Part 1 – Conference call clarity

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The great enemy of clear language is insincerity

George Orwell in *Politics and the English Language*

Introduction

What if we could find investment opportunities based on how people say things, as much as what they do say?

Our analysis shows that much can be gleaned by analysing the language of management teams when they speak to investors. Moreover, these insights can be used as signal for investment decisions.

Over the years, quantitative signals have evolved both in insight and in the data set used to capture that insight. The evolution has seen extraction of tradeable information from *price*-based data (such as momentum) to *accounting*-based data (such as earnings yield) and more recently to *text*-based data (such as sentiment using natural language processing). One such text-based data set is conference call transcripts from quarterly company results meetings.

In this Realinsights paper, we examine English language conference calls transcripts[1] and how we can employ them in investment decisions. We uncover simple themes in conference calls that we believe can be utilised as systematic signals for our

alpha models. These signals are robust, easy to calculate and make sense intuitively.

This paper is the first of a series of papers that explores these themes. In particular, we place our focus on *linguistic obfuscation*[2] as a persistent and low turnover signal for North American and European equities.

Mudding the waters

Language and thought are inherently interrelated concepts. Twentieth century linguists have often debated whether it is even possible to have one without the other[3]. Whilst we are not here to discuss how linguistic categories influence thought, we do believe the way language is used, and how sentences are strung together, provides valuable insights into not only the content, but the intentions and thoughts of the writer (or speaker). It is often said that clear thinking translates to clear writing or that *"Clear writing gives poor thinking nowhere to hide"*[4].

But what if one indeed wanted to hide poor thinking (or poor financial performance for that matter)? Then one would go out of one's way to employ unnecessarily complicated language. Language that is intended to

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[1] We use global conference call data from Factset. Only English language transcripts are discussed here.

[2] The Oxford dictionary defines obfuscation as "the act of making something less clear and more difficult to understand, usually deliberately".

(https://www.oxfordlearnersdictionaries.com/definition/english/obfuscation)

[3] See for example: *linguistic relativity* and the Sapir-Whorf hypothesis

[4] The quote is attributed to Shane Parrish, author of *The Great Mental Models. (Parrish and Beaubien)*

obfuscate and confuse the analyst – sometimes called 'weasel words'.

In other words, markers of linguistic obfuscation may point to insincerity by company management. This is the motivation of our research.

There has been a significant body of academic research that looks precisely at this type of behavior. The results are not surprising.

- Feng Li's seminal work in the *Journal of Accounting and Economics* titled "Annual report readability, current earnings, and earnings persistence" in 2008 finds that higher linguistic complexity in the manager discussion and analysis section of the 10-K annual report was reflective of lower future earnings performance (see Li, 2008).

- Miller (2010) finds that higher 10-K linguistic complexity discourages retail trading and de Franco, Hope, Vyas and Zhou (2012) show that it also leads to lower trading volumes.

- Lehavey, Li and Merkley (2012) and Loughran and McDonald (2013) show that higher linguistic complexity is associated with higher analyst forecast dispersion and higher idiosyncratic volatility respectively.

- Furthermore, Miller and Bonsall (2017) show that linguistic complexity was also related to higher credit rating dispersion.

In essence, higher linguistic complexity in annual reports is associated with lower quality of information disclosure, subsequently resulting in greater divergence of opinions, greater volatility and poorer performance in the long-run.

The bottom line: managers use linguistic complexity to muddy the waters.

Conference Calls

Following the works of Li (2008), there have been many papers in the academic literature that examine the use of language or linguistic markers in financial reports and communiques. Most focus on the text content of company annual reports. However, annual reports are polished and reviewed by teams of lawyers, incorporating a lot of legal jargon and boilerplate text. For instance, Brown and Tucker (2011) show that the year on year changes in the informational content of the manager discussion and analysis section of the 10-K has been declining. They blame this on the increasingly "boilerplate nature" of the 10-K report.

Our focus will be on quarterly earnings conference call transcripts. Company managers and invited sell and buy side analysts dial in to the call, which is recorded and later (or perhaps immediately) transcribed to words and published by third party data providers like Factset. The conference calls have a two part structure: a prepared management discussion followed by a Q&A with the analysts present.

Conference call transcripts are relatively more fluid than US10-Q and 10-K reports, which incorporate a lot of legal jargon and boilerplate text. Bloomfield (2008) commented that conference calls, being less scripted, better allow us to examine information content.

Furthermore, we find conference calls interesting for analysis as they are games of information asymmetry:

- Senior management has information that the analysts do not.

- The former is trying to paint the information in the best possible light, whilst the latter is trying to pry as much information from the managers as possible in order to reduce the asymmetry.

- In other words, conference calls are a platform for observing managers' voluntary disclosure behavior. The interaction between the two sides during the call may provide useful insights that may not have been fully reflected in the traded price.

