Taking a View:
Corporate Speculation, Governance and Compensation

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ABSTRACT

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Using a unique dataset from a well-known survey on derivatives use, this paper examines several questions about the use of derivatives to "take a view" on interest-rate and currency movements. Tests of what motivates firms to take a view suggest that firms view speculation as a profitable NPV activity. The data do not support other theories of "rational" speculation such as Campbell and Kracaw (1999). Firms "specialize" in taking a view on either interest rates or currency rates and specialization in FX contracts is positively related to the extent of the firm's foreign operations. We also examine the associations between speculation and compensation arrangements, governance structures, and internal control mechanisms. Compensation-related incentives of the CFO, but not the CEO, are associated with the likelihood that a firm actively takes derivatives positions. CFO portfolio deltas (vegas) positively (negatively) impact the probability of these activities. Moreover, firms with governance structures that allow for greater managerial power and indicate fewer shareholder rights are more likely to take a view. However, internal controls related specifically to derivatives use are more extensive for the firms that take a view, which suggests that transaction-specific controls are demand-driven. Finally, we examine whether investors using publicly available information in corporate disclosures could identify firms that openly admit to speculation in the confidential survey. The answer is that they cannot.

Taking a view: Corporate speculation and governance

I. Introduction

Derivative instruments can be used to "hedge" market risk exposures, generally implying positions in financial contracts are taken with the intention of reducing risk in some measure. Derivatives also can be used to "speculate" on movements in the value of the underlying asset. In this case, derivative positions are generally undertaken with the intention of increasing risk or making a profit and not necessarily to mitigate risk. While extant theoretical and empirical academic literature has advanced our understanding about why firms should and do use derivatives to hedge,[1] relatively little is known about the firms' use of derivatives for speculation beyond stories about derivatives disasters at particular firms such as Banc One, P&G, and Gibson Greetings.

A major impediment to research on speculation is that the concept of speculation is not well-defined. Some might argue, for example, that *not* taking derivatives positions to hedge known exposures or only partially hedging existing exposures is effectively speculating. A researcher can propose a specific definition of speculation, but because there is no standard definition, reporting requirements are not sufficient to determine which firms "speculate" using data in public documents such as financial statements. And firms do not generally publicly identify themselves as speculators because the term "speculation" when used with respect to derivatives has a pejorative connotation in the financial press.

In this paper, we use survey data to study the use of derivatives for speculation. The 1998 Wharton School/CIBC Wood Gundy survey asked respondents: How often does your market view of [exchange or interest] rates cause you to actively take positions? Possible responses are

[1] See Stulz (2003) for a summary of this research.

"Frequently", "Sometimes", or "Never". Thus, the survey provides a standardized definition of speculation that we can use for our study and the respondent firms identify that they use derivatives specifically for this purpose. We consider actively taking positions based on a market view to be speculation.

We provide three pieces of evidence on the use of derivatives for speculation. First, we present evidence on why firms speculate. Theories predict cross-sectional variation in the extent to which speculation is a value-maximizing activity for firms and provide testable implications about firm characteristics associated with speculation. To differentiate among the theories of optimal speculation, we examine characteristics of speculators and non-speculators including their financial characteristics, governance structures and management compensation arrangements. Second, we provide evidence on monitoring activities that are associated with speculative activities. This analysis is purely descriptive as there is no theory of optimal monitoring associated with speculation. However, the analysis provides intriguing descriptive patterns that can only be ascertained using the survey, which asks questions about internal controls related specifically to derivatives activities and about how firm risk management functions are evaluated. Third, we provide evidence on whether market participants could have discerned the speculative behavior from publicly available documents by examining the SEC filings of the firms that speculate.

The tests of the theories of optimal speculation suggest that speculators view the activity as a positive NPV project, which indicates they have (or believe they have) a comparative information advantage or economies of scale with respect to the market. Firms that identify themselves as speculators are larger than those that do not frequently take a view, but they do not exhibit any notable industry concentration. There is not a significant overlap between the firms that frequently speculate with currency derivatives and interest rate derivatives, suggesting that

firms "specialize" in their trading activities. In addition, the firms that frequently speculate on foreign currency rates have a greater percentage of operating revenues and costs denominated in foreign currency relative to firms that never or sometimes actively take positions. These findings are consistent with theories that firms speculate to profit on what they believe is superior information (see Stulz, 1996). However, as Stulz (1996) also notes, for firms actually to have superior information on interest rate or foreign exchange rate movements strains credulity[2].

The results are not consistent with the Campbell and Kracaw (2001) abandonment option theory of speculation, which predicts that firms that simultaneously have poor current financial resources (low quick ratios) and relatively costly external financing opportunities (high debt-to-equity ratios) are more likely to speculate, if smaller than a minimum efficient scale of investment. The speculators in our sample do have lower quick ratios than the non-speculators, but they also have lower debt-to-equity ratios, even after controlling for size. There is no evidence of a relation between speculation and investment opportunities, as measured by the firm's book-to-market ratio, even though the abandonment option theory would predict that the incentives to speculate are increasing in future growth opportunities. Finally, while firm size is a determinant of speculative behavior consistent with the profit-making theories, industry-adjusted size as a measure of efficient scale in the Campbell and Kracaw story is not (when either or both are included in the model).

