Stock Market Returns and the Content of Annual Report Narratives

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Abstract

This paper uses the tools of computational linguistics to analyze the qualitative part of annual reports of UK listed companies. More specifically, the frequency of words associated with different language indicators is used to forecast future stock returns. We find that two of these indicators, capturing 'activity' and 'realism', predict subsequent price increases, even after controlling for a wide range of factors. Elevated values of these two linguistic variables, however, are not symptomatic of exacerbated risk. Consequently, investors are advised to peruse annual report narratives, as they contain valuable information that may not yet have been discounted in the prices.

JEL codes: M41; G12; G14

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1. Introduction

Annual reports are published to fulfill the reporting requirements imposed on listed companies and can be used by management to communicate with a variety of audiences (Stanton and Stanton, 2002). Each report invariably comprises two components, namely the unaudited narrative and the financial statements. The role that disclosed accounting numbers play in the context of capital markets has already been widely discussed in the extant literature (see for instance Ball and Brown, 1968; Bhandari, 1988; Lev, 1989; Livnat and Zarowin, 1990; Kothari, 2001; Chen and Zhang, 2007). The body of knowledge regarding the influence of qualitative information incorporated in annual reports is smaller, due to initial problems related to the objective quantification of language. Early attempts at using automated systems to analyze narrative accounting disclosures were made in the 1980s (Frazier *et al.*, 1984) and the technologies as well as the computer software have been progressively developing ever since. The content analysis we employ in our study relies on computing frequencies of words relevant to a specific linguistic construct. Each construct is defined by its own dictionaries including words characterized by similar qualities or referring to the same theme. We subsequently try to evaluate whether these lexical variables forecast future stock market returns.

More specifically, we focus our attention on five master variables constructed from word frequencies by a linguistic software package called Diction. Two of these indicators, capturing 'activity' and 'realism', appear to be both statistically and economically significant in our models. We argue that companies with realistic plans and strategies and those able to compete actively in the marketplace will be well-regarded by stock market investors. This paper demonstrates that these two linguistic gauges can predict future one-year returns, even after we control for a range of company characteristics and performance indicators. Interestingly, the increased values of these linguistic measures should not be interpreted as risk contributors, as they are negatively related to the overall return standard deviation and the level of idiosyncratic risk. The most plausible interpretation of our results is that markets are to some extent informationally inefficient and that the price reaction to complex news is substantially delayed. To put it differently, we are observing a stock market anomaly that could potentially be exploited by traders.

Arguably, the motivations for drafting the narrative may extend beyond providing new material information. Annual reports can also be used to manage public impression (Neu *et al.*, 1998) or be deployed as a marketing tool (Stanton and Stanton, 2002). Furthermore, a number of authors allude to the positivity bias frequently inherent in the reports (Hildebrandt and Snyder, 1981; Rutherford, 2005; Henry 2008). Indeed, listed companies may be tempted to present their state of affairs in a favorable light in order to attract new investors, consumers, and business partners. Regulatory compliance may also be signaled to appease the regulators. Even if such practices are present, our paper shows that careful evaluation of the published narrative is a worthwhile and possibly lucrative exercise. This conclusion lends credence to the incremental information hypothesis outlined in Merkl-Davies and Brennan (2007), which states that managers may use discretionary narrative disclosures to reduce existing information asymmetries.

Our paper adds to the wealth of existing scholarship in several ways. Firstly, we focus on UK data and, in doing so, we are able to make comparisons to the frequently examined US market. This fact may be crucial, as the US has adopted a rules-based approach to reporting, while the UK operates a principle-based system (Nobes and Parker, 2008). Relative to 10-K disclosures, the style of UK annual report narratives may allow managers more flexibility in terms of manipulating the tone and semantic characteristics of text either to influence investors' perception of the company's situation and its fundamental value or to engender an emotional response on their part. This could potentially be exacerbated by the fact that regulations against fraudulent and misleading disclosure in the UK (FRC/ASB/IASB) are less stringent than in the

US (SEC, 1998, 2003; Sarbanes-Oxley Act 2002) and that the definition of fraud used by US courts is much broader (Davies, 2007: 44). As a result, disclosure-related litigation is much more common in the United States (Schleicher and Walker, 2010). The differing regulations may potentially affect the usefulness of corporate communications and provide a rationale for our study.

The second motivation for our paper relates to concentration of the previous literature on either the tone of earnings press releases (Henry, 2008; Demers and Vega, 2010; Davis *et al*., 2012), media reportage (Tetlock, 2007; Tetlock *et al*., 2008), Internet posts (Antweiler and Frank, 2004; Das and Chen, 2007) or the president's letter to shareholders (McConnell *et al*., 1986; Swales, 1988; Abrahamson and Amir, 1996; Smith and Taffler, 2000). We analyze the text of the entire annual report, excluding the financial statements section and notes to accounts. These texts are substantially longer than the documents examined previously, which allows for more reliable identification of linguistic style (Grimmer and Stewart, 2013: 6). Thirdly, the results of our study may be of interest because, instead of focusing on a market reaction in a very short window surrounding the annual report disclosure date, we endeavor to make medium-term return predictions. Last but not least, we recognize that annual reports are multifaceted documents and therefore we attempt to measure several linguistic dimensions of the text. This approach, as the paper will demonstrate, proves to be insightful.

The remainder of the paper is organized as follows. The next section reviews the literature related to the design and purpose of annual report narratives, engages with studies applying methods of computational linguistics in the field of accounting and finance, and discusses prior applications of Diction software. Section 3 enumerates our data sources, elaborates on variable construction and presents summary statistics for our sample. Section 4 reports our empirical results both on return predictability and on whether the linguistic measures should be regarded as risk proxies. We then endeavor to frame our results within existing theoretical frameworks and end the paper with a set of concluding comments.

2. Literature Review

2.1. Annual Report Narratives

While the process of drafting the annual report narrative is guided by a pre-existing set of conventions and regulations, companies still retain a large degree of flexibility in terms of content and linguistic characteristics. The design of the text is a complex, purposeful and well-considered process. Thomas (1997) points out that while the letters of the CEO and president may be written by the undersigned, a robust consultation process is typically in place involving lawyers and the chief financial officer. While large segments of a report may be prepared in-house, UK listed companies often resort to using external design agencies (Stanton and Stanton, 2002). Consequently, many departments and individuals may partake in the creation of the text, possibly with a common objective in mind.

