

## Hedge Fund Voluntary Disclosure

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### ABSTRACT

We study the contents and determinants of voluntary financial disclosures using a proprietary dataset of 3,234 letters sent by 434 hedge funds to their investors during the years 1995–2011. Contrary to the hedge fund industry’s reputation for public opacity, we document that hedge fund managers voluntarily disclose in their private investor letters a wide array of quantitative and qualitative information about fund returns, risk exposures, holdings, benchmarks, performance attribution and future prospects. We also find that variations in hedge fund disclosures across letters and over time are consistent with at least one prediction made by each of four theories of voluntary disclosure: proprietary costs, adverse selection and moral hazard, self-interested managers and regulatory pressure. We conclude that in an almost wholly unregulated setting, the voluntary quantitative and qualitative disclosures provided by managers to investors can be complex and reflect the interplay of multiple economic forces.

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Keywords: Voluntary financial disclosures; hedge funds; investor letters

## I. INTRODUCTION

We investigate the contents and determinants of voluntary financial disclosures using a proprietary dataset of 3,234 letters sent by 434 hedge funds to their investors during 1995–2011. Our work is motivated by the argument that hedge funds differ from other settings that have been analyzed in the disclosure literature, such as corporate management earnings forecasts, in three economically distinct ways that allow us to shed new light on the frequency and types of financial information that managers choose to disclose and the determinants of those choices.

First, hedge funds are all but unregulated and are exempt from the securities laws that mandate other investment vehicles make disclosures about their performance, operations and risk to their investors and/or the public (Oesterle, 2006). As such, and in contrast to SEC registrants, hedge funds' disclosures are almost completely voluntary<sup>1</sup> and are only made privately to existing or potential investors, not to the public. Second, the regulatory exemptions enjoyed by hedge funds create acute information asymmetries between hedge fund managers and investors, leading to magnified agency costs and heightened incentives toward self-serving manager behavior. Lastly, we propose that hedge funds face higher proprietary costs than do firms because whereas it can take years for competitors to exploit confidential information about a firm's products, services or intellectual property, a hedge fund can incur immediate and large losses if a competitor learns its investment strategy, performance or positions from the fund's disclosures (Aragon, Hertzels and Shi, 2013; Agarwal, Jiang, Tang and Yang, 2013).

The data we employ in our study are proprietary and consist of a random sample of the letters received by a large fund-of-hedge-funds investor during 1995–2011 from 434 hedge funds run by 265 management companies. A fund-of-hedge-funds is an investment vehicle whose portfolio consists of shares in a number of individual hedge funds, and a management company is the legal entity (typically an LLC in the U.S.) that provides limited liability to the founding investment manager(s) and that allows him to manage multiple funds under one legal entity. Using this novel dataset, we document the types of disclosures that fund managers make in their investor letters and seek to explain variation in those disclosures across letters and over time. To do so, in each letter we hand-code 39 different data items into 1/0 indicators that record whether

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<sup>1</sup> As we discuss more fully in Section II, the only mandatory disclosure potentially required is that hedge fund management companies (rather than any single fund per se) with \$100+ million of assets must disclose their long equity holdings at the end of each quarter in a Form 13F filed with the SEC.

the data item is present in the letter. Of the data items, 30 are quantitative and nine are qualitative. We also record the length of the letter and whether it is monthly or quarterly in its reporting frequency. Specific examples of the data items that we coded are the fund's assets under management, its most recent periodic return, whether that return is shown in a table or the text, whether a distribution of prior returns is displayed, whether the percent of assets held short is reported, whether a return benchmark is identified, whether manager skill is mentioned, and whether future fund performance is discussed.

The first result we highlight from our analysis is that contrary to the industry's reputation for public opacity, in their private letters to investors hedge funds frequently choose to disclose a rich array of quantitative data in tabular and chart format about fund returns, risk exposures, asset holdings and benchmarks, together with text-based qualitative discussions of fund performance and the fund's investment environment. On average, letters are 3.3 pages long and contain 8.9 quantitative and 2.8 qualitative disclosures.

Second, we find that monthly letters are disproportionately more common than quarterly letters and that monthly letters are more focused on quantitative rather than qualitative information. These results are consistent with investors caring more about and demanding information on the level and risk of fund returns, and that such quantitative data is more rapidly supplied by funds at a monthly rather than a quarterly reporting frequency. We observe that 82% of letters are monthly and 15% are quarterly and that monthly (quarterly) letters are significantly more tilted toward quantitative (qualitative) disclosures.

Third, we contrast the detailed sets of disclosures made by hedge funds in their investor letters with the conventional measures for disclosure used in prior hedge fund research (Aiken, Clifford and Ellis, 2013; Agarwal, Fos and Jiang, 2013). The conventional measures are whether a fund reports its returns to a commercial database (a proxy for voluntary disclosure), and whether a fund's management company files a Form 13F with the SEC (a measure of whether mandated disclosures are required). We find that the conventional proxy for voluntary disclosure by hedge funds is directionally correct for most disclosure categories, but when the type of voluntary disclosure being proxied for pertains to return performance or asset holdings, the conventional proxy is biased in that its sign is the opposite of what is expected. With regard to mandated disclosure, we show that the rich information voluntarily provided by fund managers is generally a substitute for rather than a complement to the sparse data that is required in SEC

Form 13F filings for most hedge funds in our sample.

Fourth, we develop and test the discriminatory predictions made by four theories of voluntary disclosure concerning how the cross-section and time-series of categories of investor letter disclosures vary as a function of the level and riskiness of fund returns. The four theories address the economic impacts on hedge fund disclosure of proprietary costs, adverse selection and moral hazard, self-interested fund managers and regulatory pressure. Because some of information items in investor letters are highly correlated (e.g., whether the fund reports returns to the short and to the long sides of its portfolio), we reduce the 39 disclosures into five disclosure category scores by summing within a given letter the number of disclosures made in each category. Five categories pertain to the quantitative data that funds provide about the fund and its return performance, asset holdings, risks and benchmarks, while the fifth covers qualitative disclosures. We then test the predictions made by the proprietary costs, adverse selection and moral hazard, self-interested fund managers and regulatory pressure theories of financial disclosure by regressing each of the quantitative and qualitative disclosure category scores on the fund's most recent return per its investor letter, a measure of the riskiness of that return, calendar time and the two conventional proxies for hedge fund disclosure.

Our regression results indicate that variation in hedge fund disclosures across letters and over time is consistent with at least one prediction from each theory of voluntary disclosure. Consistent with managers seeking to avoid incurring proprietary costs, we observe that better performing funds disclose less quantitative information about their return performance and their asset holdings in monthly letters, where the threat of losses from competitors (or the fund's own investors) replicating the fund's proprietary strategies is greater than it is in less timely quarterly letters. Consistent with managers seeking to reduce costs arising from adverse selection and/or moral hazard for their investors, we find that worse return performance and riskier returns are associated with more qualitative disclosures about fund performance in quarterly letters. Consistent with self-interested behavior on the part of fund managers, we document that riskier funds disclose less quantitative information about assets under management, fund risks, asset holdings and return performance in quarterly letters. And consistent with fund managers responding to regulatory pressure from the SEC to disclose more timely, credible and reliable information, we observe that funds disclose more quantitative and less qualitative data over time, especially in their monthly letters.

Beyond illustrating the richness in both the contents and determinants of hedge funds disclosures, our study contributes to the debate about the optimal level of regulation for hedge funds. Regulators such as the SEC consider public disclosure to be an integral method of protecting investors and have over time proposed and enacted several regulatory changes that increase the mandatory filings and disclosures by hedge funds (Smith, 2006a, 2006b; Oesterle, 2006). The hedge fund industry has argued that funds should instead privately follow best practice standards that give consideration to the particular characteristics and circumstances of each fund (MFA, 2009; WGFM, 2008). While prior research focuses on the effects of mandatory public filings by hedge funds to regulatory authorities (Brown, Goetzmann, Liang and Schwarz, 2008) and on the choice to report monthly fund returns to a commercial database (Aiken, Clifford and Ellis, 2013; Agarwal, Fos and Jiang, 2013), we show that funds already voluntarily disclose far more information to their investors than has been appreciated by researchers and/or regulators, and the determinants of their disclosure choices require consideration of multiple economic forces—proprietary costs, adverse selection, moral hazard, self-interested managers and regulatory pressure. In particular, we do find that consistent with hedge funds responding to regulatory pressure by the SEC, hedge funds have over time voluntarily made their disclosures to their investors more quantitative and less qualitative.

## **II. SAMPLE OF HEDGE FUND INVESTOR LETTERS**

### **Sample selection**

We obtained confidential access to a proprietary database of the letters that were sent by hedge fund managers to their investors from a single large fund-of-hedge-funds (FOHF). We accessed the FOHF's database on December 10, 2011. As of that date, the FOHF's database contained 1,249 Microsoft Windows folders. We randomly chose 522 folders and determined that they contained a total of 3,234 usable investor letters sent over the period 1995–2011 by 434 hedge funds run by 265 management companies.<sup>2</sup>

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<sup>2</sup> We acknowledge that our sample may not generalize to the hedge fund industry as a whole. However, the FOHF is sophisticated with a large amount of capital under management and a long track record. Its track record provides us with a lengthy time-series of consistently obtained data where the FOHF investor acts as its own control.

## **Descriptive statistics**

In Figures 1.A–1.C, we illustrate the types and contents of the investor letters in our sample. In each letter we replaced the true identities of the fund(s), management company and fund manager(s) with fictitious alternates. The letters are chosen to illustrate monthly versus quarterly letters and to show the range and depth of quantitative and qualitative information that hedge funds often provide, richness that we seek to capitalize on in our empirical tests of the predictions from competing theories of disclosure later in the paper. Figure 1.A is an example of a short monthly letter that contains only terse quantitative information. In contrast, the quarterly letter in Figure 1.B is longer and far more qualitatively oriented. Lastly, Figure 1.C is an example of a compact letter that contains a large amount of high quality information—mainly but not wholly quantitative—using text, tables, graphics and statistics.

Table 1 presents descriptive statistics on the investor letters and the funds that issued them. Panel A tabulates the reporting frequencies of letters together with the number of pages per letter, letters per fund and funds per management company. We expect that monthly letters will be disproportionately more common than quarterly letters because investors care most about the level and risk of fund returns and such quantitative information is more rapidly provided at the monthly rather than quarterly reporting frequency. Consistent with this prediction, 82% of investor letters are issued monthly and 15% are issued quarterly, making the actual ratio of monthly to quarterly letters of 5.5 almost double that of the 3.0 ratio otherwise expected. Investor letters are on average 3.3 pages long, with the maximum length being 37 pages.

Panel B tabulates letters by fund investment strategy. Sampled funds span a broad range of investment strategies, with long/short equity being the most prominent. Panel C tabulates funds by their year of inception, and letters by the year they were written. The modal year that funds started is 2005, and most letters were written and sent to investors after 2000. Lastly, for monthly and quarterly letters panel D presents distributional statistics for the most recent return reported in the investor letters. The mean returns for both letter frequencies annualize to approximately 12% per year, slightly above the annual returns found in other hedge fund studies (e.g., Lo, 2008, Tables 2.2 and 5.2).

## Quantitative and qualitative information items disclosed in hedge fund investor letters

### *Detailed disclosures in investor letters*

Despite the hedge fund industry's reputation for secrecy and public opacity, the examples provided in Figures 1.A–1.C suggest that hedge fund investor letters contain a rich variety of quantitative and qualitative information along the lines of that suggested by industry best practice guidelines (MFA, 2009; WGF, 2008). We therefore move to systematically measure the number and types of disclosures in our sample of 3,234 investor letters.

Given the richness of the textual, tabular, graphic and numeric data available, we balanced the volume of items coded and the detail with which they were coded against the time-intensive nature of the hand-coding task. Implementing this tradeoff led us to code up a total of 39 items in each letter, 30 of which are quantitative and 9 of which are qualitative. Items are coded as binary 1/0 indicators that record the presence or absence of the disclosure in the letter.

In Table 2 we present a detailed listing of the disclosure items that were coded, together with the frequency with which each is present in the 3,234 investor letters. We place each disclosure into one of six categories, the first five of which are quantitative in nature: *Fund-related*, *Return Performance*, *Asset Holdings*, *Risk* and *Benchmarks*. The sixth category, *Text-Based Discussions*, we define as being qualitative because the disclosures it contains mostly pertain to textual commentaries about fund performance.

In Table 2 we separately tabulate the frequency of quantitative and qualitative disclosures by monthly and quarterly reporting frequency based on our earlier reasoning for why we expected monthly letters to be disproportionately more common than quarterly letters—namely that investors care most about the level and risk of fund returns, and such quantitative data are more rapidly provided via monthly letters. By extension, we also propose that since quarterly letters are less amenable to focusing on the immediate past, they provide fund managers a way to contextualize historical fund returns and discuss the potential for future fund performance. As such, while we expect monthly letters to contain more quantitative than qualitative information, we predict the reverse for quarterly letters.