We also examine the associations between speculation and compensation arrangements, governance structures, and internal monitoring and control mechanisms. The equity incentives of the CEO, as measured by the sensitivity (delta) of his exercisable and unexercisable options and shareholdings, and by the convexity (vega) of his exercisable and unexercisable options, are *not* significant determinants of speculative activities. However, the *CFO's* stock price (return

[2] And Brown, Crabb and Haushalter (2003) find that even for gold mining firms that may credibly have superior information about the supply or demand for gold and which may speculate using this information, there is no evidence that they can do so profitably.

volatility) sensitivity is positively (negatively) associated with the probability of actively taking positions. These results are consistent with the notion that the use of derivatives to take views on interest rates and currency movements are made at the CFO level and not at the CEO level and that CFO's act on associated incentives.

The fact that we do not find a relation for the CEO but do find one for the CFO is important for two additional reasons. First, it suggests that a lack of statistical power does not explain the lack of results for the CEO. Second, it alleviates some concern about potential endogeneity problems. Compensation is obviously endogenous, yet our sample size is too small to directly model the compensation choice. Given that many of the factors that determine CFO compensation also determine CEO compensation, there is less likelihood that an omitted correlated variable explains the CFO results.

Speculative behavior is positively associated with greater managerial power or weaker shareholder rights, using the Gompers, Ishii, Metrick (GIM, 2003) governance index, as a measure of the strength of firms' corporate governance mechanisms. These results are particularly strong for firms in which managerial power derives from having classified boards, limitations on shareholder action by written consent, blank check preferred stock, and restrictions on shareholder rights to call special meetings.

However, we are careful not to argue that the speculators are poorly governed firms or conversely that non-speculators are well-governed firms. The primary governance metrics we use capture the ability of firm management teams and boards to insulate their firms from the market for corporate control, which represents only one aspect of corporate governance. Another important part of governance is the monitoring and control of managerial actions. Descriptive evidence on derivatives-specific internal monitoring and control, such as the frequency with which

managers report their activities to the board and the sophistication with which they measure them, suggests that the speculators have *more extensive* internal control structures. This result is not inconsistent with the fact that the speculators have stronger managerial power vis a vis *shareholders* as a measure of governance. The boards of firms that provide managers with decision-making power also appear to monitor more closely the actions that managers take more frequently for speculators than for non-speculators.

A somewhat disturbing, although not surprising, result is that speculation is not transparent in financial statements or other public disclosures. We review disclosures about derivative activities in firms' publicly available financial statements to assess the adequacy of disclosures. The assessment is possible only because the survey responses provide a confidential indication of speculation. We find that investors would not be able to differentiate firms that frequently take active positions based on views about currency or interest rates from those that sometimes or never do using publicly available documents. The findings in this paper are particularly important given the recent rash of corporate scandals related to off-balance sheet assets, financial reporting disclosures, managerial compensation and corporate governance.

The paper is organized as follows. Section II describes the survey and the respondents, and a complete copy of the survey instrument is included in Appendix B. Section III summarizes theories of optimal speculation and makes predictions about expected associations between firm-specific characteristics and speculative activities. Section IV discusses the results of multinomial logit regressions estimating the likelihood of taking a view and presents descriptive evidence on variation in monitoring activities across the groups of speculators and non-speculators. Section V provides a review of financial disclosures of derivatives activities by the survey respondents. Section VI concludes.

II. Overview of the survey

The data are from a confidential survey on derivatives use in 1998. The survey was co-conducted by researchers at the Weiss Center for International Financial Research at The Wharton School and CIBC World Markets. Bodnar, Hayt and Marston (1999a, 1999b) present response tallies and tabulate and describe the basic results.

The survey asked the following question separately for foreign currency derivatives and interest rate derivatives: How often does your market view of exchange rates [interest rates] cause you to…

a. Alter the timing of hedges?

b. Alter the size of hedges?

c. Actively take positions?

Possible responses are "Frequently" "Sometimes" or "Never". We interpret the answer to part c as an indication of speculation. Survey responses indicate that actively taking positions based on market views is an activity distinct from altering the timing of hedges or altering the size of positions, and we view part c as a more conservative approach to identifying speculators than parts a or b. Firms that frequently actively take positions also do not frequently alter the timing or size of their hedges. Thus, throughout the paper, we define speculators as those that frequently take a view on either foreign exchange (FX) rates or interest rates, although we present evidence for "sometime speculators" as well.

The survey instrument (see Appendix B) was sent to 1,928 firms in October 1998 with a second mailing in March 1998. The firms were initially randomly selected from the Compustat database of non-financial firms in 1994 to receive a similar survey. The sponsors updated the

sample for the 1998 survey to include Fortune 500 firms that had not been selected in 1994 and to adjust for buyouts, mergers, and bankruptcies since 1994. Our sample includes 1,810 of the 1,928 survey recipients for which Compustat data were available at the closest fiscal year end to December 1997. The 1998 survey was the third survey of its type. We expect that the respondents understand the questions and have sufficient knowledge to answer them, although we do not know the name or position of the person that completed the survey. Firms were given assurance that highly limited access would be granted to individual firm responses, which should mitigate concerns that there is a selection-bias among the respondents in that the firms with the most to hide may not have answered the survey. However, if such a selection bias exists, it biases against finding results, making our analysis conservative.

