0.02	-0.06	0.05	-0.08	0.06	-0.05	0.00	-0.08	0.00	-0.06	-0.01	-0.06	-0.07	-0.04	-0.07	-0.10	-0.04	-0.06
Word Count (Q)	-0.14	1	0.51	0.03	0.01	-0.12	0.09	0.00	-0.01	0.01	-0.01	-0.14	0.00	-0.06	0.00	0.03	0.02	-0.15	0.14	0.01	0.10	0.02	-0.14	0.00	0.01	-0.10	-0.05	0.02	-0.20	-0.06
Word Count (A)	-0.12	0.51	1	-0.01	0.04	-0.04	0.04	-0.06	-0.04	-0.04	0.01	-0.05	0.01	-0.01	-0.03	0.01	0.04	-0.05	0.06	-0.03	0.02	-0.03	-0.05	-0.03	-0.03	-0.04	0.00	-0.01	-0.07	-0.04
LIWC Positive (D)	-0.06	0.03	-0.01	1	-0.22	0.09	-0.07	0.18	-0.09	0.66	-0.23	0.14	-0.10	0.17	-0.14	0.58	-0.17	0.11	-0.07	0.16	-0.09	0.91	0.11	0.19	0.57	0.16	0.20	0.56	0.11	0.17
LIWC Negative (D)	0.03	0.01	0.04	-0.22	1	-0.08	0.17	-0.10	0.23	-0.26	0.56	-0.10	0.17	-0.13	0.24	-0.30	0.52	-0.14	0.11	-0.17	0.12	-0.58	-0.14	-0.17	-0.48	-0.18	-0.23	-0.46	-0.16	-0.20
LIWC Positive (Q)	-0.01	-0.12	-0.04	0.09	-0.08	1	-0.12	0.19	-0.07	0.10	-0.08	0.57	-0.07	0.11	-0.08	0.05	-0.07	0.55	-0.12	0.12	-0.07	0.10	0.91	0.18	0.11	0.44	0.13	0.08	0.53	0.14
LIWC Negative (Q)	0.01	0.09	0.04	-0.07	0.17	-0.12	1	-0.09	0.25	-0.09	0.14	-0.12	0.27	-0.10	0.14	-0.08	0.13	-0.14	0.44	-0.08	0.14	-0.13	-0.48	-0.18	-0.14	-0.25	-0.15	-0.12	-0.33	-0.16
LIWC Positive (A)	-0.05	0.00	-0.06	0.18	-0.10	0.19	-0.09	1	-0.16	0.15	-0.13	0.22	-0.12	0.62	-0.15	0.12	-0.10	0.15	-0.09	0.57	-0.11	0.19	0.20	0.92	0.17	0.23	0.54	0.13	0.16	0.51
LIWC Negative (A)	0.04	-0.01	-0.04	-0.09	0.23	-0.07	0.25	-0.16	1	-0.11	0.19	-0.07	0.16	-0.14	0.32	-0.13	0.17	-0.09	0.19	-0.12	0.29	-0.16	-0.16	-0.50	-0.18	-0.15	-0.27	-0.18	-0.16	-0.28
LM Positive (D)	-0.05	0.01	-0.04	0.66	-0.26	0.10	-0.09	0.15	-0.11	1	-0.29	0.18	-0.12	0.22	-0.16	0.58	-0.25	0.12	-0.08	0.15	-0.11	0.65	0.13	0.17	0.83	0.20	0.25	0.57	0.13	0.17
LM Negative (D)	0.07	-0.01	0.01	-0.23	0.56	-0.08	0.14	-0.13	0.19	-0.29	1	-0.11	0.24	-0.15	0.35	-0.36	0.53	-0.14	0.15	-0.20	0.13	-0.41	-0.13	-0.18	-0.74	-0.23	-0.30	-0.50	-0.17	-0.22
LM Positive (Q)	-0.04	-0.14	-0.05	0.14	-0.10	0.57	-0.12	0.22	-0.07	0.18	-0.11	1	-0.12	0.27	-0.11	0.10	-0.11	0.45	-0.13	0.15	-0.11	0.15	0.55	0.21	0.18	0.76	0.26	0.12	0.42	0.18
LM Negative (Q)	0.02	0.00	0.01	-0.10	0.17	-0.07	0.27	-0.12	0.16	-0.12	0.24	-0.12	1	-0.12	0.31	-0.12	0.18	-0.10	0.30	-0.09	0.15	-0.15	-0.17	-0.16	-0.21	-0.70	-0.25	-0.16	-0.20	-0.15
LM Positive (A)	-0.06	-0.06	-0.01	0.17	-0.13	0.11	-0.10	0.62	-0.14	0.22	-0.15	0.27	-0.12	1	-0.18	0.14	-0.15	0.14	-0.11	0.52	-0.14	0.19	0.14	0.59	0.23	0.26	0.84	0.17	0.16	0.47
LM Negative (A)	0.05	0.00	-0.03	-0.14	0.24	-0.08	0.14	-0.15	0.32	-0.16	0.35	-0.11	0.31	-0.18	1	-0.17	0.22	-0.10	0.21	-0.14	0.28	-0.21	-0.13	-0.25	-0.31	-0.27	-0.65	-0.22	-0.17	-0.27
Diction Positive (D)	-0.08	0.03	0.01	0.58	-0.30	0.05	-0.08	0.12	-0.13	0.58	-0.36	0.10	-0.12	0.14	-0.17	1	-0.23	0.14	-0.07	0.22	-0.09	0.60	0.08	0.15	0.60	0.14	0.19	0.89	0.14	0.20
Diction Negative (D)	0.06	0.02	0.04	-0.17	0.52	-0.07	0.13	-0.10	0.17	-0.25	0.53	-0.11	0.18	-0.15	0.22	-0.23	1	-0.12	0.17	-0.12	0.19	-0.35	-0.11	-0.15	-0.46	-0.19	-0.23	-0.57	-0.16	-0.21
Diction Positive (Q)	-0.05	-0.15	-0.05	0.11	-0.14	0.55	-0.14	0.15	-0.09	0.12	-0.14	0.45	-0.10	0.14	-0.10	0.14	-0.12	1	-0.14	0.22	-0.10	0.15	0.53	0.16	0.16	0.38	0.17	0.16	0.87	0.22
Diction Negative (Q)	0.00	0.14	0.06	-0.07	0.11	-0.12	0.44	-0.09	0.19	-0.08	0.15	-0.13	0.30	-0.11	0.21	-0.07	0.17	-0.14	1	-0.06	0.35	-0.10	-0.28	-0.15	-0.14	-0.27	-0.19	-0.13	-0.54	-0.26
Diction Positive (A)	-0.08	0.01	-0.03	0.16	-0.17	0.12	-0.08	0.57	-0.12	0.15	-0.20	0.15	-0.09	0.52	-0.14	0.22	-0.12	0.22	-0.06	1	-0.05	0.20	0.14	0.54	0.21	0.16	0.47	0.22	0.19	0.76
Diction Negative (A)	0.00	0.10	0.02	-0.09	0.12	-0.07	0.14	-0.11	0.29	-0.11	0.13	-0.11	0.15	-0.14	0.28	-0.09	0.19	-0.10	0.35	-0.05	1	-0.12	-0.12	-0.21	-0.15	-0.17	-0.25	-0.15	-0.22	-0.63
LIWC Net (D)	-0.06	0.02	-0.03	0.91	-0.58	0.10	-0.13	0.19	-0.16	0.65	-0.41	0.15	-0.15	0.19	-0.21	0.60	-0.35	0.15	-0.10	0.20	-0.12	1	0.14	0.23	0.67	0.20	0.25	0.66	0.16	0.22
LIWC Net (Q)	-0.01	-0.14	-0.05	0.11	-0.14	0.91	-0.48	0.20	-0.16	0.13	-0.13	0.55	-0.17	0.14	-0.13	0.08	-0.11	0.53	-0.28	0.14	-0.12	0.14	1	0.23	0.15	0.49	0.17	0.12	0.59	0.19
LIWC Net (A)	-0.06	0.00	-0.03	0.19	-0.17	0.18	-0.18	0.92	-0.50	0.17	-0.18	0.21	-0.16	0.59	-0.25	0.15	-0.15	0.16	-0.15	0.54	-0.21	0.23	0.23	1	0.21	0.25	0.58	0.18	0.19	0.55
LM Net (D)	-0.07	0.01	-0.03	0.57	-0.48	0.11	-0.14	0.17	-0.18	0.83	-0.74	0.18	-0.21	0.23	-0.31	0.60	-0.46	0.16	-0.14	0.21	-0.15	0.67	0.15	0.21	1	0.26	0.33	0.68	0.18	0.24
LM Net (Q)	-0.04	-0.10	-0.04	0.16	-0.18	0.44	-0.25	0.23	-0.15	0.20	-0.23	0.76	-0.70	0.26	-0.27	0.14	-0.19	0.38	-0.27	0.16	-0.17	0.20	0.49	0.25	0.26	1	0.34	0.18	0.42	0.22
LM Net (A)	-0.07	-0.05	0.00	0.20	-0.23	0.13	-0.15	0.54	-0.27	0.25	-0.30	0.26	-0.25	0.84	-0.65	0.19	-0.23	0.17	-0.19	0.47	-0.25	0.25	0.17	0.58	0.33	0.34	1	0.24	0.21	0.50
Diction Net (D)	-0.10	0.02	-0.01	0.56	-0.46	0.08	-0.12	0.13	-0.18	0.57	-0.50	0.12	-0.16	0.17	-0.22	0.89	-0.57	0.16	-0.13	0.22	-0.15	0.66	0.12	0.18	0.68	0.18	0.24	1	0.18	0.25
Diction Net (Q)	-0.04	-0.20	-0.07	0.11	-0.16	0.53	-0.33	0.16	-0.16	0.13	-0.17	0.42	-0.20	0.16	-0.17	0.14	-0.16	0.87	-0.54	0.19	-0.22	0.16	0.59	0.19	0.18	0.42	0.21	0.18	1	0.29
Diction Net (A)	-0.06	-0.06	-0.04	0.17	-0.20	0.14	-0.16	0.51	-0.28	0.17	-0.22	0.18	-0.15	0.47	-0.27	0.20	-0.21	0.22	-0.26	0.76	-0.63	0.22	0.19	0.55	0.24	0.22	0.50	0.25	0.29	1

Source: Factset, S&P, Macquarie Capital (USA), May 2013.

Correlation with EPS and Sales Surprises

To understand what the tone measures are capturing, we examine the correlation of the tone scores with the corresponding earnings and sales surprise.

Tone measures are positively correlated with earnings surprise. Correlations are higher for changes in tone.

In Fig 42 and Fig 43 we examine the correlation of the tone measures in levels and changes with earnings surprises. A pleasing feature is that the Net and Positive tone measures exhibit a positive correlation with earnings surprise. More so, the negative tone measures exhibit a negative correlation with earnings surprises. The correlations increase when looking at changes in tone. The tone measures computed using the LM dictionary appears to have the strongest correlation with earnings surprise. For example, changes in the LM Net Positive score for the discussion section has a correlation of 18.3% with earnings surprise. In contrast, an increase in the LM Negative tone score for the discussion section has a correlation of -16.7% with earnings surprises.

Fig 42 Correlation of Level Measures of Tone with EPS Surprise

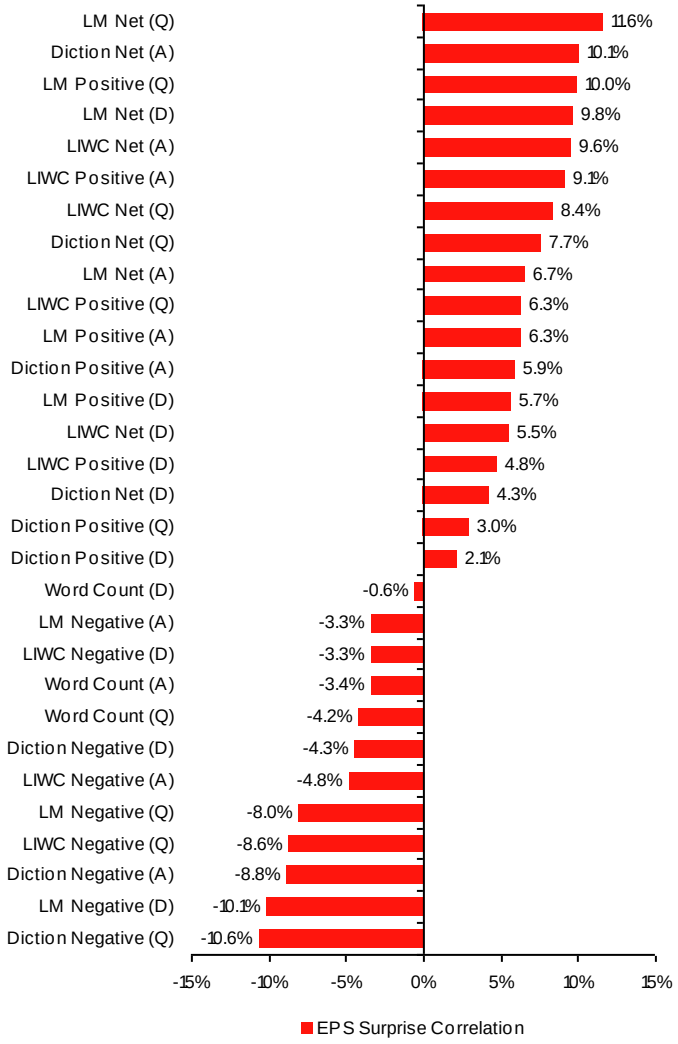
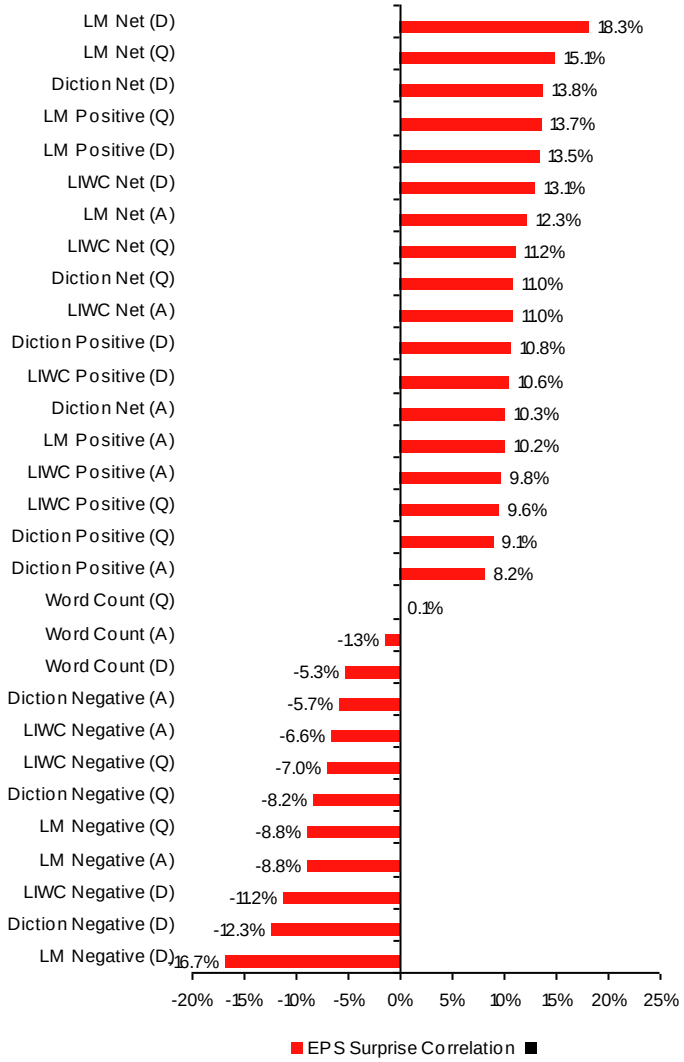


Fig 43 Correlation of Change Measures of Tone with EPS Surprise



Sources (Fig 42-42): Factset, S&P, Macquarie Capital (USA), May 2013.

Change in tone is even more strongly correlated with sales surprises.

In Fig 44 and Fig 45 we look at correlations of the tone measures with sales surprises. These correlations are marginally higher than what we found with earnings surprises.

Correlations of change in discussion tone are highest.

To illustrate this point, when looking at changes in the LM Net Positive score for the discussion section, we see a correlation of 20.9% with sales surprises. Similarly for changes in the LM Negative tone score for the discussion section we observe a correlation of -24.9%.

This is pleasing to find an intuitive alignment between the tone measures and the fundamental result. However, these correlations are still relatively low suggesting there is more information in the tone measures than simply indicating whether earnings or sales met or missed analyst forecasts.