In addition to the frequency of a given disclosure (the % letters column), we report the percentage of disclosures that change from letter to letter within our sample—either from not disclosing to disclosing an item (the % + column) or from disclosing to not disclosing an item



(the % – column).<sup>3</sup> We do so to estimate the degree to which funds' disclosure choices are sticky over time, expecting that the desire by fund managers to avoid the costs of supplying frequently changing sets of disclosure items, combined with demand from investors to avoid the costs of having to determine afresh with every letter whether the set of disclosures changed or not and why, will lead to letter-to-letter disclosures being persistent, and more so for quantitative than for qualitative disclosures.

We note several results in Table 2. First, panel A shows that the frequency with which quantitative items are disclosed in letters varies widely across disclosure categories and across items for a given periodicity, and across periodicities for a given disclosure category and item. Not surprisingly, the most common disclosure is the fund's most recent return which is provided in 98% of monthly letters and 98% of quarterly letters. The least common disclosure is information about flows into or out of the fund, which is shown in just 0.5% of monthly and 0.4% of quarterly letters. Investor letters commonly provide a breakdown of the fund's investment positions, including the percentage of the fund's portfolio invested in long positions (69% in monthly letters and 64% in quarterly letters), in short positions (67% and 62%), by industry sector (45% and 23%), by geographic region (30% and 11%), and by market capitalization (14% and 11%). Dimensions of the fund's historical risk, such as the fund's distribution of past returns, volatility of past returns and the Sharpe ratio of past returns are also often reported, but much more so in monthly than in quarterly letters. The correlation between the fund's returns and those of a benchmark is shown in 36% of monthly and 17% of quarterly letters, with performance being more commonly reported as benchmarked in quarterly rather than monthly letters regardless of whether the benchmark is a hedge fund index, a large market index, or some other more specialized benchmark.

Within the set of qualitative text-based disclosures tabulated in panel B, as in panel A we find a large range in the frequency with which the nine text-based disclosures are reported in letters, with frequencies varying across categories and items given periodicity, and across periodicities for any given category or item. For both monthly and quarterly letters, the three most common qualitative disclosures are displaying the most recent return in a table, displaying the most recent return in the text and a qualitative discussion of performance. Also commonly

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<sup>3</sup> To calculate a change in disclosure a fund must have at least two letters at the specified reporting frequency, which reduces the number of letters for which changes can be calculated to 2,269 monthly and 368 quarterly letters.

provided to investors are discussions of the future and discussions that connect fund performance to fund manager skill. The least frequent disclosure is making reference to peer funds.

Third, as expected we find that monthly letters contain significantly more quantitative information than do quarterly letters, but that the reverse is true for qualitative information. From panel A, the mean frequency of quantitative disclosures is 31% in monthly letters as compared to 25% in quarterly letters, with the mean paired difference of 5.8% being significantly positive ( $t$ -statistic = 2.1). In contrast, from panel B the mean frequency of qualitative disclosures is 29% in monthly letters as compared to 43% in quarterly letters, with the mean paired difference of -14.2% being significantly negative ( $t$ -statistic = -2.4).

Lastly, we observe that as expected, the letter-to-letter persistence in which items fund managers disclose is high, and higher for quantitative than qualitative disclosures, with the mean percentage of disclosures that change from letter to letter ranging from 0.8% (panel A, monthly letters, % - column) to 5.6% (panel B, quarterly letters, % + column).

Overall, we interpret the results in Table 2, together with our detailed reading of many the letters, as indicating that hedge fund managers on average prefer to meet investors' demand for 'hard' quantitative information in monthly letters and reserve their communication of 'softer' qualitative data more for quarterly letters, and that the choices that fund managers make about which information items to disclose are highly persistent at the letter-to-letter level.

#### *Comparisons to conventional sparse proxies for disclosures by hedge funds*

Given the number and richness of the disclosures shown in Table 2, we compare investor letter disclosures to the two conventional and sparse proxies that have been used in hedge fund research. These are the 1/0 dummy variables that indicate [1] whether a fund reports its returns to one or more hedge fund commercial databases, denoted *commercial*, and [2] whether a fund's management company files a Form 13F with the SEC (Aiken, Clifford and Ellis, 2013; Agarwal, Fos and Jiang, 2013), denoted *SEC13F*. *SEC13F* measures mandatory disclosure by hedge funds, whereas *commercial* is a proxy for whether a hedge fund makes voluntary disclosures. In Appendix A we detail the numerous ways in which, as suggested by Table 2, the information that is privately and voluntarily disclosed in hedge fund investor letters is incremental to what is publicly mandated to be reported in Form 13F filed with the SEC, and to what is reported in commercial hedge fund databases.

We first assess the unbiasedness of *commercial* as a proxy for voluntary disclosure by hedge funds by comparing *commercial* with the information funds disclose in their investor letters.<sup>4</sup> We propose that *commercial* is an unbiased proxy for how much information hedge funds disclose voluntarily if at the fund level the mean scores of all six disclosure categories—*Fund-related*, *Return Performance*, *Asset Holdings*, *Risk*, *Benchmarks* and *Text-Based Discussions*—are larger when *commercial* = 1 than when *commercial* = 0.

We report the mean disclosure category scores by *commercial* in Table 4. Panel A shows that 272 of the 434 funds in our sample disclosed their monthly returns to one or more of the Hedge Fund Research (HFR), Lipper-TASS, BarclayHedge or Morningstar commercial databases.<sup>5</sup> Panel B presents mean disclosure category scores by *commercial*. Contrary to what would be expected if *commercial* was an unbiased proxy for voluntary disclosure by hedge funds, we observe that mean disclosure scores are reliably lower when *commercial* = 1 than when *commercial* = 0 for two of the six disclosure categories, *Return Performance* and *Asset Holdings* (*t*-statistics on differences in means are -5.4 and -9.7, respectively). The conventional proxy for voluntary disclosure by hedge funds is therefore severely biased when the type of voluntary disclosure being proxied for pertains to return performance or asset holdings. This bias illustrates that there may be benefits to future research using multiple and more detailed measures of particular kinds of disclosure to proxy for the quantity and type of information voluntarily disclosed by hedge funds in place of the single coarse and sparse conventional proxy.

We also assess the relations between *SEC13F* and mean disclosure category scores (at the management company rather than the fund level because Form 13F filing requirements apply to management companies, not funds). We do not seek to assess the unbiasedness of *SEC13F* as a proxy for mandatory disclosure, because we assume that all management companies that should legally file Form 13Fs do indeed file Form 13Fs. Rather, we use the relations between *SEC13F* and mean disclosure category scores to estimate whether certain types of voluntary disclosures in hedge fund investor letters are compliments or substitutes to hedge funds' mandated disclosures.

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<sup>4</sup> We choose this approach over other ways to evaluate *commercial* because it is empirically testable. For example, commercial databases charge subscription fees and it would therefore have to be the case that investors pay a third party to find out the performance of their investment in a hedge fund. Also, the returns reported to the commercial databases are owned by the reporting hedge fund and hedge funds sometimes remove or overwrite reported returns (Patton, Ramadorai, and Streatfield, 2015). In contrast, a letter provides an investor with a timely and permanently unalterable record of reported performance.

<sup>5</sup> We are grateful to Andrew Patton and Tarun Ramadorai for providing us with data on which funds in our sample are present in the BarclayHedge or Morningstar commercial databases.

We do so cautiously, however, because Form 13Fs are only mandated to be filed by hedge fund management companies with \$100+ million of assets. SEC13F is therefore positively correlated with the total amount of assets under management by management companies, which in turn is positively correlated with the size of any single fund, even though a single management company may have multiple funds within it.

As noted by Balakrishnan, Li and Yang (2013), the relation between mandatory and voluntary disclosure is ambiguous. On the one hand, Gigler and Hemmer (1998) argue that mandatory reporting of financial information plays a confirmatory role where voluntary disclosure solves agency problems, making the two complements. Likewise, LaFond and Watts (2008) argue that verifiable quantitative information about a firm's current performance provides a benchmark that enable qualitative information to generate credible data about otherwise unverifiable gains. On the other hand, literature inspired by Verrecchia (1983, 1990) suggests that voluntary and mandatory disclosures can be substitutes. For example, when managers are only willing to disclose a fixed quantity of information, the more that is satisfied by mandated channels the less will be supplied voluntarily.

We report mean disclosure category scores by *Sec13F* in Table 5, noting that panel A shows that 140 of the 265 management companies in our sample filed a Form 13F. Panel B presents mean disclosure category scores by *SEC13F*. Panel B indicates that three disclosure categories exhibit evidence consistent with mandatory and voluntary hedge fund disclosures being substitutes, one category is consistent with complements and one category shows no relation. Specifically, the number of voluntary disclosures made in the *Return Performance*, *Risk* and *Text-Based Discussions* disclosure categories are reliably lower when *SEC13F* = 1 than when *SEC13F* = 0 (*t*-statistics on differences in means are -2.7, -12.9 and -13.9, respectively); the number of voluntary disclosures made in the *Benchmarks* category is reliably higher when *SEC13F* = 1 than when *SEC13F* = 0 (*t*-statistic on difference in means is 7.5); and the difference in the number of voluntary disclosures made in the *Fund-related* and *Asset Holdings* categories when *SEC13F* = 1 is not significantly different than when *SEC13F* = 0 (*t*-statistics on differences in means are -1.7 and -1.3, respectively). We conclude that the rich information voluntarily provided by fund managers through their periodic investor letters is generally a substitute for rather than a complement to the sparse data that can be required by SEC Form 13F filings.<sup>6</sup>

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<sup>6</sup> As cautioned on p.11, we acknowledge that our evidence can also be interpreted as indicating that smaller hedge

### **III. THEORIES OF VOLUNTARY DISCLOSURE AS APPLIED TO HEDGE FUNDS**

In this section, we outline four theories of financial disclosure, connect each to the setting of hedge funds, and develop a set of discriminatory predictions about how the cross-section and time-series of various categories of investor letter disclosures vary as a function of the level and riskiness of fund return. The four theories address the economic impacts on hedge fund disclosure of proprietary costs, adverse selection and moral hazard, self-interested fund managers and regulatory pressure.

#### **Proprietary costs**

As emphasized by Verrecchia (2001), one of the most compelling reasons why firms may not voluntarily disclose both financial and nonfinancial information is the costs they can face from revealing proprietary data. We argue that hedge funds face higher proprietary costs than do firms because whereas it can take years for competitors to exploit confidential information about a firm's products, services or intellectual property, a hedge fund can incur immediate and large losses if a competitor learns its investment strategy, performance or positions from the fund's disclosures (Aragon, Hertzels and Shi, 2013; Agarwal, Jiang, Tang and Yang, 2013). Hedge fund investments are usually a bet on the fund manager's proprietary financial strategies and abilities (Edwards and Caglayan, 2001; Lo, 2008), with the result that by periodically disclosing the fund's investment positions or details about the sources of performance, the fund creates a risk that a competitor fund or even the fund's own investors will reverse engineer the fund's proprietary strategy (Aragon, Hertzels and Shi, 2013; Agarwal, Jiang, Tang and Yang, 2013). In the extreme, if the fund's strategy could be completely unraveled there would be little benefit to investing in the hedge fund and compensating the fund manager, because the investor could earn the same returns by replicating the investment strategy without paying the manager fees (SEC, 2003, p.20; WGFM, 2008, p.51). Fund managers therefore have incentives to limit disclosure in order to reduce the likelihood that their proprietary strategies are replicated.

Empirical evidence on the effects of proprietary costs of disclosure is somewhat limited and indirect (Healy and Palepu, 2001). Hayes and Lundholm (1996) argue that proprietary costs

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funds tend to voluntarily disclose more to their investors. One reason for this might be that investors in smaller funds demand more information be supplied to them by fund managers because smaller funds have less of a track record and/or are at higher risk of facing problems due to concentrated investors moving into or out of the fund.

lead firms to only provide disaggregated financial data when they have similarly-performing business segments. Brockman, Khurana and Martin (2008) find a negative relation between how far a manager-disclosed earnings forecast misses actual EPS and market-to-book, where market-to-book is used as a proxy for the intensity of the proprietary costs facing the firm.<sup>7</sup> One of the difficulties in traditional test settings is that the link between the information that reveals an organization's proprietary strategies and the information that it discloses is not necessarily strong. For example, how the disclosure of corporate earnings reveals proprietary information about product production is indirect at best (Guo, Lev and Zhou, 2004). For hedge funds, however, whose product is the stream of returns that they report, the link between the information disclosed by the fund and the strategy that is proprietary to the fund is strong.

Together with the difference in timeliness between monthly versus quarterly investor letters, we propose that the reasons provided as to why hedge funds face substantial risks of experiencing high proprietary costs lead to two predictions. We expect that [1] better returns will be associated with less disclosure by the fund in its investor letters because better returns indicate that the fund has a more valuable proprietary strategy to protect, [2] the relation will be more negative in monthly than in quarterly letters because monthly letters are more timely and contain more frequent disclosures and so have the potential to reveal more data about a fund's strategies.

### **Agency costs**

Agency costs arise prominently in hedge funds due to the principal-agent problem where managers are hired by investors to produce returns by investing as the investors' agent. Because investors cannot directly observe managers' actions, they bear costs ex-ante in expectation and/or ex-post in realization when they invest in hedge funds. We consider two sources of agency costs facing investors and develop predictions from each in the hedge fund setting.