[Insert Table I here]

Table I provides a summary of the survey respondents and non-respondents. There are 369 respondents and 1,459 non-respondents in our dataset, which represents a 20.2% response rate.[3] One-hundred forty-eight or 40.1% (152 or 41.2%) of the 369 respondents report using currency (interest rate) derivatives.[4] The majority of the respondents operate in the rubber, stone, metals, and heavy machinery and the food, textiles, lumber, paper, and chemicals industries. The response rates within industries range from 10% in agriculture and forestry to 27% in mining, oil and gas exploration and construction. Overall, the industry membership of the respondent sample is representative of the Compustat population. The respondents are larger than the non-respondents.

[3] This response rate is of the order of magnitude in other surveys of corporate financial officers like that by Graham and Harvey (2001) who obtain a 9% response rate.

[4] Seven firms were sent a survey based on their status when the surveys were mailed, but Compustat data are not available for 1997 for the individual entity due to mergers or other transactions. These firms are not included in the analysis.

The average book value of total assets for the responding firms is $6,251 million compared to $4,237 million for non-responding firms.

III. Motivations for speculation

In this section, we hypothesize the determinants of speculation based on three theories that predict that speculation can be a value-maximizing activity. The first theory, which we denote the abandonment option theory, leads to predictions about the association between speculative activities, firm growth, firm size, and financial flexibility. The second theory, which we denote the profit-making theory, leads to predictions about the association between speculative activities, a firm's other operating activities, and firm size. The third theory, which we denote the agency cost theory, leads to predictions about the association between speculative activities, compensation arrangements, and corporate governance.[5]

A. Abandonment options, investment opportunities, and financial flexibility

Campbell and Kracaw (2001) develop a model in which speculation is optimal when a firm simultaneously has an initial endowment below a minimal efficient scale but has reasonable abandonment options and faces costly external financing. The abandonment options make the firm's investment opportunity set convex. Speculation in the Campbell and Kracaw model represents a gamble that might generate enough internal financing to allow investment in the profitable opportunities. According to the Campbell and Kracaw model, firms will speculate more if they have:

[5] There are other explanations for speculation, but they do not amount to much more than anecdote. For example, some have argued that managers act irrationally or simply in error, perhaps because they don't understand the instruments, firm exposures, or both. We ignore these explanations, although if we find no support for any of the "rational" theories, one might view that as evidence that supports these explanations (setting aside power issues).

1a) good future prospects (growth options), *but*

1b) size is below minimum efficient scale; and

2a) poor current financial resources and

2b) relatively costly external financing opportunities.

We use two proxies for growth options: the ratio of the book value of firms' common equity scaled by market value averaged over 1995-1997 (BM), and the ratio of research and development expense to sales for 1997. We use four proxies for whether a firm is operating below efficient scale that use an *industry* median measure to proxy for the "efficient" scale of a firm. The first metric is an indicator variable (SIZE-BELOW) that equals one if firm size (SIZE, the market value of the firm, defined as the sum of the market value of equity, the book value of long-term debt, and the book value of preferred stock), is below the industry median, and equals zero otherwise. The industry median is computed by 3-digit SIC using all firms on Compustat with data available to compute SIZE as of fiscal year end 1997. The second metric is the ratio of SIZE to the industry median size (I-SIZE). While the abandonment option theory does not predict a linear relation between scale and speculation, this variable allows for the fact that industry median is an imperfect proxy for efficient scale. We also create a indicator variable and a continuous measure of scale using the ratio of fixed assets (PPE) to SIZE as a measure of firm size.

We use a firm's quick ratio (QUICK), defined as cash and short-term investments divided by current liabilities, as a proxy for a firm's internal funds availability. Following extant research on risk management, capital structure and corporate governance, our proxies for the cost of external financing are the interest coverage ratio (COV) and the long-term debt ratio (DE) ratio.

The quick ratio is computed at fiscal year end 1997 and the DE ratio is averaged over 1995-1997. The lower the coverage ratio and the higher the long-term debt ratio, the greater are the costs of external financing.

[Insert Table II here.]

Descriptive statistics on the proxy variables are reported in Table II. The non-speculator group includes firms that do not use derivatives and firms that use derivatives, but never speculate.

The univariate tests on differences in our proxies used to test the abandonment option theory of speculation yield mixed results. The speculators have significantly lower book-to-market ratios (i.e., greater growth opportunities) than the firms that sometimes or never speculate,[6] but they are not significantly different from other firms on the basis of their R&D expenditures. Firms that frequently speculate are significantly less likely to be below efficient scale (SIZE-BELOW) than the sometimes speculators, which are significantly less likely to be below efficient scale than the firms that never speculate. In addition, the frequent speculators are larger on an industry-relative basis (I-SIZE) than the firms that sometimes speculate, which are larger than the firms that never speculate, although the differences are not statistically significant. The results for the scale variables are opposite the predictions of Campbell and Kracaw's abandonment option theory, which predicts that firms below efficient scale (with poor current financial resources and relatively costly external financing opportunities) are more likely to speculate.