Fig 44 Correlation of Level Measures of Tone with Sales Surprise

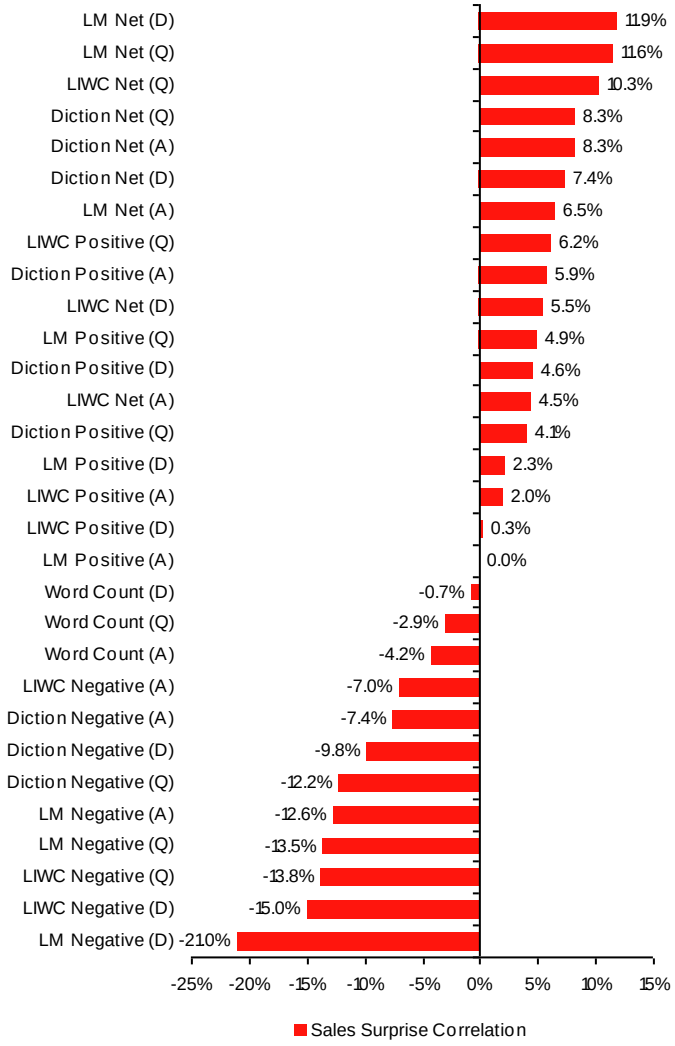
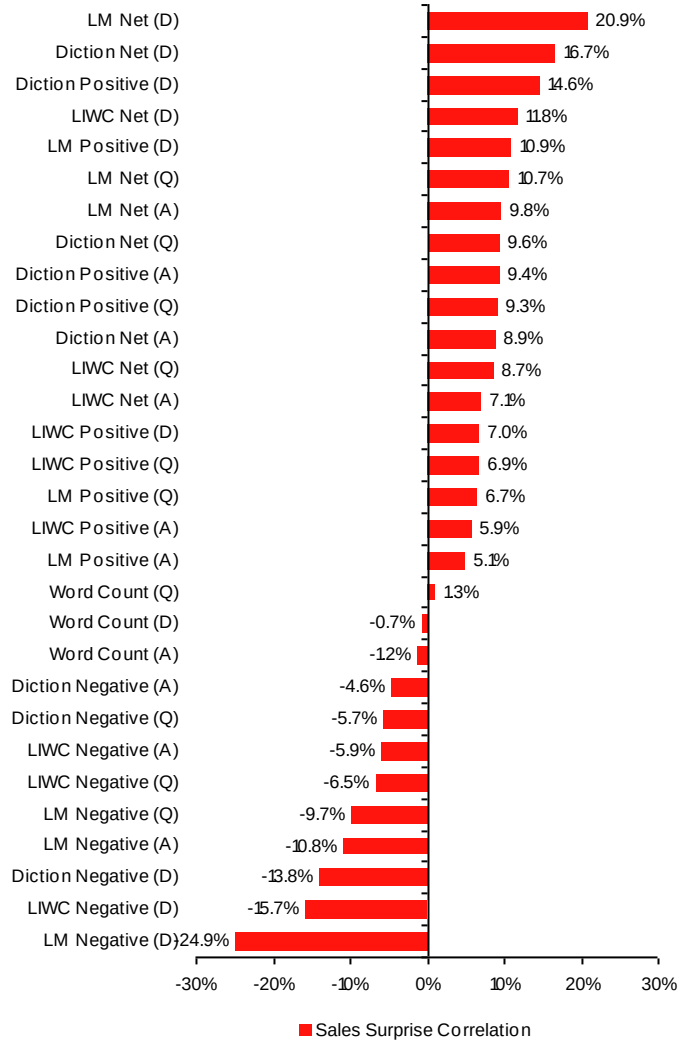


Fig 45 Correlation of Change Measures of Tone with Sales Surprise



Sources (Fig 44-45): Factset, S&P, Macquarie Capital (USA), May 2013.

Correlation of Tone Measures with Stock Characteristics

Building on the analysis we did examining the correlation between tone measures and earnings/sales surprises, we examine correlations with a broader set of stock characteristics. We show correlations of tone measures in levels with stock characteristics in Fig 46. In Fig 47 we show correlations of the tone measures in changes with stock characteristics. The stock characteristics we use are not sector adjusted. For correlations using sector adjusted stock characteristics please contact us.

Tone is positively correlated with price momentum and earning revisions, and exhibits expensive attributes.

Focusing our comments on the Net Positive measures, in Fig 46 we see clearly that higher levels of Net Positivity is associated with higher price momentum and higher levels of earning revisions. This is true across Net Positivity measures from each dictionary and for each section of a conference call. Not surprisingly we also see that the higher Net Positivity measures indicate a stock tends to be expensive. The correlation is higher for earnings yield and cash flow yield measures, though we believe this is exacerbated by a loss effect. Other notable correlations are with measures of risk. Net Positivity measures primarily for the discussion section are negatively correlated with beta and stock return volatility.

Change in tone measures also exhibit a negative correlation with measures of fundamental performance.

In Fig 47 we look at correlations of changes in the tone measures with stock characteristics. Our previous observations hold when looking at changes – increases in Net Positivity is associated with more expensive stocks and those that have experienced high price momentum and earning revisions. There is one marked difference. This is a negative correlation with several measures of fundamental performance. Namely, increases in Net Positivity are associated with lower levels of operating performance and decreases in operating performance (e.g. ROE, Asset Turnover, Interest Cover, Changes in Working Capital).

We have also looked at correlations with sector adjusted stock characteristics and we find that these observations hold, albeit with marginally lower correlations.

Fig 46 Correlations of Tone Measures in Levels with Stock Characteristics

	Word Count (D)	Word Count (Q)	Word Count (A)	LWC Positive (D)	LWC Negative (D)	LWC Positive (Q)	LWC Negative (Q)	LWC Positive (A)	LWC Negative (A)	LM Positive (D)	LM Negative (D)	LM Positive (Q)	LM Negative (Q)	LM Positive (A)	LM Negative (A)	Diction Positive (D)	Diction Negative (D)	Diction Positive (Q)	Diction Negative (Q)	Diction Positive (A)	Diction Negative (A)	LWC Net (D)	LWC Net (Q)	LWC Net (A)	LM Net (D)	LM Net (Q)	LM Net (A)	Diction Net (D)	Diction Net (Q)	Diction Net (A)
EV/EBITDA	0.05	-0.01	0.04	0.00	-0.22	-0.04	-0.08	-0.01	-0.04	0.07	-0.23	0.01	-0.05	0.05	-0.11	0.15	-0.13	0.14	-0.07	0.10	-0.04	0.08	0.00	0.01	0.18	0.04	0.10	0.17	0.12	0.08
FCF/EV	-0.01	-0.02	0.04	0.01	-0.05	-0.02	0.01	-0.02	0.00	0.05	-0.02	-0.04	0.04	0.00	0.04	0.02	-0.02	0.08	0.00	-0.05	-0.01	0.03	-0.03	-0.01	0.06	-0.04	-0.02	0.03	0.08	-0.02
Earnings Yield	-0.03	0.03	-0.04	-0.01	0.15	0.00	0.11	-0.02	0.06	-0.05	0.20	-0.01	0.09	-0.04	0.12	-0.07	0.05	-0.11	0.12	-0.07	0.07	-0.06	-0.04	-0.04	-0.15	-0.06	-0.10	-0.08	-0.13	-0.08
Cash flow Yield	-0.03	0.02	-0.06	0.00	0.21	0.03	0.09	-0.02	0.04	-0.06	0.22	0.02	0.05	-0.06	0.11	-0.13	0.10	-0.16	0.07	-0.10	0.07	-0.07	0.00	-0.03	-0.17	-0.02	-0.10	-0.15	-0.14	-0.10
Sales / EV	-0.08	0.10	0.06	0.23	0.25	0.05	0.13	0.13	0.09	0.11	0.20	0.14	-0.03	0.11	0.04	0.02	0.19	-0.14	0.15	0.02	0.10	0.12	0.00	0.08	-0.01	0.11	0.06	-0.04	-0.17	-0.03
Price / Sales	0.05	-0.10	-0.04	-0.25	-0.26	-0.06	-0.12	-0.12	-0.08	-0.13	-0.22	-0.16	0.04	-0.10	-0.04	-0.02	-0.17	0.14	-0.14	0.00	-0.10	-0.13	-0.01	-0.07	0.01	-0.13	-0.05	0.04	0.17	0.05
Prices / Book	-0.05	0.03	0.05	0.06	-0.22	-0.04	-0.04	0.05	-0.06	0.10	-0.19	0.04	-0.04	0.10	-0.11	0.21	-0.12	0.13	0.00	0.14	-0.06	0.13	-0.02	0.07	0.18	0.05	0.14	0.20	0.08	0.12
1M Price Momentum	-0.03	0.00	0.00	0.03	-0.04	0.03	-0.08	0.03	-0.02	0.05	-0.05	0.05	-0.09	0.05	-0.06	0.01	-0.04	0.04	-0.08	0.02	-0.03	0.04	0.05	0.03	0.06	0.09	0.07	0.02	0.06	0.03
3M Price Momentum	-0.03	0.00	-0.02	0.06	-0.08	0.07	-0.12	0.06	-0.06	0.09	-0.10	0.11	-0.16	0.08	-0.12	0.03	-0.08	0.06	-0.10	0.04	-0.05	0.08	0.11	0.07	0.12	0.17	0.12	0.06	0.09	0.07
6M Price Momentum	-0.05	-0.01	-0.03	0.08	-0.15	0.08	-0.15	0.07	-0.10	0.11	-0.20	0.13	-0.20	0.10	-0.17	0.08	-0.13	0.08	-0.13	0.08	-0.07	0.12	0.12	0.10	0.19	0.21	0.17	0.11	0.12	0.10
12M Price Momentum	-0.07	-0.01	-0.04	0.10	-0.24	0.08	-0.17	0.09	-0.14	0.13	-0.31	0.12	-0.24	0.11	-0.22	0.13	-0.20	0.10	-0.13	0.13	-0.05	0.17	0.13	0.12	0.26	0.22	0.20	0.18	0.13	0.12
12-1M Price Momentum	-0.06	-0.01	-0.04	0.09	-0.23	0.07	-0.16	0.08	-0.14	0.12	-0.30	0.11	-0.22	0.09	-0.20	0.13	-0.19	0.09	-0.12	0.12	-0.05	0.16	0.12	0.11	0.24	0.21	0.18	0.17	0.12	0.11
# of Days to Cover Short	-0.07	0.02	0.00	0.02	0.00	0.07	-0.03	0.03	0.01	0.02	0.04	0.06	0.05	0.04	-0.02	-0.02	0.04	0.05	0.02	0.00	0.08	0.02	0.07	0.02	0.00	0.01	0.05	-0.03	0.03	-0.06
3M % Chg in Short Interest	0.00	0.00	0.00	-0.03	0.00	-0.02	0.01	-0.03	0.02	-0.04	0.01	-0.04	0.03	-0.02	0.02	-0.03	-0.01	-0.04	0.02	-0.03	0.02	-0.03	-0.02	-0.04	-0.04	-0.05	-0.03	-0.02	-0.04	-0.03
FQ1 EPS Up/Down Ratio, 2M	-0.05	-0.04	-0.04	0.02	-0.16	0.06	-0.11	0.03	-0.07	0.05	-0.23	0.07	-0.14	0.03	-0.12	0.04	-0.10	0.05	-0.11	0.03	-0.06	0.08	0.09	0.04	0.15	0.13	0.08	0.07	0.09	0.06
FQ1 Average EPS Revision, 2M	-0.01	0.01	-0.02	0.03	-0.10	0.02	-0.02	0.02	-0.02	0.06	-0.12	0.03	-0.05	0.02	-0.06	0.05	-0.11	0.03	-0.02	0.01	-0.02	0.07	0.03	0.02	0.11	0.06	0.04	0.07	0.03	0.02
FY1 EPS Up/Down Ratio, 3M	-0.01	-0.05	-0.03	0.11	-0.23	0.03	-0.09	0.07	-0.10	0.13	-0.30	0.09	-0.16	0.09	-0.15	0.17	-0.17	0.10	-0.11	0.10	-0.09	0.18	0.06	0.09	0.26	0.16	0.15	0.20	0.12	0.13
FY1 EPS Up/Down Ratio, 6M	-0.01	-0.05	-0.03	0.11	-0.26	0.01	-0.10	0.07	-0.11	0.13	-0.35	0.07	-0.17	0.09	-0.15	0.19	-0.20	0.10	-0.12	0.12	-0.10	0.19	0.05	0.10	0.28	0.16	0.15	0.23	0.13	0.14
FY2 EPS Up/Down Ratio, 3M	-0.05	-0.02	-0.03	0.11	-0.24	0.06	-0.11	0.08	-0.11	0.14	-0.31	0.12	-0.19	0.10	-0.18	0.16	-0.18	0.10	-0.12	0.11	-0.09	0.18	0.10	0.10	0.27	0.20	0.17	0.20	0.12	0.13
FY2 EPS Up/Down Ratio, 6M	-0.04	-0.03	-0.03	0.11	-0.27	0.04	-0.12	0.08	-0.12	0.13	-0.36	0.10	-0.20	0.10	-0.19	0.18	-0.20	0.11	-0.13	0.13	-0.09	0.19	0.08	0.10	0.29	0.20	0.17	0.22	0.13	0.14
FY1 Average EPS Revision, 3M	-0.05	-0.02	-0.02	0.06	-0.16	0.04	-0.09	0.05	-0.07	0.08	-0.25	0.07	-0.16	0.06	-0.13	0.10	-0.12	0.06	-0.11	0.07	-0.08	0.11	0.07	0.07	0.19	0.15	0.12	0.13	0.09	0.10
FY1 Average EPS Revision, 6M	-0.05	-0.02	-0.02	0.05	-0.19	0.03	-0.10	0.04	-0.07	0.07	-0.29	0.06	-0.16	0.06	-0.15	0.11	-0.13	0.08	-0.10	0.08	-0.06	0.11	0.06	0.06	0.20	0.15	0.13	0.14	0.10	0.10
FY2 Average EPS Revision, 3M	-0.07	0.00	-0.03	0.06	-0.17	0.05	-0.10	0.05	-0.08	0.08	-0.25	0.09	-0.18	0.06	-0.15	0.10	-0.12	0.07	-0.11	0.08	-0.09	0.11	0.08	0.07	0.20	0.17	0.13	0.13	0.09	0.11
FY2 Average EPS Revision, 6M	-0.06	-0.01	-0.01	0.05	-0.19	0.04	-0.11	0.05	-0.08	0.06	-0.30	0.08	-0.18	0.06	-0.17	0.10	-0.13	0.08	-0.11	0.09	-0.07	0.11	0.08	0.07	0.20	0.17	0.13	0.14	0.10	0.10
R&D as % of Total Assets	-0.04	-0.05	0.07	-0.33	-0.07	-0.26	-0.02	-0.09	-0.01	-0.27	-0.06	-0.39	0.12	-0.16	0.05	-0.20	-0.05	-0.02	-0.07	-0.06	-0.16	-0.27	-0.23	-0.08	-0.16	-0.33	-0.15	-0.13	0.04	0.05
Capex as % of Total Assets	-0.05	-0.02	-0.09	-0.06	0.10	0.10	0.01	-0.07	0.02	-0.10	0.05	0.08	-0.04	-0.09	-0.01	-0.15	0.04	-0.12	0.00	-0.11	0.04	-0.09	0.08	-0.07	-0.11	0.08	-0.06	-0.16	-0.10	-0.11
YoY change in Capex/Assets	-0.02	-0.02	-0.04	-0.07	0.00	0.03	0.00	-0.04	0.00	-0.08	-0.07	0.01	-0.04	-0.04	-0.05	-0.03	-0.02	-0.02	0.05	-0.02	0.09	-0.06	0.03	-0.04	-0.03	0.03	-0.01	-0.02	-0.03	-0.06
Total Assets / Book	0.00	0.09	0.02	0.31	0.03	0.01	0.03	0.11	-0.01	0.22	0.13	0.15	-0.01	0.13	0.03	0.18	-0.04	-0.01	0.08	0.06	0.02	0.26	0.00	0.09	0.11	0.11	0.09	0.15	-0.05	0.03
YoY change in debt	0.03	-0.02	-0.01	-0.01	0.03	0.01	0.06	0.01	0.03	0.00	0.06	-0.02	0.08	0.01	0.02	0.01	0.03	0.01	0.04	-0.01	-0.02	-0.02	-0.01	0.00	-0.03	-0.06	-0.01	-0.01	-0.01	-0.01
YoY change in # shares outstanding	0.01	0.01	0.00	-0.11	0.00	0.01	-0.07	-0.05	0.02	-0.06	-0.05	0.01	-0.10	-0.05	-0.04	-0.09	0.00	-0.05	-0.09	-0.02	0.00	-0.10	0.03	-0.04	-0.02	0.06	-0.02	-0.08	0.00	-0.02
Change in Working Capital / Assets	0.03	0.03	0.00	-0.05	0.03	-0.01	0.06	-0.04	0.05	-0.04	0.06	-0.02	0.08	-0.02	0.03	0.00	0.01	-0.07	0.07	0.00	0.04	-0.05	-0.03	-0.05	-0.06	-0.07	-0.03	-0.01	-0.09	-0.03
Interest Cover	-0.04	-0.06	0.01	-0.12	-0.10	-0.04	0.01	-0.03	0.00	-0.09	-0.11	-0.06	0.01	-0.03	-0.03	0.04	-0.04	0.04	0.03	0.04	-0.03	-0.07	-0.04	-0.02	-0.03	-0.04	-0.01	0.04	0.02	0.04
Return on Equity	-0.07	0.07	0.03	0.06	-0.08	-0.01	0.06	0.04	-0.01	0.06	-0.02	0.04	0.03	0.06	-0.01	0.15	-0.06	0.04	0.10	0.08	0.02	0.08	-0.03	0.03	0.06	0.00	0.05	0.13	-0.03	0.03
Return on Assets	-0.06	0.02	0.02	-0.13	-0.11	-0.02	0.03	-0.03	-0.01	-0.07	-0.09	-0.06	0.04	-0.03	-0.03	0.03	-0.04	0.04	0.05	0.03	0.00	-0.08	-0.03	-0.02	-0.01	-0.07	-0.01	0.03	0.00	0.01
Change in Return on Equity	-0.04	-0.01	-0.01	0.06	-0.07	0.00	-0.02	0.01	-0.02	0.03	-0.13	0.02	-0.06	0.02	-0.05	0.07	-0.07	0.02	-0.02	0.04	0.05	0.08	0.00	0.02	0.09	0.05	0.04	0.08	0.01	0.00
Change in Return on Assets	-0.04	0.00	-0.02	0.04	-0.09	0.00	-0.04	0.02	-0.03	0.03	-0.15	0.01	-0.08	0.02	-0.06	0.07	-0.09	0.02	-0.02	0.05	0.05	0.07	0.01	0.03	0.11	0.06	0.05	0.09	0.02	0.01
Asset Turnover	-0.15	0.14	0.10	0.21	0.10	0.06	0.12	0.15	0.05	0.13	0.03	0.17	-0.08	0.15	-0.08	0.11	0.13	-0.05	0.16	0.09	0.07	0.16	0.02	0.12	0.09	0.17	0.16	0.04	-0.14	0.02
Change in Asset Turnover	-0.03	0.02	0.00	0.02	0.02	0.01	0.00	-0.02	0.03	0.00	0.00	0.02	0.01	-0.01	0.00	0.01	-0.01	-0.03	0.06	-0.01	0.09	0.01	0.01	-0.02	0.00	0.01	-0.01	0.01	-0.05	-0.06
Gross Margins	0.12	-0.15	-0.04	-0.21	-0.18	-0.04	-0.06	-0.06	-0.07	-0.11	-0.13	-0.16	0.12	-0.06	0.01	-0.01	-0.06	0.18	-0.10	0.02	-0.13	-0.13	-0.02	-0.03	-0.02	-0.17	-0.05	0.00	0.19	0.08
Change in Gross Margins	-0.02	-0.03	-0.02	0.01	-0.06	0.00	-0.05	0.04	-0.03	0.03	-0.12	0.02	-0.08	0.03	-0.04	0.04	-0.05	0.02	-0.06	0.04	-0.05	0.03	0.01	0.05	0.08	0.07	0.04	0.05	0.04	0.05
Accruals / Total Assets	0.07	0.05	0.01	-0.01	0.03	-0.03	0.07	-0.04	0.06	-0.01	0.07	-0.02	0.08	-0.01	0.04	0.04	-0.02	-0.06	0.08	0.00	0.06	-0.02	-0.05	-0.05	-0.04	-0.07	-0.03	0.04	-0.10	-0.05
Beta	-0.04	-0.03	0.00	-0.12	0.08	0.02	-0.02	-0.05	0.05	-0.11	0.04	-0.03	-0.04	-0.08	0.04	-0.16	0.07	-0.05	-0.02	-0.05	0.06	-0.13	0.02	-0.06	-0.11	0.00	-0.08	-0.16	-0.03	-0.08
Stock Return Volatility, 1Yr	-0.02	-0.01	0.00	-0.16	0.28	0.05	0.03	-0.10	0.12	-0.17	0.22	-0.05	0.02	-0.14	0.11	-0.30	0.25	-0.13	-0.05	-0.17	-0.02	-0.24	0.03	-0.13	-0.25	-0.05	-0.16	-0.32	-0.08	-0.11
Stock Return Volatility, 3M	-0.01	-0.01	0.00	-0.17	0.24	0.01	0.07	-0.12	0.14	-0.19	0.18	-0.09	0.06	-0.17	0.12	-0.28	0.23	-0.16	0.00	-0.17	0.02	-0.23	-0.01	-0.15	-0.25	-0.10	-0.19	-0.30	-0.12	-0.13
Chg in 1M volume	0.01	0.00	-0.03	-0.03	0.02	-0.04	0.05	-0.08	0.05	-0.04	0.05	-0.07	0.10	-0.09	0.10	-0.02	0.01	-0.10	0.06	-0.07	0.03	-0.03	-0.05	-0.09	-0.06	-0.11	-0.12	-0.02	-0.11	-0.06
Chg in 3M volume	0.05	-0.01	-0.04	-0.05	0.07	-0.06	0.10	-0.09	0.09	-0.06	0.10	-0.08	0.13	-0.08	0.12	-0.05	0.06	-0.15	0.08	-0.09	0.02	-0.07	-0.09	-0.11	-0.10	-0.13	-0.13	-0.06	-0.16	-0.08
Market Capitalization	0.12	-0.15	-0.10	0.01	-0.07	-0.09	-0.02	0.11	-0.08	0.05	-0.11	-0.03	0.00	0.09	0.06	0.11	-0.17	0.02	-0.05	0.12	-0.12	0.04	-0.08	0.12	0.09	-0.02	0.03	0.13	0.06	0.17