As with any voluntary disclosure, managers face an ethical dilemma (see Evans et al. 2001, and Liu et al. 2015). On one hand they are bound by laws of continuous disclosure, but on the other hand, when

the information is negative, they have a tendency to delay release. This is known as *bad news hoarding*[5].

Discretionary disclosures, such as conference calls, provide opportunities for managers to engage in opportunistic behavior. Managers are likely to exploit the information asymmetries between themselves (insiders) and analysts (outsiders).

Thus, managers who use complex or verbose language in their earnings calls may be trying to "obfuscate" information from prying analysts. Therefore linguistic complexity in conference calls is likely to provide hints on future stock price performance.

Related research

We find ample support for this idea. For instance, Deloitte in 2003 found that Enron's corporate communications became increasingly vague and ambiguous as the firm's financial situation began to deteriorate. Merkl-Davis and Brennan (2007) explain that "Enron managed impressions with words when the underlying numbers told another story"[6].

Brochet, Naranjo and Yu (2012) find that firms with more linguistic complexity in their conference calls exhibit less subsequent trading volume and price movement.

Bushee, Gow and Taylor (2017) dissect linguistic complexity into an obfuscation component and an information component. When managers' linguistic complexity is unrelated to analyst complexity, then it is related to obfuscation. They show that obfuscation is positively related to information asymmetry. Nomura Research (2021) also looked at the complexity of language used in earnings calls in the United States from 2014 to 2021, and found that overall, simple language in calls yielded higher subsequent returns than calls with more complex language.

Measures for linguistic complexity

In the papers discussed above, the Gunning Fog Index (aka Fog) is often used as the proxy for linguistic complexity. Fog is a tool to assess text readability, where the index level roughly translates to the years of formal education one needs to understand the index. For instance, a fog index of 12 equates to the reading complexity of a high school year 12 student. The first two paragraphs of *Anna Karenina* by Tolstoy have a fog index of 13.2, whilst Aesop's *The Hare and the Tortoise* has a fog index of 7.7. Often, written text has a higher fog than spoken text.

The precise formulation of Fog is:

$$FOG = 0.4 * \{\frac{\text{num. of words}}{\text{num. of sentences}} + 100 * \frac{\text{num. of complex words}}{\text{num. of words}}\}$$

where complex words are defined to be words with three or more syllables.

Within speech, a lower Fog index is often seen positively and associated with clarity and ease of understanding. For instance, during war time, Winston Churchill's speeches averaged a Fog of 6. Kayam (2017) analyzed the readability and simplicity of Donald Trump's language during the 2016 US presidential campaign and found a similar pattern. Trump's language equated to the level of reading complexity of a 9 to 11 year old, whilst those of other Republican candidates averaged to that of a 14 to 15 year old. Kayam (2017) found that Trump' sentences and words were *significantly shorter and less complex than those of any other candidate*. The study suggests that Trump used simple language as a rhetorical strategy to gain popularity.

Gunning Fog is not the only measure for linguistic complexity. Other popular readability measures include Flesch-Kincaid, Flesch Reading Ease, Farr-Jenkins-Paterson, Dale-Chall, Coleman Lieu, SMOG (Simple Measure of Gobbledygook), the FORCAST

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[5] Jin and Myers (2006) develop Bad News Hoarding Theory to describe when managers conceal bad news for extended periods of time, and negative information stockpiles with the firm. This leads to future stock market crashes when the information is finally released to the public.

[6] Later we go on to find *that the frequency of numbers being used* by management during the conference calls provides a positive indicator for future performance. And we will incorporate this factor into our modified obfuscation metric.

index (Klare, 1975) and the Automated Readability Index (Senter and Smith, 1967).

In our initial foray into examining the efficacy of complexity measures, we note that many of these metrics were not very effective, and in some cases contradictory. Most measures of linguistic complexity measures were developed over 50 years ago, and for an entirely different context. Furthermore, most of these measures are calibrated (and not with a financial corpus). This results in many "magic numbers" as coefficients in the equation. For instance:

$$\text{Flesch Kincard Grade Level} =$$
$$0.39 * \frac{\text{num. of words}}{\text{num. of sentences}} + 11.8 * \frac{\text{total syllables}}{\text{num. of words}} - 15.59$$

Our preference is not to employ such measures.

Instead we focused on looking at the key components of linguistic markers, and individually test their efficacy. This way we can build our signals from the bottom up.