The firms that frequently take a view have poor financial resources as measured by the quick ratio relative to the firms that sometimes or never do. The average quick ratio for the frequent speculators is 0.225 compared to 0.976 for the firms that never speculate and 0.307 for the

[6] One non-speculator firm has a negative book-to-market ratio in 1995 of -0.19 due to negative book equity but positive ratios in 1996 and 1997. The result is an average book-to-market ratio of approximately -0.001. The tabulated results exclude this observation.

firms that speculate sometimes. The differences are statistically significant. This pattern is consistent with the abandonment option theory because firms that have worse current resources gain the most from speculating. In addition, the frequent speculatorsalso have lower (worse) interest coverage ratios. None of the differences are significant, however. Moreover, the frequent speculators have lower long-term debt ratios and better debt ratings, which could indicate better long-term solvency. The abandonment option theory predicts that the speculators would have a higher cost of accessing external debt capital, ceteris paribus.

In any case, results for the separate proxies for good growth opportunities, a low efficient scale endowment, low liquidity and high costs of external finance are ancillary because the abandonment option theory as articulated by Campbell and Krakaw (1999) predicts that the *simultaneous* presence of these firm attributes increase the value and, presumably, the probability of speculation. One element alone does not suffice. Table II presents descriptive statistics for interaction variables that combine our proxies for growth opportunities (BM), scale (I-SIZE), liquidity (QUICK), and cost of external finance (COV or DE). The input variables are recoded so that the abandonment option theory would predict a positive association between the interaction variable and speculation. The frequent speculators have higher values of BM*I-SIZE*QUICK*COV and BM*I-SIZE*QUICK*DE than the sometimes speculators, consistent with the abandonment option theory. However, the differences are not statistically significant. Moreover, the means of the interaction variables for the frequent speculators are lower than those of the firms that never speculate, and the differences for BM*I-SIZE*QUICK*COV are statistically significant at the ten percent level, contrary to predictions of the abandonment option story.

B. Speculation as a profit-making activity

Stulz (1996) claims that specific cases like Orange County, Baring Brothers, Proctor and Gamble, and Banc One suggest that managers speculate to make a profit. He provides two explanations for profitable speculation even in efficient markets. First, speculation can appear to be profitable, or managers can expect it to be profitable, when a firm has or *believes* itself to have an information advantage about price movements on the instruments in question. The theory is usually described in the context of commodity derivatives or financial institutions and interest rates. While the theory itself is not restricted to commodity instruments, the underlying assumption that a firm has superior information seems less plausible for interest rate and FX markets.

This explanation suggests that firms that have the greatest information advantage are more likely to speculate. We use two proxies for firm characteristics that we predict are associated with a firm's information advantage: the natural log of the market value of the firm {log(SIZE)} and the magnitude of a firm's operations denominated in a foreign currency. We predict that firms that have more foreign operations are more likely to have superior information about FX price movements, and larger firms are also more likely to have better information. Univariate results indicate that the frequent speculators are significantly larger than the sometimes speculators, which are significantly larger than the firms that never take a view.[7]

We recognize that both of these proxies are weak at best. A more powerful testable implication of the information advantage theory is that firms earn positive returns to their speculative activities, although the informational advantage story may also apply if managers

[7] Extant research on risk management also has documented that larger firms are more likely to use derivatives in general. See Stulz (2003) for a summary of these studies.

believe they have superior information even if they actually do not. Given the nature of the data available in this study, we cannot determine whether the speculation was profitable for the speculators.[8]

The second explanation for speculation as a profit-making activity is that firms that have economies of scale with respect to derivatives transactions are able to take advantage of profitable arbitrage opportunities.[9] This explanation suggests that larger firms and firms with more extensive derivatives programs – even hedging programs – are more likely to speculate.

It is useful at this point to summarize the predictions about the association between speculation and firm size. The Campbell and Kracaw abandonment option theory predicts that firms whose size is below minimum efficient scale are more likely to speculate, while the Stulz profit-making theories predict that larger firms are more likely to speculate for two possible reasons. Larger firms may speculate because firm size is correlated with the likelihood that the firm has or *believes* it has an information advantage or because economies of scale allow for arbitrage opportunities. The abandonment option theory implies that an industry-relative measure of firm size (I-SIZE or I-PPESIZE) will be associated with speculation while the profit-making theories predict that unadjusted firm size will be associated with speculation.

C. Agency costs – Compensation and corporate governance

Speculation can be optimal when managers' compensation includes equity-based components. Assuming speculation is an activity that increases the volatility of the underlying

[8] Brown, Crabb, and Haushalter (2003) provide several anecdotes in which managers of large public firms suggest that they believe they have informed beliefs about the direction of the gold market. In addition, they provide evidence that gold mining firms may actively increase (decrease) exposure to gold price variation when prices increase (decrease), possibly reflecting superior information they have about future prices. However, they also find that little or no financial or operational benefits result even before accounting for attendant costs.

[9] We do not include tax arbitrage of the type discussed by Smithson (1988) to be in this class.

firm value, it also increases the value of equity-based compensation. Equity represents a residual claim to the net cash flow of the firms, so shares can be viewed as options on the firm (Merton, 1973). Of course, stock options also provide direct incentives to increase volatility.

We examine the incentives of both the CEO and the CFO. While prior studies focus only on the CEO or top executives as a group, the CFO is generally charged with all treasury operations including risk management functions (c.f., Graham and Harvey, 2001) at both the highest strategic levels but often frequently at the operational level. Certainly as Stulz (1996) suggests, incentives for both CEO's and CFO's may be relevant factors for whether firms choose to speculate.