### *Adverse selection and moral hazard*

The degree of information asymmetry between investors and hedge fund managers is

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<sup>7</sup> Also, Bamber and Cheon (1998) report that the managers of firms facing higher competition in their product markets are less likely to disclose a specific earnings forecast or an earnings forecast in a special press release or in an analyst meeting. Piotroski (2003) concludes that firms experiencing declining profitability and profitability that varies less across industry segments are less likely to voluntarily increase their segment disclosures. Berger and Hann (2007) find mixed evidence regarding the influence of proprietary costs on firms' incentives to provide voluntary disclosures about segment profits.

likely to be especially severe in the hedge fund setting for two reasons. First, hedge funds face no legal requirements to “level the informational playing field” with their investors (e.g., Regulation FD or listing requirements). Second, investors in hedge funds have less power to discipline the fund manager after they have made their investment than do investors in publicly traded companies. Unlike publicly traded firms where investors can discipline managers either indirectly by selling their shares or directly through action taken by the Board of Directors, hedge funds have no Boards of Directors and investors typically face an initial lock-up period of 3–12 months followed by minimum notice periods of 30–90 days. As a result, we argue that hedge fund managers face greater incentives to engage in selective disclosure than corporate managers. The lack of mandated financial transparency and lack of investor power to ex-post discipline fund managers raises the concern that fund managers will diverge from their stated investment strategy, fail to execute their strategy, or expropriate investors’ funds.

At the same time, the size of the potential agency costs facing investors means that the incentives for funds to reduce them are high. Two main mechanisms exist to achieve this goal. Funds can ex-ante signal their quality to prospective investors and thereby reduce the effects and costs of adverse selection by promising to and delivering on greater disclosure and transparency. Consistent with this mechanism, survey evidence suggests that additional position transparency is demanded to keep track of strategy drift and sector concentration to ensure funds are investing in the class of assets and investment style they claim to be investing in (SEC, 2003, p.49; DB, 2003). Alternatively, greater disclosure by hedge funds can reduce moral hazard costs because it provides greater opportunity to ex-post scrutinize fund managers.

Because hedge funds face high agency costs from adverse selection and/or moral hazard that can be reduced by funds voluntarily choosing to disclose financial information to investors, we predict that more disclosure in investor letters will alleviate agency concerns, particularly for poorly performing or riskier funds because investors are more likely to demand information more when the fund is doing poorly or is risky.<sup>8</sup> In addition, because a three-month return

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<sup>8</sup> We note that there are likely to be tradeoffs between different kinds of costs when fund performance is poor. On the one hand, a poorly performing fund faces strong incentives to explain to its investors why it is performing poorly because if it doesn’t its investors may assume that the reason is because the firm does not have a good investment strategy. If so, the fund’s investors may start pulling their money out of the fund with the fund then experiencing high exit costs. On the other hand, the fund may know that it truly has a strong proprietary investment strategy and that its poor performance is not representative of its expected future returns. If so, then the fund faces genuine proprietary costs if it explains its proprietary strategy to its investors in order to stem their redemptions.

aggregates three individual months worth of returns, we argue that a three-month return will be a less noisy and more precise indicator of truly poor performance or truly high risk than a one-month return. As such, we predict that worse returns and riskier returns will be more associated with greater disclosure in quarterly letters than in monthly letters.

#### *Self-serving hedge fund manager behavior*

Instead of seeking to take actions that reduce agency costs, fund managers may instead do the opposite and take actions that increase or exploit agency costs to their benefit. Among such actions, investor communications including but not limited to investor letters can be used to legitimize or hide improper fund manager actions and performance. Indeed, providing clear attribution of performance is encouraged as a best practice for hedge funds (MFA, 2009; WGFM, 2008, p.52). The concern that hedge fund managers will be more (less) forthcoming when performance is good (poor) underlies many of the SEC's deliberations and discussions in exchange listing guides (Lang and Lundholm, 1993, p.249). Consistent with the SEC's concerns, prior research found evidence of self-serving behavior by fund managers. Thus Bollen and Pool (2009, 2012) find that fund managers misreport returns to avoid reporting losses when such returns are not closely monitored, and that statistically suspicious patterns in a fund's returns predict subsequent legal or regulatory action. Agarwal, Daniel and Naik (2011) find that fund returns during December are significantly higher than those during the rest of the year even after controlling for risk in both time-series and the cross-section, while Patton, Ramodorai and Streatfield (2015) observe that funds' historical returns are routinely revised in commercial databases and that funds that do revise significantly and predictably underperform funds that never revised their performance histories.

Prior research into corporate disclosures indicates that the willingness of corporate management to disclose can be motivated by self-serving reasons. Miller (2002) finds increased disclosure during periods of increased corporate earnings, while Lang and Lundholm (1993) find that analysts perceive that firm disclosure is greater in years with a positive annual earnings surprise. Other research such as that in Jorgensen and Kirshenheiter (2003) finds that risky companies are more likely to withhold risk disclosures.

Applied to hedge funds, these forces lead us to propose that the self-serving fund manager hypothesis makes predictions that are the opposite of those based on fund managers



using disclosures to alleviate the problems of adverse selection and moral hazard. Specifically, if the disclosure decisions of hedge fund managers are driven by their own self-interest rather than the interests of investors, then we expect that better returns and less risky returns will be associated with more, not less, disclosure, and that these relations will be more pronounced in quarterly than in monthly letters.

### **Regulatory pressure**

The SEC has increasingly challenged the exceptions from mandatory disclosure provided to hedge funds. Over time, the SEC has sought to require hedge funds to disclose detailed quantitative and verifiable information about their holdings, operations and risk to regulators and investors, pressures that hedge funds have vigorously resisted (Eder, 2011). In 2004 the SEC adopted a rule that required most hedge funds to register under the Investment Advisers Act of 1940 (Brown, Goetzmann, Liang and Schwartz, 2008, 2012). Although the rule only mandated hedge funds with more than 14 clients, assets of at least \$25 million and a lockup period of less than two years to disclose via Form ADV detailed information about their internal compliance systems, not their operations or holdings, it was widely seen as a first step by the SEC toward achieving even greater oversight and regulation (George and Hwang, 2011). Ultimately the rule was negated by the U.S. Court of Appeals in 2006. Moving forward in time, the financial crisis of 2007–2008 gave regulators fresh impetus to seek to regulate hedge funds, this time under the banner of managing systemic risk, even though there was little empirical evidence that hedge funds materially contributed to the financial crisis (Brown, Green and Hand, 2012).

Most recently, in 2011 the SEC proposed that hedge funds based in the U.S. be mandated to make regular reports on their trading positions, counterparties and performance to a financial stability panel established under the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act. Since mid-2012, per Rule 204(b)-1 of the Advisers Act, hedge funds registered as advisors with the SEC must periodically file Form PF which requires managers to provide the SEC—but not investors in the fund nor the public—with information on exposure by asset class, counterparties, leverage, geographic concentrations, risk profiles, investor details, liquidity terms, strategies, turnover by asset class, stress test results and value-at-risk data.

The regulatory pressure exerted over time by the SEC aimed at requiring that hedge funds be more transparent and disclose more quantifiable, timely and verifiable information to their

investors, regulators and the public leads us to hypothesize that funds will seek to alleviate the pressure by privately and voluntarily supplying their investors with what the SEC publicly and mandatorily has sought to achieve. Specifically, we predict that over time, fund managers have in their investor letters supplied their investors with more quantitative and less qualitative information, particularly in monthly letters that are more timely than quarterly communications.

#### **IV. EMPIRICAL TESTS**

##### **Test methods**

We test the predictions made by the theories of disclosure in two ways: by describing the broad time-series evolution of funds' quantitative and qualitative disclosures, and by estimating multivariate panel regressions that seek to identify the determinants of funds' disclosures.

##### *Broad evolution of funds' disclosures over time*

We posited that if hedge fund managers over the past 20 years sought to lower the regulatory pressures exerted on them by the SEC, they will have done so by supplying their investors with more quantitative and less qualitative information, particularly in monthly letters.

Panel A of Figure 2 plots the annual averages of each of the five quantitative disclosure category scores over calendar time, while panel B does the same thing for the single qualitative disclosure category score. Inspection of panels A and B indicates that the number of quantitative disclosures rose over time while the number of qualitative disclosures fell. Statistically, four of the five quantitative disclosure category scores are reliably positively correlated with time and the qualitative disclosure category score is reliably negatively correlated with time. It is also the case that the correlation between the mean of the five quantitative disclosure category scores and the single qualitative disclosure category score is strongly negative.

In panels C and D of Figure 2, we plot the mean quantitative disclosure category scores against the qualitative disclosure category score separately for monthly versus quarterly letters. Inspection indicates that the time-series trends seen in panels A and B are driven by monthly letters, with no time trend apparent for qualitative disclosures in quarterly letters and only a weak trend for quantitative disclosures. For monthly letters the correlations between the mean quantitative disclosure category score and time, and between the qualitative disclosure category score and time, are 0.85 (p-value < 0.01) and -0.78 (p-value < 0.01). In contrast, in panel D the

correlation between the mean quantitative disclosure category scores and time is 0.78 (p-value < 0.01) while the correlation between the qualitative disclosure category score and time is -0.08 (p-value = -0.2). Based on the linear fitted values underlying these correlations, in monthly letters the number of quantitative (qualitative) disclosures made by hedge fund managers increases (decreases) by 1.4 (1.2), while in quarterly letters the number of quantitative (qualitative) disclosures increases (decreases) by just 0.5 (0.1).

Overall, we conclude that the findings indicated by Figure 2 support the regulatory pressure prediction in response to pressure from the SEC toward requiring more mandatory disclosure, hedge fund managers voluntarily supplied their investors with more quantitative and less qualitative information over time.

### *Multivariate regressions*

We next estimate regressions of the quantitative and qualitative disclosure category scores on a fund's most recent return in its investor letter, a measure of the riskiness of the return, calendar time and controls. We then compare the signs of estimated coefficients on our variables of interest with those predicted by the proprietary costs, adverse selection and/or moral hazard, self-interested fund managers, and regulatory pressure perspectives on disclosure. Because certain predictions vary across monthly versus quarterly letter frequency, we estimate regressions separately for monthly and quarterly letters.

The regressions take the following form:

$$disclosure\_score_{it} = \alpha + \beta_1 ret_{it} + \beta_2 ret_{it}^2 + \beta_3 time_{it} + \gamma controls_{it} + e_{it}, \quad (1)$$

where  $disclosure\_score_{it}$  is the score for a particular disclosure category for letter  $i$  at time  $t$ ,  $ret_{it}$  is a fund's most recent return as disclosed in investor letter  $it$ ,  $ret_{it}^2$  is a measure of the riskiness of the fund's returns and  $time_{it}$  is the number of months from January 1990 to the letter date.  $ret$  is standardized separately for monthly and quarterly letters to be mean zero and unit standard deviation. The controls are the dummy variables *commercial* and *SEC13F* from section II and *aum*, the natural log of fund assets-under-management.<sup>9</sup> Equation (1) is estimated using pooled

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<sup>9</sup> Only 25% of letters disclose the fund's assets under management. To avoid losing 75% of sample observations in our regressions, we fit a model of *aum* for those letters with *aum* and use the parameter estimates to estimate *aum* for letters that do not disclose *aum*. The estimated *aum* regression, which includes strategy fixed effects that are not reported below, is:

OLS with standard errors clustered by fund since many funds have multiple letters in the sample.

A summary of our predictions concerning the effects of fund returns, fund risk and time on fund disclosure within the framework of equation (1) is shown in Table 6. Reading across the four theories of disclosure we note that the sets of predictions for  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  are discriminatory in that they differ from each other. In terms of specifics, to recap our discussions in section III, we predict  $\beta_1 < 0$  if proprietary costs lead managers to restrict disclosure when return performance is good out of concern that their strategies will be revealed to competitors, and more so for disclosures in timely monthly than less timely quarterly letters. The predictions from the agency costs view depend on how managers respond to agency costs. If managers take actions that alleviate problems of adverse selection and moral hazard faced by their investors then we predict  $\beta_1 < 0$  ( $\beta_2 > 0$ ) because investors demand—and managers supply—more information when returns are poor (risky), and more so in quarterly letters because quarterly returns are more precise indicators of truly poor performance and risk than are monthly returns. Conversely, if managers respond to agency costs by taking actions that benefit themselves rather than their investors, then our predictions are the opposite: we predict  $\beta_1 > 0$  ( $\beta_2 < 0$ ) because managers want to hide information about returns when returns are poor (risky), and more so in quarterly letters since quarterly returns are more precise indicators of truly poor performance and risk than are monthly returns. Lastly, after controlling for the level and risk of fund performance, regulatory pressure predicts that funds will over time shift their disclosures away from being qualitative and toward being quantitative.<sup>10</sup>

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<i>commercial</i>	<i>SEC13F</i>	<i>time</i>	<i>time x time</i>	<i># obs.</i>	<i>Adj. Rsq.</i>
-1.62	0.99	0.19	-0.0005	836	95.5%
(-17.9)	(11.2)	(9.0)	(-8.6)		

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We note that the inferences from our main regressions are not sensitive to simply omitting *aum*.