Source: Factset, S&P, Compustat, IBES, Macquarie Capital (USA), May 2013.

Fig 47 Correlations of Tone Measures in Changes with Stock Characteristics

	Word Count (D)	Word Count (Q)	Word Count (A)	LWC Positive (D)	LWC Negative (D)	LWC Positive (Q)	LWC Negative (Q)	LWC Positive (A)	LWC Negative (A)	LM Positive (D)	LM Negative (D)	LM Positive (Q)	LM Negative (Q)	LM Positive (A)	LM Negative (A)	Diction Positive (D)	Diction Negative (D)	Diction Positive (Q)	Diction Negative (Q)	Diction Positive (A)	Diction Negative (A)	LWC Net (D)	LWC Net (Q)	LWC Net (A)	LM Net (D)	LM Net (Q)	LM Net (A)	Diction Net (D)	Diction Net (Q)	Diction Net (A)
EV/EBITDA	-0.02	0.00	-0.01	0.07	-0.15	0.03	-0.05	0.03	-0.04	0.08	-0.19	0.03	-0.08	0.04	-0.10	0.12	-0.13	0.07	-0.07	0.06	-0.11	0.12	0.05	0.04	0.16	0.07	0.09	0.14	0.08	0.10
FCF/EV	-0.03	0.01	0.02	-0.01	-0.02	-0.01	-0.01	-0.02	-0.02	-0.02	-0.03	-0.01	0.00	-0.01	-0.03	0.00	-0.02	0.01	0.00	-0.02	0.03	0.00	-0.01	-0.01	0.00	-0.01	0.01	0.00	0.01	-0.03
Earnings Yield	0.03	0.01	0.00	-0.11	0.18	-0.04	0.09	-0.07	0.07	-0.14	0.24	-0.06	0.12	-0.09	0.14	-0.15	0.17	-0.07	0.10	-0.10	0.12	-0.17	-0.07	-0.09	-0.23	-0.12	-0.14	-0.18	-0.10	-0.14
Cash flow Yield	0.02	0.01	0.00	-0.08	0.15	-0.03	0.06	-0.04	0.05	-0.09	0.19	-0.03	0.08	-0.05	0.10	-0.12	0.13	-0.05	0.06	-0.07	0.10	-0.13	-0.05	-0.06	-0.17	-0.08	-0.09	-0.15	-0.07	-0.10
Sales / EV	0.02	-0.01	-0.01	-0.03	0.07	-0.02	0.01	-0.02	0.03	-0.05	0.08	-0.02	0.02	-0.04	0.04	-0.07	0.06	-0.04	0.02	-0.03	0.05	-0.05	-0.02	-0.02	-0.08	-0.02	-0.05	-0.07	-0.04	-0.05
Price / Sales	-0.03	0.01	0.01	0.03	-0.07	0.01	0.00	0.01	-0.02	0.04	-0.07	0.01	-0.01	0.03	-0.03	0.06	-0.05	0.03	-0.02	0.03	-0.05	0.05	0.01	0.02	0.07	0.01	0.04	0.06	0.03	0.05
Prices / Book	-0.01	0.00	0.01	0.00	-0.06	-0.01	-0.01	0.00	-0.01	0.01	-0.06	-0.01	-0.02	0.01	-0.03	0.05	-0.05	0.02	-0.03	0.02	-0.07	0.02	-0.01	0.01	0.04	0.00	0.03	0.05	0.03	0.05
1M Price Momentum	-0.02	0.00	0.00	0.03	-0.08	0.02	-0.07	0.04	-0.03	0.08	-0.08	0.06	-0.06	0.08	-0.07	0.04	-0.09	0.04	-0.08	0.04	-0.06	0.06	0.05	0.05	0.09	0.08	0.09	0.07	0.07	0.07
3M Price Momentum	-0.05	0.02	0.01	0.07	-0.12	0.07	-0.11	0.08	-0.07	0.12	-0.16	0.11	-0.14	0.11	-0.14	0.08	-0.15	0.07	-0.10	0.07	-0.08	0.11	0.10	0.09	0.16	0.16	0.16	0.12	0.10	0.09
6M Price Momentum	-0.07	0.02	0.00	0.11	-0.22	0.08	-0.13	0.09	-0.11	0.17	-0.29	0.12	-0.18	0.12	-0.20	0.15	-0.22	0.10	-0.13	0.12	-0.12	0.18	0.12	0.12	0.27	0.20	0.20	0.20	0.14	0.15
12M Price Momentum	-0.06	0.01	0.01	0.11	-0.30	0.05	-0.12	0.07	-0.14	0.13	-0.41	0.07	-0.19	0.09	-0.24	0.22	-0.28	0.13	-0.11	0.13	-0.11	0.22	0.09	0.11	0.31	0.16	0.20	0.27	0.15	0.15
12-1M Price Momentum	-0.05	0.01	0.01	0.11	-0.28	0.05	-0.10	0.06	-0.14	0.11	-0.39	0.05	-0.17	0.07	-0.23	0.21	-0.25	0.12	-0.09	0.12	-0.09	0.21	0.08	0.10	0.29	0.14	0.17	0.25	0.13	0.14
# of Days to Cover Short	0.02	-0.01	-0.01	0.00	-0.03	0.03	-0.05	0.03	-0.02	0.02	-0.02	0.05	-0.03	0.02	-0.05	0.00	-0.04	0.03	-0.05	0.02	-0.05	0.01	0.04	0.03	0.03	0.05	0.04	0.01	0.05	0.04
3M % Chg in Short Interest	0.01	0.01	0.00	-0.02	0.02	-0.01	0.00	-0.03	0.01	-0.02	0.05	-0.03	0.02	-0.03	0.02	-0.03	0.02	-0.04	0.00	-0.02	0.00	-0.03	-0.01	-0.03	-0.04	-0.03	-0.04	-0.03	-0.03	-0.02
FQ1 EPS Up/Down Ratio, 2M	-0.04	0.02	0.03	0.11	-0.20	0.06	-0.08	0.05	-0.08	0.11	-0.27	0.07	-0.12	0.08	-0.13	0.17	-0.17	0.09	-0.07	0.10	-0.04	0.17	0.08	0.07	0.22	0.13	0.12	0.20	0.10	0.09
FQ1 Average EPS Revision, 2M	-0.01	0.02	0.00	0.06	-0.10	0.03	-0.05	0.03	-0.05	0.05	-0.14	0.02	-0.06	0.04	-0.08	0.08	-0.09	0.04	-0.02	0.04	-0.02	0.08	0.04	0.04	0.11	0.06	0.07	0.09	0.05	0.04
FY1 EPS Up/Down Ratio, 3M	-0.05	0.01	0.00	0.12	-0.24	0.04	-0.08	0.04	-0.09	0.12	-0.32	0.05	-0.12	0.06	-0.16	0.20	-0.21	0.09	-0.09	0.10	-0.08	0.20	0.06	0.07	0.26	0.11	0.13	0.24	0.10	0.11
FY1 EPS Up/Down Ratio, 6M	-0.04	0.00	-0.01	0.11	-0.26	0.03	-0.06	0.03	-0.09	0.11	-0.34	0.03	-0.11	0.04	-0.15	0.21	-0.22	0.10	-0.07	0.10	-0.07	0.20	0.05	0.06	0.26	0.09	0.11	0.25	0.11	0.11
FY2 EPS Up/Down Ratio, 3M	-0.05	0.02	0.02	0.13	-0.26	0.06	-0.08	0.06	-0.10	0.13	-0.34	0.07	-0.14	0.07	-0.18	0.22	-0.22	0.11	-0.10	0.11	-0.09	0.21	0.08	0.09	0.27	0.14	0.15	0.25	0.12	0.12
FY2 EPS Up/Down Ratio, 6M	-0.04	0.01	0.01	0.11	-0.27	0.03	-0.07	0.05	-0.10	0.10	-0.36	0.03	-0.12	0.04	-0.17	0.22	-0.23	0.12	-0.09	0.10	-0.08	0.21	0.06	0.07	0.27	0.10	0.12	0.26	0.12	0.12
FY1 Average EPS Revision, 3M	-0.03	0.02	0.02	0.11	-0.22	0.04	-0.07	0.05	-0.08	0.10	-0.29	0.05	-0.12	0.06	-0.15	0.17	-0.19	0.09	-0.06	0.09	-0.06	0.18	0.06	0.07	0.24	0.11	0.12	0.20	0.09	0.09
FY1 Average EPS Revision, 6M	-0.02	0.00	0.01	0.08	-0.23	0.03	-0.05	0.04	-0.06	0.07	-0.30	0.02	-0.10	0.04	-0.13	0.16	-0.19	0.09	-0.03	0.08	-0.04	0.16	0.04	0.05	0.22	0.08	0.10	0.20	0.08	0.08
FY2 Average EPS Revision, 3M	-0.03	0.02	0.01	0.12	-0.22	0.05	-0.08	0.05	-0.08	0.12	-0.29	0.05	-0.13	0.06	-0.16	0.18	-0.20	0.09	-0.07	0.09	-0.06	0.19	0.08	0.08	0.25	0.13	0.13	0.21	0.10	0.10
FY2 Average EPS Revision, 6M	-0.03	0.01	0.01	0.10	-0.25	0.04	-0.07	0.05	-0.08	0.09	-0.33	0.03	-0.12	0.04	-0.16	0.19	-0.21	0.10	-0.06	0.10	-0.06	0.19	0.06	0.07	0.24	0.10	0.12	0.22	0.10	0.10
R&D as % of Total Assets	-0.05	0.00	0.00	0.02	0.01	0.01	0.00	0.01	0.00	0.03	-0.01	0.01	0.02	0.03	0.00	0.02	-0.01	0.00	-0.02	0.00	0.00	0.02	0.01	0.01	0.03	0.00	0.03	0.02	0.01	0.00
Capex as % of Total Assets	0.01	0.01	0.02	-0.02	0.07	-0.01	0.03	-0.01	0.01	-0.03	0.09	0.00	0.01	-0.01	0.04	-0.04	0.05	-0.03	0.00	-0.02	-0.02	-0.05	-0.02	-0.02	-0.07	-0.01	-0.03	-0.06	-0.02	-0.01
YoY change in Capex/Assets	0.01	0.01	0.01	-0.10	0.16	-0.03	0.08	-0.05	0.07	-0.11	0.18	-0.03	0.09	-0.06	0.11	-0.09	0.12	-0.05	0.09	-0.05	0.07	-0.15	-0.06	-0.07	-0.18	-0.08	-0.11	-0.12	-0.08	-0.08
Total Assets / Book	0.01	0.01	0.01	-0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.02	0.00	-0.01	0.02	0.00	0.01	-0.01	0.01	-0.01	0.00	0.00	0.00	0.00	-0.01	-0.01	-0.01	-0.01
YoY change in debt	0.03	-0.04	-0.01	-0.02	0.10	0.01	0.05	0.01	0.03	-0.02	0.10	0.02	0.04	0.00	0.02	-0.07	0.07	-0.01	0.03	-0.02	0.01	-0.05	-0.01	-0.01	-0.07	-0.02	-0.01	-0.10	-0.02	-0.02
YoY change in # shares outstanding	0.00	0.02	0.02	0.05	-0.12	0.01	-0.03	0.04	-0.04	0.07	-0.14	0.01	-0.08	0.05	-0.08	0.10	-0.10	0.05	-0.04	0.06	0.00	0.09	0.01	0.05	0.13	0.06	0.08	0.11	0.06	0.04
Change in Working Capital / Assets	0.02	0.00	-0.01	-0.05	0.11	0.00	0.08	-0.01	0.05	-0.06	0.13	-0.02	0.09	-0.02	0.07	-0.08	0.08	-0.05	0.06	-0.04	0.01	-0.09	-0.03	-0.03	-0.12	-0.07	-0.05	-0.09	-0.07	-0.04
Interest Cover	0.02	0.00	0.02	-0.07	0.07	-0.03	0.05	-0.05	0.02	-0.07	0.09	-0.06	0.05	-0.04	0.05	-0.07	0.04	-0.05	0.03	-0.04	0.01	-0.08	-0.04	-0.05	-0.10	-0.08	-0.06	-0.08	-0.05	-0.04
Return on Equity	0.02	0.00	0.00	-0.10	0.09	-0.03	0.06	-0.05	0.04	-0.10	0.12	-0.05	0.07	-0.05	0.08	-0.07	0.08	-0.04	0.04	-0.05	0.01	-0.11	-0.05	-0.06	-0.13	-0.09	-0.08	-0.09	-0.05	-0.04
Return on Assets	0.01	0.00	0.01	-0.08	0.07	-0.03	0.06	-0.06	0.03	-0.09	0.12	-0.05	0.07	-0.04	0.07	-0.07	0.07	-0.04	0.03	-0.05	0.01	-0.10	-0.05	-0.06	-0.12	-0.08	-0.07	-0.09	-0.05	-0.04
Change in Return on Equity	0.02	-0.02	-0.03	-0.06	0.06	-0.03	0.07	-0.04	0.04	-0.10	0.07	-0.05	0.08	-0.06	0.05	-0.01	0.05	-0.03	0.04	-0.04	0.05	-0.07	-0.05	-0.05	-0.10	-0.09	-0.07	-0.03	-0.04	-0.05
Change in Return on Assets	0.01	-0.02	-0.03	-0.07	0.03	-0.04	0.05	-0.05	0.02	-0.10	0.03	-0.07	0.06	-0.06	0.04	0.00	0.02	-0.01	0.03	-0.02	0.06	-0.07	-0.06	-0.05	-0.08	-0.09	-0.07	-0.01	-0.02	-0.05
Asset Turnover	0.01	-0.01	0.00	-0.04	0.03	-0.02	0.01	-0.03	0.02	-0.05	0.04	-0.03	0.02	-0.03	0.02	-0.05	0.03	-0.02	0.00	-0.02	0.00	-0.05	-0.02	-0.03	-0.06	-0.03	-0.03	-0.04	-0.02	-0.02
Change in Asset Turnover	0.00	0.00	-0.02	-0.07	0.17	-0.02	0.05	-0.02	0.05	-0.07	0.16	-0.04	0.09	-0.03	0.09	-0.09	0.10	-0.06	0.04	-0.06	0.05	-0.13	-0.03	-0.04	-0.14	-0.08	-0.08	-0.11	-0.07	-0.07
Gross Margins	-0.02	0.00	0.00	0.01	-0.02	0.00	0.01	0.01	-0.01	0.02	0.00	0.00	0.01	0.02	0.00	0.02	0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.01	0.01	-0.01	0.01	0.01	0.00	0.01
Change in Gross Margins	-0.01	0.00	0.01	-0.02	-0.01	-0.03	0.02	-0.02	0.01	-0.04	-0.05	-0.03	0.00	-0.03	0.00	0.03	-0.02	0.00	-0.03	-0.01	-0.03	-0.01	-0.03	-0.02	0.00	-0.02	-0.02	0.03	0.01	0.01
Accruals / Total Assets	0.01	0.01	0.00	-0.07	0.12	-0.02	0.09	-0.02	0.06	-0.08	0.13	-0.03	0.08	-0.04	0.08	-0.09	0.07	-0.05	0.06	-0.05	0.04	-0.10	-0.05	-0.04	-0.12	-0.08	-0.07	-0.10	-0.07	-0.06
Beta	-0.03	-0.01	0.02	-0.01	0.02	-0.01	0.02	-0.01	-0.01	0.00	0.00	-0.02	0.01	-0.01	-0.01	0.00	0.01	0.00	0.04	-0.01	0.04	-0.02	-0.02	0.00	0.00	-0.01	-0.01	-0.01	-0.01	-0.04
Stock Return Volatility, 1Yr	-0.01	0.00	0.01	-0.03	0.12	0.01	0.01	0.01	0.05	0.00	0.15	0.03	0.00	0.02	0.04	-0.10	0.11	-0.03	0.03	-0.04	0.08	-0.07	0.00	-0.01	-0.09	0.03	-0.01	-0.12	-0.03	-0.07
Stock Return Volatility, 3M	0.02	0.00	0.02	-0.05	0.17	-0.02	0.07	-0.03	0.10	-0.07	0.22	-0.04	0.07	-0.06	0.12	-0.13	0.18	-0.07	0.09	-0.08	0.12	-0.11	-0.05	-0.06	-0.17	-0.07	-0.10	-0.16	-0.10	-0.12
Chg in 1M volume	0.05	0.02	0.03	-0.03	0.10	-0.04	0.06	-0.07	0.03	-0.06	0.11	-0.10	0.11	-0.12	0.13	-0.05	0.11	-0.08	0.05	-0.07	0.03	-0.08	-0.06	-0.07	-0.10	-0.14	-0.16	-0.08	-0.09	-0.07
Chg in 3M volume	0.09	0.00	0.01	-0.08	0.21	-0.03	0.11	-0.07	0.12	-0.10	0.27	-0.10	0.13	-0.09	0.19	-0.14	0.17	-0.13	0.07	-0.11	0.02	-0.15	-0.07	-0.10	-0.21	-0.16	-0.17	-0.17	-0.14	-0.10
Market Capitalization	-0.02	0.03	0.02	0.03	-0.03	0.00	0.00	0.00	-0.02	0.02	-0.03	-0.01	-0.01	0.02	-0.03	0.02	-0.03	0.00	0.01	0.02	-0.02	0.03	0.00	0.01	0.03	0.00	0.03	0.02	-0.01	0.02