Key linguistic markers

We breakdown conference call transcripts into 5 markers:

- Length: is the total number of words
- % Descriptive: gauges whether the speaker uses a lot of expressive / descriptive words, i.e. $\frac{\text{num. of adjectives \& adverbs}}{\text{num. of words}}$
- % Numeric: gauges whether the speaker uses a lot of numbers (these involve quantities, money, cardinals etc.) $\frac{\text{num. of numerical words}}{\text{num. of words}}$
- Words per Sentence: gauges how long the typical sentences are, i.e. $\frac{\text{num. of words}}{\text{num. of sentences}}$
- % Complex words: gauges how often complex words are used by the speaker (following the Gunning Fog definition, complex words are where there are 3 or more syllables) $\frac{\text{num. of complex words}}{\text{num. of words}}$

Furthermore, we split the conference call transcript into three key components:

- Manager discussion section
- Questions by the analysts
- Answers by the managers

and apply our key linguistic markers to each part of the transcript individually.

In the next section, we briefly describe our conference call dataset that we use, and share two key insights.

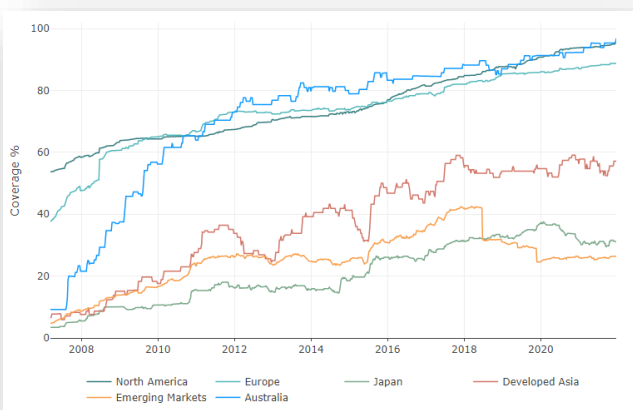## Chart 1. Conference call transcript coverage for MSCI ACWI

Panel A. Number of Stocks with Conference Call coverage across time for the MSCI ACWI universe.
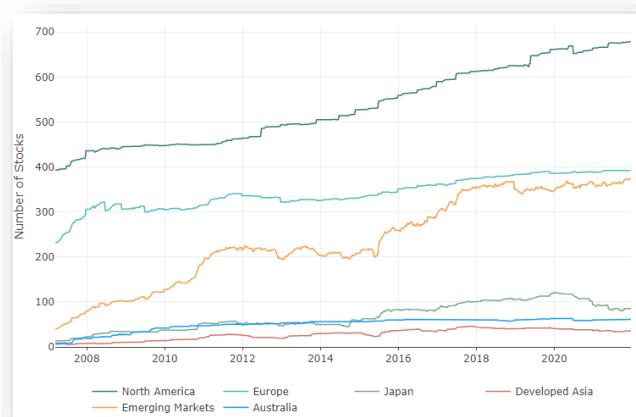
Source: Realindex, Factset   Date range: Mar 2007 to Dec 2021

Panel B. Percentage coverage of the region across time for the MSCI ACWI universe

Source: Realindex, Factset   Date range: Mar 2007 to Dec 2021

Data and characteristics

Here we give readers a sense of the data we are working with. Chart 1 gives a summary.

The Factset Conference Call Transcript data provides decent coverage for North America, Europe and Australia. The dataset begins circa 2008, however, it is only in the last 5 years that we see MSCI ACWI coverage above 80%. Overall, we have more than 1,400 firms. We note a high count for Emerging Markets which is largely driven by India. The large drop-off in percentage coverage in Emerging Markets in 2018 was due to the inclusion of Chinese names into MSCI ACWI.

We note some interesting differences between transcripts. For the sake of brevity, we will discuss a few of these differences in characteristics below.

Length - An obvious difference is the length of the transcripts. In Chart 2, we break the conference call transcript into the three key components, and examine their average length across time. This is plotted in the boxplots below, where the black dot is the last average value. Overall, we see that the management discussion section is generally longer than the Q&A section. The analyst questions are

particularly short, averaging circa 1,500 words across our full sample. Management answers are longer at circa 3,700 words whilst management discussion averages around 3,900 words. This varies over time, and has a cyclical pattern. This is particularly evident in Europe where one of the four quarterly calls is substantially longer than the other three. (This is shown in Chart 6 below.)

Geography - There are some interesting geographical differences. Conference calls were notably shorter in Emerging Markets and Japan. The length of Q&A interactions seem longer for America, Europe and Australia, and we can assume that for these regions managers and analysts are more comfortable in communicating in English.

We also see geographical differences with various other linguistic markers – in this example, we look at the management discussion section. We do this in part because we find that the management discussion section provides the most information with regards to obfuscation. We will explain this in the section below.

American managers tend to be more descriptive, and prefer to use more polysyllabic words. (In our next paper in this series, examining tone and sentiment, we find that Americans are also more upbeat than their European or Australian counterparts.) We also found that Japanese managers used shorter sentences in their prepared speeches. The significantly lower word-per-sentence when Japanese managers speak English also contributes to a significantly lower average Fog measure for Japan, relative to other regions where English is more prevalent.