The content of annual reports may vary substantially across different companies. However, due to regulatory constraints, these reports tend to share common characteristics. The narrative will typically open with non-statutory and non-audited Chairman's and CEO's statements. The Companies Act 2006 mandate large and medium quoted companies to include a business review section covering a description of company business, its performance, principal risks, position, trends and factors, as well as financial and non-financial key performance indicators (KPIs). It also obliges firms to report on environmental matters, the company's employees, social and community issues, all of which are typically addressed in a corporate social responsibility statement, often compiled in accordance with the Global Reporting

Initiative Guidelines. Section 420 of the Companies Act states that quoted firms must disclose directors' remuneration report for each financial year, while section 415 refers to the duty to prepare a directors' report. Guidance on these two sections is also provided in the UK Corporate Governance Code. A typical annual report will also contain a statement of directors' responsibilities, confirming that directors have adhered to sections 393, 394 and 396 (3) requiring the preparation of true and fair accounts. Compliance with the provisions of the Act is monitored by the Financial Reporting Council (FRC) that may try to persuade directors to introduce voluntary corrections or, in extreme cases, secure a court order.[2] It is important to realize that the Listing Rules require companies to either comply with the UK Corporate Governance Code or explain why they have failed to do so. Like the Code, the Disclosure and Transparency Rules are also pertinent to the process of drafting corporate governance statements. In their study, PricewaterhouseCoopers (2009: 1) notes that the "compliance mindset" can inhibit effective communication.

Ultimately, annual reports are communication instruments through which a particular viewpoint is presented. In their narratives, companies tend to highlight the positive aspects of their performance (Bhana, 2009) and in cases where the financial results are favorable, the text tends to be adorned with graphs (Beattie and Jones, 1992). Similarly, a fusion of pictures and narratives has been becoming increasingly prevalent and has been frequently deployed as an image management tool (Lee, 1994). While it may be important to understand which parts of the report are highlighted and by what means, the act of deemphasizing information is equally important. One may argue that omitted information can be viewed as being as relevant as that which is included (Buhr, 1998; Stittle, 2002).

[2] Companies are often challenged on their narrative reporting by the FRC team. The challenges may relate to the lack of understandability, inconsistency of the text with the financial statements or to the business review section that may not appear fair, balanced or comprehensive. Most of the questions put forward to the Boards by FRC are confidential, while other individual issues can be widely publicized. It is also worth noting that FRC issued guidance on some of the narrative parts, including directors' and strategic reports.

The functions of annual reports have been analyzed from various research perspectives. One strand of the literature notes that the reports may have an impression management purpose, with the text, graphs and photographs directing the reader towards a favorable interpretation of corporate activities (see for instance McKinstry, 1996; Beattie *et al.*, 2008; Clatworthy and Jones, 2003). Consequently, a number of scholars argue that annual reports can be viewed as marketing tools designed to build brands, as well as to promote products and services to multiple audiences (Dröge *et al.*, 1990; Subramanian *et al.*, 1993). A less common perspective is that related to political economy, which recognizes political, economic and social tensions and argues that annual reports are ideological instruments that represent specific interests (Burchell *et al.*, 1980; Cooper and Sherer, 1984; Guthrie and Parker, 1989). Companies may also try, through the use of this particular communication medium, to legitimize their existence by convincing society that their actions are in line with community objectives and values (O'Donovan, 2002; Lanis and Richardson, 2013). Last but not least, annual reports can be understood from the accountability perspective, which emphasizes legal aspects and argues that these documents should be used by management to address the concerns of shareholders and stakeholders (Coy *et al.*, 2001; Hooks *et al.*, 2001). An in-depth literature review provided by Stanton and Stanton (2002) discusses the different theoretical viewpoints on annual reports.

2.2. Content Analysis and Computational Linguistics in Accounting and Finance Studies

The task of categorizing text documents or summarizing them using quantitative measures may be neither straightforward nor easy to implement. Some authors have tried to achieve these objectives using human judgment. For instance, Bhattacharya *et al.* (2009) engaged in a painstaking exercise of reading over 170 thousand news items about Internet IPOs in order to segregate them into good, bad and neutral news. While they find evidence of media hype during the Internet bubble phase, this phenomenon was able to explain only a small proportion of realized price increases on Internet stocks. Smith and Taffler (1995) look at whether it is possible to recognize companies which are about to go into receivership, voluntary or compulsory liquidation simply by reading their chairmen's statements. In order to implement this experiment they had to engage no less than 146 undergraduate students. Even though such attempts are admirable, they are clearly time-consuming and probably unsuitable for our study which tries to analyze 1,262 annual reports.

Recent advances in computational linguistics afford researchers the opportunity to utilize computerized approaches to content analysis. Such approaches rely on the construction of dictionaries that compile words with similar characteristics or meanings. Subsequently, the frequency with which these words occur in a particular text is measured, providing a reliable gauge of a given semantic dimension. A number of studies employ positiveness dictionaries and note that the tone implicit in the US quarterly earnings press releases is related to announcement period market response (Henry, 2008; Demers and Vega, 2010; Davies *et al.*, 2012). Demers and Vega (2010) also document that managerial language characterized by a lack of certainty is symptomatic of a higher level of company-specific risk. In a similar spirit, Li (2008) shows that communications of companies with poor performance are longer and harder to read. Rogers *et al.* (2011) warn managers against misleading use of language in corporate communications and note that whenever announcements with a positive tone coincide with insider selling there is a real danger of shareholder litigation.

Another strand of research looked at the content of the presidents' and chairmen's letters to shareholders. McConnel *et al.* (1986) and Swales (1988) argue that the proportions of these letters devoted to certain themes can be informative with regard to the stock market performance of a company. The results presented in Abrahamson and Amir (1996) attest to the fact that negativity of these letters is inversely linked to both accounting-based performance measures and returns. Clatworthy and Jones (2003) report that chairmen's statements in the UK tend to simultaneously highlight positive aspects of performance and attribute bad news to the external environment, while Schleicher and Walker (2010) show how the tone of outlook sections incorporated into chairmen's statements depends on managerial incentive variables. Lastly, by applying word-based and theme-based content analysis, Smith and Taffler (2000) observe that such narratives can help to predict firm failure. While we find these studies instructive to our own investigation, we would like to note that chairmen's letters in the UK are typically one or two pages in length. We therefore decided to examine the entire narrative included in annual report, as the content analysis of longer texts can provide a more reliable indication of style and language. In what follows we will employ a computer-assisted approach to counting the frequencies of words falling into particular categories – categories that appear to matter to financial markets. In doing so, we are able to uncover a number of interesting regularities and predictable patterns.

2.3. Diction Software and Its Prior Applications

To operationalize our linguistic analysis, we utilized a text-analysis software package called Diction 6.0. By now, this software is well-established within the academic community, with many studies relying on it as a content analysis method, particularly in the fields of political science, communication and language analysis, as well as in media studies. A full list of books and academic articles that engage with Diction can be found on the software's web page.[3] The primary function of Diction is to compute the frequencies of words falling into predetermined tag categories within the analyzed text. The software takes a 500-word segment to be its textual norm and computes the frequency of words from a specific vocabulary list

[3] Please see http://www.dictionsoftware.com/published-studies/

expressed as an average per 500 word units of the text. Words with identical spelling but different meanings are dealt with by using statistical weighting procedures.