<sup>10</sup> We make no sign predictions for the control variables. For *aum*, although larger funds mean larger raw demand by investors for disclosure, larger funds also have more to lose by disclosure. Because *SEC13F* measures mandated disclosure, we expect the coefficient on *SEC13F* to be positive if voluntary and mandated disclosures are complements, but negative if they are substitutes, and our theories of disclosure are silent as to which is the case. Likewise, because *commercial* is a proxy for the voluntary disclosures that funds make outside their investor letters, and what managers report in their investor letters could be either a complement to or a substitute for the sparser return information disclosed to commercial databases, we do not predict the sign of the coefficient on *commercial*.

## Regression results

Table 7 presents the results of estimating equation (1) at the most aggregate level by type of disclosure. In panel A the dependent variable is the average of the five quantitative disclosure category scores for a given letter, while in panel B the dependent variable is the letter's single qualitative disclosure category score. Each panel shows the results of two regressions: one using monthly letters and one using quarterly letters. We highlight four findings.

First, consistent with proprietary cost arguments that managers will reduce their disclosures when returns are strong since in such circumstances disclosures may reveal their proprietary strategies to competitors, particularly quantitative disclosures in monthly letters, in panel A the estimated coefficient  $\hat{\beta}_1$  is reliably negative for quantitative disclosures in monthly letters but is insignificantly different from zero in quarterly letters. The estimated coefficients in panel A on  $ret$  and  $ret^2$  indicate that a one standard deviation increase in them is associated with an average decrease of -0.25 and -0.20, respectively, in the number of quantitative disclosures provided by fund managers in their monthly letters.<sup>11</sup>

Second, consistent with managers seeking to mitigate the effects of adverse selection, we observe in panel B that for qualitative disclosures in quarterly letters  $\hat{\beta}_1$  is reliably negative,  $\hat{\beta}_{1M}$  is reliably more positive than  $\hat{\beta}_{1Q}$ ,  $\hat{\beta}_2$  is reliably positive and  $\hat{\beta}_{2M}$  is reliably smaller than  $\hat{\beta}_{2Q}$ . That is, in their quarterly but not monthly investor letters, managers act in investors' best interests by meeting their economic demand for more disclosure when returns are worse and when returns are riskier. The value of  $\hat{\beta}_{1Q}$  indicates that a one standard deviation increase in  $ret$  is associated on average with a reduction of -0.19 qualitative disclosures in quarterly letters.

Third, consistent with the self-interested fund manager view of agency theory, in panel A we find that  $\hat{\beta}_2$  is reliably negative for quantitative disclosures in both monthly and quarterly letters, but that  $\hat{\beta}_{2M}$  is reliably larger than  $\hat{\beta}_{2Q}$ . That is, in both their monthly and quarterly letters, but especially in their quarterly letters, managers disclose less quantitative information about fund risk when returns are poor. This finding adds to those of other studies that looked into and found evidence of self-serving behavior by fund managers, such as Bollen and Pool (2009,

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<sup>11</sup> For example, the decrease of -0.25 disclosure items relating to  $ret$  is the product of the coefficient -0.05 multiplied by 1.0 (because  $ret$  is standardized by letter periodicity to be mean zero and standard deviation of one) multiplied by five since the dependent variable is the average of the five quantitative disclosure category scores, each of which is the sum of between three and eight individual 1/0 disclosure items).

2012), Agarwal, Daniel and Naik (2011) and Patton, Ramodorai and Streatfield (2015).

Finally, consistent with funds responding to regulatory pressures to increase the amount of quantitative information they provide to their investors, and in a manner that is timely for investors, we observe in panel A that  $\hat{\beta}_3$  is reliably positive for quantitative disclosures in monthly and quarterly letters. While this result supports the view that the pressure brought by the SEC resulted in private benefits for hedge fund investors, it did not result in public benefits in that the greater amount of information supplied by funds was not publicly disclosed.<sup>12</sup>

Table 8 presents the results of estimating the same types of regressions as in Table 7 but where the average of the five quantitative disclosure category scores for a given letter are replaced with the individual scores for *Fund-related* (panel A), *Return Performance* (panel B), *Asset Holdings* (panel C), *Risk* (panel D) and *Benchmarks* (panel E). Inspection of panels A–E indicates that the aggregated results shown in panel A of Table 7 are driven by *Fund-related*, *Return Performance* and *Asset Holdings* disclosures, and to a lesser extent by *Risk* disclosures. In contrast, variation in *Benchmarks* disclosures are not explained by any of *ret*, *ret*<sup>2</sup> or *time*.

The results of our regressions in Tables 7 and 8 indicate that at the margin, hedge funds' disclosures in their investor letters reliably reflect the influences of all four disclosure theories. We argued earlier that the hedge fund setting can yield new insights into what for-profit entities choose to disclose to their investors, and the key determinants of those choices, because as compared to corporations, hedge fund disclosures are almost wholly private, unregulated and voluntary, and the economics of the hedge fund industry amplify the proprietary costs of disclosure, the problems of adverse selection and moral hazard stemming from information asymmetries, the incentives for self-serving behavior and regulatory pressures. In combination with our large dataset sourced from a single large investor, the in-depth binary coding of 30 quantitative and 9 qualitative disclosure items spanning both monthly and quarterly letters over a continuous 15-year period, and using both aggregated and more detailed test methods, we interpret our empirical evidence as supporting this claim.

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<sup>12</sup> We note that our tests do not address the possibility that the temporal changes in the quantitative and qualitative disclosures instead reflect the falling average returns earned by hedge funds as the hedge fund sector expanded and competed away the rents initially available to first movers (Getmansky, Lee and Lo, 2015).

## VI. CAVEATS, LIMITATIONS AND ROBUSTNESS

Although we provide new evidence on the contents and determinants of hedge fund disclosure, we acknowledge several caveats and limitations to our study. First, while we interpret the changes over time that we document in the number and types of hedge fund disclosure letters as being due to funds responding to increased regulatory pressure by the SEC, we grant that the same empirical facts could instead reflect changes in investors' demand for information, independent of the SEC. For example, as the hedge fund industry has grown over time and opportunities to earn alpha have declined, investors may have demanded more quantitative information from funds about their strategies, risks, returns etc.

Second, we recognize that the behavior of hedge fund managers with regard to financial disclosure decisions may not generalize to other types of managers such as those in public or private corporations. This is because the varied strength of the economic forces that influence disclosure choices in the hedge fund setting may lead to different outcomes in other setting.

Third, we note that disclosures through investor letters may not generalize to disclosures that are not typically contracted on, such as face-to-face meetings, telephone calls, video and texts, nor can we assess the importance of these types of disclosure as we have no data on them. Our inability to control for the effects of alternative disclosure channels could mean that there are omitted correlated variable biases present in and affecting our multivariate regressions.

Fourth, our results exhibit a reasonable degree of robustness in that untabulated analyses indicate that the tenor of our regression results remains unchanged if we include the lagged dependent disclosure variable in all of our analyses (most results get stronger), if we use the standard deviation of returns across a fund's sample letters as the measure of fund risk and if we estimate regressions at the fund level.<sup>13</sup>

Lastly, instead of relying on expert (researcher) judgment to classify disclosure items into categories, in untabulated analyses we applied latent trait analysis to quantitative versus qualitative disclosures and distilled funds' disclosures down to eight orthogonal disclosure factors: six quantitative and two qualitative factors.<sup>14</sup> Using these factors based on letting the

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<sup>13</sup> For example, after taking into account the much smaller number of fund-level observations than letter-level observations, our regression results are similar at the fund level to those shown in Tables 7 and 8.

<sup>14</sup> In the first step of extracting factors, we calculated a tetrachoric correlation matrix because all of the disclosures are binary (Lee, Poon and Bentler, 1995). We then used this matrix to extract factors from the disclosures using an unweighted least squares method, retaining only those factors with eigenvalues greater than one (0.5) for the

data speak instead of the disclosure category scores leads to similar inferences to those reported.

## VII. CONCLUSIONS

In this paper we study the contents and determinants of hedge funds' voluntary financial disclosure using a proprietary dataset of 3,234 letters sent by 434 funds to their investors during 1995–2011. While there is significant research on disclosure choices, we argue that the hedge fund setting offers several advantages relative to other settings that have been studied. Specifically, as compared to corporations, hedge fund disclosures are almost wholly private, unregulated and voluntary, and the economics facing hedge funds serve to amplify proprietary costs, information asymmetries, problems of adverse selection and moral hazard stemming information asymmetries, incentives for self-serving manager behavior and regulatory pressures.

Using 39 different data items hand-coded from the sampled investor letters, we document that contrary to the industry's reputation for public opacity, in their private letters hedge funds frequently voluntarily disclose a rich array of quantitative data in tabular and chart format about fund returns, risk exposures, asset holdings and benchmarks, together with text-based qualitative discussions of fund performance and the fund's investment environment. We also predict and find that monthly letters are disproportionately more common than quarterly letters and that monthly (quarterly) letters are more focused on quantitative (qualitative) disclosures.

We contrast the rich disclosures in hedge fund investor letters with conventional proxies for disclosure that have been used in prior hedge fund research. While we find that the conventional proxy for voluntary disclosure—namely, whether the fund reports its returns to one or more commercial databases—is directionally correct for most disclosure categories, but when the type of voluntary disclosure being proxied for pertains to return performance or asset holdings, the conventional proxy is directionally the opposite of what it should be.

Finally, we develop and test the predictions made by four theories of voluntary disclosure about how the cross-section and time-series of various categories of investor letter disclosures vary as a function of the level and riskiness of fund returns. The theories address the economic impacts on hedge fund disclosure of proprietary costs, adverse selection and moral hazard, self-interested fund managers and regulatory pressure, respectively, and our regression results

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quantitative (qualitative) disclosures. In the second step, we rotated the factors using the varimax procedure to uncover the latent traits within disclosures for interpretation (Bishop, Fienberg, and Holland, 1975; Loehlin, 1999).



indicate that variation in hedge fund disclosures across letters and over time is consistent with at least one prediction from each theory. For example, consistent with managers seeking to avoid incurring proprietary costs, we observe that better performing funds disclose less quantitative information about their return performance and their asset holdings in monthly letters where the threat of losses from competitors (or the fund's own investors) replicating the fund's proprietary strategies is greater than it is in less timely quarterly letters. Consistent with managers seeking to reduce costs arising from adverse selection and/or moral hazard for their investors, we find that worse return performance and riskier returns are associated with more qualitative disclosures about fund performance in quarterly letters. Consistent with self-interested behavior on the part of fund managers, we document that riskier funds disclose less quantitative information about assets under management, fund risks, asset holdings and return performance in quarterly letters. And consistent with fund managers responding to regulatory pressure from the SEC to disclose more timely, credible and reliable information, we observe that funds disclose more quantitative and less qualitative data over time, especially in their monthly letters.

Beyond illustrating the richness in both the contents and determinants of hedge funds disclosures, our study contributes to the debate about the optimal level of regulation for hedge funds. Regulators such as the SEC consider public disclosure to be integral in protecting investors and have over time proposed and enacted regulatory changes that increase the mandatory disclosures applicable to hedge funds. However, the hedge fund industry has argued that funds should instead privately follow best practice standards that give consideration to the particular characteristics and circumstances of each fund (MFA, 2009; WGFM, 2008). In contrast to prior research that has focused on the effects of mandatory public filings by hedge funds to regulatory authorities (Brown, Goetzmann, Liang and Schwarz, 2008) and on the choice to report monthly fund returns to a commercial database (Aiken, Clifford and Ellis, 2013; Agarwal, Fos and Jiang, 2013), we instead show that funds not only already voluntarily disclose far more information to their investors more than has been appreciated by researchers and/or regulators, but that the determinants of their disclosure choices require consideration of multiple economic forces—proprietary costs, adverse selection, moral hazard, self-interested managers and regulatory pressure. In particular, we find that consistent with hedge funds responding to regulatory pressure by the SEC, hedge funds have over time voluntarily made their disclosures to their investors more quantitative and less qualitative, especially in their most timely letters.

We conclude that our study into the voluntary disclosures made by hedge funds in their private letters to investors indicates that even in an almost wholly unregulated setting, the quantitative and qualitative information provided by managers to investors can be complex and reflect the interplay of multiple economic forces. As such, we expect there to be value in future research seeking to delve further into understanding the causes and consequences of hedge fund disclosures.

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## APPENDIX A

In this appendix we detail the ways in which the information that is privately and voluntarily disclosed in hedge fund investor letters is incremental to what is publicly mandated to be reported in Form 13F filed with the Securities and Exchange Commission (SEC) and to what is reported in commercial hedge fund databases.