We use two proxies for the extent to which compensation contracts provide incentives for risk-taking. The first proxy simply measures the relative proportion of non-equity-based compensation to total compensation. The prediction is that managers with greater equity-based compensation are more likely to engage in speculation under the assumption that greater equity-based compensation is correlated with greater incentives for risk-taking. We obtain compensation data from Execucomp. CASHCOMP% measures CEO salary and CEO bonus (Execucomp variables SALARY and BONUS) as a percent of total compensation including options (Execucomp variable TDC1).

Table II reports that the CEOs of the frequent speculators derive more of their compensation from equity and less from salary and bonus. The average CEO of the speculators derives approximately 40% of his total compensation from salary and bonus, while the average CEO of the non-speculators derives approximately 54%. The difference is significant at the 10% level. The cash-based compensation rates of the CFOs for the firms that frequently and sometimes take a view are similar (approximately 53%), but the cash-based compensation rates of the CFOs of the firms that never speculate is higher (60.65%). These patterns are consistent with the

predicted positive association between equity-based compensation and speculation.

The second proxy for compensation incentives explicitly measures the risk-taking incentives provided by the manager's equity-based compensation. Following Core and Guay (1999), we use two variables – DELTA and VEGA – to capture the sensitivity of a manager's wealth to the outcomes of his decisions, in this case speculation. DELTA is the sum of the deltas for exercisable and unexercisable options plus the delta of the manager's current shareholdings, where delta is based on the Black-Scholes option pricing formula as modified by Merton (1973) to account for dividend payouts. Thus, DELTA measures the sensitivity of the manager's firm-specific equity-based wealth to a 1% change in the firm's stock price. DELTA proxies for the manager's incentives to manage and, specifically, to increase the stock price of the firm. VEGA is the sum of the corresponding vegas and measures the sensitivity of the manager's wealth to 1% change in firm stock return volatility. VEGA captures the manager's incentives to increase the risk of the firm directly. Details of the computation are in Appendix A.

DELTA and VEGA for the CEOs of the speculating firms are higher than those of the non-speculators and sometimes speculators, consistent with the notion that their wealth is more sensitive to the outcomes of their decisions that affect stock price and stock return volatility. The differences are not generally significant, however. The CFO DELTAs, but not VEGAs, exhibit the same pattern, although they are statistically significant.[10]

Two characteristics of an executive – age and tenure – are associated with the ability of DELTA and VEGA to capture the risk-taking incentives provided by equity and stock options. A substantial body of literature links the incentives provided by various compensation structures to time horizons. As executives age or have been with the firm longer, equity-based incentives to

[10] The average DELTA for the Core and Guay (1999) sample of 5,352 CEO-year observations from 1992 to 1996 is 557.732 (in thousands) with a median of 117.434 and a standard deviation of 3,680.516.

motivate desired behavior are more important because the executive has less need to prove himself or establish a reputation (e.g., Gibbons and Murphy, 1992).

Stulz (1996) makes a similar proposal specifically related to risk-taking with derivatives. He argues that some executives may "take a view" when taking risks can lead to managerial promotion. In addition, age and tenure have been used as proxies for skill and for risk-aversion. Older executives have greater costs of failure because getting rehired is more difficult; thus older executives are more risk-averse. Consistent with this idea, Yermack (1995) finds that older CEOs and CEOs with longer tenure get more options, presumably because need more contemporaneous incentives.

In summary, we predict that older executives and those with longer tenure are less likely to speculate, *ceteris paribus*. Data on CEO tenure and age are obtained from Execucomp, supplemented by hand-collection of the data from proxy statements. Table II does not show any distinct pattern in the ages or tenures of the CEOs across the groups. For example, the CEOs of the firms that never speculate have been CEO longer than the CEOs of both the frequent or sometimes speculators (7.8 years on average compared to six years), but the difference is not statistically significant.

Corporate governance

Personal incentives for a manager to speculate may be mitigated (or exacerbated) by governance structures that restrict (or encourage) speculation. The equity component of compensation contracts creates incentives for risk-taking, but boards may act to restrict the nature of the risk-taking. For example, while it may be optimal to encourage risk-taking with respect to R&D projects or other projects for which the firm has a comparative information advantage, it may

not be optimal to encourage speculation in FX or interest rate movements.

We use the Gompers, Ishii, and Metrick (GIM, 2003) Governance index as a proxy for the (inverse of the) strength of the corporate governance mechanisms of our sample firms. GIM use data from the Investor Responsibility Research Center (IRRC) to construct their index, which they refer to as the "G" index. The IRRC tracks charter provisions, bylaw provisions, and other firm-level rules associated with corporate governance.

GIM and Fahlenbrack (2004) categorize the provisions into five types: (1) Tactics for delaying hostile bidders, (2) voting rights, (3) director/officer protection, (4) other takeover defenses, and (5) state laws. There are multiple provisions within each category. Their overall index generally scores one point for each of 24 provisions that restricts shareholder rights or increases managerial power.[11] Thus, a higher index score is viewed as weaker corporate governance. GIM show a positive correlation between stronger shareholder rights as measured by this index and firm value, profits, and sales growth, and a negative correlation between shareholder rights and capital expenditures and frequency of corporate acquisitions. The GIM index is available for 150 of the 290 non-speculators, 59 of the sometimes speculators, and 11 of the 13 frequent speculators.