Diction has in excess of thirty thesauruses which capture different linguistic dimensions and based on which sub-score frequencies are computed. These frequencies for subaltern categories are subsequently transformed and aggregated according to predetermined formulas to form five master variables - *Activity*, *Optimism*, *Certainty*, *Realism* and *Commonality*. The intention behind designing these proxies was to capture the general understanding of a text being analyzed. The software also allows its users to program in custom wordlists and construct their own variables. For instance, Henry (2006, 2008) designed her own dictionaries and utilized Diction to process texts. On the other hand, Demers and Vega (2010) and Davis *et al.* (2012) used standard thesauruses programmed into the software package to evaluate the sentiment inherent in US quarterly earnings press releases.

There are also several other applications of the software in the finance and accounting context that are worthy of note. In their book, Amernic *et al.* (2010) provide interesting examples of how Diction can be used to measure the tone of CEO letters to shareholders. Rogers *et al.* (2011) have found that an overly upbeat tone in corporate disclosures, as measured by the Diction's *Optimism* indicator, increases the risk of shareholder litigation. Linsley (2011) examined UK bank risk disclosures in the vicinity of the credit crisis by focusing on three of the five available master variables. In their effort to investigate discourse ethics, Yuthas *et al.* (2002) scrutinized the Management's Discussion and Analysis section of annual reports by looking at a whole range of software-produced variables. Craig and Brennan (2012) utilized Diction to compare CEO letters to shareholders published by high and low reputation companies. Finally, Syderff and Weetman (2002) argued that the transitivity index and Diction scores are useful alternatives to researchers seeking to investigate impression management in corporate communications. While all of these previous studies are instructive and illuminating, their research objectives are dissimilar to ours. Our overarching purpose is to evaluate whether computerized examination of annual report narratives aids in making more successful stock market investments.

3. Data

In compiling our dataset, our focus was on constituents of the FTSE 350 index operating outside the financial sector. Consequently, we had to eliminate 72 entities that were involved in the provision of financial services[4] and a number of companies with insufficient data on annual reports and financial indicators. As a result of this screening process, we arrived at a final sample of 209 firms, for which annual reports were gathered from corporate web pages, Morningstar and Bloomberg. In the calculations that follow, we assume that annual report publication date is equivalent to either the Morningstar or Bloomberg date, whichever came first. Several reports were omitted due to the fact that a 250 trading day window after the announcement is needed to compute the subsequent investment returns. As a result, our dataset incorporates a total of 1,262 annual reports disseminated between January 2006 and August 2012. A complete list of companies with their corresponding number of observations is presented in the appendix to this paper. It should be noted at this stage that UK companies typically issue this type of communications in PDF format, which necessitates conversion of files into text documents for our linguistic analysis. For this purpose, we employed Convert PDF to Word Desktop Software and, whenever the files included text embedded within pictures, we resorted to using an optical character recognition system called Smart OCR. Files were

[4] The structure of annual report narratives for banks and financial institutions departs significantly from what is norm for a typical company. These entities have to comply with IAS30 – Disclosures in the Financial Statements of Banks and Similar Financial Institutions and the Basel Accord, consequently devoting a lot of space to describing issues such as liquidity and risk management. Some of the other content analysis studies performed in the UK context also excluded financial intermediaries (see for instance Clathworthy and Jones, 2003; Schleicher and Walker, 2010).

examined for internal consistency and, whenever required, corrected manually. After converting annual reports into a text format, we deleted financial report and notes to accounts from each of the files. These sections are strictly regulated and audited, which leaves almost no room to employ linguistic strategies. Consequently, it is only the narrative part of the annual report that we choose to focus on.

We carry out our content analysis using the computer-assisted text analysis software Diction 6.0. It contains over thirty dictionaries, each of which includes a list of words specific to a particular linguistic dimension. For example, a thesaurus related to *Praise* is based on affirmations of different commendable qualities and includes, amongst others, words such as: successful, intelligent, accountable, admirable or beneficial. Diction then computes the frequencies with which words from a particular dictionary appear in the text files as per an average 500-word segment. These frequencies are subsequently converted into *z*-scores and amalgamated into master variables. For example, the *Certainty* master variable, which captures resoluteness, inflexibility and tendency to express ideas with authority is constructed from the *z*-scores of individual categories as follows:

$$\text{Certainty} = [\text{Tenacity} + \text{Leveling} + \text{Collectiveness} + \text{Insistence}] - [\text{Numerical Terms} + \text{Ambivalence} + \text{Self Reference} + \text{Variety}] \quad (1)$$

The software linearly scales the resultant measure by adding a constant of 50 to each of the observations in order to avoid negative entries and provides a slight statistical correction by referencing its normative databank.

In addition to the *Certainty* variable defined above, Diction also constructs an *Optimism* indicator capturing the positive entailments of things or individuals, an *Activity* score which increases with words characteristic of change, non-inertial concepts and implementation of ideas, a *Realism* score measuring tangibility and recognisability of issues discussed and a

Commonality variable gauging the referencing frequency of agreed-upon values and principles. Again, these are constructed from the *z*-scores of subaltern categories as follows:

Optimism = [Praise + Satisfaction + Inspiration] – [Blame + Hardship + Denial] (2)

Activity = [Aggression + Accomplishment + Communication + Motion] – [Cognitive Terms + Passivity + Embellishment] (3)

Realism = [Familiarity + Spatial Awareness + Temporal Awareness + Present Concern + Human Interest + Concreteness] – [Past Concern + Complexity] (4)

Commonality = [Centrality + Cooperation + Rapport] – [Diversity + Exclusion + Liberation](5)

The software added 50 to each of the aforementioned constructs and performed a slight statistical correction in relation to its normative databank.

Since we examine the returns over a period of about one calendar year following the publication of each annual report, we have to assume that the markets will have had the time required to peruse the text from different angles and look at different semantic dimensions. Consequently, we do not want to restrict our investigation to one aspect of the communication and believe that a multi-dimensional approach is more suitable in this context. The analysis that follows utilizes all of the five aforementioned master variables.

[Table I about here]

Table I summarizes the construction of our linguistic measures and the control variables used in our study. We try to account for firm-specific characteristics, as well as the financial figures disclosed simultaneously with annual report narrative. Firstly, we rely on the insights of the Capital Asset Pricing Model (CAPM) developed by Sharpe (1964), Lintner (1965) and Mossin (1966) and include security's beta as one of the explanatory variables in our regressions.

It needs to be noted that the empirical performance of CAPM has been questioned (see for instance Fama and French, 1996) and additional variables may be needed to explain the cross-sectional variation in security returns. Banz (1981) has shown that the size of a company is a predictor of its returns, which is unsurprising considering that small capitalization stocks are riskier, more strongly affected by illiquidity and subject to higher transaction costs (Lesmond *et al.*, 1999; Shumway, 2001; Amihud, 2002). Furthermore, Rosenberg *et al.* (1985) document that firms with higher book-to-market ratios generate greater rewards to investors on average. These discoveries led to development of the three-factor Fama-French model (Fama and French, 1993), which is helpful in the context of our inquiry. In light of this previous evidence, we incorporate the natural logarithm of stock market capitalization (*Size*) and *Book-to-Market* ratio as explanatory variables in the return regressions.