The takeaway here is that linguistic analysis data needs to be normalised for different region.
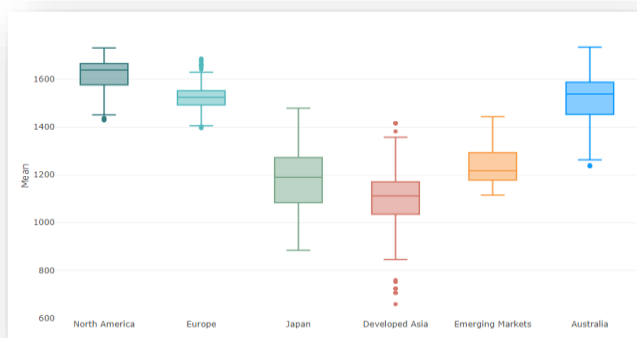
Chart 2. Conference call transcript length

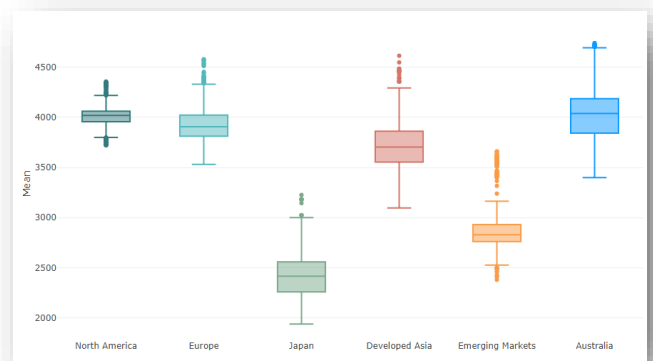### Panel A. Distribution of Management Discussion Length (Means)
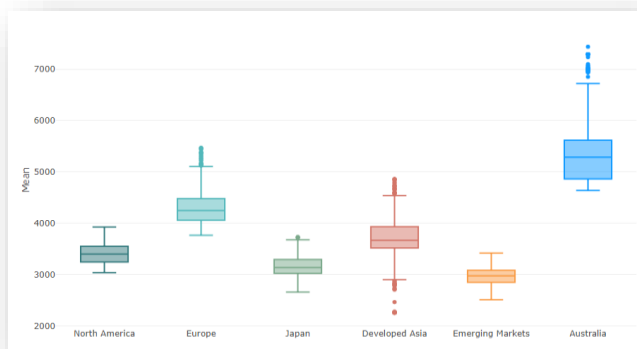
Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021

Panel B. Distribution of Analyst Question Length (Means)

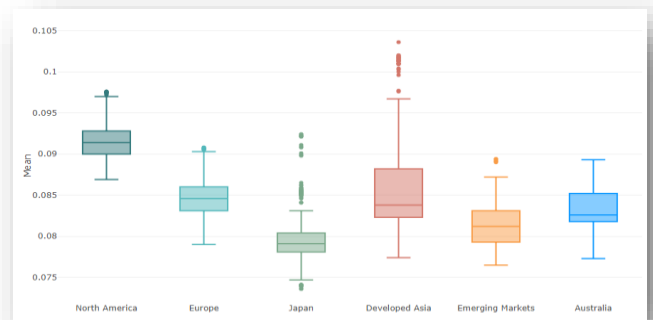*Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021*

Panel C. Distribution of Management Answers Length

Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021

Chart 3. Conference call transcript linguistic markers

Panel A. Percentage descriptive in the management discussion section

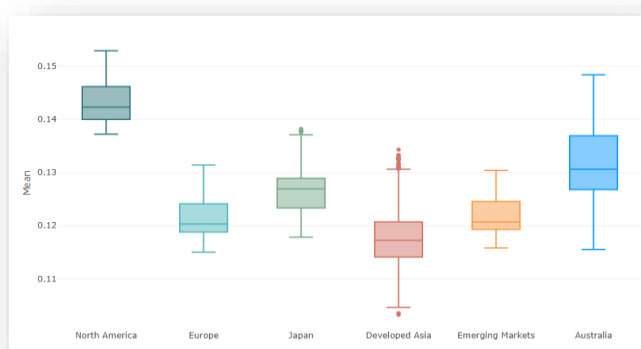*Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021*