Source: Factset, S&P, Compustat, IBES, Macquarie Capital (USA), May 2013.

Market Reaction to Earnings and Tone

We examine market reactions to earnings and tone.

We now turn our attention to examining how the market reacts to earnings and tone. The analysis in this section examines the abnormal returns around an event (i.e. earnings announcement), starting one month before the announcement through three months after. Our primary benchmark for evaluating abnormal returns is an equal weighted index of the 200 firms in our sample. Also, for the analysis of market reactions, if a call happened after market, we roll forward the event date one day.

Market Reaction to Earnings and Sales Surprises

We find negligible drift following earnings and sales surprises.

As a benchmark for our tone analysis, we start off by examining how the market reacts to earnings and sales surprises for our sample of firms in Fig 48 to Fig 51. What we find is that after the initial reaction on the event day, there is negligible drift for the next 3 months after the earnings announcement. This even holds when we focus on more extreme surprises by partitioning events into quintiles.

Fig 48 Market Reaction to Earnings Surprises (Terciles)

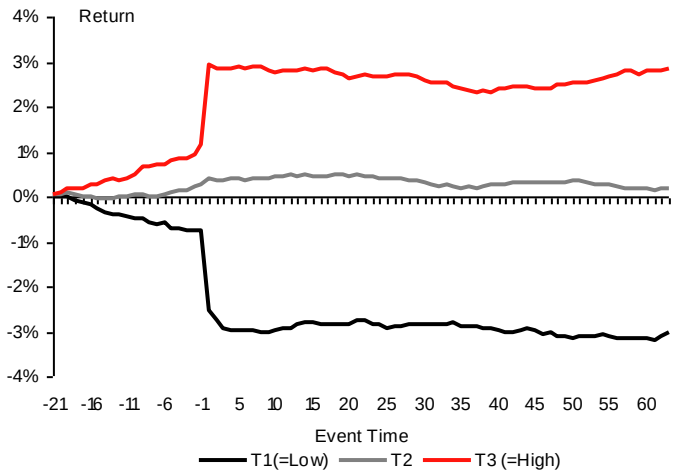


Fig 49 Market Reaction to Sales Surprises (Terciles)

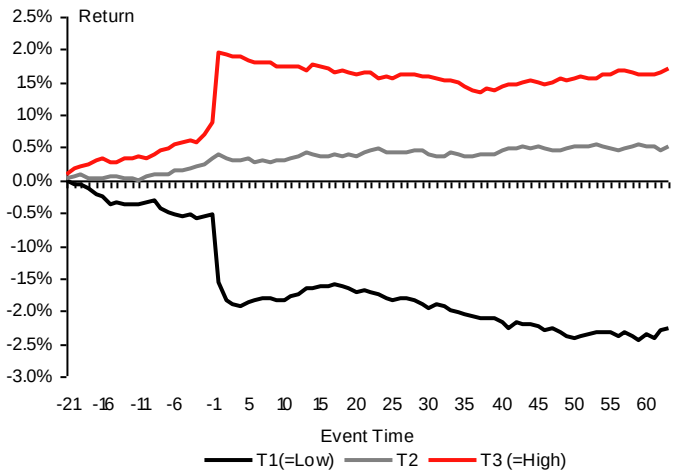


Fig 50 Market Reaction to Earnings Surprises (Quintiles)

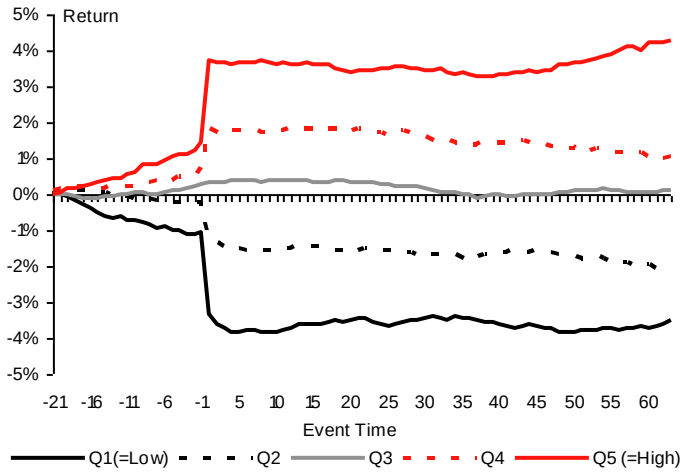
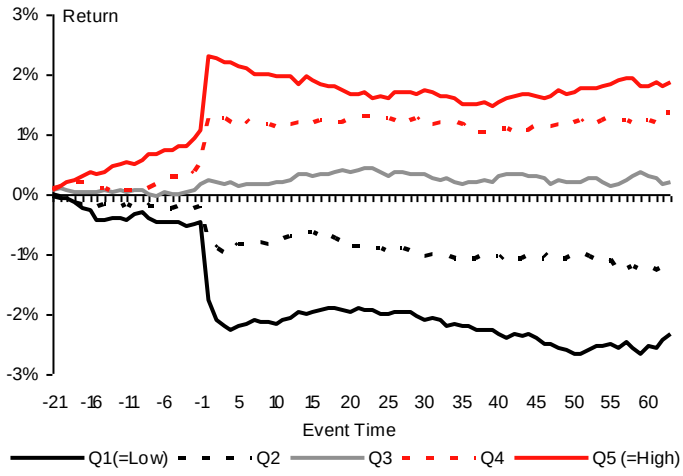


Fig 51 Market Reaction to Sales Surprises (Quintiles)



Sources (Fig 48-51): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Market Reaction to Tone

When analyzing market reaction to tone, we focus on an abnormal measure of Net Positivity.

Moving to examining the market reaction to tone, we would like to note that for brevity we only show the market reaction to Net Positivity (i.e. Positive minus Negative Tone). Please contact us for results on the individual Positive and Negative measures.

Importantly, when we examine the market reaction to conference call tone, we focus on 'abnormal' tone. That is tone that has been stripped of earnings surprise effects.

In Fig 52 we summarize the drift returns for the different tone measures. In the first panel we benchmark tone drift returns against the drift returns for earnings surprise. We look at drift returns in the next 1 month and 3 months after the earnings announcement. We measure drift returns from T+1.

In the second panel we detail the drift returns to the tone measure measured in levels. Additionally, in the third panel we show drift returns for the tone measures in changes.

To provide more insight into the evolution of the drift returns, in Fig 53 to Fig 61 we show charts of the drift returns for the level tone measures, while Fig 62 to Fig 70 shows charts of the drift returns for the tone measures in changes.

Fig 52 Summary of Market Reactions to Tone

Benchmark								
	1 Month Drift Returns				3 Month Drift Returns			
Variable	T1	T2	T3	Spread	T1	T2	T3	Spread
EPS Surprise	-0.01%	0.11%	-0.18%	-0.17%	-0.28%	-0.17%	-0.03%	0.25%

Tone Measures in Levels								
	1 Month Drift Returns				3 Month Drift Returns			
Variable	T1	T2	T3	Spread	T1	T2	T3	Spread
D- LMWC	-0.20%	-0.04%	0.17%	0.37%	-0.35%	-0.21%	0.07%	0.42%
D- Diction	-0.29%	0.04%	0.19%	0.48%	-0.34%	-0.03%	-0.12%	0.22%
D- LM	-0.26%	0.05%	0.15%	0.42%	-0.33%	-0.16%	0.00%	0.33%
Q- LMWC	0.24%	-0.25%	-0.04%	-0.28%	-0.05%	-0.25%	-0.13%	-0.07%
Q- Diction	-0.17%	-0.05%	0.18%	0.35%	-0.03%	-0.25%	-0.15%	-0.12%
Q- LM	0.05%	0.08%	-0.17%	-0.22%	-0.11%	0.09%	-0.41%	-0.30%
A- LMWC	-0.21%	-0.01%	0.19%	0.40%	-0.49%	-0.28%	0.34%	0.83%
A- Diction	-0.30%	-0.13%	0.38%	0.68%	-0.35%	-0.47%	0.38%	0.73%
A- LM	-0.02%	-0.19%	0.17%	0.19%	0.15%	-0.54%	-0.04%	-0.19%

Tone Measures in Changes								
	1 Month Drift Returns				3 Month Drift Returns			
Variable	T1	T2	T3	Spread	T1	T2	T3	Spread
D- LMWC	-0.26%	0.03%	0.23%	0.49%	-0.59%	0.08%	-0.02%	0.57%
D- Diction	-0.33%	0.05%	0.28%	0.61%	-0.47%	-0.55%	0.49%	0.96%
D- LM	-0.22%	-0.01%	0.24%	0.47%	-0.49%	-0.50%	0.46%	0.94%
Q- LMWC	0.09%	-0.20%	0.16%	0.07%	-0.50%	0.05%	-0.04%	0.46%
Q- Diction	-0.15%	0.01%	0.20%	0.35%	-0.48%	0.04%	-0.05%	0.42%
Q- LM	-0.06%	0.09%	0.03%	0.09%	-0.24%	-0.22%	-0.03%	0.22%
A- LMWC	0.07%	-0.09%	0.07%	0.00%	0.10%	-0.76%	0.16%	0.06%
A- Diction	-0.15%	0.04%	0.16%	0.32%	-0.31%	-0.14%	-0.04%	0.27%
A- LM	0.18%	-0.18%	0.05%	-0.13%	-0.09%	-0.56%	0.16%	0.25%

Source: Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Fig 53 LIWC Net-Pos for Discussion (Level)

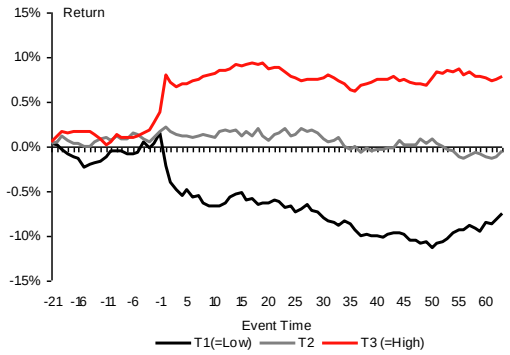


Fig 54 LIWC Net-Pos for Question (Level)

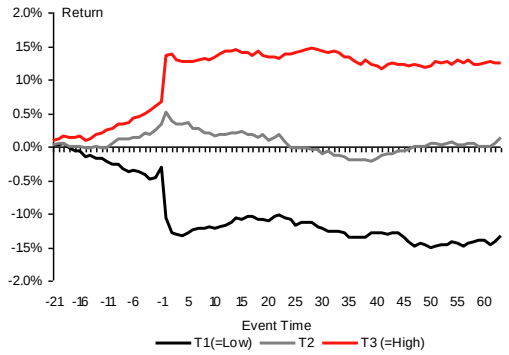


Fig 55 LIWC Net-Pos for Answer (Level)