Firms present their annual financial statements concurrently with annual report narrative. Disentangling the influence of the narrative from that of the accounting numbers necessitates controlling for financial performance indicators in the predictive regressions. To this end, we construct a variable *Earnings_Surprise*, which measures an increase in earnings per share relative to a random walk forecast, scaled by the share price. Several comments need to be made regarding this construction approach. Firstly, one cannot simply compute the percentage increase in earnings, as the figure from the previous period may have been negative. For this reason, the consistently non-negative price appears in the denominator. This scaling is consistent with Easton and Zmijewski (1989), Bartov *et al.* (2002) and Brown and Caylor (2005). Secondly, the choice of benchmark for earnings performance is dictated by data availability. However, it is by no means inferior, as Hughes and Ricks (1987) observe that analyst forecast errors do not dominate a seasonal random walk earnings forecast in terms of correlation with excess returns. Several earlier studies have used an earnings surprise measure identical to ours (see for instance Wisniewski (2004) and Sponholtz (2008)). Furthermore, we control for percentage growth in sales (*Δ%Sales*), as investors may appreciate companies that expand and strive to increase their market share. Last but not least, we utilize a change in financial leverage (*ΔLeverage*), defined as total liabilities over total assets. This indicator measures the extent of financial risk that may be associated with the likelihood of bankruptcy. One would expect that investors would be compensated for taking on additional risk with more generous stock returns.

[Table II about here]

Table II presents summary statistics for the variables used in our study. Since our lexical variables are composite and transformed measures, their distribution parameters may be difficult to interpret. However, their averages may be compared with Diction's norms for business annual reports published in Amernic *et al*. (2010: 111). Juxtaposition of the reported means for our master variables with the normal ranges reveals that there are, on average, no immediately notable distributional abnormalities. When evaluating a representative company in our sample, we discover that it has a beta of 0.91 and its market price exceeds its book value by about 69%. Earnings, on average, were declining, which is unsurprising considering that the period covered fell between 2006 and 2012. This time interval coincides with the credit crunch and prolonged economic stagnation. Companies, however, managed to maintain decent sales dynamics, perhaps at the cost of decreasing profit margins. The negative mean of *ΔLeverage* indicates that firms were decreasing their reliance on debt, and were perhaps forced to do so by the circumstances surrounding the credit crunch.

[Table III about here]

Pearson correlation coefficients between the key variables together with their significance levels are reported in Table III. The most important observation is that our *Activity* and *Realism* indicators have strong associations with future returns that cohere with our *a priori* expectations. Companies that take an active approach to competing in the markets enjoy higher returns on their stock. Similarly, investors tend to appreciate language referring to realistic and tangible considerations. Far-fetched and abstract statements may be perceived as lacking credibility and viewed as a smokescreen strategy on the part of management. Another conclusion that arises from evaluating Table III is that the correlations between our independent variables are reasonably low and the problem of multicollinearity is unlikely to occur. In the presence of strongly associated regressors, the standard errors of regression parameter estimates will be inflated. We have computed variance inflation factors (VIFs) for all of the regressions reported in our paper. Chatterjee and Price (1991) argue that VIFs in excess of 10 are symptomatic of a multicollinearity problem, however the highest VIF recorded in our specifications is 1.33, alleviating any concerns regarding this issue.

4. Results

4.1. Predicting Future Returns

Prior research measuring the influence of tone inherent in US earnings press releases on stock returns focused on short, typically 3-day, event windows (Henry, 2008; Davis *et al.*, 2012). Our objective is distinct from that of those previous studies and, instead of measuring the immediate price reaction, we intend to assess the predictive power of textual characteristics over a longer horizon. In our calculations we assume that the investor will be able to analyze the report using content analysis software and, should the indications be positive, place a buy order at close of the day on which the report was disseminated. We look at the cumulative raw continuously compounded return over a period of about one year (250 trading days), as annual reports are, as their name indicates, published annually. Extending this window will lead to an overlap between observations, causing a range of potential econometric problems. In light of the abovementioned considerations, the final investment horizon considered here is equivalent to a

(1,250) period, where *Day 0* is defined as the first dissemination date of a report. We want to stress that the regressions that follow are predictive in nature and the return prediction is based only on the information available on *Day 0*. The impact of any unexpected price-sensitive events occurring during the (1,250) timeframe will therefore be captured by the regression residuals.

[Table IV about here]

Table IV presents results for regressions linking firms' returns to the linguistic features of their annual report narratives. The first two specifications focus only on the basic relationship between language characteristics and returns without making corrections for any other potentially important influences. Regressions (3) and (4) control for company-specific characteristics, while regressions (5) and (6) also consider the impact of financial results and gearing. The evenly numbered specifications exclude statistically insignificant linguistic constructs, which are consequently deemed to be of lesser importance.

Firstly, and perhaps most importantly, two of our lexical variables – *Activity* and *Realism* - exert a statistically significant influence, regardless of whether they are considered individually (regression (2)) or in conjunction with other control variables. It may be argued that *Activity* indicator is likely to correlate positively with the realized and potential opportunities that a company is facing. To illustrate, words such as 'completion', 'launch', or 'achieving' increase the value of this variable, while 'shutdown' or 'standstills' will lead to its decrease. Corporations that operate in the contemporary dynamic business environment cannot afford prolonged periods of inactivity and need to continuously adjust to changing market conditions. Firms failing to vigorously compete in the marketplace will ultimately perish. It may therefore be reasonable to postulate that investing in active firms could deliver greater rewards to shareholders. The *Realism* variable, on the other hand, is linked to expressions that are substantive and tangible in nature. One could expect that firms without any manifest successes will be inclined to use vague, abstract and idealistic statements that are not rooted in material reality. Similarly, in the absence of a realistic future strategy, the annual report narrative is likely to make utopian references. Concreteness of text is essential to effective communication and any non-tangibility in expression may potentially suggest the existence of hidden managerial motives. According to the dual coding theory developed by Paivio (1971), people can process concrete words better because they can be more easily visualized. Furthermore, by engaging with those words both hemispheres of the brain are activated (Paivio, 1986; Binder *et al.*, 2005). In earlier research, Wisniewski and Moro (2014) show that markets react unfavorably when political leaders make abstract, non-concrete declarations. In a corporate context, a realistic strategy is more credible and easier to implement, which in turn seems to increase shareholder wealth.

These results indicate that investors prefer companies that are realistic and active in pursuing their mission. The numerical values of linguistic indicators can be used to predict future returns, which should not be possible in efficient markets unless increases in those indicators are associated with a higher degree of risk. For this anomaly to be eliminated from the market, investors would have to employ content analysis immediately after a report is published or, at the very least, read the document very carefully. Obtaining a copy of a content analysis software requires payment of a fee[5], while perusing documents that are sometimes several hundred pages in length over a short period of time is a rather formidable task. Regardless of the practical difficulties, investors are advised to engage in these activities, as they may potentially be lucrative. According to the regression estimates, increasing the *Activity* indicator by the value of its one standard deviation raises returns over the following year by between 3.72% and 4.31%. An impact range for the *Realism* variable, computed in the same way, is between 2.08%

[5] These fees are not necessarily prohibitive. At the time of writing this paper, Diction was priced at USD 219 per copy for educational use and USD 269 for corporate use.

and 2.71%. These estimates are in excess of typical transaction costs in the market, making the analysis of annual report narratives a worthwhile exercise.