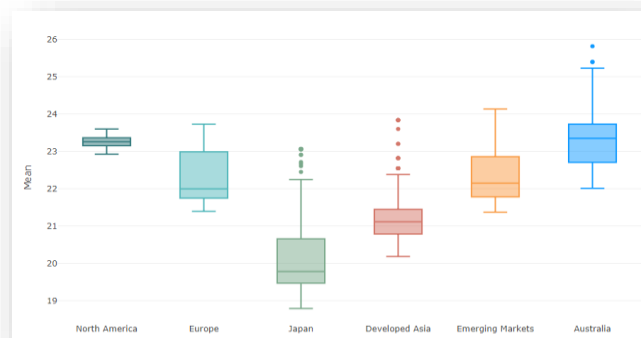**Panel B. Percentage Numeric in the Management Discussion Section**
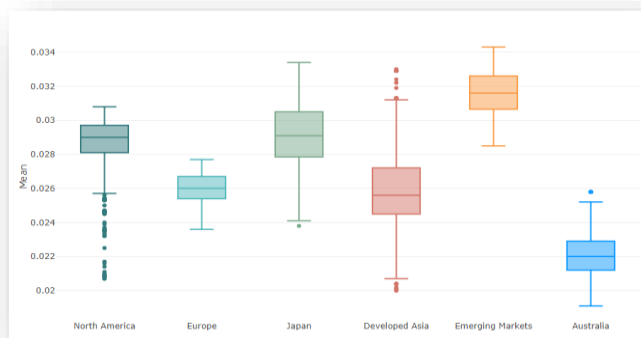
Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021

Panel C. Percentage Complex Words in the Management Discussion Section

Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021

Panel D. Words per Sentence in the Management Discussion Section

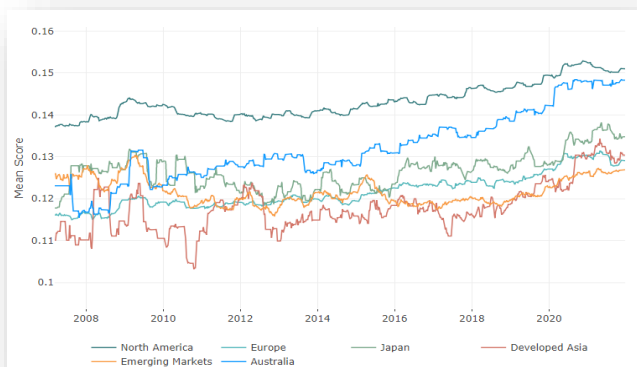*Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021*

We also note that the usage of complex words in conference calls has ticked up over time (see Chart 4). We note this phenomenon across all regions but it is particularly noticeable in Australia. There was an uptick of complexity in the wake of the Global Financial Crisis as well, which might reflect management uncertainty about the future.

Interestingly, we do not see an increase in complexity among analyst questions. This could mean that the underlying business complexity of firms has not changed, and that the excess complexity over time is perhaps due to obfuscation and uncertainty.

Over time, we notice that analyst questions have become noticeably shorter (see Chart 5). At the same time, the overall word length of the analyst questions has remained the same. There are no material changes to the percentage complexity, percentage descriptive or numeric in the analysts' transcripts. Without dwelling too much on individual transcripts, we can only suggest that analysts over the last decade have become more eager to squeeze in a question to company management.
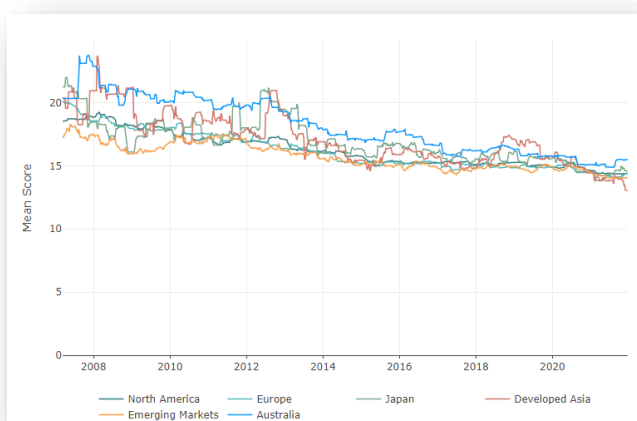
Chart 4. Percentage Complex words (in the Management Section) have been trending up

Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021

## Chart 5. Words per Sentence (for Analyst Questions) have been trending down

Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021

Chart 6 plots the average length of the management discussion section of the conference call. With the exception of Australia, the length of the management discussion section remains largely constant across time. As discussed earlier, clear seasonal patterns

emerge, in particular with a surge in length for annual conference calls for Europe and North America. Recall that for North American and Europe (ex UK) firms, conference calls occur on a quarterly basis, while for Australia and UK, they usually occur twice a year.

Chart 6. Length of the management section of conference calls
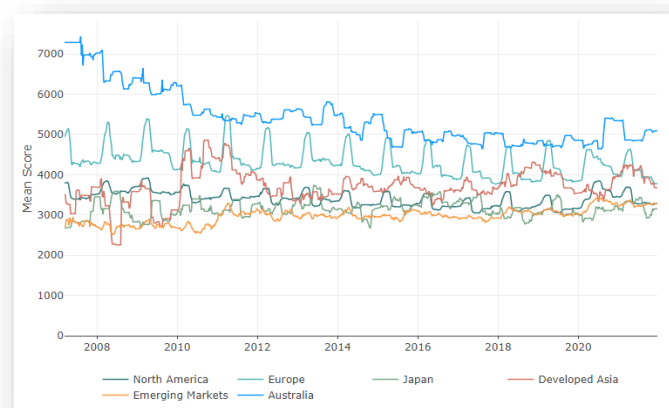
Source: Realindex, Factset Transcripts; Date Range: Mar 2007 to Dec 2021

Overall, these observations on the data suggest to us that there are significant regional variations in conference call transcripts. Conference call signals will need to be built with this in mind. Furthermore, given the coverage constraints, we believe that conference call signals can only be applied in North America and Europe.