GIM identify that an important component of the overall index relates to the provisions that allow managers to delay hostile takeovers. These provisions include staggered or classified boards on which directors serve in staggered terms, blank check preferred stock over which a firm's current board has substantial authority, limitations on the ability to take action via written consent, and special meeting provisions limiting or eliminating the ability of shareholders to call special meetings (causing them to wait for regularly scheduled meetings to disengage takeover defenses).

[11] We note that GIM carefully adjust their measure for various opt-out or opt-in choices firms have relative to state laws dictating certain governance behaviors. We, too, make these adjustments.

We refer to this subindex as the DELAY component or index in our tests. GIM note that legal scholars such as Coates (2000) and Daines and Klausner (2001) suggest that the provisions captured by DELAY render all the other defenses redundant.

Table II reports the mean values for the GIM index and the DELAY component. Frequent speculators, on average, have significantly higher GIM indices (more control in the hands of management) and higher DELAY indices than firms that never speculate. As reported in Table II, the DELAY component varies from 2.00 for non-speculators to 2.90 for frequent speculators, a difference that is statistically significant at the 5% level.

IV. Multivariate analysis of the incentives for speculation

Tables III-V present multinomial logit estimations of the marginal probabilities (labeled ΔProb.) that a firm never takes a view, sometimes takes a view, or frequently takes a view.[12] The table reports the marginal effect of each regressor and the associated probability value (p-value) of the test that the marginal probability is equal to zero based on asymptotic standard errors. Each table includes different explanatory variables.

We have a small number of observations in the frequent speculator category, and data availability of the independent variables, particularly the CEO/CFO deltas and vegas, reduces the small number of observations even further. Data availability obviously constrains the latitude we have in specifying as full a model as we would like. It is not possible to estimate a single model that includes all the variables appearing in Tables III-V.

[12] In results not reported, we repeat the multinomial logit analysis with four categories: 0 = no derivatives use; 1 = derivatives use but never takes a view; 2 = sometimes takes a view; and 3 = frequently takes a view. The results are consistent with those reported in Tables III-V. Since the limited sample in the final equation limits the feasible number of regressors in all equations, we focus on the specification described in the text.

Our estimation strategy is to present the multivariate results in a sequential manner based on variables found to be significant in preliminary models, recognizing that some readers may raise variable-selection or data-mining objections. However, the approach allows us to isolate economic effects. In the first table, we focus on proxies for the abandonment option and profit-making theories of speculation. In the second table, we focus on the marginal impact of characterizing the strength of shareholder rights in the presence of these variable and, finally, in the third on the importance of CEO and CFO incentives for using derivatives in ways that are connected to their personal incentives (and possibly not those of their shareholders). To those who are still skeptical of this procedure, we appeal to the fact that the results are in general fairly strong and that even if one were to make Bonferroni or similar adjustments to our reported measures of significance in an effort to model the variable selection aspect of our methodology, the one or at most two previous regressions that justify the model in Table V are not enough in number or character to dispel belief in the results.

[Insert Table III here.]

Table III reports results when the model includes the following variables: an interaction variable representing the key construct from the abandonment option theory, the book-to-market ratio, log(SIZE), the quick ratio, and the debt-to-equity ratio. In Panel A, the interaction term is measured by BM*I-SIZE*QUICK*DE. In Panel B, the term is measured by BM*I-SIZE*QUICK*COV.

In general, the results of the multinomial logit regressions in Table III support the profit-making theory of speculation and not the abandonment option theory of speculation. Only the

coefficient estimate on the quick ratio is consistent with the abandonment option theory. Quick ratios are positively associated with non-speculation (marginal probability of over 4.38 percent, significant at the 15 percent level) and negatively associated with speculation (with sometime speculation marginal probability of -4.05 percent, significant at the 15 percent level). This result suggests that firms with less internal cash flow flexibility are more likely to engage in variance-increasing activities ("bet the ranch").

The interaction term embedding the simultaneous measurement of growth opportunities, the minimum scale indicator (proxying for a firm operating below a level of minimum efficient scale), a firm's quick ratio, and it's debt to equity ratio is not related to the likelihood of speculation (Panel A). However, larger firms as measured by log(SIZE), which is not relative to industry firm size, is associated with speculation: larger firms are significantly more likely to be speculators and significantly less likely to be non-speculators.

In Panel B, the abandonment option interaction variable using the coverage ratio in place of debt ratio as a measure of the cost of external financing (BM*I-SIZE*QUICK*COV) is included in the regression in place of BM*I-SIZE*QUICK*DE. The results confirm a lack of support for the abandonment option story.

As in Panel A, unadjusted firm size is positively associated with the likelihood of speculation. This result is consistent with the profit-making theory of speculation, which suggests that larger firms speculate either because of economies of scale *or* because of a correlation between firm size and an information advantage or at least a belief in one.

In an effort to distinguish between these two explanations for the positive association between firm size and speculation, we examine the firms' exposures to foreign operations and the overlap in the extent to which the firms use both interest rate and FX derivatives to frequently take

a view. If the information advantage belief story explains the positive association between firm size and speculation, we expect the firms with greater foreign operations, which are more likely to have (or at least to perceive) an information advantage in FX markets, are more likely to speculate.[13] If the economies-of-scale story explains the positive association between firm size and speculation, we expect that speculators will speculate with both FX and interest rate derivatives.