### A.1 Form 13Fs

Also known as the Information Required of Institutional Investment Managers Form, a Form 13F is a filing that is required to be made quarterly with the SEC by institutional investment managers that use the U.S. mail (or other means or instrumentality of interstate commerce) in the course of their business, and exercise investment discretion over \$100 million or more in Section 13(f) securities.<sup>15</sup> Examples of such institutional investment managers may include insurance companies, banks, pension funds, investment advisers and broker-dealers. The Form 13F must be filed within 45 days of the end of each quarter. We illustrate the information contained in a typical Form 13F in Figure A.1 using the 11/6/15 filing made to the SEC's website by Birchview Capital, LP for its quarter ended 9/30/15.

We call attention to six ways in which we propose that the information in investor letters differs from that in a Form 13F.

1. Hedge fund letters are written at the fund level whereas 13F data are reported only at the management company level. Since 70 of our 265 management companies (26%) have multiple funds, an investor receiving a letter from a given fund is quite likely to have finer data available to her than that in the management company's 13F.
2. Management companies do not have to file a 13F unless it is required because they manage \$100 million or more of Section 13(f) securities. In contrast, even the smallest hedge fund communicates with its investors at least annually through a letter.
3. Management companies that do file a 13F only have to disclose a small and narrowly prescribed amount of historical, objective data, and then only for the Section 13(f) securities held by the fund.<sup>16</sup> In contrast, as we report in Tables 2 and 3, hedge fund letters often provide the investor with both backward- and forward-looking quantitative and qualitative information about Section 13(f) and non-Section 13(f) securities. The latter include futures, commodities, bonds and currencies, many of which represent the key assets of numerous fixed income, macro, emerging market and multi-strategy funds.

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<sup>15</sup> Section 13(f) securities are defined under Rule 13F-1(c) [17 CFR 240.13F-1(c)] and include equity securities that trade on an exchange (including the Nasdaq National Market System), certain equity options and warrants, shares of closed-end investment companies, and certain convertible debt securities. The Official List of Section 13(f) securities is published quarterly at <http://www.sec.gov/divisions/investment/13Flists.htm>.

<sup>16</sup> The Form 13F report requires disclosure of the name of the institutional investment manager that files the report, and, with respect to each section 13(f) security over which it exercises investment discretion, the name and class, the CUSIP number, the number of shares as of the end of the calendar quarter for which the report is filed, and the total market value. See <http://www.sec.gov/answers/form13F.htm>.

4. 13Fs do not disclose positions in stocks held shorts. As such, 13Fs do provide no indication of the fund's short bets or hedging activities, both of which are very often crucial aspects of the fund's investment strategies. In contrast, hedge fund letters frequently contain quantitative and qualitative data about individual and groups of assets held short by the fund.
5. 13F filings do not contain data about the leverage employed by the management company or any of its funds. This is sometimes provided in hedge fund letters.
6. The information contained in hedge fund letters is almost certainly timelier than that reported in the management company's 13F. Of letters in our sample, 85% are monthly reports as compared to the quarterly periodicity of 13F filings. Whereas in our sample fund investors receive their letters an average of 15 days after the end of the period being reported on, Brown and Schwarz (2013) report that the mean (median) delay between the end of the quarter and the date when 13F filings are available on Edgar is 40 (45) days. It is also the case that hedge fund managers are allowed to apply to the SEC for a delay in filing their 13F (Agarwal, Jiang, Tan and Yang, 2013), making even more stale the information in the 13F for the funds whose managers who obtain such exemptions from the SEC.

## **A.2 Commercial hedge fund databases**

There are several commercially available databases that hedge funds may choose to submit their returns to. The most important ones, and those that have been most widely used in academic hedge fund research, are HFR, Lipper-TASS, BarclayHedge, Morningstar, Eureka Hedge and CISDM.

We call attention to three ways in which the information disclosed in the hedge fund letters is incremental to what is reported in commercial hedge fund databases.

1. Some management companies choose not to submit data on any or all of their funds to commercial databases. Of the 434 hedge funds in our sample, 228 are not in one or more of the HFR, Lipper-TASS, BarclayHedge and Morningstar commercial databases (our updated approximation to the universe of commercial hedge fund databases). For such funds, the main source of information outside of any 13F filings, especially the fund's return performance, comes from investor letters.
2. Investors in a fund receive the fund's investor letter for free. In contrast, access to data in a commercial database requires that the investor purchase a subscription. Given the incomplete coverage provided by any single commercial database, such costs may be very large if the investor has investments in multiple funds and across multiple management companies.
3. Although hedge fund databases allow subscribers to calibrate the return performance of a fund against that of a variety of well established public and private benchmarks such as the S&P500 and the CSFB-Tremont HFI Long-Short Equity Index, hedge fund letters communicate incremental information to investors by telling them which if any benchmarks the fund manager calibrates the fund's performance against.

## FIGURE A.1

**Example of a Form 13F filing. The filer is Birchview Capital, LP and the 13F was filed on 11/6/15 for the quarter ended 9/30/15.**

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4			COLUMN 5		COLUMN 6	COLUMN 7	COLUMN 8		
			VALUE	SHRS OR	SH/	PUT/	INVESTMENT			OTHER	VOTING AUTHORITY	
NAME OF ISSUER	TITLE OF CLASS	CUSIP	(x\$1000)	PRN AMT	PRN	CALL	DISCRETION	MANAGER	SOLE	SHARED	NONE	
ACCELERATE DIAGNOSTICS INC	COM	00430H102	53,364	2,067,560	SH		SOLE		2,067,560	0	0	
ACCURAY INC	COM	004397105	811	120,300	SH		SOLE		120,300	0	0	
ADVAXIS INC	COM	007624208	724	35,600	SH		SOLE		35,600	0	0	
AEGERION PHARMACEUTICALS INC	COM	00767E102	873	46,000	SH		SOLE		46,000	0	0	
AGIOS PHARMACEUTICALS INC	COM	00847X104	378	3,400	SH		SOLE		3,400	0	0	
BIOGEN IDEC INC	COM	09062X103	404	1,000	SH		SOLE		1,000	0	0	
BIOLASE INC	COM	090911108	2,063	1,185,903	SH		SOLE		1,185,903	0	0	
CABOT OIL & GAS CORP	COM	127097103	662	21,000	SH		SOLE		21,000	0	0	
CALITHERA BIOSCIENCES INC	COM	13089P101	141	19,700	SH		SOLE		19,700	0	0	
CELGENE CORP	COM	151020104	84,782	732,553	SH		SOLE		732,553	0	0	
CELGENE CORP	RIGHT 12/31/2030	151020112	444	213,432	SH		SOLE		213,432	0	0	
CERUS CORP	COM	157085101	431	83,000	SH		SOLE		83,000	0	0	
COHERUS BIOSCIENCES INC	COM	19249H103	217	7,500	SH		SOLE		7,500	0	0	
COLLEGIUM PHARMACEUTICAL INC	COM	19459J104	1,405	78,768	SH		SOLE		78,768	0	0	
CONTINENTAL RESOURCES INC	COM	212015101	1,385	32,674	SH		SOLE		32,674	0	0	
CONTRAFECT CORP	COM	212326102	2,150	455,082	SH		SOLE		455,082	0	0	
ENCANA CORP	COM	292505104	896	81,300	SH		SOLE		81,300	0	0	
EQT CORP	COM	26884L109	3,359	41,300	SH		SOLE		41,300	0	0	
GILEAD SCIENCES INC	COM	375558103	2,186	18,670	SH		SOLE		18,670	0	0	
HANSEN MEDICAL INC	COM	411307101	4,832	5,281,438	SH		SOLE		5,281,438	0	0	
INSPIREMD INC	COM	45779A309	188	670,000	SH		SOLE		670,000	0	0	
MASIMO CORP	COM	574795100	1,418	36,600	SH		SOLE		36,600	0	0	
MEDIVATION INC	COM	58501N101	2,476	21,680	SH		SOLE		21,680	0	0	
MERCK & CO INC	COM	58933Y105	854	15,000	SH		SOLE		15,000	0	0	
MERRIMACK PHARMACEUTICALS INC	COM	590328100	523	42,300	SH		SOLE		42,300	0	0	
METABOLIX INC RESTRICTED	COM	591018809	7,638	2,263,169	SH		SOLE		2,263,169	0	0	
NXSTAGE MEDICAL INC	COM	67072V103	210	14,700	SH		SOLE		14,700	0	0	
ONCOMED PHARMACEUTICALS INC	COM	68234X102	1,321	58,689	SH		SOLE		58,689	0	0	
PETROQUEST ENERGY INC	COM	716748108	242	122,050	SH		SOLE		122,050	0	0	
PIONEER NATURAL RESOURCES CO (PXD)	COM	723787107	416	3,000	SH		SOLE		3,000	0	0	
PTC THERAPEUTICS INC	COM	69366J200	813	16,900	SH		SOLE		16,900	0	0	
PUMA BIOTECHNOLOGY INC	COM	74587V107	251	2,150	SH		SOLE		2,150	0	0	
QUIDEL CORP	COM	74838J101	894	38,975	SH		SOLE		38,975	0	0	
QUOTIENT LTD	COM	G73268107	269	18,200	SH		SOLE		18,200	0	0	
RAPTOR PHARMACEUTICAL CORP	COM	75382F106	726	46,000	SH		SOLE		46,000	0	0	
ROKA BIOSCIENCE INC	COM	775431109	396	152,307	SH		SOLE		152,307	0	0	
SOUTHWESTERN ENERGY CO	COM	845467109	2,193	96,483	SH		SOLE		96,483	0	0	
TORNIER NV	COM	N87237108	750	30,000	SH		SOLE		30,000	0	0	
TRANSITION THERAPEUTICS INC	COM	893716209	306	145,746	SH		SOLE		145,746	0	0	
VERMILLION INC	COM	92407M206	5,625	2,717,514	SH		SOLE		2,717,514	0	0	
XENCOR INC	COM	98401F105	270	12,300	SH		SOLE		12,300	0	0	



**TABLE 1: Descriptive statistics on the sample of hedge fund investor letters**

This table describes key attributes of the proprietary sample of 3,234 private letters sent by 434 hedge funds to their investors during 1995–2011. Panel A presents the distribution of letter periodicities, pages per letter, letters per fund and funds per management company. Panel B tabulates letters and funds by fund investment strategy. Panel C reports the number of investor letters by year of fund inception and by year of the performance discussed in the letter. Panel D reports the number of funds that voluntarily report to the HFR, Lipper-TASS, BarclayHedge or Morningstar commercial databases, and the number of management companies that file 13Fs with the SEC.

*Panel A: Hedge fund investor letter periodicities, pages per letter, letters per fund and funds per management company*

Periodicity	# letters	Percent		# pages per letter	# letters per fund	# funds per management company
Annual	26	0.8%	Min.	1	1	1
Semi-annual	24	0.7%	Q1	1	2	1
Quarterly	487	15.1%	Median	2	4	1
Monthly	2,639	81.6%	Mean	3.3	7.6	1.7
Biweekly	22	0.7%	Q3	4	9	2
Unknown	36	1.1%	Max.	37	58	16
Total	3,234	100.0%	Std.dev.	2.8	9.3	1.6

*Panel B: Hedge funds' investment strategies*

Strategy	# letters	# funds
Commodities	30	7
Convertible arbitrage	29	8
Emerging markets	82	12
Equity long bias	177	29
Equity long/short	1,525	188
Event driven	228	32
Fixed income	83	14
Macro	173	20
Multi-strategy	654	87
Unknown	253	37
Total	3,234	434

**TABLE 1 (continued)**

*Panel C: Number of sample hedge funds begun in each of the years 1990–2011 and the number of sample investor letters by sample period year*

Year	# funds begun in year	# letters	Year	# funds	# letters	Year	# funds	# letters
1990	2	0	1998	6	12	2006	24	339
1991	1	1	1999	8	2	2007	13	340
1992	1	0	2000	17	5	2008	16	372
1993	2	0	2001	28	77	2009	10	311
1994	2	0	2002	19	244	2010	5	275
1995	4	2	2003	28	242	2011	1	127
1996	10	2	2004	29	257	Unknown	170	7
1997	2	15	2005	36	604	Total	434	3,234

*Panel D: Distributional statistics on the most recent return reported by hedge funds in their investor letters (monthly and quarterly letters only)*

Reporting periodicity	# obs.	Mean	Std.dev.	Min.	P25	Median	P75	Max.
Monthly	2639	0.9%	4.1%	-42.0%	-0.5%	0.9%	2.5%	29.6%
Quarterly	487	3.0%	10.0%	-35.3%	-0.9%	2.7%	6.2%	75.5%

**Table 2: Frequency with which quantitative and qualitative information items are disclosed in hedge fund investor letters and the frequency of changes in disclosures**

This table presents the percentage of the 2,639 monthly and 487 quarterly letters that disclose particular quantitative and qualitative items of information (% letters), or change from not disclosing an item to disclosing it (% +) or from disclosing an item to not disclosing it (% -). To calculate a change in disclosure a fund must have at least two letters at the specified reporting frequency [2,269 monthly and 368 quarterly letters meet this criterion].