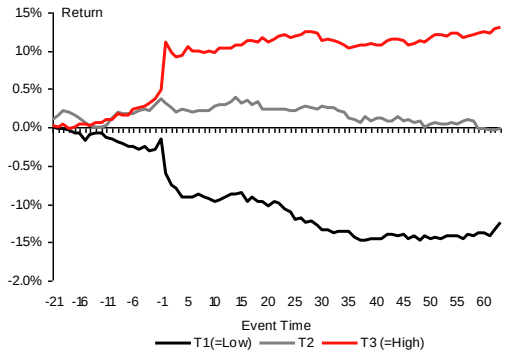


Fig 56 Diction Net-Pos for Discussion (Level)

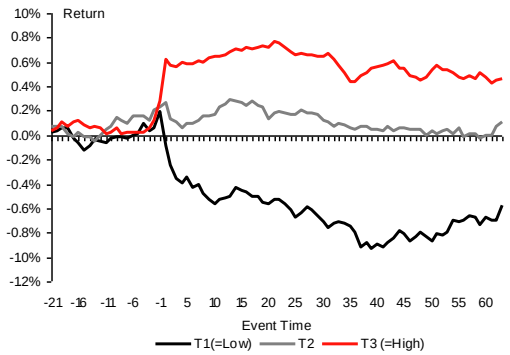


Fig 57 Diction Net-Pos for Question (Level)

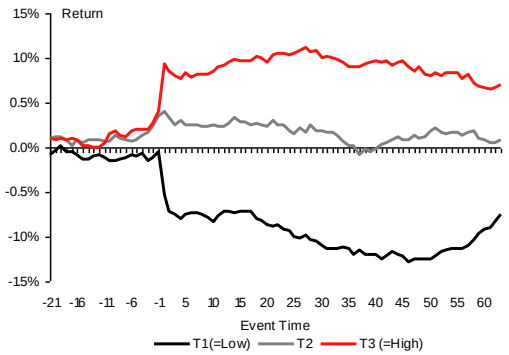


Fig 58 Diction Net-Pos for Answer (Level)

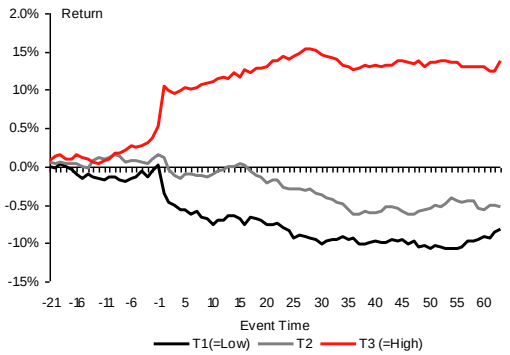


Fig 59 LM Net-Pos for Discussion (Level)

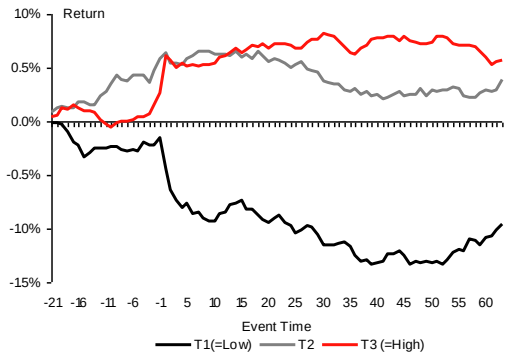


Fig 60 LM Net-Pos for Question (Level)

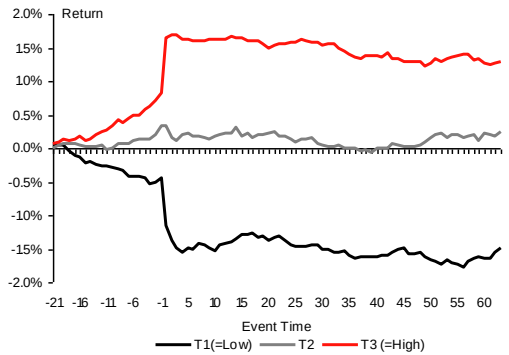
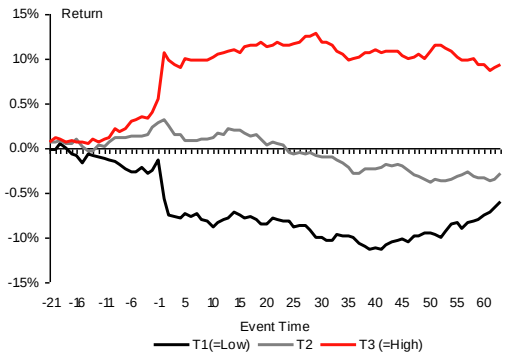


Fig 61 LM Net-Pos for Answer (Level)



Sources (Fig 53-61): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Fig 62 LIWC Net-Pos for Discussion (Chg)

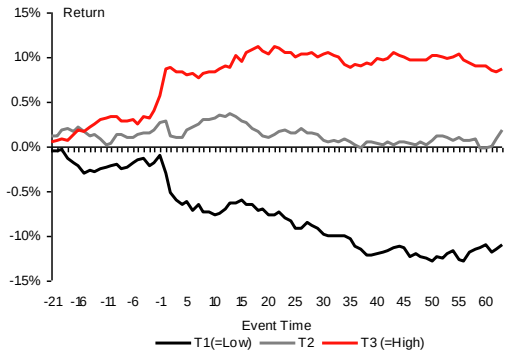


Fig 63 LIWC Net-Pos for Question (Chg)

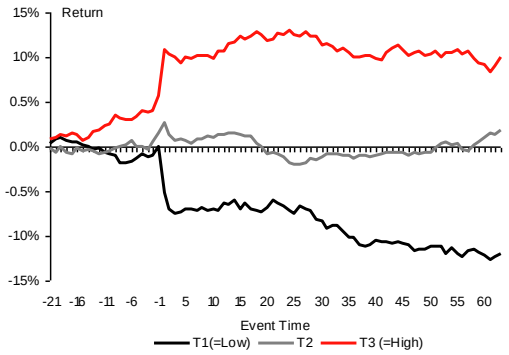


Fig 64 LIWC Net-Pos for Answer (Chg)

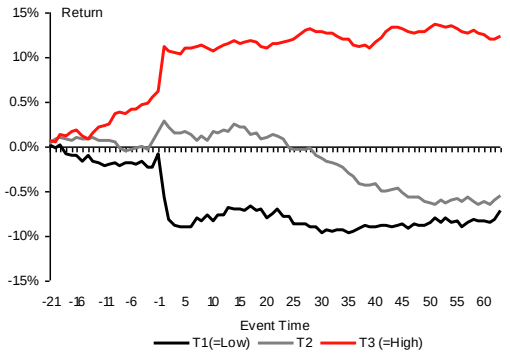


Fig 65 Diction Net-Pos for Discussion (Chg)

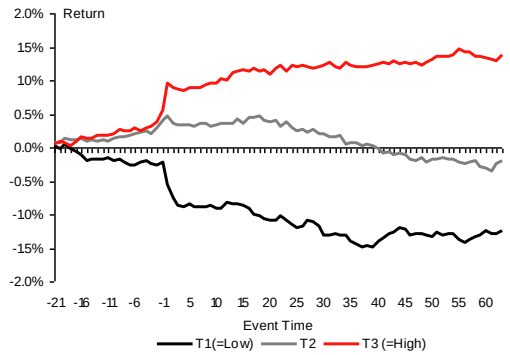


Fig 66 Diction Net-Pos for Question (Chg)

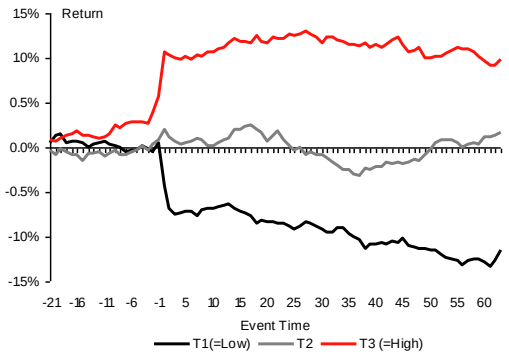


Fig 67 Diction Net-Pos for Answer (Chg)

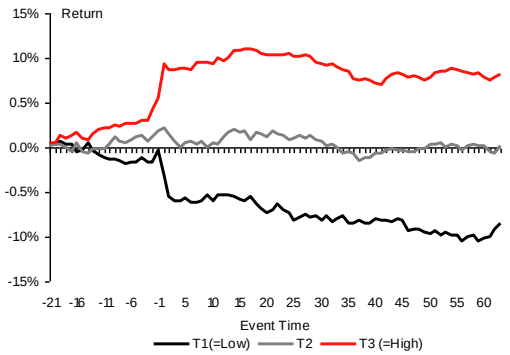


Fig 68 LM Net-Pos for Discussion (Chg)

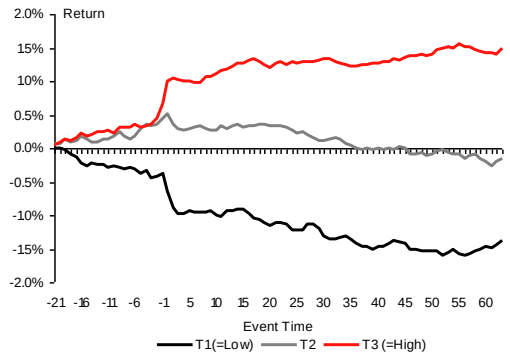


Fig 69 LM Net-Pos for Question (Chg)

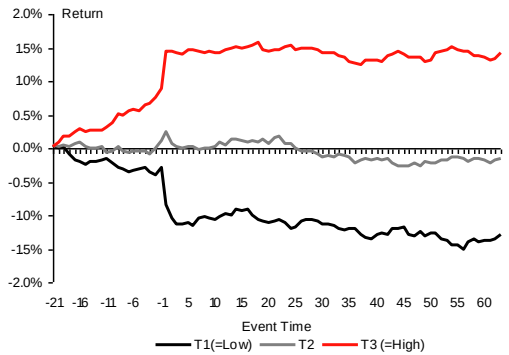
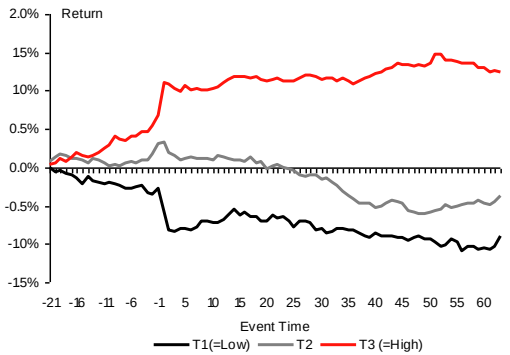


Fig 70 LM Net-Pos for Answer (Chg)



Sources (Fig 62-70): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Changes in the tone of the discussion section appear most important.

Our takeaway from examining the market reaction to tone is that changes in tone appear more important. Specifically, changes in the tone of the discussion section.

In Fig 71 to Fig 74 we chart the difference in drift returns for T3-T1 of each tone measure. The stronger reaction to changes in discussion tone can be seen in Fig 72 and Fig 74. Changes in the tone measures computed for the discussion section using the three different dictionaries produce the best drift returns.

This suggests firms might engage in tone management.

This is a surprising result to us. We did initially think the Q&A section would provide the best insights (and it still might with regards to deception). However, the fact that tone in the discussion section appears more important suggests firms engage in tone management. The discussion section is prepared (and in fact sometimes recorded prior to the actual call). This means management can look at crafting a message that provides information (or convey sentiment) that is beyond the hard numbers.

Fig 71 Difference in 1 Month Drifts (Tone in Levels)

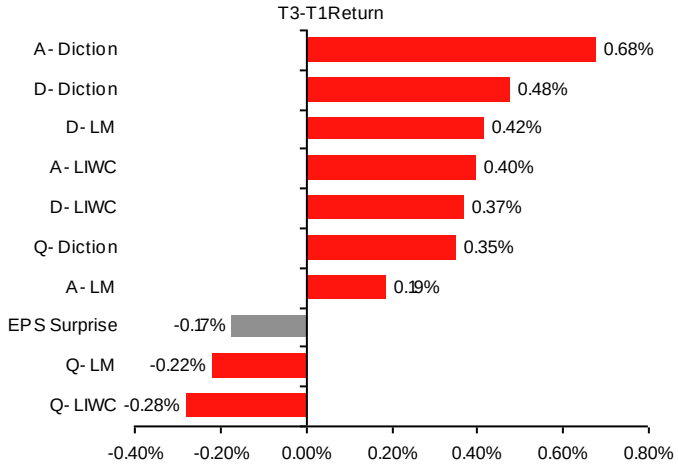


Fig 72 Difference in 1 Month Drifts (Tone in Changes)

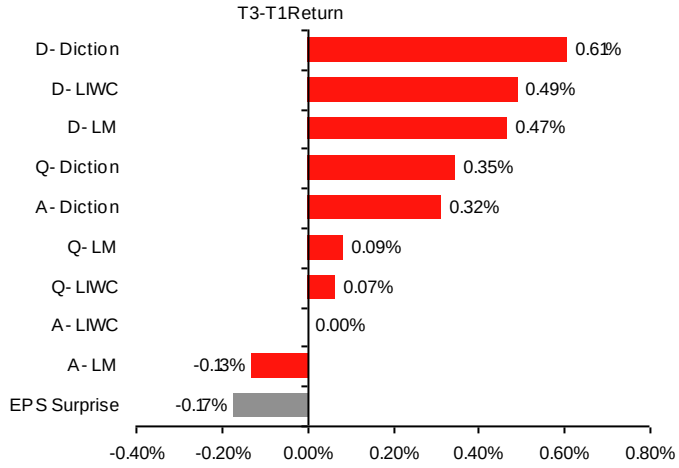


Fig 73 Difference in 3 Month Drifts (Tone in Levels)

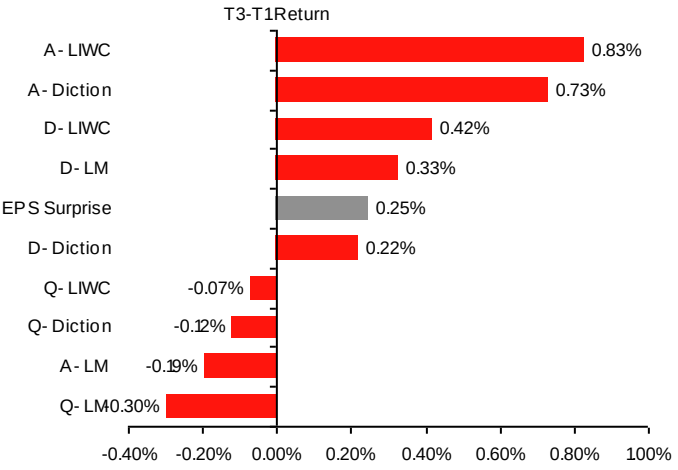
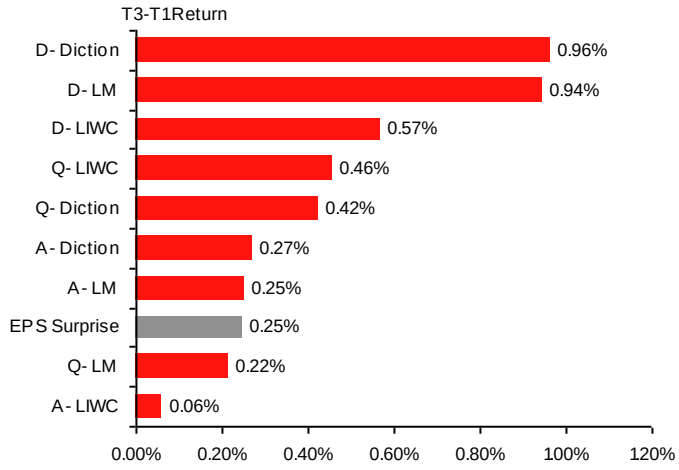


Fig 74 Difference in 3 Month Drifts (Tone in Changes)



Sources (Fig 71-74): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Averaging Out Tone

To help reduce the breadth of signals, we average tone measures across dictionaries.

In the previous analysis we examined the tone measures computed from the different dictionaries independently. However, in Fig 40 and Fig 41 we showed that the measures from the different dictionaries are by no means perfect substitutes for one another.

We think that there could be valuable information in each of the tone measures from the different dictionaries. As a test, we combined the three tone measures from each dictionary for each section. For example, we average the standardized scores from the LIWC, Diction and LM dictionaries for the discussion section. Given our insights from the previous section, we now focus our analysis on changes in tone.

Once we have these combined scores for the Discussion, Question and Answer section we aggregate into one overall score to examine the tone over the overall conference call.

We find averaging tone measures improves drift performance.

In Fig 75 we summarize the drifts for the 1 and 3 months following the earnings announcement. What we find is that the combined scores are more powerful than using the individual scores from each dictionary. For example, the T3-T1 3 month drift for the LIWC, Diction and LM change in tone measures for the discussion section was 0.57%, 0.96% and 0.94%. The T3-T1 3 month drift return for the combined discussion measure is 1.13%. We also see improvements in T3 and T1.