The firms that frequently speculate on foreign currency rates have a greater percentage of operating revenues and costs denominated in foreign currency relative to firms that never or sometimes actively take positions (results not tabulated). This correlation is consistent the argument that speculation is profitable when a trader has inside knowledge of a market, and that firms with greater foreign currency exposure have greater knowledge. Moreover, the firms that take a view using currency derivatives do not always also frequently take active positions in interest rate derivatives. Two-thirds of the FX speculators report that they only sometimes take positions in interest-rate derivatives (not tabulated). This combination of responses is *not* consistent with economies of scale associated with initiating or maintaining a trading operation in general. We stress that we are unwilling to conclude that the speculators *have* an information advantage in FX markets. The results suggest only that managers believe they have an information advantage.

Results for the remaining variables also are not consistent with the abandonment option theory. There is an insignificant relation between book-to-market ratios, as a measure of

[13] Stulz (1996) predicts industry clustering of speculators if superior information explains speculative behavior, but this prediction results because he discusses speculation in the context of *commodity* derivatives. The underlying assumption of his prediction is that the extent to which firms have (or perceive themselves to have) superior information will vary by industry, not by firms within industries. Industry clustering is not a reasonable prediction for our analysis of firms that speculate with FX and interest rate derivatives, despite the anecdotal example of Banc One. (See Stulz, 1996, for a discussion of trading of interest-rate based derivatives by Banc One.)

investment opportunities, and the likelihood of taking a view. In addition, the non-speculators have higher debt-to-equity ratios (marginal probability is 0.0221, p-value = 0.0646) while debt-to-equity ratios are negatively associated with the probability of sometimes speculating (marginal probability of -18.5 percent) and frequent speculation (insignificant p-value of 24.5 percent). Assuming a positive correlation between debt-to-equity ratios and the cost of external financing, this result is opposite that predicted by the abandonment option story, in which firms with more costly external financing have incentives to increase variance. Stulz (1996) suggests one interpretation of these results. He contends that financial distress can mitigate other incentives to speculate because distressed firms are less likely to be able to sustain an ex post negative outcome. His argument suggests that distressed firms are less likely to speculate, *ceteris paribus*, consistent with the results for the debt-to-equity ratio if higher DE ratios are an indication of distress.

[Insert Table IV here.]

The model in Table IV adds the Gompers et al. (2003) corporate governance index to the three variables that were significant in Table III: log(SIZE), the quick ratio, and the debt-to-equity ratio. Recall that larger values of the index indicate *fewer* shareholder rights or *greater* relative management power to resist various types of shareholder activism.

The results for log(SIZE), the quick ratio, and the debt-to-equity ratio in general mimic those in Table III although significance levels have declined. Ostensibly this occurs because, as indicated above, the sample size shrinks due to data limitations. The economic importance of the included financial measures remains high (even slightly higher than in the previous table).

The corporate governance index, however, emerges as an important variable that explains

the probability that sample firms frequently speculate. Its marginal probability is significantly positive (marginal probability of 0.007 with a p-value of 3.6 percent), which suggests that speculating firms tend to be those whose shareholders have fewer rights. While this result does not imply that *all* firms with weak corporate governance structures ("dictatorial" firms in GIM's nomenclature) will speculate or which of the twenty-four provisions embodied in the governance index are most influential, it strongly suggests that managers who speculate have fewer concerns about the disciplining nature of the market for corporate control.

To better understand the source of the governance index influence, in untabulated tests we decompose the governance index into its five subcomponents defined in Gompers et al. (2003) and used in Fahlenbrach (2004), and we examine their relative importance to explain the likelihood of never, sometimes, or frequently taking a view. The five subcomponents – DELAY, Protect, Vote, Direct Defense, and State Law – uniquely reflect nearly all twenty-four corporate governance elements aggregated in the index.

Specifications of the model that separately include each of the sub indexes and the various combinations of the other variables considered in our multivariate analysis indicate that only DELAY significantly influences the likelihood of speculating versus not speculating. Although GIM are unable to confirm empirically in a returns-based analysis that DELAY is the most relevant sub index, we strongly verify it in our tests.

The model in Table V measures the association between speculation and the compensation variables. The DELAY variable and debt-to-equity ratios are retained in the model given their significance in Table IV

[Insert Table V here.]

The results suggest that corporate governance effects remain strong in the face of not only debt ratios but various measures of the sensitivity of executive portfolios to changes in share price and return risk. For frequent speculators, the marginal probability associated with DELAY is 3.6 percent and has a p-value of 7.2 percent while the same parameter in the non-speculator equation is -6.4 percent with a p-value of 16.2 percent, suggesting that greater (lower) managerial power is associated with increased (decreased) probabilities of speculation. The debt-to-equity ratio is negative but marginally insignificant for sometime speculators (-52.4 percent with a p-value of 15.1 percent). The sign, however, is consistent with the previous results that more clearly indicate that greater debt ratios are inversely associated with the probability of speculation. Lower significance may result from lower power in the current analyses due to data limitations resulting in a small sample size.