We also looked to see if there was any material differences in linguistic markers for different sectors within MSCI ACWI. Although not charted here, we find that whilst variations do exist, they are not as stark. For example:

- Banks had a slightly higher use of numerical words than other sectors in the management discussion and answers section (although not by analyst questions)
- Utilities and Insurers tended to have slighter more complex words than the average, whilst

banks and communication services tended to have fewer complex words

- IT firms tended have shorter management discussion sections
- We find no discernible differences in Words per Sentence between the different sectors

Overall, these differences can be easily adjusted for by normalisation in order to reduce bias. However, after taking into account the cross-sectional dispersion, these variations in means are not particularly significant.

Our findings on linguistic complexity

In this Realinsights note, we share two key insights on our research on linguistic complexity. Both of these are related to the management discussion section, and how we can infer or detect signs of managers trying to obfuscate due to bad news.

Our focus, therefore, is on regions / countries where English is the predominant language. Our analysis includes Continental Europe where English is relatively well understood, but excludes Japan where it is not. However, our key focus is largely on North America where we have the best coverage of conference call transcripts, together with the greatest breadth.

The two key insights or dimensions we discuss here are:

- The Filibuster. Speeches are worse if they are of the same complexity but are longer.
- The Obfuscator. Speeches are worse if they are of the same length but are more complex.

#1 The Filibuster

Management speeches should be short, sharp and on point. Here the rationale is that longer speeches are complex, lacking in clarity and potentially trying to obfuscate. Furthermore, it is also likely that longer

speeches could be as a result of bad corporate news. We call it the *'filibuster'* because management can lengthen their discussion / speech section to "wear down" the analysts before Q&A time (as well as potentially reducing Q&A time).

$$\text{The Filibuster} = \psi(\text{mgmt discssion word length})$$

where $\psi(x) = \frac{x - \bar{x}}{s}$ is the normalizing function where $\bar{x}$ is the region-sector average of x. Similarly, s is the region-section standard deviation of x.

We find that this simple metric holds empirically, and indeed, long speeches are bad.

In Table 1, we run simple, equally-weighted long-short portfolios: long stocks with high filibuster scores and short stocks with low filibuster scores. We find this to be a negative. This is more evident in North America and Europe where we have more significant T-stats.

Table 1. Fractile Performance from 2010 to 2017

| Region	Mean	Standard Dev	IR	t-stat	Hit Rate	Turnover
North America	-1.8%	3.36%	-0.54	-1.86	47.4%	162.1%
Europe ex UK	-2.58%	4.92%	-0.53	-1.82	47.6%	190.5%
UK	-2.90%	8.30%	-0.35	-1.21	45.8%	176.9%
Australia (ASX 300)	-2.41%	9.71%	-0.25	0.86	48.3%	156.6%

Source: Realindex, Factset; Date: from Jan 2010 to Dec 2021

In Charts 7 and 8, we illustrate the fractile performance of the signal in North America and Europe, where conference call coverage and frequency is at its best. It is noted here that the fractile profile in North America is very characteristic of a Quality (i.e. defensive) signal, i.e. that the worst offenders underperform. We find that the signal has weaker / mixed results in Europe.

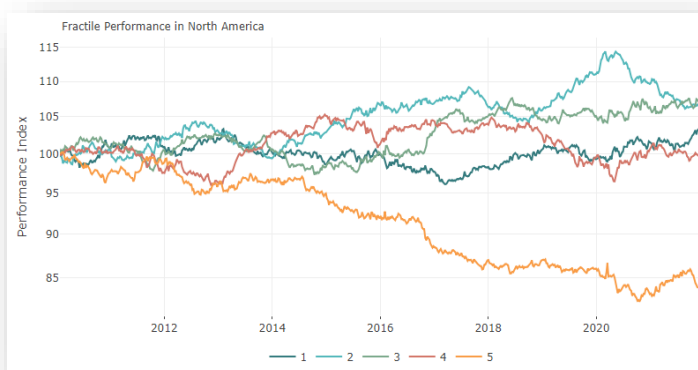[7] *FM refers to the Fama-MacBeth panel regression approach*