The estimated coefficients on *Size* and *Book-to-Market* in specifications (3) to (6) confirm the earlier findings of Banz (1981), Rosenberg *et al.* (1985) and Fama and French (1993). Large companies, which are perceived as more stable, diversified and liquid, command a lower risk premium. On the other hand, companies with a high book-to-market ratio earn higher returns, either because of risk compensation, or due to correction of market undervaluation. The negative and statistically insignificant coefficient on *Beta* mirrors the empirical failure of the Capital Asset Pricing Model, which has been previously noted by Fama and French (1996). Perhaps this failure is associated with the fact that, for much of the period considered here, the stock market underperformed the risk-free asset, which can be attributed to the occurrence of the credit crunch and the European sovereign debt crisis. Consequently, stocks with high exposure to market variation produced an inferior performance, which is opposite to the theoretical predictions of CAPM. With regard to our accounting controls included in specifications (5) and (6), they do not contribute substantially to the explanatory power of our empirical model. These numbers may be imprecise due to creative accounting/earnings management practices (Healy and Wahlen, 1999). What is more relevant in our context, however, is that these numbers are stale. The financial figures reported in annual reports can, to a large extent, be predicted based on the interim earnings announcements, profit warnings or preliminary statements of annual results made earlier. Consequently, the financial sections contained in annual reports rarely include significant new information.

While the *Activity* and *Realism* linguistic measures are significant in all of the regressions, the proportion of the regressant variance explained by empirical specifications remains relatively low. For the model including all of our explanatory and control variables, the adjusted R-squared is slightly below 4%. This finding can be easily rationalized in light of the existing literature. It is a well-established empirical fact that stock prices change too much and, according to Shiller (1981), their volatility is five to fifteen times higher than that implied by a fundamental dividend discount model. Some evidence presented by accounting scholars also indicates that the relationship between accounting numbers and returns is weak and unstable (see Lev (1989) who provides a literature review on this topic). Most importantly, we want to note that we are not trying to explain contemporaneous returns, but rather engage in an act of prediction. Reliable predictions of future stock price movements remain a holy grail for financial economists and practitioners, with generous material rewards being available to anyone who manages to accomplish this goal. Consequently, forecasting even a moderate fraction of the movements in the dependent variable can be considered a meaningful success. At the same time, these considerations underscore the fact that stock market investments are inherently risky ventures, characterized by a multiplicity of possible future outcomes.

4.2. Can Linguistic Variables be Viewed as Risk Proxies?

While it is the case that large values of the *Activity* and *Realism* indices derived from the content analysis are predictive of stock price increases, these increases may potentially represent a compensation for risk. In this section, we endeavor to examine whether these lexical measures can be interpreted as risk factors. To this end, we try to link these measures with the standard deviation of daily returns in the (1,250) period that proxies for the amount of a company's total risk. In a separate set of models, we also assess whether large values of these linguistic variables lead to elevated levels of idiosyncratic volatility, which is defined here as the standard deviation of the residuals from CAPM regression. This regression links daily returns on a company in excess of the daily equivalent of the 3-month UK interbank interest rate to the excess returns on the FTSE 350 index. The text of an annual report is essentially unique for each particular company, which warrants the investigation of the company-specific component of risk.

[Table V about here]

Panel A in Table V reports the results of the specifications where total risk is taken to be the dependent variable. The regressors included in each of the six specifications are identical to those used in the return regressions, with one notable exception. We also add the standard deviation of daily returns in the 250-day period preceding the annual report disclosure date (*Past_Vola*). This has been done in order to take into account the well-known phenomenon of volatility clustering in the financial time series, which was first noted by Mandelbrot (1963) and subsequently formalized by Engle (1982) and Bollerslev (1986). Panel B of Table V models idiosyncratic volatility and uses historical company-specific volatility (*Past_Idio_Vola*) as one of the regressors. It also omits beta as an explanatory factor as, by definition, diversifiable risk is independent of beta.

The key observation that can be made is that *Activity* and *Realism* always bear a negative coefficient regardless of the specification and definition of risk. This means that these indicators reduce both the total and the diversifiable risk of firms and, in the case of *Activity,* this reduction is often statistically significant. Consequently, we find no evidence to support the assertion that the predictable returns reported in the previous section are a manifestation of risk premium. This, in turn, has important ramifications for stock market investors, their trading strategies and the importance one should attach to carefully reading annual reports. Unsurprisingly, high beta is found to magnify the amount of total risk (Panel A, specifications (3) to (6)) and volatility does not appear to be an integrated process, as the coefficients on *Past_Vola* and *Past_Idio_Vola* are significantly smaller than unity. The values of the adjusted R-squared coefficients indicate that about one-fifth of the variation in dependent variables is explained by the regressions.

5. Theoretical Framing of the Results

According to the semi-strong form of the Efficient Market Hypothesis (EMH) put forward by Fama (1970), stock prices should adjust to the content of annual report narratives instantaneously. Price reaction should materialize in full on the dissemination day and no post-announcement drift should be present. Our findings seem to violate this idealistic description of the price formation process. Apparently, investors can analyze narratives at the end of the publication day, when this information is already in the public domain, and derive financial benefits over the next year based on their conclusions. These elevated returns cannot be simply labeled as risk premium, as the strategy suggested here does not seem to entail additional risk exposure. Consequently, our paper adds more insight to the vigorous academic debate on whether the EMH is an accurate description of reality. Fellow researchers in the field have already discovered a long list of stock market anomalies. For instance, our paper confirms the existence of both the size effect (Banz, 1981) and the book-to-market effect (Rosenberg *et al.*, 1985). However, since both of these two company characteristics may be related to risk, one can argue that higher rates of return are required to induce investors to keep small and value stocks. Similar arguments cannot be made in reference to our *Activity* and *Realism* linguistic variables, making the rejection of EMH even more clear-cut.

Our findings could, however, be more easily reconciled with the bounded rationality concept attributed to Herbert A. Simon. This theoretical framework acknowledges the cognitive limitations of the human mind, particularly when dealing with complex problems and huge volume of information (Simon, 1957). Investors may feel under pressure to make swift decisions, which in turn means that they will not have time to engage in fully rational optimization. Reading corporate narratives under time constraints may render certain text characteristics less discernible. Although there is some evidence in the literature that investors can react relatively quickly to the positiveness of short corporate textual outputs (Henry, 2008; Davis *et al.*, 2012), the annual report narratives we analyze here are voluminous. In absence of a semantic computer software, investors may initially react to disclosure based on their approximate and limited understanding. It is only with the passage of time that they will be able to fully absorb all aspects of the published document. The process of assessing whether corporate plans are realistic and whether the company is sufficiently active in the market may indeed be prolonged. Consequently, looking at the issue through the lens of bounded rationality may explain why valuation adjustments occur with a delay relative to the publication date.