*Panel A: Frequency with which 30 quantitative items are disclosed in investor letters*

Quantitative disclosure <i>category</i> and item	Monthly letters M (2,639   2,269)			Quarterly letters Q (487   368)		
	% letters	% +	% -	% letters	% +	% -
<i>Fund-related</i>						
Management company AUM	22.0%	1.5%	1.1%	9.2%	2.7%	3.3%
Fund AUM	39.0%	1.4%	1.3%	9.0%	1.9%	3.0%
Net asset value	9.1%	0.3%	0.1%	0.2%	0.0%	0.3%
Fund flows	0.5%	0.0%	0.0%	0.4%	0.0%	0.3%
<i>Return Performance</i>						
Most recent return	97.0%	0.8%	0.8%	98.0%	0.8%	1.1%
Return(s) to long positions	27.0%	2.1%	1.7%	50.0%	2.7%	3.5%
Return(s) to short positions	26.0%	2.0%	1.7%	50.0%	3.0%	3.8%
Return(s) by industry sector	10.0%	0.5%	0.5%	9.2%	1.6%	1.4%
Return(s) by geography	5.7%	0.4%	0.2%	4.1%	0.0%	0.3%
Other return decomposition	40.0%	1.9%	1.5%	54.0%	3.0%	3.3%
<i>Asset Holdings</i>						
Percent held long	69.0%	1.0%	0.7%	64.0%	3.8%	4.1%
Percent held short	67.0%	0.9%	0.5%	62.0%	3.3%	3.3%
Percent by industry sector	45.0%	1.8%	1.4%	23.0%	3.0%	2.2%
Percent by geography	30.0%	1.1%	1.0%	11.0%	0.5%	0.5%
Percent by market capitalization	14.0%	1.2%	0.8%	11.0%	0.8%	0.8%
Identify best performing investment(s)	6.5%	1.7%	1.7%	7.6%	0.3%	0.5%
Identify worst performing investment(s)	3.9%	1.5%	1.4%	6.6%	1.6%	0.8%
Other holdings decomposition	25.0%	1.3%	1.1%	14.0%	2.2%	1.4%
<i>Risk</i>						
Historical returns	84.0%	0.6%	0.5%	61.0%	4.3%	5.2%
Distribution of returns	10.0%	0.3%	0.1%	0.8%	0.5%	0.5%
Volatility of returns	42.0%	1.4%	0.7%	14.0%	1.1%	1.4%
Worst month's return	18.0%	0.8%	0.5%	2.5%	1.6%	1.6%
Sharpe ratio	26.0%	0.8%	0.4%	7.8%	0.8%	0.8%
Correlation with benchmark	36.0%	1.4%	0.8%	17.0%	1.4%	2.2%
Downside risk	30.0%	1.2%	0.9%	4.7%	1.4%	2.2%
Information ratio	1.7%	0.1%	0.0%	0.6%	0.3%	0.0%
Other ratio	19.0%	0.3%	0.1%	1.0%	0.3%	0.5%
<i>Benchmarks</i>						
Identifies a benchmark	71.0%	1.1%	0.9%	83.0%	2.2%	1.6%
Identifies hedge fund index as a benchmark	9.4%	0.1%	0.3%	5.5%	1.1%	0.5%
Identifies large market index as a benchmark	41.0%	1.3%	1.0%	71.0%	1.9%	1.9%
Mean frequency of quantitative disclosures	30.8%	1.0%	0.8%	25.1%	1.6%	1.7%

**Table 2 (continued)**

	Mean	t-stat.
Difference in frequency of quantitative disclosures in M versus Q letters	5.8%	2.1
Difference in frequency of + changes in quantitative disclosures in M versus Q letters	-0.6%	-3.0
Difference in frequency of - changes in quantitative disclosures in M versus Q letters	-1.0%	-4.3
Difference in frequency of + versus - changes in quantitative disclosures in M letters	0.2%	6.8
Difference in frequency of + versus - changes in quantitative disclosures in Q letters	-0.1%	-1.5

*Panel B: Frequency with which 9 qualitative items are disclosed in investor letters*

Qualitative disclosure <i>category</i> and item	Monthly letters M (2,639   2,269)			Quarterly letters Q (487   368)		
	% letters	% +	% -	% letters	% +	% -
<i>Text-Based Discussions</i>						
Most recent return shown in the text	51.0%	2.2%	1.7%	77.0%	1.4%	1.9%
Most recent return shown in a table	91.0%	0.5%	0.4%	65.0%	1.6%	0.8%
Refers to changes in the fund or strategy	5.8%	2.6%	3.2%	33.0%	12.0%	13.0%
Discusses past performance	6.3%	3.0%	3.0%	18.0%	7.3%	6.3%
Discusses the future	30.0%	3.7%	3.3%	60.0%	4.6%	3.3%
Discusses performance as extreme	5.2%	3.2%	3.2%	13.0%	7.1%	6.0%
Refers to peer funds	2.3%	0.7%	0.6%	3.7%	1.9%	1.4%
Discusses manager skill related to performance	28.0%	6.8%	6.6%	50.0%	8.2%	7.3%
Discusses some other aspect of performance	43.0%	4.1%	4.0%	71.0%	6.0%	4.1%
Mean frequency of qualitative disclosures	29.2%	3.0%	2.9%	43.4%	5.6%	4.9%

	Mean	t-stat.
Difference in frequency of qualitative disclosures in M versus Q letters	-14.2%	-2.4
Difference in frequency of + changes in qualitative disclosures in M versus Q letters	-2.6%	-2.6
Difference in frequency of - changes in qualitative disclosures in M versus Q letters	-2.0%	-1.9
Difference in frequency of + versus - changes in qualitative disclosures in M letters	0.1%	0.8
Difference in frequency of + versus - changes in qualitative disclosures in Q letters	0.7%	2.2

**Table 3: Distributional statistics for disclosure category scores**

This table shows the number of disclosures made in investor letters by disclosure type (quantitative versus qualitative) and disclosure category (Fund-related, Return Performance, Asset Holdings, Risk, Benchmarks and Text-Based Discussions) across monthly and quarterly investor letters. Analysis covers the 39 disclosure items listed in Table 2.

*Panel A: Numbers of disclosures per disclosure category in monthly letters*

Disclosure type and <i>category</i>	Monthly letters						Max. feasible
	Distribution of numbers of disclosures by category						
	Min.	Q1	Median	Mean	Q3	Max.	
Quantitative:							
<i>Fund-related</i>	0	0	0	0.7	1	3	4
<i>Return Performance</i>	0	1	1	2.1	4	6	6
<i>Asset Holdings</i>	0	1	2	2.7	4	8	8
<i>Risk</i>	0	1	2	2.7	4	8	9
<i>Benchmarks</i>	0	0	1	1.2	2	3	3
Qualitative:							
<i>Text-Based Discussions</i>	0	1	3	2.6	4	7	9
Total disclosures	1	9	11	11.2	14	25	35

*Panel B: Numbers of disclosures per disclosure category in quarterly letters*

Disclosure type and <i>category</i>	Quarterly letters						Max. feasible
	Distribution of numbers of disclosures by category						
	Min.	Q1	Median	Mean	Q3	Max.	
Quantitative:							
<i>Fund-related</i>	0	0	0	0.2	0	3	4
<i>Return Performance</i>	0	1	3	2.7	4	6	6
<i>Asset Holdings</i>	0	0	2	2.0	3	7	8
<i>Risk</i>	0	0	1	1.1	1	7	9
<i>Benchmarks</i>	0	1	2	1.6	2	3	3
Qualitative:							
<i>Text-Based Discussions</i>	1	3	4	3.9	5	8	9
Total disclosures	2	9	11	11.2	14	23	35

**Table 3 (continued)**

*Panel C: Mean differences in the number of disclosures in monthly less quarterly letters*

<i>Disclosure type and category</i>	Mean diff.	t-stat.
Quantitative:		
<i>Fund-related</i>	0.5	12.7
<i>Return Performance</i>	-0.6	-8.0
<i>Asset Holdings</i>	0.6	7.1
<i>Risk</i>	1.6	15.2
<i>Benchmarks</i>	-0.4	-8.6
Qualitative:		
<i>Text-Based Discussions</i>	-1.3	-17.6
Total disclosures	0.0	-0.2

**TABLE 4: Mean disclosure category scores conditional on whether sample hedge funds report to one or more commercial databases**

This table describes the frequency with which sample hedge funds reports to a commercial database (*commercial* = *Yes* = 1) or not (*commercial* = *No* = 0) and the mean values of disclosure category scores conditioned on *commercial*.

*Panel A: Frequency with which hedge funds report to the HFR, Lipper-TASS, BarclayHedge or Morningstar commercial databases*

	Yes	Total # funds	% funds that disclose to a commercial database
Does fund disclose to the HFR, Lipper-TASS, BarclayHedge or Morningstar commercial databases?	272	434	63%

*Panel B: Mean disclosure category scores conditional on whether the fund reports to one or more commercial databases*

	<i>commercial</i> = Y = 1	<i>commercial</i> = N = 0	Y - N	<i>t</i> -stat.
Quantitative disclosure scores				
<i>Fund-related</i>	0.63	0.60	0.03	1.0
<i>Return Performance</i>	2.03	2.32	-0.29	-5.4
<i>Asset Holdings</i>	2.23	2.83	-0.59	-9.7
<i>Risk</i>	2.72	2.03	0.69	8.9
<i>Benchmarks</i>	1.37	1.15	0.22	6.9
Qualitative disclosure scores				
<i>Text-Based Discussions</i>	3.02	2.60	0.42	7.8

**TABLE 5: Mean disclosure category scores conditional on whether the management companies that overarch sample hedge funds file a Form 13F with the SEC**

This table describes the frequency with which the management companies that overarch sample hedge funds file a Form 13F with the SEC ( $SEC13F = Yes = 1$ ) or not ( $SEC13F = No = 0$ ) and the mean values of disclosure category scores conditioned on  $SEC13F$ .

*Panel A: Frequency with which the management companies that overarch sample hedge funds file a Form 13F with the SEC*

	Yes	Total # management companies (MCs)	% MCs that file a 13F
Does the management company file a Form 13F with the SEC?	140	265	53%

*Panel B: Mean disclosure category scores conditional on whether the management company that overarches one or more sample hedge funds files a Form 13F with the SEC*

	$SEC13F$ = Y = 1	$SEC13F$ = N = 0	Y - N	t-stat.
Quantitative disclosure scores				
<i>Fund-related</i>	0.60	0.65	-0.05	-1.7
<i>Return Performance</i>	2.10	2.25	-0.15	-2.7
<i>Asset Holdings</i>	2.47	2.55	-0.08	-1.3
<i>Risk</i>	2.02	3.01	-0.99	-12.9
<i>Benchmarks</i>	1.37	1.12	0.24	7.5
Qualitative disclosure scores				
<i>Text-Based Discussions</i>	2.53	3.28	-0.75	-13.9



**TABLE 6: Summary of the predictions made by voluntary disclosure theories for the determinants of disclosures made in hedge fund investor letters**

This table summarizes the signs predicted on the coefficients on a fund’s most recent return ( $ret_{it}$ ) as disclosed in investor letter  $i$  at time  $t$ , the riskiness of that return ( $ret_{it} \times ret_{it}$ ) and calendar time ( $time_{it}$ ) when all three independent variables are included in the OLS regression  $disclosure\_score_{it} = \alpha + \beta_1 ret_{it} + \beta_2 ret_{it} \times ret_{it} + \beta_3 time_{it} + \gamma controls_{it} + e_{it}$ , where the dependent variable  $disclosure\_score_{it}$  is the quantitative or qualitative disclosure category score of letter  $it$ .  $ret$  is standardized separately for monthly and quarterly letters to be mean zero and have unit standard deviation. The subscripts M and Q on  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  coefficients indicate that they are estimated using only monthly or quarterly letters, respectively.

Construct	Proxy used	Reporting periodicity	Theory of voluntary disclosure			
			Proprietary costs to fund managers and investors	Agency costs Adverse selection & moral hazard facing investors	Self-interested behavior by fund managers	Regulatory pressure from the SEC
Fund return	$ret$	Monthly	$\beta_{1M} < 0$	$\beta_{1M} < 0$	$\beta_{1M} > 0$	
		Quarterly	$\beta_{1Q} < 0$	$\beta_{1Q} < 0$	$\beta_{1Q} > 0$	
			$\beta_{1M} < \beta_{1Q}$	$\beta_{1M} > \beta_{1Q}$	$\beta_{1M} < \beta_{1Q}$	
Riskiness of fund return	$ret \times ret$	Monthly		$\beta_{2M} > 0$	$\beta_{2M} < 0$	
		Quarterly		$\beta_{2Q} > 0$	$\beta_{2Q} < 0$	
				$\beta_{2M} < \beta_{2Q}$	$\beta_{2M} > \beta_{2Q}$	
Calendar time	$time$	Monthly				$\beta_{3M} > 0$
		Quarterly				$\beta_{3Q} < 0$

**TABLE 7: Determinants of aggregated quantitative and qualitative disclosures**

This table reports the results of estimating pooled OLS regressions of hedge fund investor letters' aggregated quantitative and qualitative disclosure category scores on a fund's most recent return as disclosed in the investor letter ( $ret$ ), the riskiness of the return ( $ret^2$ ), calendar time ( $time$ ) and controls.  $ret$  is standardized separately for monthly and quarterly letters to be mean zero and unit standard deviation.  $time$  is the number of months from January 1990 to the letter date.  $aum$  is the natural log of assets under management.  $SEC13F$  is a 1/0 indicator equal to one if the management company files a Form 13F.  $commercial$  is a 1/0 indicator equal to one if the letter is from a fund that reports to the HFR, Lipper-TASS, BarclayHedge or Morningstar databases. Standard errors are clustered by fund.  $t$ -statistics are in **bold** font if they are greater than 1.95 in absolute magnitude for the independent variables  $ret$ ,  $ret^2$ , or  $time$ . \*\*, \*\*\* indicate that the monthly coefficient estimate is reliable different from the quarterly coefficient estimate at the 5% and 1% levels of significance for a two-tailed test.