Fig 75 Summary of Market Reactions to Aggregated Tone

Combined Change in Tone Measures								
	1 Month Drift Returns				3 Month Drift Returns			
Variable	T1	T2	T3	Spread	T1	T2	T3	Spread
Discussion	-0.29%	-0.01%	0.31%	0.60%	-0.57%	-0.52%	0.56%	1.13%
Question	-0.20%	0.12%	0.14%	0.33%	-0.64%	0.14%	0.01%	0.66%
Answer	-0.03%	0.00%	0.09%	0.12%	-0.03%	-0.74%	0.27%	0.30%
All	-0.11%	-0.10%	0.22%	0.33%	-0.53%	-0.39%	0.40%	0.93%

Source: Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Fig 76 Combined Tone for the Discussion Section

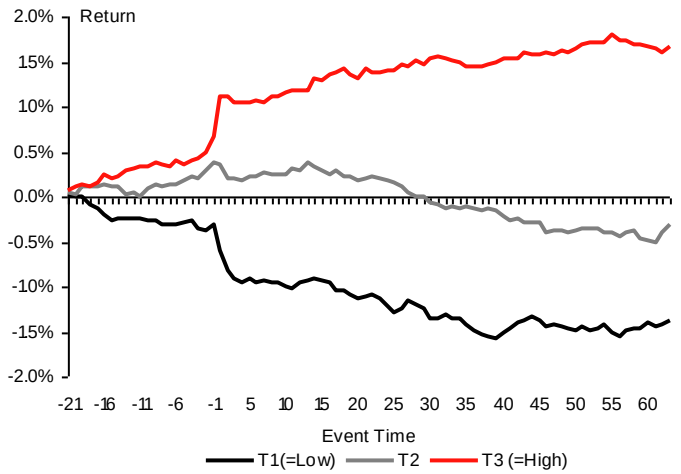
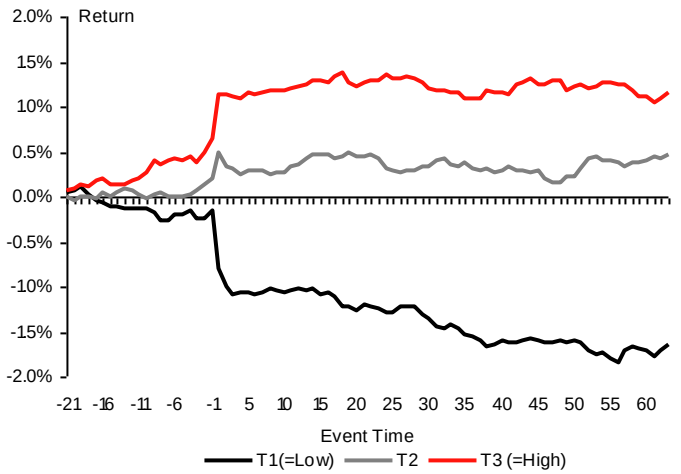


Fig 77 Combined Tone for the Question Section



Sources (Fig 76-77): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Fig 78 Combined Tone for the Answer Section

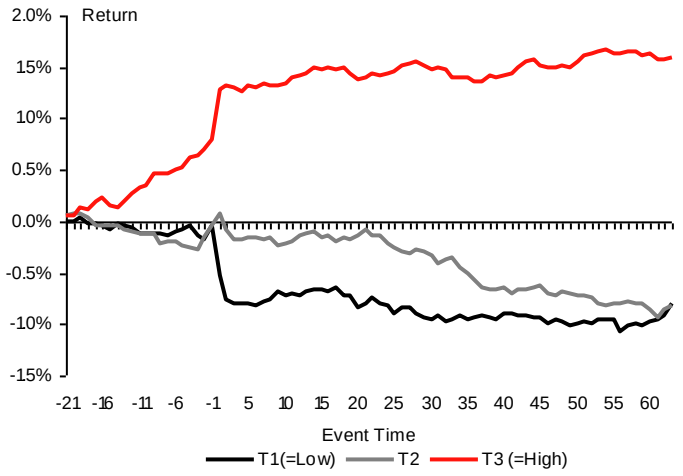


Fig 79 Combined Tone Across the Three Sections

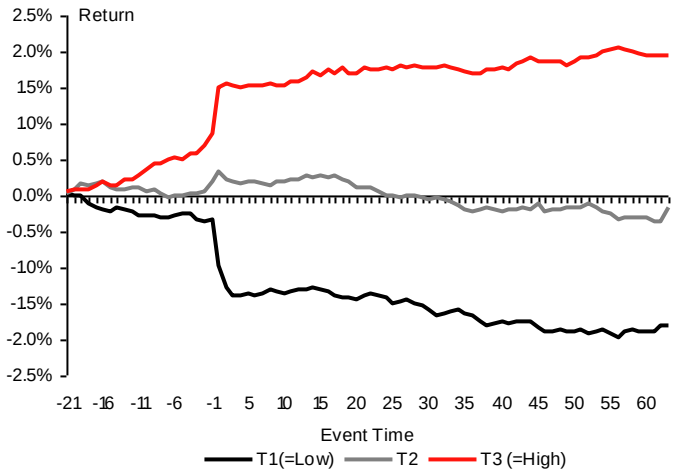


Fig 80 Difference in 1 Month Drifts

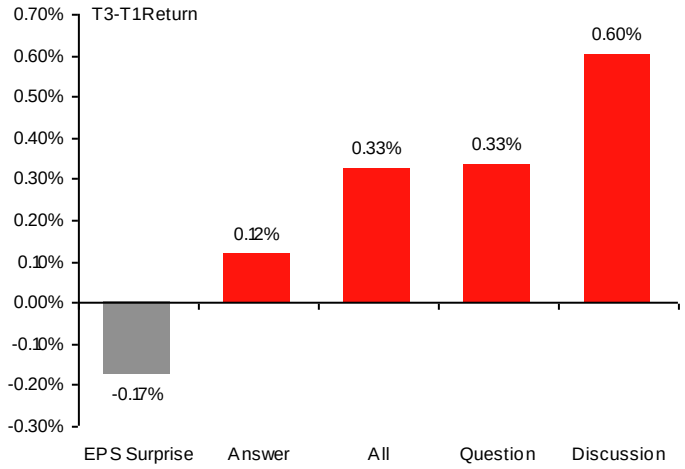
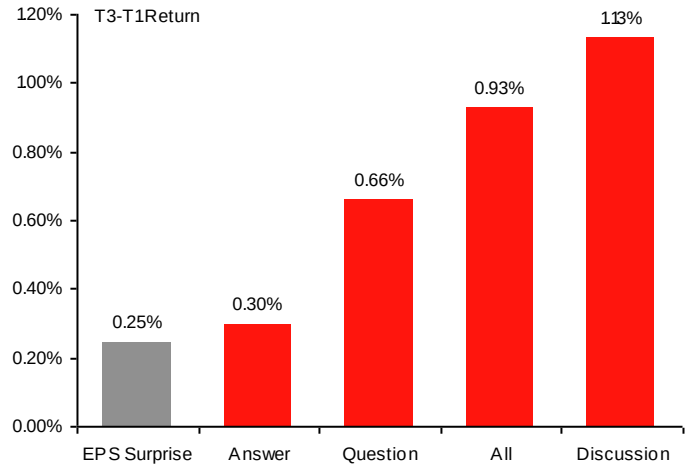


Fig 81 Difference in 3 Month Drifts



Sources (Fig 78-81): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

We find that the drift returns associated with the tone measures are not driven by sector, value or momentum effects.

Is It Just Momentum and Value?

For the analysis so far, we have benchmarked performance against an equal weighted index of all stocks in our sample. These returns can be thought of as size adjusted, since our stocks are the 200 largest firms in the S&P500. However, as we showed in our correlation analysis, tone is correlated with momentum and value. Are the return drifts we have documented just a reflection of these effects?

To address this concern we benchmark returns of an event firm against firms that are in the same sector and similar in terms of value and momentum attributes. To do this we first match each event firm with a firm from the Russell 1000 index that is also in its 2-digit GICS sector. We next require that the match firm has a price-to-book ratio within 20% of our event firm. We take the top 5 firms with the closest 12 month stock return.

When we compute abnormal returns over this sector, value and momentum matched index we actually find that drift returns increase. Either the parameters for our matching are not tight enough, or an equal benchmark of the largest 200 stocks is in fact a better match (i.e. co-movement among the largest large cap stocks is high) meaning lower abnormal returns.

Fig 82 Summary of Reactions to Aggregated Tone – Using a Sector, Value and Momentum Matched Benchmark

Combined Change in Tone Measures								
	1 Month Drift Returns				3 Month Drift Returns			
Variable	T1	T2	T3	Spread	T1	T2	T3	Spread
Discussion	-0.40%	-0.16%	0.34%	0.73%	-1.12%	-0.48%	0.34%	1.46%
Question	-0.29%	-0.13%	0.25%	0.54%	-1.01%	-0.23%	0.02%	1.03%
Answer	-0.21%	-0.04%	0.08%	0.29%	-0.41%	-0.92%	0.09%	0.50%
All	-0.20%	-0.34%	0.33%	0.53%	-0.84%	-0.75%	0.33%	1.17%

Source: Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Fig 83 Combined Tone for the Discussion Section

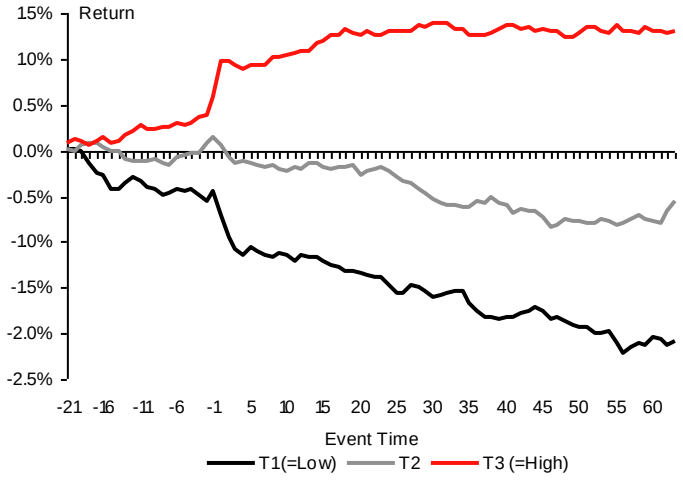


Fig 84 Combined Tone for the Question Section

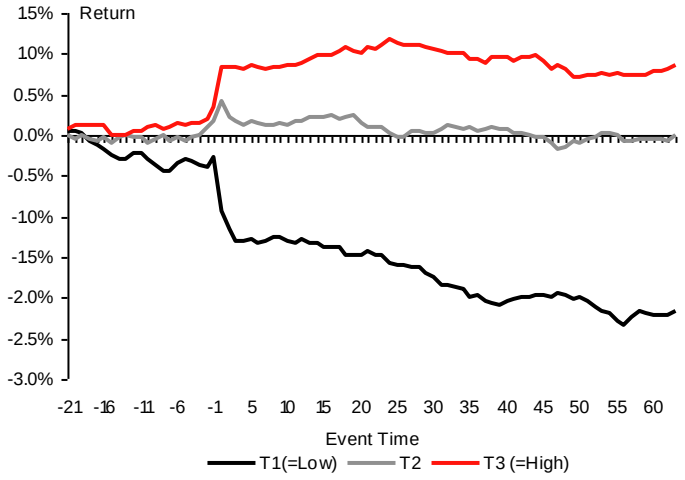


Fig 85 Combined Tone for the Answer Section

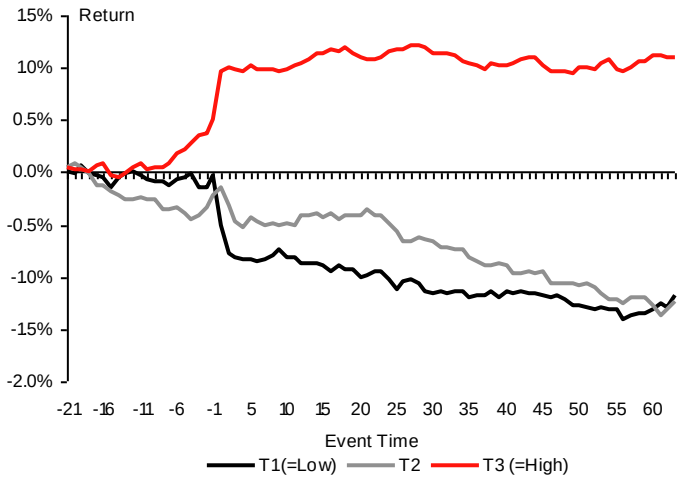
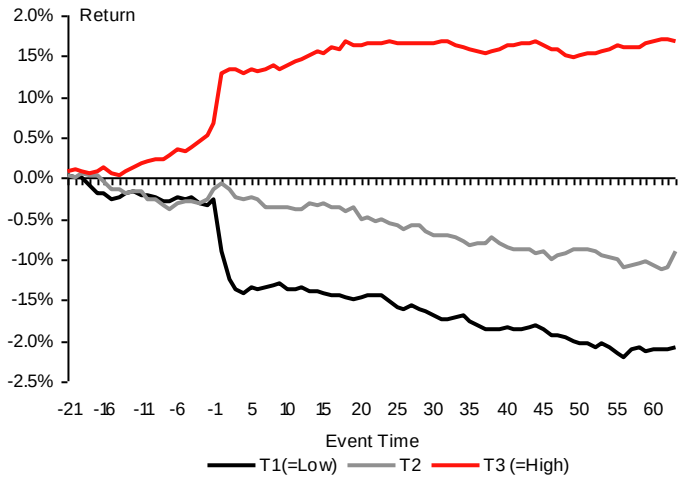


Fig 86 Combined Tone Across the Three Sections



Sources (Fig 83-86): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Market Reaction to Earnings – Incorporating Tone

Combining tone with earnings surprises provides valuable insights into the post earnings announcement drift.

So far we have examined the market reaction to earnings surprises, and also the market reaction to the component of tone unexplained by earnings surprises. Now we combine the two effects together. Specifically, we examine the market reaction to earnings and tone. For our tone measures we focus on the combined discussion measure and also the aggreagte tone measure.

We first identify firms that have had a high (low) earnings surprise. We then partition those events based on the tone score. For example, in Fig 87 we look at high earnings surprises and see when combined with an increase in Net discussion tone, there is a 0.64% drift over the next three months for high tone, compared with -0.55% for low tone. We also see a noticeable reversal in returns for low (negative) earnings surprise stocks combined with high increases in Net tone.

Fig 87 High EPS Surprise with Discussion Tone

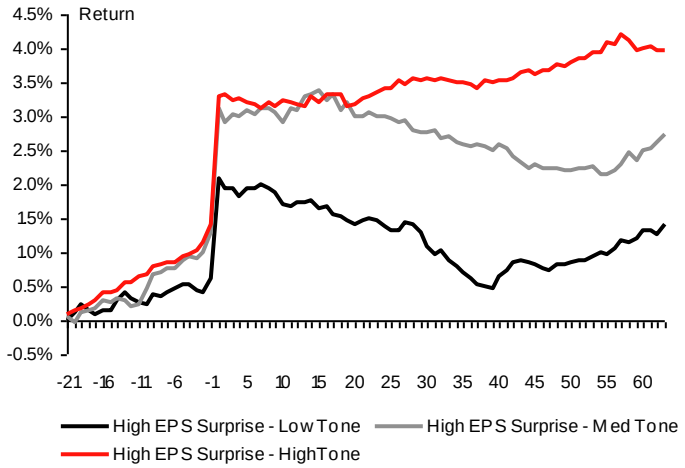


Fig 88 Low EPS Surprise with Discussion Tone

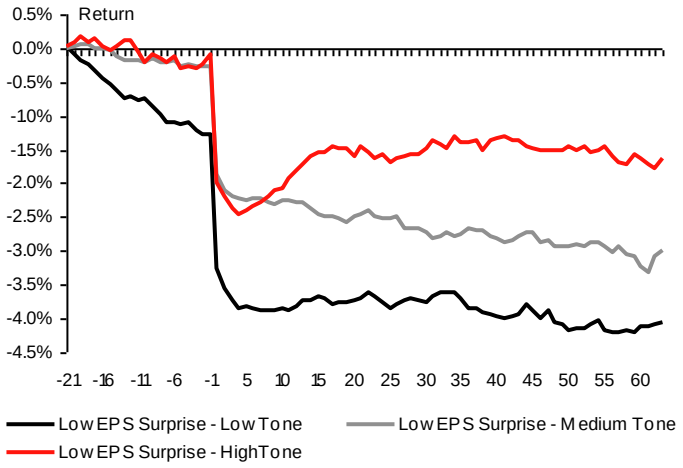


Fig 89 High EPS Surprise with Aggregate Tone

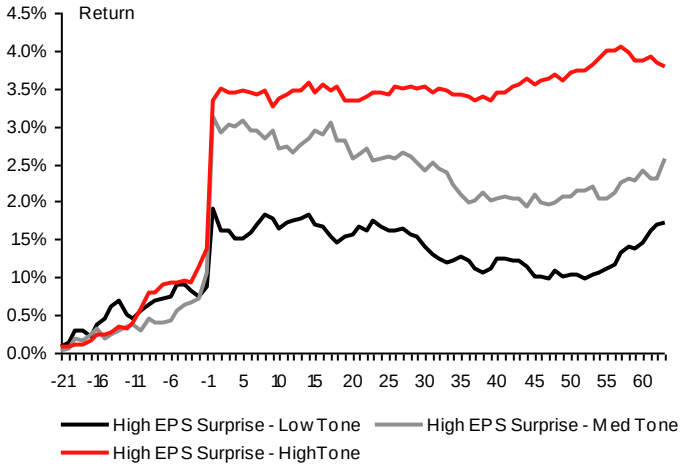
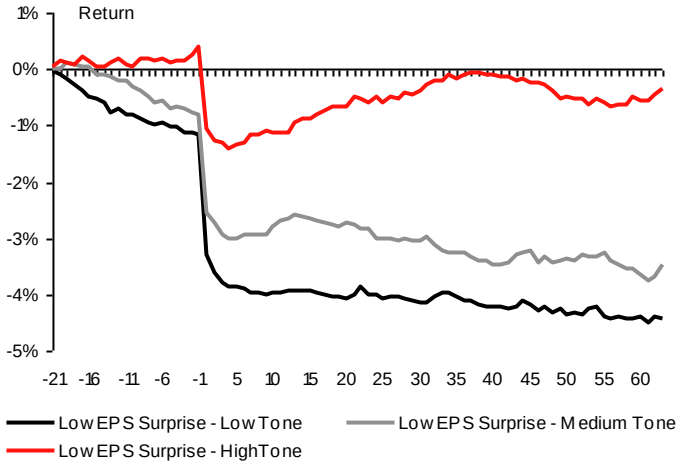


Fig 90 Low EPS Surprise with Aggregate Tone



Sources (Fig 87-90): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Capturing Tone in a Portfolio

We move beyond event studies, and test the tone measures cross-sectionally.