Our results can also be contemplated and conceptualized from the point of view of disclosure theories. In their literature review on corporate disclosure strategies, Merkl-Davies and Brennan (2007) rely on useful taxonomy that could be deployed here. They argue that managers are at an informational advantage in relation to outsiders and may use discretionary narrative disclosure to either reduce the informational asymmetries or to exploit them in order to engage in impression management. In the former case, narrative disclosures provide new incremental information, which may lead to reductions in uncertainty and cost of capital, as well as improvement in stock performance (Baginski *et al.*, 2000). On the other hand, impression management is simply a case of opportunistic manipulation of stakeholders' perceptions (Clatworthy and Jones, 2001; Yuthas *et al.*, 2002). Injection of positiveness bias into narratives is often motivated by the self-serving objectives of insiders (Hildebrandt and Snyder, 1981; Clatworthy and Jones, 2003; Rutherford, 2005; Henry, 2008). One may argue, however, that if investors are perceptive or at least rational within the limits of their cognitive bounds, unsubstantiated impression management will be to a large extent ineffectual. Given sufficient time, reporting biases will be recognized and investors will, on average, adjust their expectations.

In our judgment, the findings on predictability of returns presented in this paper shed some light on the incremental information versus impression management hypotheses. Firstly, some of the information published in annual report narratives appears to be price-sensitive and its material nature allows the formulation of predictions about future valuations of companies. Even though its value may not be recognized instantly, it is gradually discounted into prices, as market participants absorb the content of lengthy narratives. The persistence and strength of price reaction suggests that the textual information disseminated is new and reliable. One can therefore infer that managers use the narratives as a vehicle to reduce informational asymmetries present in the market. At the same time, we cannot completely rule out the hypothesis that the qualitative parts of annual reports fulfill an impression management role, although the claim that they are solely restricted to that role appears to lack validity.

6. Conclusions

The aim of this paper was to evaluate whether the linguistic characteristics of narratives published in the annual reports of UK listed companies can predict future one-year returns. In evaluating these texts we resort to using tools of content analysis. More specifically, we examine the master variables constructed by the semantic software package called Diction. We show that two variables capturing activity and realism are positively and significantly associated with future price changes, even after controlling for a range of company-specific characteristics and accounting variables. Increasing individually either of the two indicators by a magnitude of one standard deviation raises the future return somewhere in the neighborhood of 2.08% to 4.31%. This attests to the fact that the phenomenon we discovered is not only statistically but also economically significant. Since annual report narratives act as a conduit for dissemination of such material incremental information, they should not be solely perceived as vehicles for impression management.

One may suspect that these two linguistic measures are correlated with the uncertainty level and that elevated returns simply represent a manifestation of a risk premium. However, we document empirically that there is no solid basis for such an assertion. In fact, an increase in activity and realism variables decreases the magnitude of both the total and the idiosyncratic risk. This leads us to conclude that the regularities observed here amount to a stock market anomaly and are a violation of the efficient market hypothesis. While this may be the case, this conclusion is neither astounding nor unexpected. Narratives in annual reports are lengthy and highly complex texts. Unless investors use computerized methods of evaluation, perusal and assessment of these documents across many dimensions can turn into an extremely protracted exercise. It is therefore not particularly startling to observe that markets require time to digest this large volume of sophisticated information. The delayed reaction, however, is consistent with the theory of bounded rationality, where investors are confined by their cognitive limitations.

Our findings have important ramifications for stock market participants. It seems that annual report narratives incorporate important information that is not instantly discounted in stock prices. There could be potential material rewards for those who analyze these texts and adjust their trading strategies accordingly. As long as an annual report can be easily converted into a text file, automated assessment of the text is neither time-consuming nor particularly costly. We therefore recommend that investors either familiarize themselves with those documents or use appropriate software to obtain summary statistics on them. A word of caution is necessary at this stage however. Scholars have established that after an anomaly is discovered and market participants start to trade on it, the anomalies become annihilated (Schwert, 2003; Macquering *et al.,* 2006). In other words, if investors start to follow our advice *en masse,* prices will adjust instantly in response to annual report publication and future return predictability will disappear.

Appendix

Companies with the Corresponding Number of Annual Reports Included in the Sample

3i Group	7	Capita	6
3i Infrastructure	5	Carillion	6
Admiral Group	6	Carnival	6
Amec	6	Carpetright	7
Amlin	6	Catlin Group	6
Anglo American	6	Centrica	6
Antofagasta	6	Close Brothers Group	6
ARM Holdings	6	Cobham	6
Ashmore Group	5	Colt Group	6
Ashtead Group	7	Compass Group	6
Associated Brit.Foods	6	Computacenter	6
Astrazeneca	6	CRH	6
Aveva Group	7	Croda International	6
Aviva	6	CSR	6
Babcock Intl.	7	Daejan Holdings	7
BAE Systems	6	Dairy Crest	7
Balfour Beatty	6	De La Rue	7
Barratt Developments	6	Debenhams	5
BBA Aviation	6	Dechra Pharmaceuticals	6
Beazley	6	Diageo	5
Bellway	6	Dialight	6
Berendsen	6	Diploma	5
Berkeley Group Hdg.(The)	7	Dixons Retail	7
BG Group	6	Domino Printing Sciences	6
BHP Billiton	6	Drax Group	6
Big Yellow Group	7	Dunelm Group	5
Blackrock World Mng.	4	Electrocomp.	7
Bodycote	6	Elementis	6
Booker Group	6	Eurasian Natres.Corp.	4
Bovis Homes Group	6	Experian	5
BP	6	Fenner	6
Brewin Dolphin	6	Ferrexpo	5
British American Tobacco	6	Fidessa Group	6
British Land	7	First Group	7
British Sky Bcast.Group	6	Fresnillo	4
Britvic	6	G4S	6
BT Group	7	Galliford Try	6
BTG	7	Genus	6
Bunzl	6	GKN	6
Burberry Group	7	Glaxosmithkline	6
Bwin Party Digital Entm.	6	Glencore Xstrata	1
Cable & Wireless Comms.	7	Go-Ahead Group	6