*Panel A: Dependent variable = average of the five quantitative disclosure category scores*

	Monthly letters		Quarterly letters		
	Est. coef.	$t$ -stat.	Est. coef.	$t$ -stat.	
$ret$	<b>-0.05</b>	<b>-3.2</b>	0.03	0.9	
$ret^2$	<b>-0.01</b>	<b>-2.2</b>	<b>-0.04</b>	<b>-5.2</b>	***
$time$	<b>0.01</b>	<b>2.6</b>	<b>0.00</b>	<b>2.1</b>	
$aum$	-0.12	-1.6	0.00	0.1	
$SEC13F$	-0.12	-0.9	0.15	0.8	
$commercial$	-0.10	-0.6	-0.29	-1.8	
# letters	2,576		458		
Adj. R-squared	5.2%		13.7%		

*Panel B: Dependent variable = the single qualitative disclosure score*

	Monthly letters		Quarterly letters		
	Est. coef.	$t$ -stat.	Est. coef.	$t$ -stat.	
$ret$	-0.03	-1.1	<b>-0.19</b>	<b>-2.7</b>	**
$ret^2$	-0.02	-1.5	<b>0.03</b>	<b>2.4</b>	***
$time$	0.00	0.3	0.00	0.1	
$aum$	0.04	0.3	0.07	0.9	
$SEC13F$	-0.97	-4.5	0.07	0.2	
$commercial$	0.45	1.6	0.31	1.0	
# letters	2,576		458		
Adj. R-squared	12.9%		3.0%		

**TABLE 8: Determinants of disclosure scores for each individual disclosure category**

This table reports the results of estimating pooled OLS regressions of hedge fund investor letters' four individual quantitative disclosure category scores on the fund's most recent return disclosed in the investor letter ( $ret$ ), the riskiness of the return ( $ret^2$ ), calendar time ( $time$ ) and controls.  $ret$  is standardized separately for monthly and quarterly letters to be mean zero and unit standard deviation.  $time$  is the number of months from January 1990 to the letter date.  $aum$  is the natural log of assets under management.  $SEC13F$  is a 1/0 indicator equal to one if the management company files a Form 13F.  $commercial$  is a 1/0 indicator equal to one if the letter is from a fund that reports to the HFR, Lipper-TASS, BarclayHedge or Morningstar databases. Standard errors are clustered by fund.  $t$ -statistics are bolded if they are greater than 1.95 in absolute magnitude for the independent variables  $ret$ ,  $ret^2$ , or  $time$ . \*\*, \*\*\* indicate that the monthly coefficient estimate is reliable different from the quarterly coefficient estimate at the 5% and 1% level of significance for a two-tailed test, respectively.

*Panel A: Dependent variable = Fund-related disclosure category score*

	Monthly letters		Quarterly letters		
	Est. coef.	$t$ -stat.	Est. coef.	$t$ -stat.	
$ret$	-0.02	-1.2	0.05	0.7	**
$ret^2$	<b>-0.01</b>	<b>-2.0</b>	<b>-0.08</b>	<b>-4.2</b>	
$time$	0.00	-0.2	<b>-0.84</b>	<b>-2.1</b>	
$aum$	-0.04	-0.3	-0.16	-1.0	
$SEC13F$	0.05	0.3	0.62	1.4	
$commercial$	0.04	0.5	0.01	1.0	
# letters	2,576		458		
Adj. R-squared	0.2%		4.6%		

*Panel B: Dependent variable = Return Performance disclosure category score*

	Monthly letters		Quarterly letters		
	Est. coef.	$t$ -stat.	Est. coef.	$t$ -stat.	
$ret$	<b>-0.07</b>	<b>-2.4</b>	0.05	0.7	***
$ret^2$	<b>-0.03</b>	<b>-3.2</b>	<b>-0.08</b>	<b>-4.2</b>	
$time$	<b>0.01</b>	<b>4.0</b>	0.01	1.0	
$aum$	-0.29	-2.7	-0.16	-1.0	
$SEC13F$	-0.11	-0.5	0.62	1.4	
$commercial$	-0.55	-2.1	-0.84	-2.1	
# letters	2,576		458		
Adj. R-squared	6.7%		6.2%		

**TABLE 8 (continued)***Panel C: Dependent variable = Asset Holdings disclosure category score*

	Monthly letters		Quarterly letters		
	Est. coef.	<i>t</i> -stat.	Est. coef.	<i>t</i> -stat.	
<i>ret</i>	<b>-0.09</b>	<b>-2.7</b>	0.09	0.8	
<i>ret</i> <sup>2</sup>	0.01	0.4	-0.05	-1.8	***
<i>time</i>	0.01	1.6	<b>0.01</b>	<b>2.0</b>	
<i>aum</i>	-0.11	-0.7	-0.03	-0.3	
<i>SEC13F</i>	-0.05	-0.2	0.15	0.6	
<i>commercial</i>	-0.67	-1.9	-0.66	-1.9	
# letters	2,576		458		
Adj. R-squared	4.6%		9.3%		

*Panel D: Dependent variable = Risk disclosure category score*

	Monthly letters		Quarterly letters	
	Est. coef.	<i>t</i> -stat.	Est. coef.	<i>t</i> -stat.
<i>ret</i>	-0.06	-1.5	-0.01	-0.1
<i>ret</i> <sup>2</sup>	-0.02	-0.7	<b>-0.03</b>	<b>-2.4</b>
<i>time</i>	0.01	1.6	0.01	1.7
<i>aum</i>	-0.16	-0.8	0.03	0.3
<i>SEC13F</i>	-0.71	-1.9	-0.28	-0.9
<i>commercial</i>	0.53	1.1	-0.30	-1.1
# letters	2,576		458	
Adj. R-squared	7.0%		7.1%	

*Panel E: Dependent variable = Benchmarks disclosure category score*

	Monthly letters		Quarterly letters	
	Est. coef.	<i>t</i> -stat.	Est. coef.	<i>t</i> -stat.
<i>ret</i>	-0.01	-0.3	0.01	0.3
<i>ret</i> <sup>2</sup>	-0.01	-1.1	-0.01	-0.7
<i>time</i>	0.00	0.7	0.00	-1.0
<i>aum</i>	-0.08	-1.3	0.21	3.5
<i>SEC13F</i>	0.34	2.7	0.04	0.2
<i>commercial</i>	0.15	1.0	0.37	2.0
# letters	2,576		458	
Adj. R-squared	4.3%		15.9%	

## FIGURE 1.A

### Disguised example of a short quantitative monthly hedge fund investor letter

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**RED BRIDGE**  
ASSET MANAGEMENT LP



502 Burberry Street, Suite 701 | San Francisco, CA 92115  
Tel: 415.865.3758 | Fax: 415.865.3744

December 2009 Monthly Update

**Montrana Sound LP**  
Delaware Limited Partnership

2009	Montrana Sound	Russell 2000	NASDAQ	S&P 500
December	6.38%	8.05%	5.87%	1.93%
YTD	60.12%	27.17%	45.36%	26.47%

% Long	130.1%
% Short	24.8%
Fund AUM	\$32.3 million
Total Firm AUM	\$106.1 million

\* The information in this letter relates solely to the performance of Montrana Sound LP, which opened on February 10, 2003 with assets contributed by Red Bridge's principals. Returns for the indices (which Red Bridge obtained from publicly available sources) include reinvestment of dividend income, but do not reflect the deduction of any transaction or management costs. Index performance information is included solely to show market performance generally during the period for which returns are presented, and does not reflect a belief by Red Bridge that investing in an index is a viable investment alternative or is in any way comparable to the Fund's performance. Indices are unmanaged and diversified (across companies, industries and sectors). The Fund may concentrate its investments in relatively few stocks, industries, or sectors, may invest in stocks with smaller or larger market capitalizations, may trade actively, and may be more or less volatile than these indices. Returns for the Fund are net of transaction costs and investment management fees and reflect the subtraction of the performance-based allocation that would have been paid if a performance fee were payable as of the end of the relevant period. Fund returns do not reflect the deduction of the following Fund expenses: administration and audit fees, and organizational costs, all of which have been paid for by Red Bridge. Performance results include the reinvestment of all income. The performance data included in this report were not compiled, reviewed or audited by an independent accountant, and data may be adjusted as a result of a subsequent audit. It should not be assumed that recommendations made in the future will be profitable or will equal the performance set forth in this report. Individual account results may vary. Past performance is not indicative of future results. Investment losses are possible.

Sarah Kennett [skennett@redbridgelp.com](mailto:skennett@redbridgelp.com)

Yale Xiang [yxiang@redbridgelp.com](mailto:yxiang@redbridgelp.com)

FIGURE 1.B

Disguised example of a short qualitative quarterly hedge fund investor letter



**Quality Modulus Corporation**

558 Cedar Grove Extension • Sanford • North Carolina 28540  
Phone 704.652.1800 • Fax 704.652.1800 • Email qualmodcorp@mindspring.com

Sandy Smith  
President

April 8, 1999

Dear Investor,

For the quarter ended March 31, 1999, Quality Modulus was down approximately 2.4% net. As you know, the quarter saw the price of crude oil plummet to decade-low levels. As one measure of volatility, in the month of March the average daily net (not intraday) change in the oilfield service index, the OSX, was 2.3%, equivalent to the Dow moving up or down about 200 points every day. The oil service group for the quarter was the worst performing sector of the market - save the tobacco stocks. Some company.

On an inflation adjusted basis, the oil price collapse equaled historical low levels, comparable to the \$3 per barrel in 1972 and the low prices of the 1980's. Investing in energy at each of these periods provided the opportunity for excellent returns and I believe that the risk/reward of the group at present is compelling and look forward to the balance of the year for the following reasons:

1. Fundamentals - supply and demand: We do not expect the level of near term oil surplus to continue. A number of well-documented exceptional events have combined to cut short-term demand, most notably the recent severe Asian problems and the record mild winter. However, global demand for oil continues to grow and as the economies of southeastern Asia pick back up and with a more normal cooling and heating season in North America and Europe, we expect to see a heightened acceleration of demand. Current depletion rates and the absence of any significant shut in production (as opposed to the early 1980's) lead us to believe that meeting demand over the next several years will cause continued upward earnings momentum for oil service companies.

2. Commodity prices: While oil price volatility will doubtless continue, the recent price agreement between OPEC and non-OPEC countries underscores producers' commitment to get oil prices into the corridor where they have been trading in the 1990's. As investors become more convinced that a commodity price floor has been put in place, they will look beyond the very near term and focus instead on the growth and earnings for this group. This group should then represent an attractive investment opportunity, both on a relative and absolute basis. With all the attention focused on oil, the strong price of natural gas has escaped widespread notice. Gas futures for May are now trading around \$2.50 per mcf, despite the very mild winter and despite record levels of drilling activity. Gas prices at these levels will continue to spur strong production activity.



**Quality Modulus Corporation**

558 Cedar Grove Extension • Sanford • North Carolina 28540  
Phone 704.652.1800 • Fax 704.652.1800 • Email qualmodcorp@mindspring.com

Sandy Smith  
President

3. Valuation: As oil prices spiraled downwards, investors discounted the earnings of virtually all stocks in the sector, including those with less or little exposure to short term oil price fluctuations. These stocks include deep-water construction and drilling companies, seismic companies and the more gas related plays. While I am very encouraged by the outlook for the balance of the year, it is unclear how long the current Asian currency/economic and related commodity storms will last. Our approach for the coming quarter will continue to be to try and mitigate volatility while maintaining core positions in those stocks we feel have the best risk/reward profiles. As I look at the industry fundamentals, I am excited for opportunities ahead. At the same time, I feel that some patience and hedging is needed in the near term. Given some reasonable time and some commodity support, we should be well rewarded for investing in energy service.

As always, this letter is meant as an overview and I welcome your thoughts or questions.

Best personal regards.

Sandy Smith  
President

FIGURE 1.C

Disguised example of a monthly hedge fund investor letter containing both quantitative and qualitative information

Jazzan Capital Management  
 Five Times Square  
 Suite 119  
 New York, NY 10130  
 (212)223-3850

Global Bond Fund  
 June 2004  
 Performance Report  
 Page 1 of 2

FUND OBJECTIVE

The Fund seeks to produce attractive real rates of return by building the highest yielding portfolio of global fixed income securities with appealing low risk characteristics. The strategy utilizes the full spectrum of fixed income securities, and is specifically constructed to *outperform in steady or rising rate environments*. Moderate leverage and short selling are employed. The Fund has strictly adhered to its mandate for nine years. Jazzan Capital Management is an SEC registered investment advisor that serves as advisor to the Total Bond Fund.