We now examine how to exploit tone in a portfolio context (i.e. cross-sectionally). Given our insights from our analysis around earnings announcements, we focus on the combined change in tone for the discussion section along with the aggregated tone measure (aggregated across the discussion, question and answer section). Again we use a tone measure that is orthogonal to earnings surprises. For this analysis we present returns that are excess over an equal weighted benchmark of the 200 stocks in our sample. We also compute pure returns. These are purged of beta, market capitalization, price-to-book, 12 month price momentum and sector effects.

Change in Discussion and Combined Tone

As in our event studies, change in discussion tone appears to be an effective cross sectional signal.

In Fig 91 to Fig 98 we present results for the change in Net Positive tone for the discussion section, while Fig 99 to Fig 104 shows results for the change in tone of the aggregated call. Focusing on change in Net tone for the discussion section, we see the signal produces solid spread returns of 0.37% over 1 month, with good contribution from both Q1 and Q5. Interestingly, when examining the spread returns there are indications of a reversal over longer holding periods, although this is mitigated when using pure returns. We explore this issue further in Fig 93 and Fig 94 when we examine changes in positive and negative tone separately. Examining the positive and negative tone signals separately, we clearly see the signs of reversal. However, we are cautious with this result given the time period we are using for our testing. We do however point to our observations in Fig 47 where we see change in tone is positively correlated to momentum, earnings revisions and negatively correlated with value. Additionally, there appears to be an association with a decline in fundamentals. We question whether the reversal is a reflection of hype or sentiment disipating, and the weaker fundamentals coming into play.

Given our small sample, we show April 2009 has a large effect on our performance statistics.

When we examine the monthly spread returns in Fig 95 we see there was a large draw down in April 2009. Given the relatively small size of our sample (we have fewer months to average across), this has a large effect on our overall average spread and quintile returns. By excluding this one month we now see the average 1 month spread return increases to 0.60%.

When we test the combined tone score, we find similar, albeit weaker results, leading us to prefer the change in tone for the discussion section as a signal.

Fig 91 Spread Returns (Discussion Net Tone)

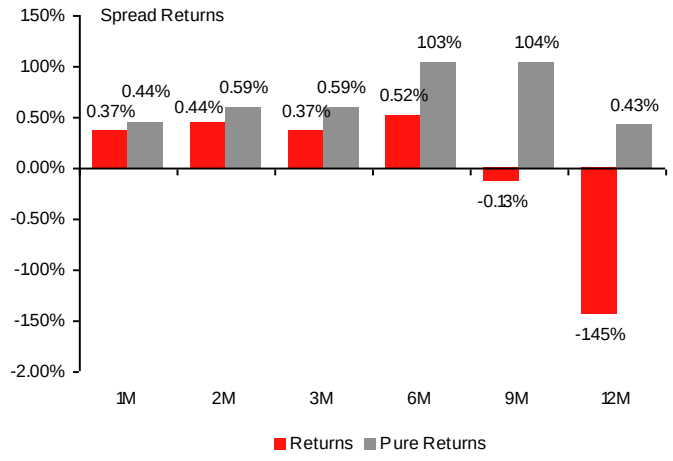
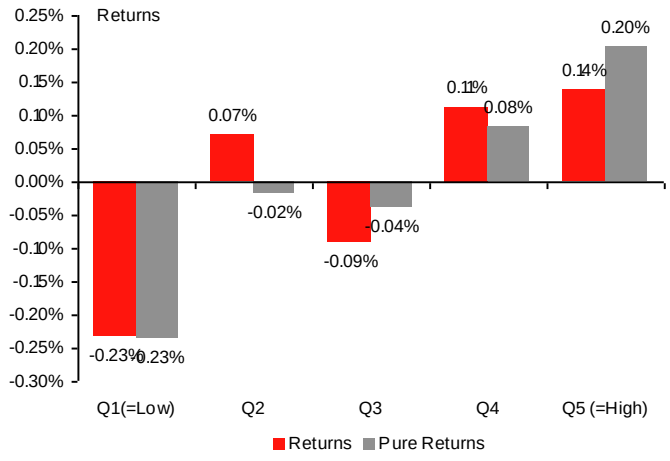


Fig 92 Quintile Returns (Discussion Net Tone)



Sources (Fig 91-92): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Fig 93 Spread Returns (Discussion Positive Tone)

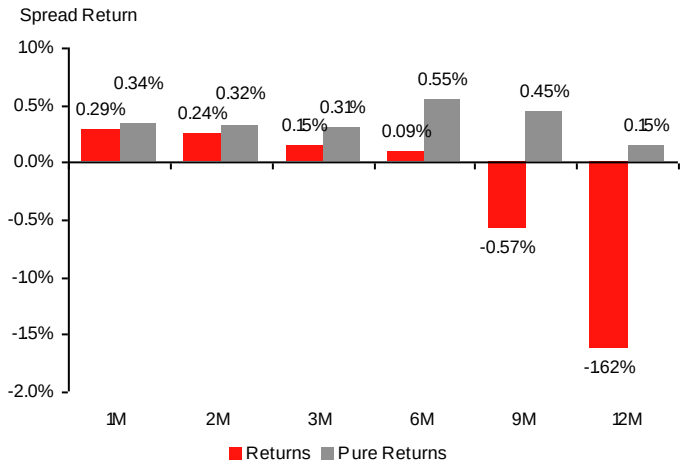


Fig 94 Spread Returns (Discussion Negative Tone)

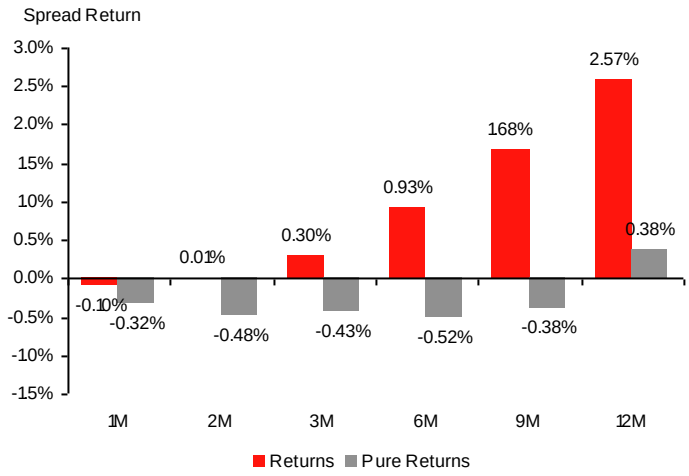


Fig 95 Monthly Spread Returns (Discussion Net Tone)

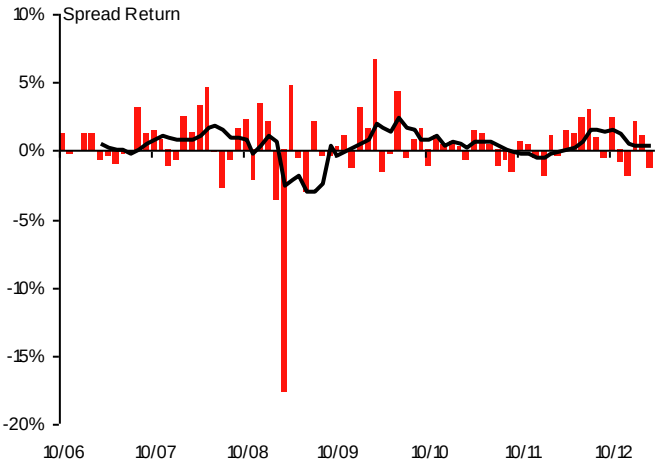


Fig 96 Cumulative Returns (Discussion Net Tone)

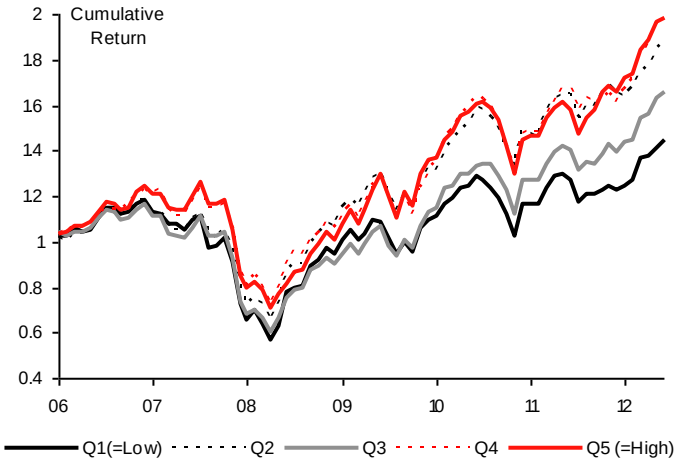


Fig 97 Spread Returns (Discussion Net Tone) – ex Apr09

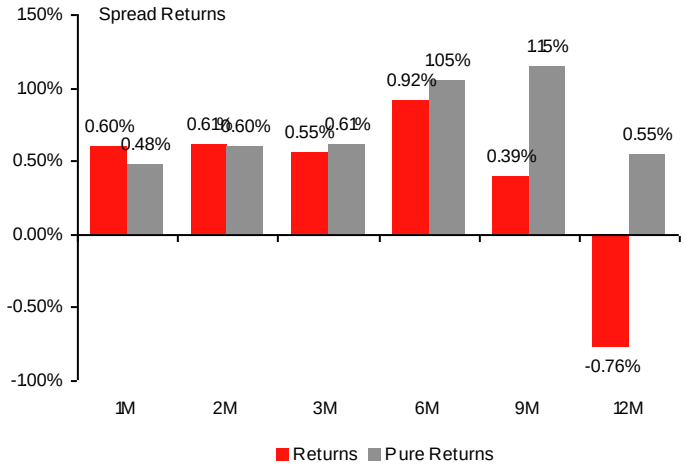
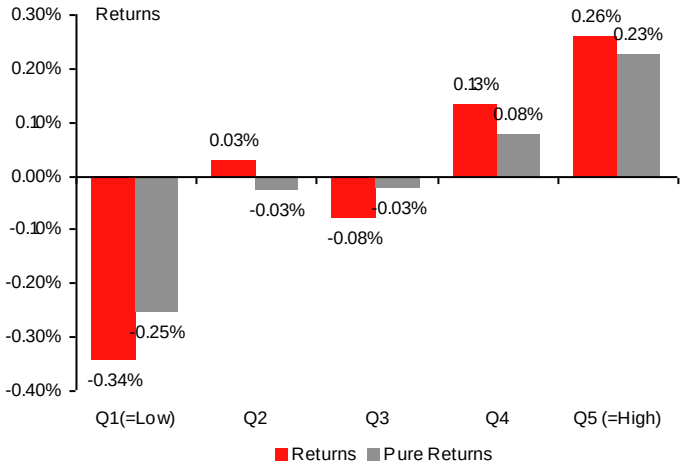


Fig 98 Quintile Returns (Discussion Net Tone) – ex-Apr09



Sources (Fig 93-98): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Fig 99 Spread Returns (Aggregate Net Tone)

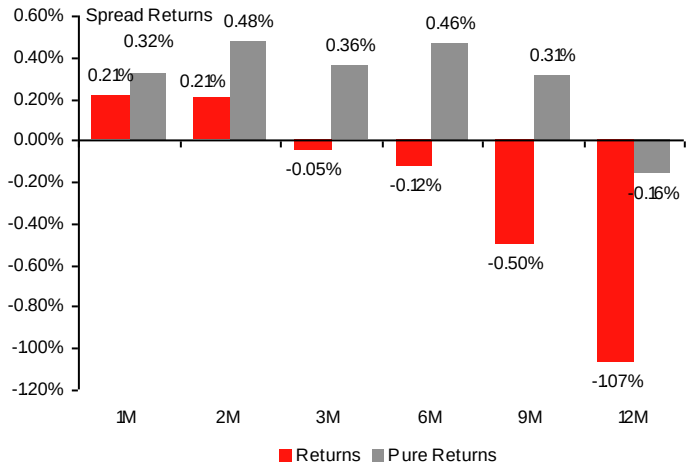


Fig 100 Quintile Returns (Aggregate Net Tone)

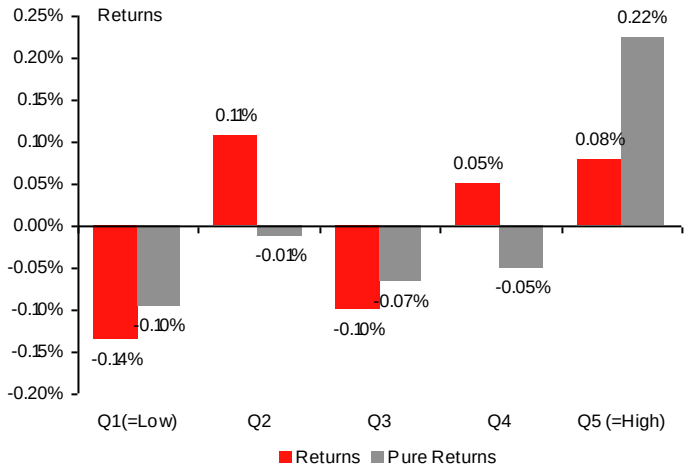


Fig 101 Monthly Spread Returns (Aggregate Net Tone)

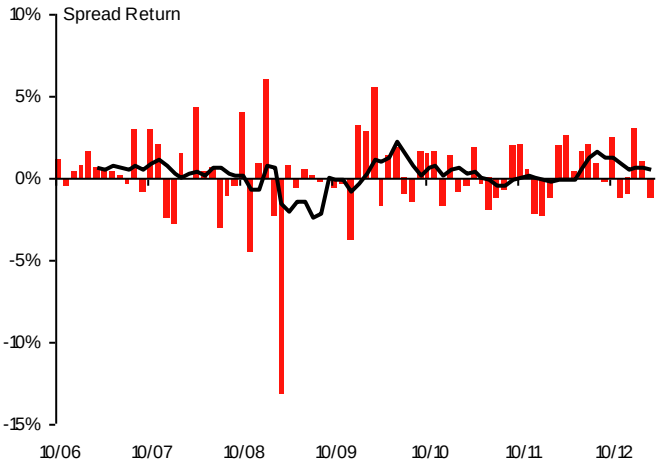


Fig 102 Cumulative Returns (Aggregate Net Tone)

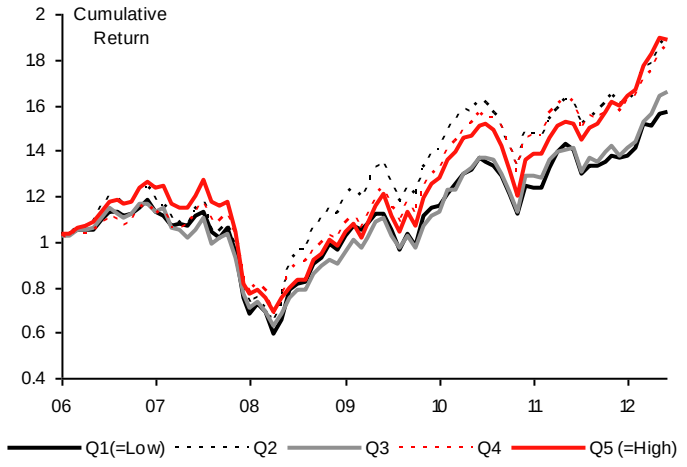


Fig 103 Spread Returns (Aggregate Net Tone) – ex Mar09

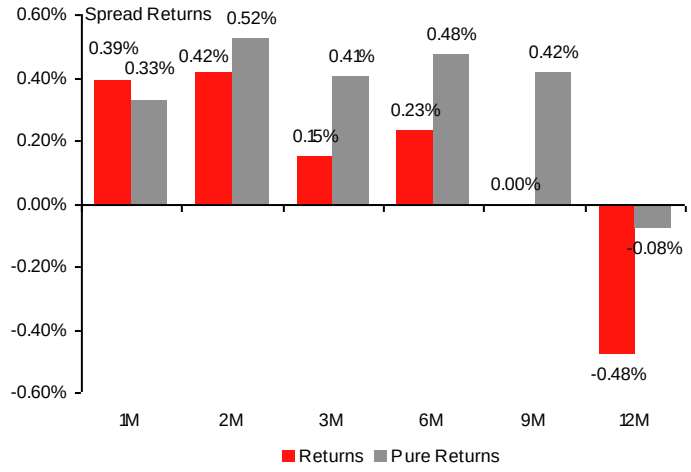
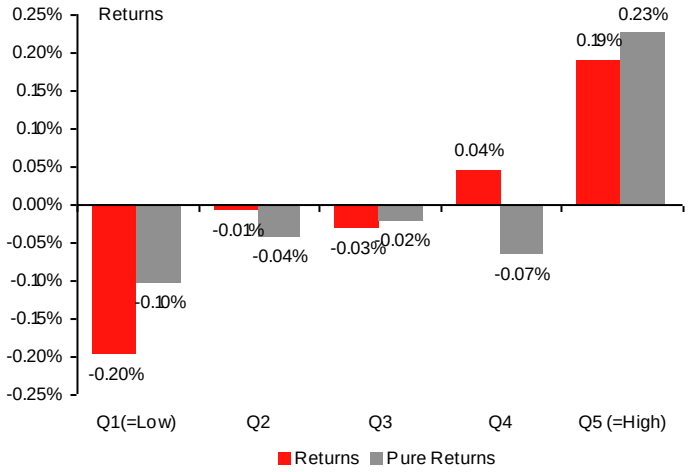


Fig 104 Quintile Returns (Aggregate Net Tone) – ex-Mar09



Sources (Fig 99-104): Factset, S&P, Compustat, Macquarie Capital (USA), May 2013.