Chart 7. Long short spread return of The Filibuster in North America (Sector Normalized)
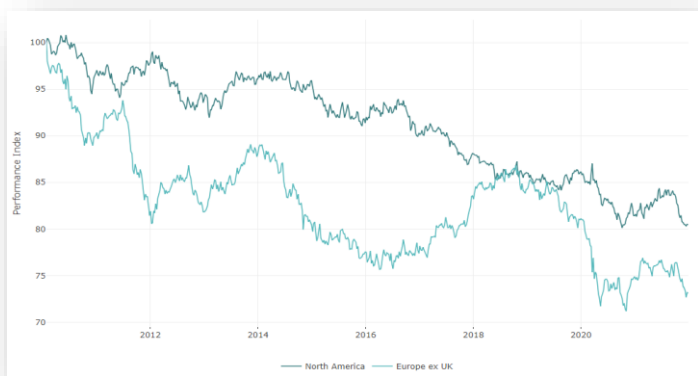
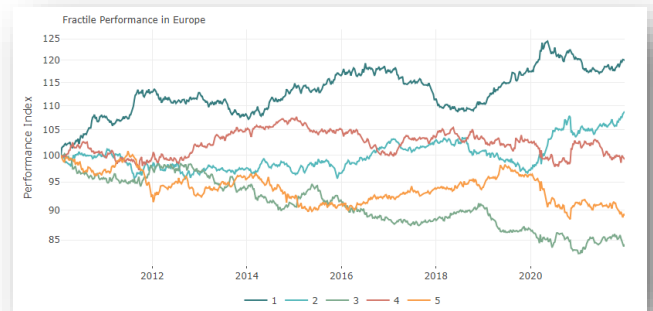*Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021*

Chart 8. Quintile returns for The Filibuster Signal (Sector Normalized)

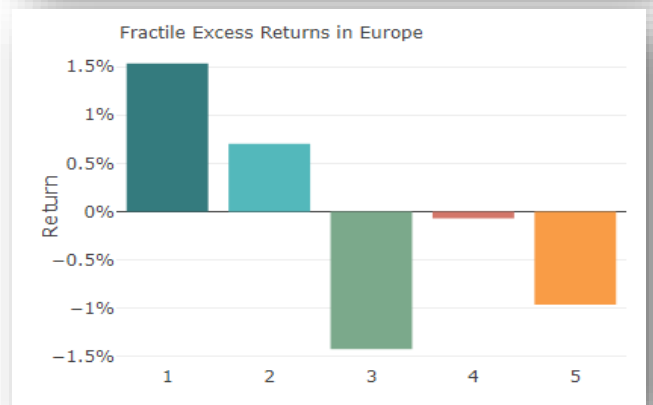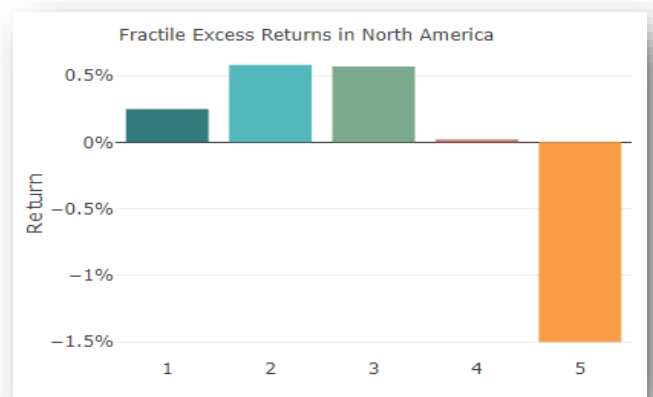*Panel A. Equally-weighted fractiles in North America*

Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021

Panel B. Equally-weighted fractiles in Europe

Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021

Panel C. Fractile Excess Returns

Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021

#2 The Obfuscator

Management speeches also need to be clear and concise. Here we propose our own Fog measure to capture obfuscation:

$$\text{The Obfuscator} = \frac{\text{num. of words}}{\text{num. of sentences}} + 100 * \frac{\text{num. of complex words}}{\text{num. of words}} - 100 * \frac{\text{num. of numeric words}}{\text{num. of words}}$$

We normalise this signal with either region normalisation, or region-sector normalisation. We apply this on the management discussion section of the conference call.

The rationale here is to extend upon the Gunning Fog measure and incorporate the *percentage of numbers* in the management discussion section. We argue that when managers are more open to talking about numbers, it increases clarity for the analyst and reduces the obfuscation score.

In Table 2, we run simple, equally-weighted long-short portfolios: long stocks with high obfuscation scores and short stocks with low obfuscation scores. Similar to the filibuster metric, we find that obfuscation works best in North America and Europe, and less effective in the UK and Australia. Regardless, it is clear that linguistic obfuscation is a negative signal for all regions.