RECENT PERFORMANCE – CURRENT STRATEGY

Treasuries rallied in the final hours of the quarter, making the short portfolio a slight drag on performance. The drivers of return were spread and income from a diversified portfolio of relatively high quality agencies, corporates and sovereign debt. Our belief is that the curve will flatten with long rates rising less than short rates from current levels. In June, the long portfolio consisted of 20% pass throughs, 40% investment grade credits, 20% emerging markets and 20% currency forwards. The Fund's short portfolio consists of select treasury & agency maturities skewed toward the short end of the curve. The strategy currently has a slightly positive net duration.

PERFORMANCE – NET

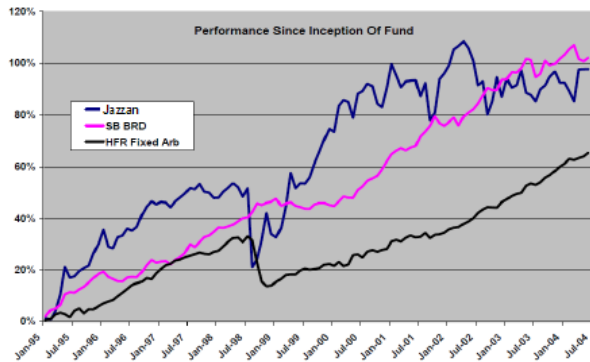
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
2004	-0.03%	-1.70%	-2.08%	6.68%	0.10%	0.16%							2.93%
2003	3.79%	-1.72%	0.58%	2.97%	-4.24%	-0.48%	-1.32%	2.67%	0.86%	1.74%	1.05%	-1.98%	3.68%
2002	1.58%	3.24%	0.69%	0.85%	-1.14%	-2.43%	-4.59%	0.77%	-6.63%	2.92%	5.14%	-3.80%	-4.01%
2001	4.87%	-2.22%	-2.13%	1.20%	0.19%	0.17%	-3.19%	2.88%	-7.54%	1.66%	7.21%	1.16%	3.48%
2000	-0.60%	5.87%	1.23%	-0.39%	-3.25%	5.38%	0.62%	1.63%	-0.54%	-3.53%	-0.67%	4.20%	9.87%
1999	-0.89%	2.74%	6.48%	8.83%	-3.74%	1.35%	-0.09%	1.66%	3.54%	2.84%	2.92%	2.51%	31.35%
1998	0.11%	1.66%	1.08%	1.21%	-0.97%	-2.39%	2.27%	-20.02%	2.59%	6.02%	8.11%	-5.77%	-8.79%
1997	0.76%	-0.09%	-1.20%	1.61%	1.09%	1.09%	1.47%	-0.32%	1.45%	-1.90%	-0.25%	-1.34%	2.30%
1996	4.13%	-4.73%	-0.47%	3.36%	0.46%	2.12%	-0.54%	1.12%	3.49%	2.34%	1.42%	-0.72%	12.27%
1995	1.34%	-0.57%	3.42%	6.25%	9.61%	-3.48%	0.56%	1.73%	1.07%	0.81%	4.10%	2.96%	30.86%

PERFORMANCE

Cumulative Return 109.7%  
 Compounded Ann Ret 8.11%  
 Mean Annual Ret 8.39%  
 Mean Mo Ret 0.72%  
 Median Mo Ret 0.95%  
 Percent Positive Mo.s 63.2%  
 Best Month 9.61%  
 Worst Month -20.02%

RISK

Monthly Std Dev 3.6%  
 Annualized Mo Std Dev 12.6%  
 Sharpe (5% RF) 0.27



Past performance is not necessarily indicative of future results.

Jazzan Capital Management  
 Five Times Square  
 Suite 119  
 New York, NY 10130  
 (212)223-3850

Global Bond Fund  
 June 2004  
 Performance Report  
 Page 2 of 2

KEY TERMS

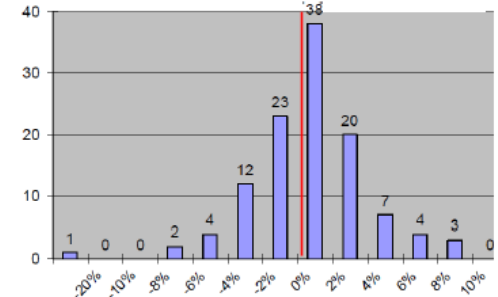
Jurisdiction	Bermuda, United States
Start Date	Oct. 1, 1996
Counsel	Conyers, Dill & Pearman, Bermuda Orrick Coudert, U.S.
Subscriptions	Monthly
Prime Broker	Merrill Lynch
Mgmt Fee	1.5%
Auditor	KPMG

Minimum	USD 1,000,000
AUM (6/30/04)	\$85.3M
Registrar & Transfer Agent	Meridian Corporate Services, Ltd. Bermuda
Withdrawals	Semi-annually
High Water Mark	Yes
Incentive Fee	20%
Lock Up	6 months

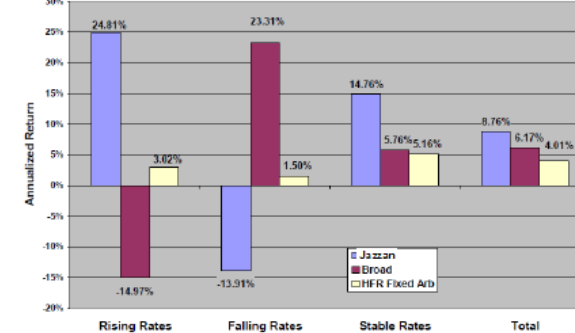
CORRELATION WITH NON-TRADITIONAL

Jazzan Global Bond Fund	1
HFRI Macro Index	0.3016
HFRI Convertible Arbitrage	0.4536
HFRI Distressed Securities	0.5728
HFRI Equity Market Neutral	0.0853
HFRI Event Driven	0.6930
HFRI Merger Arbitrage	0.5802
HFRI Short Selling	-0.4859
HFRI Equity Hedge	0.5622
HFRI Fixed Income Arbitrage	-0.0015
HFRI High Yield	0.5639
HFRI Fixed Income Convertible Bond	0.5621
HFRI Fixed Income Diversified	0.1439
HFRI Fixed Income Mortgage Backed	0.1229

Global Bond Fund - Distribution of Monthly Returns (Jan '95 - June '04)



Different Interest Rate Scenarios Post Long Term Capital (Sept '98 - June '04)



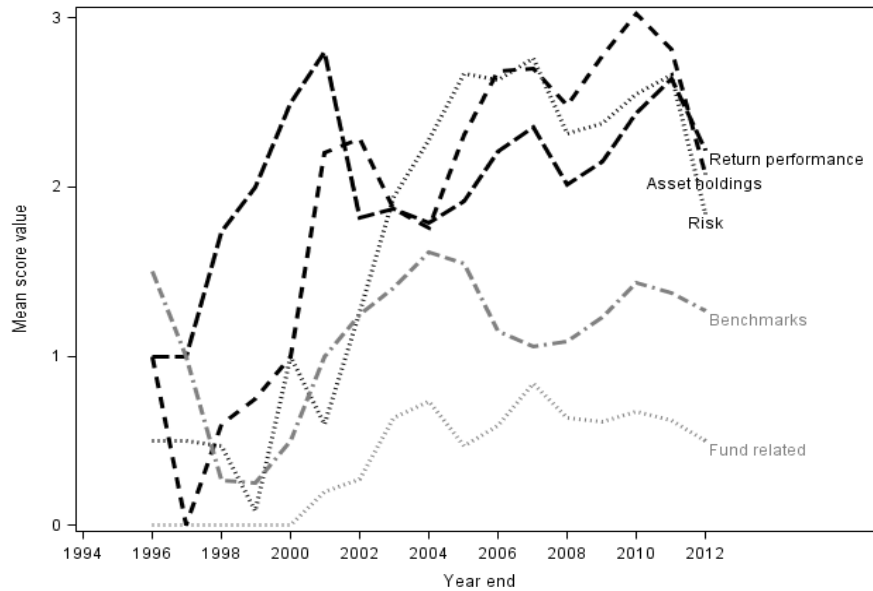
CORRELATION WITH TRADITIONAL STRATEGIES

Global Bond Fund	1
S&P 500	0.5351
Salomon Broad	0.0465
3 Month T-Bills	0.0889
High Yield	0.5354
Emerging Mrkt Bond	0.7428
Global Govt Invest Grd	-0.0047

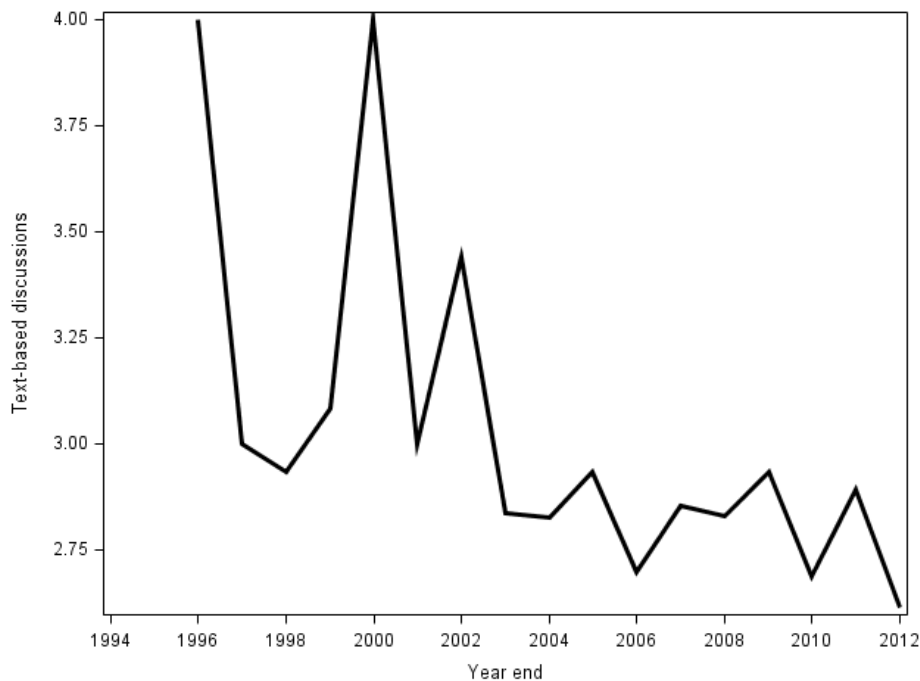
**FIGURE 2: Calendar time evolution of quantitative and qualitative disclosure scores**

This figure plots the evolution in calendar time of the four quantitative category scores and the one qualitative disclosure category score over the period 1995–2011. The yearly value of each score plotted is the mean across all sample letters in that year.

*Panel A: Calendar time plot of the five quantitative disclosure category scores*



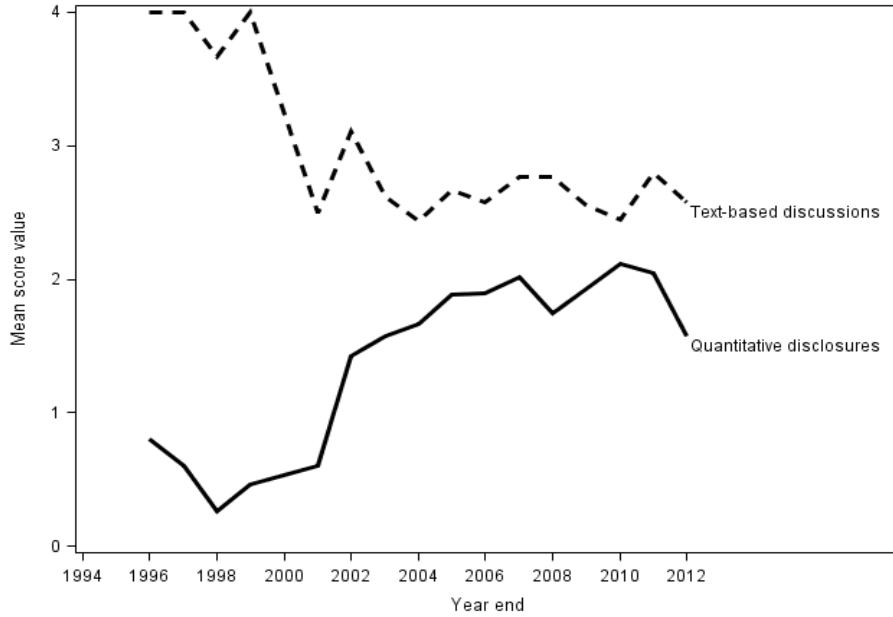
*Panel B: Calendar time plot of the qualitative disclosure category score*





**FIGURE 2 (continued)**

*Panel C: For monthly letters, calendar time plots of the mean of the five quantitative disclosure category scores against the qualitative disclosure category score*



*Panel D: For quarterly letters, calendar time plots of the mean of the five quantitative disclosure category scores against the qualitative disclosure category score. The series begin in 2003 due to the paucity of sample quarterly letters prior to 2003.*