Testing 10-K Tone

Building on our analysis of conference call tone, we examine tone in the MD&A section of annual reports.

Building on our analysis of the tone in conference calls, we examine the tone in the Management Discussion and Analysis (MD&A) section of annual reports. We think focusing on the MD&A section makes this somewhat comparable to the tone from the discussion section of conference calls. More so, the benefit of examining the tone of MD&A sections is that we can perform our testing over a longer period. However, the downside is that the testing will be on annual data not quarterly as in the case of the conference call tone.

To compute the tone of the MD&A section we first need to download and clean the annual reports from the SEC Edgar server. Once we have all the filings we then extract the MD&A section. For more details on how we go about sourcing/cleaning the data and then extracting the MD&A section, please see our Quantamentals: Camouflaged in Complexity note. For comparability with our conference call tone analysis we present results for change in tone.

To test the tone of the MD&A section, we do so on firms in the R1000 and R2000. Similar to our conference call tone testing, we present returns that are excess over an equal weighted benchmark of the stocks that we can successfully extract and MD&A. We also compute pure returns. These are purged of beta, market capitalization, price-to-book, 12 month price momentum and sector effects.

For Fig 105 to Fig 108 we show results for the R1000, and in Fig 109 to Fig 112 we show results for the R2000.

We observe a similar reversal at longer holding periods for changes in 10-K MD&A tone.

We do not find tone from annual reports to be an important variable in explaining the cross-section of returns at shorter holding periods (less than 3 months). Interestingly, over longer holding periods we see the same reversal pattern appear which we observed with the conference call tone measures. While the returns over longer holding periods reduced considerably when looking at pure returns, we are intrigued by this reversal pattern. We question whether changes in tone can be used to help identify peaks and troughs in price momentum. To better understand this we would need to move beyond the 10-K's and work with the 10-Q's, or get a longer and broader sample of quarterly conference call transcripts.

Fig 105 Spread Returns (R1000)

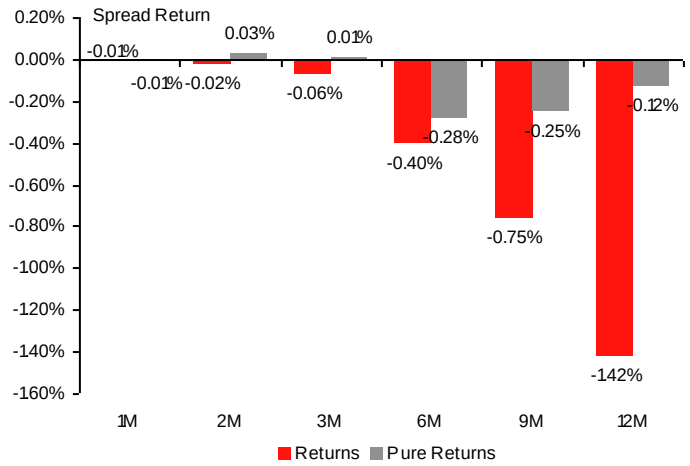
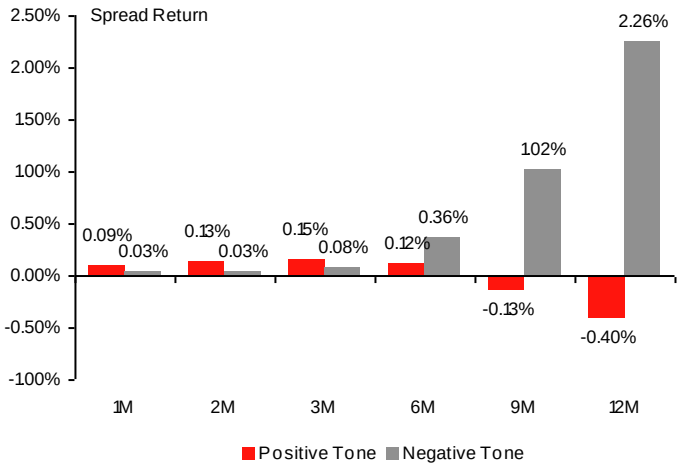


Fig 106 Spread Returns for Positive and Negative Tone (R1000)



Sources (Fig 105-106): SEC, Russell, Compustat, Macquarie Capital (USA), May 2013.

Fig 107 Monthly Spread Returns (R1000)

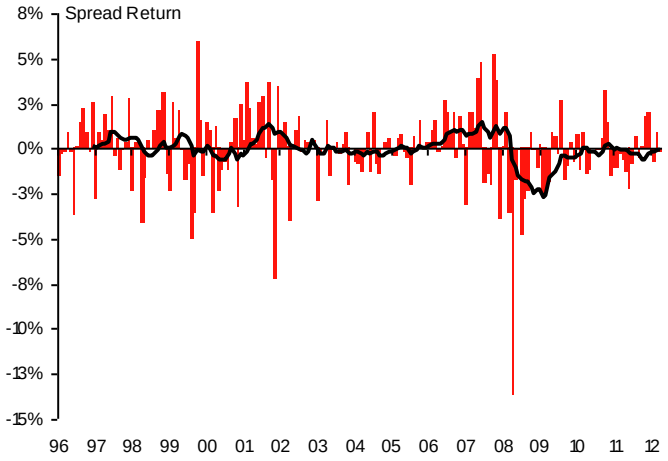


Fig 108 Cumulative Returns (R1000)

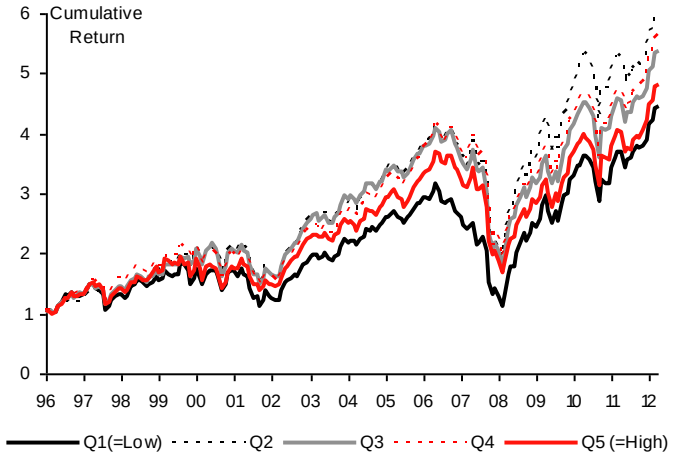


Fig 109 Spread Returns (R2000)

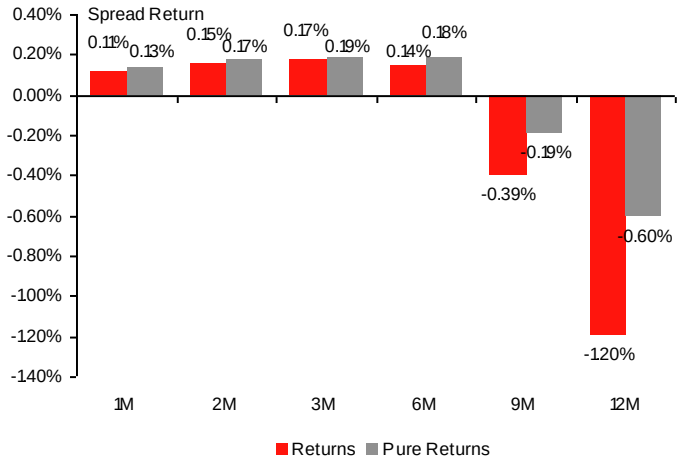


Fig 110 Spread Returns for Positive and Negative Tone (R2000)

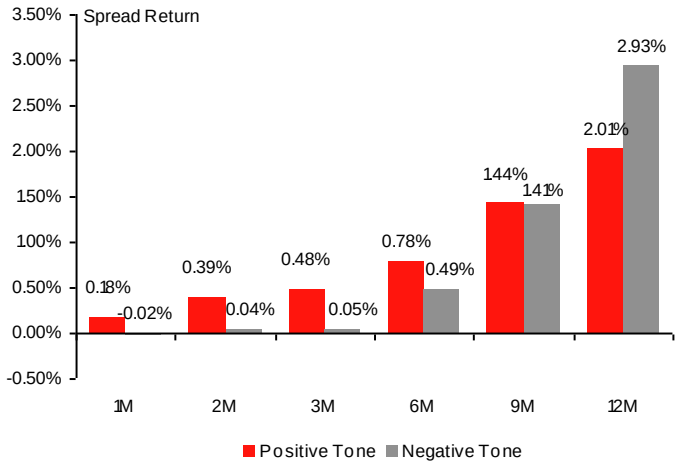


Fig 111 Monthly Spread Returns (R2000)

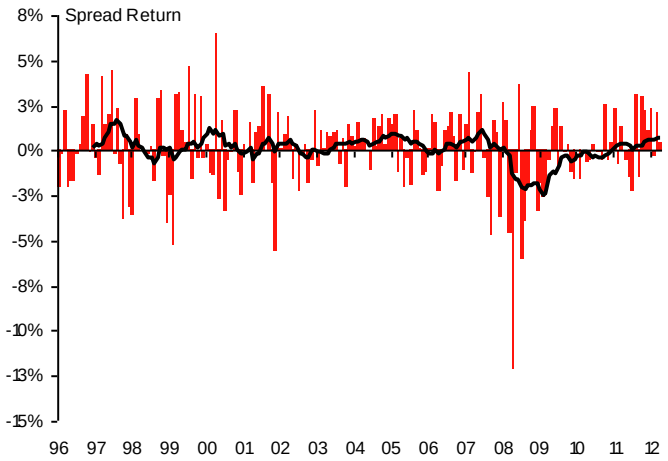
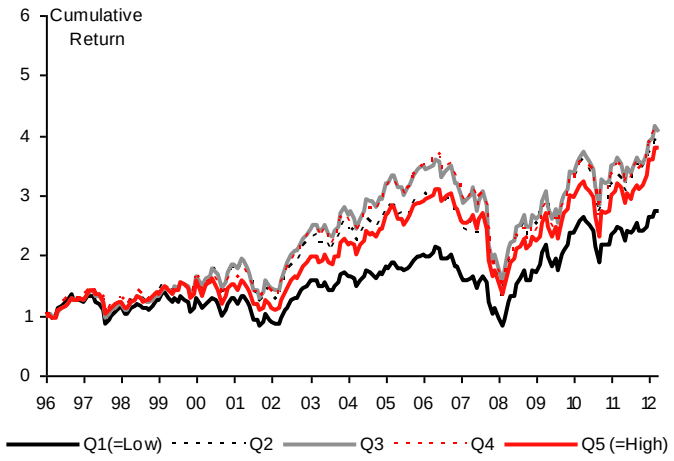


Fig 112 Cumulative Returns (R2000)



Sources (Fig 107-112): SEC, Russell, Compustat, Macquarie Capital (USA), May 2013.

Concluding Remarks

How could investors use this signal?

Our research builds on our earlier analysis of annual reports.

We think textual analysis is an interesting space for quantitative research. This is now our second project utilizing text analysis methods, and again we find encouraging results.

We find changes in the tone of the discussion section generate the best results, suggesting firms engage in tone management.

Our take on the tone signals computed from the transcripts of earnings conference calls is that the discussion section holds the most promise. The fact that changes in the tone of the discussion section appear more important suggests firms engage in tone management. The discussion section is prepared (and in fact sometime recorded prior to the actual call). This means management can look at crafting a message (and generating sentiment or setting expectations) that is beyond the information contained in the hard numbers.

We also find that a combination of the tone measures computed from three separate dictionaries produces the best results. Additionally, we think value can be added in refining the word lists used to capture positive and negative tone.

We think this signal is best used by investors over shorter horizons (<3 months). This is clear from both our event study and cross sectional work. However, over longer horizons investors may want to consider this as a reversal signal. It could be used to help identify turning points in price momentum. This may be a result of managements tone raising (or lowering) investor expectations too much.

The Future

We think expanding the analysis of conference call tone to a broader universe could generate even better results.

Overall, we are encouraged by this research. We think this is a promising area for quantitative research. This is best highlighted by the fact that we find negligible drift to signals based on the actual earnings surprise while we find drift returns associated with soft information. We are confident that extending the analysis into a broader universe (and away from the largest large cap names) could lead to even better results.

To take this research further, there is scope to improve the analysis of tone by developing domain-specific wordlists, in the spirit of Loughran and McDonald (2011).

We also think there is promise in exploring the Q&A section of conference calls for signs of management deception (see Larcker and Zaklyukina, 2012).

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Macquarie - Australia/New Zealand
Outperform – return >3% in excess of benchmark return
Neutral – return within 3% of benchmark return
Underperform – return >3% below benchmark return

Benchmark return is determined by long term nominal GDP growth plus 12 month forward market dividend yield

Macquarie – Asia/Europe
Outperform – expected return >+10%
Neutral – expected return from -10% to +10%
Underperform – expected return <-10%

Macquarie First South - South Africa
Outperform – expected return >+10%
Neutral – expected return from -10% to +10%
Underperform – expected return <-10%

Macquarie - Canada
Outperform – return >5% in excess of benchmark return
Neutral – return within 5% of benchmark return
Underperform – return >5% below benchmark return

Macquarie - USA
Outperform (Buy) – return >5% in excess of Russell 3000 index return
Neutral (Hold) – return within 5% of Russell 3000 index return
Underperform (Sell)– return >5% below Russell 3000 index return

Volatility index definition*

This is calculated from the volatility of historical price movements.

Very high–highest risk – Stock should be expected to move up or down 60–100% in a year – investors should be aware this stock is highly speculative.

High – stock should be expected to move up or down at least 40–60% in a year – investors should be aware this stock could be speculative.

Medium – stock should be expected to move up or down at least 30–40% in a year.

Low–medium – stock should be expected to move up or down at least 25–30% in a year.

Low – stock should be expected to move up or down at least 15–25% in a year.
* Applicable to Asia/Australian/NZ/Canada stocks only

Recommendations – 12 months
Note: Quant recommendations may differ from Fundamental Analyst recommendations

Financial definitions

All "Adjusted" data items have had the following adjustments made:
Added back: goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense
Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests

EPS = adjusted net profit / efpowa*
ROA = adjusted ebit / average total assets
ROA Banks/Insurance = adjusted net profit /average total assets
ROE = adjusted net profit / average shareholders funds
Gross cashflow = adjusted net profit + depreciation
*equivalent fully paid ordinary weighted average number of shares

All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).

Recommendation proportions – For quarter ending 31 March 2013

	AU/NZ	Asia	RSA	USA	CA	EUR	
Outperform	45.12%	53.24%	50.00%	40.70%	62.98%	43.30%	(for US coverage by MCUSA, 10.55% of stocks followed are investment banking clients)
Neutral	41.52%	28.01%	41.43%	55.01%	32.60%	34.10%	(for US coverage by MCUSA, 9.05% of stocks followed are investment banking clients)
Underperform	13.36%	18.74%	8.57%	4.29%	4.42%	22.60%	(for US coverage by MCUSA, 0.00% of stocks followed are investment banking clients)

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