Grainger	6	Menzies (John)	6
Great Portland Estates	7	Michael Page Intl.	6
Greene King	7	Millennium & Cpth.Htls.	6
Greggs	6	Mitchells & Butlers	6
Halfords Group	7	Mitie Group	7
Halma	7	Mondi	4
Hammerson	6	National Express	6
Hansteen Holdings	6	National Grid	7
Hargreaves Lansdown	4	Next	7
Hays	6	Oxford Instruments	7
Henderson Group	6	Paragon Gp.Of Cos.	6
HICL Infrastructure	6	Paypoint	6
Hikma Pharmaceuticals	6	Pearson	6
Hiscox	6	Pennon Group	7
Hochschild Mining	5	Persimmon	5
Home Retail Group	6	Petrofac	6
Homeserve	7	Phoenix Group Hdg. (Lon)	2
Howden Joinery Gp.	6	Polar Capital Tech.Tst.	7
Hunting	6	Premier Farnell	7
ICAP	7	PZ Cussons	7
Ictl.Htls.Gp.	6	Qinetiq Group	6
IG Group Holdings	6	Randgold Resources	6
IMI	6	Rank Group	5
Imperial Tobacco Gp.	6	Rathbone Brothers	6
Inchcape	6	Reckitt Benckiser Group	6
Informa	6	Redrow	6
Inmarsat	6	Reed Elsevier	6
Intermediate Capital Gp.	7	Regus	6
Interserve	6	Renishaw	7
Intertek Group	6	Rentokil Initial	6
Invensys	7	Resolution	3
IP Group	6	Restaurant Group	6
ITE Group	6	Rexam	6
ITV	5	Rightmove	6
Jardine Lloyd Thompson	6	Rio Tinto	6
Kazakhmys	6	RIT Capital Partners	7
Kcom Group	7	Rotork	6
Kenmare Res. (Lon)	6	RPC Group	7
Kier Group	6	RPS Group	6
Kingfisher	7	Sabmiller	7
Ladbrokes	6	Sage Group	6
Lonmin	6	Salamander Energy	5
MAN Group	7	Savills	6
Marks & Spencer Group	7	Schroders	6
Meggitt	6	Segro	6

Senior	6	Telecity Group	4
Serco Group	6	Telecom Plus	7
Severn Trent	6	Tesco	7
Shaftesbury	6	Travis Perkins	6
SIG	6	Tullett Prebon	5
Smith & Nephew	6	Tullow Oil	6
Smiths Group	6	UBM	6
Soco International	6	Ultra Electronics Hdg.	6
Spectris	6	Unilever (UK)	6
Spirax-Sarco	6	Vedanta Resources	7
Spirent Communications	6	Victrex	6
Sports Direct Intl.	5	Vodafone Group	7
SSE	7	Weir Group	6
SVG Capital	6	WH Smith	6
Synergy Health	7	Whitbread	7
Tate & Lyle	5	William Hill	6
Taylor Wimpey	5	WPP	6
Ted Baker	6		

Note: Listed in this table are companies included in the sample, together with the corresponding annual reports.

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Table I
Variable Definitions

Variable	Definition
Returns	Continuously compounded return on the company during the (1,250) window relative to the annual report publication date.
Certainty	This variable increases in the frequency of the words falling into the categories related to tenacity, levelling, collectiveness and insistence, while decreasing in the frequency of words related to numerical terms, ambivalence, self-reference and variety.
Activity	This variable increases in the frequency of the words falling into the categories related to aggression, accomplishment, communication and motion, while decreasing in the frequency of words related to cognitive terms, passivity and embellishment.
Optimism	This variable increases in the frequency of the words falling into the categories related to praise, satisfaction and inspiration, while decreasing in the frequency of words related to blame, hardship and denial.
Realism	This variable increases in the frequency of the words falling into the categories related to familiarity, spatial awareness, temporal awareness, present concern, human interest and concreteness, while decreasing in the frequency of words related to past concern and complexity.
Commonality	This variable increases in the frequency of the words falling into the categories related to centrality, cooperation and rapport, while decreasing in the frequency of words related to diversity, exclusion and liberation.
Beta	CAPM beta estimated prior to the annual report dissemination date by regressing the excess return on the company against the excess return on the stock market index. FTSE350 is taken as a proxy for the market index and the 3-month UK LIBOR as a proxy for the risk-free rate.
Size	Natural log of a firm's market capitalization at the end of the fiscal year for which the annual report was prepared.
Book-to-Market	Book value per share divided stock price at the end of the fiscal year to which the annual report refers.
Earnings_Surprise	Change in earnings per share from the previous year (denominated in pounds) divided by the stock price recorded at the end of the fiscal year.
Δ%Sales	Percentage change in sales (year-to-year).
ΔLeverage	Change in the financial leverage, where the leverage is calculated as total liabilities over total assets.

Table II
Summary Statistics

Variable	Mean	Standard Deviation	25th Percentile	Median	75th Percentile
Returns	0.0303	0.4293	-0.1649	0.0794	0.2673
Certainty	46.9951	6.4305	43.9725	48.6600	51.4300
Activity	49.4721	2.1897	48.4500	49.6000	50.6800
Optimism	50.1768	1.3238	49.5500	50.1300	50.9000
Realism	43.2468	2.2368	42.3900	43.3800	44.2500
Commonality	53.1077	2.5162	51.8200	52.9550	54.3000
Beta	0.9115	0.4053	0.6480	0.8710	1.1356
Size	14.2887	1.4543	13.3070	14.0363	15.0170
Book-to-Market	0.5932	0.7756	0.2316	0.3975	0.7531
Earnings_Surprise	-0.0187	0.4641	-0.0114	0.0079	0.0263
Δ%Sales	0.0878	0.2610	0.0075	0.0800	0.1660
ΔLeverage	-0.0051	0.1015	-0.0420	-0.0046	0.0289

Note: The variable definitions are provided in Table I.

Table III
Pearson Correlations between the Key Variables in the Study

	Returns	*Certainty*	*Activity*	*Optimism*	*Realism*	*Commonality*
Returns	1.0000					
Certainty	0.0183	1.0000				
Activity	0.0910***	0.2947***	1.0000			
Optimism	0.0229	0.2312***	-0.0336	1.0000		
Realism	0.0543*	0.2052***	-0.0323	0.0688	1.0000	
Commonality	0.0325	0.2082***	0.0465	0.1599	0.0274	1.0000

Note: This table presents Pearson correlation coefficients between the key variables utilized in our study. Definitions of the variables can be found in Table I. *, **, *** denote the statistical significance at 10%, 5% and 1%, respectively.

Table IV
Regressions Linking Stock Returns and Characteristics of Annual Report Narrative