Table 2. Fractile Performance from 2010 to 2021

Region	Mean	Standard Dev	IR	t-stat	Hit Rate	Turnover
North America	-3.68%	3.00%	-1.23	-4.24	43.4%	155%
Europe ex UK	-3.64%	4.33%	-0.84	-2.91	44.4%	184.8%
UK	-1.94%	7.56%	-0.26	-1.01	48.9%	155.1%
Australia (ASX 300)	-1.86%	7.69%	-0.24	-0.84	48.8%	163.3%

Source: Realindex, Factset; Date: from Jan 2010 to Dec 2021

To home in on performance in North America and Europe, where conference call coverage and frequency is the best, we present charts 9 and 10. We note that the fractile characteristics in Chart 10 is more ideal than the one in Chart 8: we can see both

the long and short sides are working for both North America and Europe.
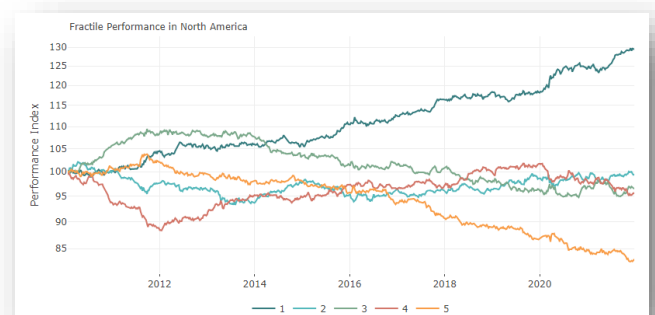
Chart 9. Long short spread return of The Obfuscator (Sector Normalized)

Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021

Chart 10. Quintile returns for The Obfuscator in North America (Sector Normalized)
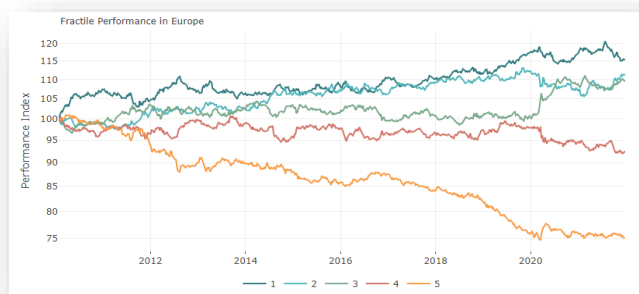
Panel A. Equally-weighted fractiles in North America

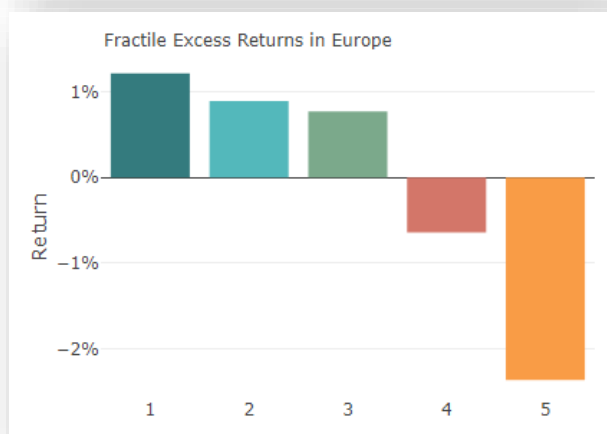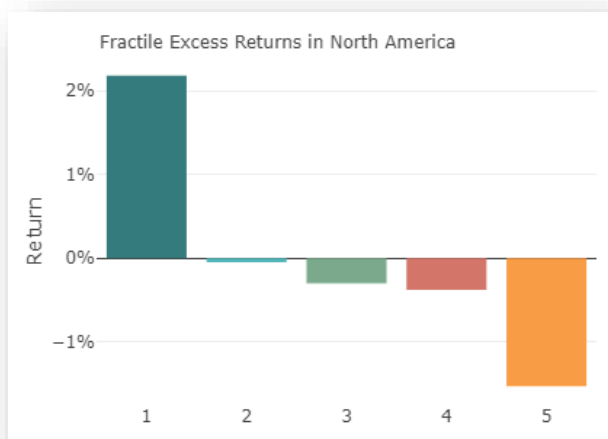*Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021*

Panel B. Equally-weighted fractiles in Europe

Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021

Panel C. Fractile Excess Returns

Source: Realindex, Factset Transcripts; Date Range: Jan 2010 to Dec 2021

What is Realindex doing with this insight?

The insights prepared in this Realinsights have been extensively evaluated by the research team at Realindex in preparation for application in our stock selection models. In practice, the ideas we actually apply are variations and extensions of the ideas above, sharpening some of the approaches and capturing some more nuanced influences.

Conclusions

This Realinsights paper describes how conference call clarity can be used as an alpha signal. We uncover two simple themes in conference calls that we believe can be utilized as systematic signals for alpha models. We find that:

- The length of the management discussion section, once normalised for sector, provides a useful negative signal on future stock price performance. This is especially true for North America.

- The complexity of the management discussion section is also a good negative indicator of future performance. This is because linguistic complexity is likely to be due to deliberate obfuscation by management as they bad news hoard

These signals are robust, easy to calculate and make sense intuitively.

Reference

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