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-2.0751***	-1.3066***	-1.5650**	-0.8830**	-1.4286**	-0.8341**
	(0.6329)	*(0.3637)*	*(0.6436)*	*(0.3802)*	*(0.6435)*	*(0.3814)*
Certainty	-0.0027		-0.0029		-0.0027	
	(0.0021)		*(0.0021)*		*(0.0021)*	
Activity	0.0197***	0.0174***	0.0196***	0.0170***	0.0196***	0.0173***
	(0.0058)	*(0.0055)*	*(0.0058)*	*(0.0054)*	*(0.0058)*	*(0.0054)*
Optimism	0.0099		0.0092		0.0077	
	(0.0095)		*(0.0094)*		*(0.0094)*	
Realism	0.0121**	0.0110***	0.0120**	0.0106**	0.0106*	0.0093*
	(0.0055)	*(0.0054)*	(0.0055)	*(0.0053)*	*(0.0055)*	*(0.0054)*
Commonality	0.0043		*0.0032*		0.0031	
	(0.0049)		*(0.0049)*		*(0.0049)*	
Beta			-0.0123	-0.0134	-0.0203	-0.0213
			(0.0300)	*(0.0299)*	*(0.0301)*	*(0.0300)*
Size			-0.0291***	-0.0289***	-0.0289***	-0.0288***
			(0.0084)	*(0.0084)*	*(0.0084)*	(0.0084)
Book-to-Market			0.0666***	0.0669***	0.0583***	0.0589***
			(0.0157)	(0.0157)	*(0.0175)*	*(0.0175)*
Earnings_Surprise					-0.0341	-0.0335
					(0.0294)	*(0.0293)*
Δ%Sales					0.0439	0.0421
					(0.0460)	*(0.0459)*
ΔLeverage					0.1941	0.2016
					(0.1233)	*(0.1231)*
Adj. R-squared	0.9197%	0.9277%	3.4651%	3.4819%	3.7725%	3.8306%
F-statistic	3.3411	6.9037	6.6356	10.0622	5.4087	7.1590
Prob(F-stat)	0.0053	0.0010	0.0000	0.0000	0.0000	0.0000

No. Obs.	1262	1262	1257	1257	1238	1238

Note: Reported in this table are estimates of regressions where the continuously compounded return on company's stock over the 250 trading days following the annual report disclosure is taken to be the dependent variable. Standard errors of the fitted regression coefficients are reported in parentheses. The first five explanatory variables relate to the linguistic content of the annual report narrative, while the remaining indicators act as controls. The precise definitions of the variables are given in Table 1. *, **, *** denote the statistical significance at 10%, 5% and 1%, respectively.

Table V

Risk and the Linguistic Measures

Panel A. Determinants of Total Volatility						
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	3.7654***	2.3717***	3.1295**	2.1143**	3.0627**	2.1079**
	(1.4528)	*(0.8919)*	*(1.4575)*	*(0.9113)*	*(1.4722)*	*(0.9299)*
Certainty	0.0075		0.0070		0.0064	
	(0.0046)		*(0.0045)*		*(0.0046)*	
Activity	-0.0265*	-0.0191	-0.0253*	-0.0182	-0.0245*	-0.0181
	(0.0144)	*(0.0136)*	*(0.0142)*	*(0.0134)*	*(0.0145)*	*(0.0137)*
Optimism	-0.0066		-0.0063		-0.0065	
	(0.0205)		*(0.0201)*		*(0.0204)*	
Realism	-0.0062	-0.0020	-0.0062	-0.0020	-0.0060	-0.0024
	(0.0123)	*(0.0119)*	*(0.0121)*	*(0.0117)*	*(0.0123)*	*(0.0119)*
Commonality	-0.0162		-0.0096		-0.0089	
	(0.0114)		*(0.0112)*		*(0.0114)*	
Beta			0.5031***	0.5078***	0.5110***	0.5153***
			(0.0691)	*(0.0689)*	*(0.0700)*	*(0.0698)*
Size			-0.0039	-0.0055	-0.0028	-0.0040
			(0.0184)	*(0.0183)*	*(0.0186)*	*(0.0185)*
Book-to-Market			-0.0145	-0.0173	-0.0115	-0.0142
			(0.0351)	*(0.0350)*	*(0.0398)*	*(0.0397)*
Earnings_Surprise					0.0216	0.0214
					(0.0646)	*(0.0644)*
Δ%Sales					-0.0138	-0.0069
					(0.0985)	*(0.0982)*

ΔLeverage					0.1288	0.1212
					(0.2774)	*(0.2768)*
Past_Vola	0.4000***	0.4009***	0.3348***	0.3344***	0.3293***	0.3289***
	(0.0250)	*(0.0250)*	*(0.0263)*	*(0.0263)*	*(0.0269)*	*(0.0268)*
Adj. R-squared	16.9912%	16.9195%	20.3530%	20.3656%	19.7757%	19.8265%
F-statistic	43.9171	86.3980	36.5768	54.4066	26.3694	34.9345
Prob(F-stat)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. Obs.	1259	1259	1254	1254	1236	1236

Panel B. Determinants of Idiosyncratic Volatility

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	3.3973***	2.3725***	3.3147**	2.3335***	3.2696**	2.3978***
	(1.2767)	*(0.7845)*	*(1.3075)*	*(0.8195)*	*(1.3220)*	*(0.8371)*
Certainty	0.0073*		0.0070*		0.0063	
	(0.0040)		*(0.0040)*		*(0.0041)*	
Activity	-0.0298**	-0.0225*	-0.0293**	-0.0223*	-0.0291**	-0.0229
	(0.0127)	*(0.0120)*	*(0.0127)*	*(0.0120)*	*(0.0130)*	*(0.0123)*
Optimism	-0.0042		-0.0043		-0.0040	
	(0.0180)		*(0.0181)*		*(0.0183)*	
Realism	-0.0084	-0.0040	-0.0075	-0.0033	-0.0080	-0.0044
	(0.0108)	*(0.0104)*	*(0.0108)*	*(0.0105)*	*(0.0110)*	*(0.0107)*
Commonality	-0.0113		-0.0111		-0.0097	
	(0.0100)		*(0.0100)*		*(0.0102)*	
Size			0.0019	0.0004	0.0029	0.0018
			(0.0164)	*(0.0163)*	*(0.0166)*	*(0.0165)*
Book-to-Market			-0.0194	-0.0222	-0.0207	-0.0232
			(0.0313)	*(0.0312)*	*(0.0355)*	*(0.0355)*
Earnings_Surprise					0.0028	0.0031

					(0.0580)	*(0.0579)*
Δ%Sales					-0.0029	0.0097
					(0.0885)	*(0.0883)*
ΔLeverage					0.0240	0.0162
					(0.2490)	*(0.2485)*
Past_Vola	0.4198***	0.4196***	0.4216***	0.4214***	0.4173***	0.4170***
	(0.0246)	*(0.0246)*	*(0.0248)*	*(0.0248)*	*(0.0253)*	*(0.0253)*
Adj. R-squared	18.9478%	18.8829%	18.9432%	18.9013%	18.0650%	18.0794%
F-statistic	50.0144	98.6149	37.6038	59.4063	25.7539	35.0697
Prob(F-stat)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
No. Obs.	1259	1259	1254	1254	1236	1236

Note: Panel A of this table models the standard deviation of daily returns in the (1,250) window relative to the annual report disclosure date (Day 0). This standard deviation has been expressed in percentage terms. The explanatory variables used here are described in Table I, with the exception of *Past_Vola* which is defined as the return standard deviation in the (-250,-1) window. Panel B, on the other hand, examines the determinants of idiosyncratic volatility measured in the (1,250) timeframe. Idiosyncratic volatility is taken to denote the standard deviation of the CAPM regression residuals and *Past_Idio_Vola* is its realization in the 250 trading days prior to the disclosure date. Standard errors of the parameter estimates are given in parentheses. *, **, *** denote the statistical significance at 10%, 5% and 1%, respectively.