With respect to the compensation variables, Table V presents results vis a vis executive incentives to speculate. CEO deltas and vegas are not at all important in explaining the probability of speculation, but CFO deltas and vegas are. The insignificant association between CEO compensation incentives and speculation is robust. The result holds strongly when we exclude CFO deltas and vegas from the equation and, alternatively, when we exclude DELAY and debt ratios. Put simply, CEO incentives appear to be unconnected to speculative activities for the firms we examine.

The incentives of the CFO, however, are strongly associated with a firm's choice to speculate. CFO wealth deltas have a positive (5.6 percent) marginal probability for frequent speculation (p-value 3.5 percent). At the same time, CFO wealth vegas have a negative (-0.3 percent) marginal probability (p-value 14.3 percent). This combination of results suggests that

CFOs view speculation as a profit-enhancing activity and have compensation contracts that reward it, and that they are not concerned with taking risky financial market bets to increase their wealth via the option component of their company-related wealth.

We can benchmark our results against those from industry-specific studies of compensation incentives for risk-taking behavior associated with derivatives use, although the proxies for compensation are not directly comparable. Tufano (1996), for example, finds a positive association between the dollar value of shares owned by officers and directors as a group and the proportion of gold exposure that mining firms hedge, and he finds a negative association between the number of options held by this group and hedging. Schrand and Unal (1998) find a positive association between managerial share ownership retained in an S&L conversion and post-conversion risk reduction, and they find a negative association between option ownership and post-conversion risk reduction. Neither study measures managerial wealth sensitivity to share price or volatility changes; instead, they simply measure some notion of share ownership and option ownership. Both papers interpret their results as suggesting that greater share ownership provides incentives for risk reduction, possibly resulting from suboptimal levels of diversification of managers' portfolios, while managerial option ownership provides incentives for risk taking. Brown, Crabb and Haushalter (2003) argue that corporate managers likely believe they have superior information that can add value via speculative activities; however, they find no evidence that this belief, as manifest in actively managed changes in the gold market hedge ratios of gold producers, is connected to compensation proxies.

In contrast, our results provide further evidence that CFO's of speculating firms view speculation as a profit-making activity. CFO's whose wealth is most sensitive to changes in firm value are *more* likely to actively take positions based on a view of rates, which suggests that they

believe that speculation is a positive NPV project or that they have contractual incentives to trade for profit. However, CFO's whose wealth is most sensitive to changes in firm volatility are *less* likely to actively take positions, which is not consistent with the use of speculation merely to increase option value via increased volatility without a corresponding return. It is critical to note that, as argued by Smith and Stulz (1985), this result may indicate a significant mismatch between the incentives of shareholders and managers.

Additional evidence on speculation and monitoring

Several questions in the survey help to characterize the monitoring environments of the speculators relative to the non-speculators. The analysis is unique because data on derivatives-specific monitoring activities is generally unavailable in public documents. The survey instrument provides an opportunity to analyze internal controls that specifically relate to the use of derivatives. It adds to the previous analysis that uses a general rating of the firm's corporate governance, which we assume is correlated with managerial power, but which does not pertain specifically to managerial power with respect to derivatives. The univariate analysis is presented in Table VI.

[Insert Table VI here.]

Overall, there appears to be *greater* oversight of derivatives activities by the speculators as evidenced by four key differences between the firms that actively take positions based on market views and those that sometimes or never do. First, 100% of the speculators have a centralized approach to managing the firm's risk management activities. The percentage of firms that use a

centralized approach is lower (93%) for the firms that sometimes speculate and still lower (84%) for those that never speculate. The International Organization of Securities Commissions (IOSCO, 1998) report on risk management and control guidance associated with derivatives use indicates that a centralized approach may be desirable, especially for larger and more complex entities. Thus, the centralized approach we observe could be a sign of greater internal control over speculators. Alternatively, use of a centralized approach could be correlated with complexity, as recommended by IOSCO, and speculators could in general have more complex derivatives operations.

Second, the speculators are more likely to have a documented policy about derivatives use and to report activities to the Board of Directors (BOD) more frequently. Two-thirds of the frequent speculators report derivatives activities to the BOD on either a quarterly or annual basis. Firms that only sometimes or never take positions report less frequently or have no set schedule. In addition, all of the frequent speculators have a documented policy with respect to the use of derivatives. Only 73% and 86% of the firms that sometimes or never take positions, respectively, have documented policies. The more frequent schedules for reporting by the speculators may again suggest that the speculators have more extensive and complicated activities in general that require such oversight.

Third, the derivatives activities of the speculators are most frequently evaluated based on *profit* relative to a benchmark. The non-speculators are more likely to evaluate their derivatives activities by reduced volatility relative to a benchmark. Approximately 39% of the firms that sometimes take positions evaluate their activities based on reduced volatility; 42.7% of the firms that never take positions use this approach. The benchmark they use is also different. Speculators are more likely to use spot rates (results not tabulated). The finding that the speculators'

benchmark is the item on which they are taking a view is consistent with the proposal that these firms speculate because they believe they have an information advantage. If a manager believes he or she has superior knowledge about the spot rate and therefore can profit from this view, he or she would believe he or she can beat the benchmark and compensation benchmarks can be set accordingly.

Finally, the speculators more frequently value their portfolios. One-third of the frequent speculators value their portfolios daily compared to only 7.8% and 12.2% of the sometimes and never speculators. The frequent speculators are also more likely to use an internal source for valuation as evidenced by the lower mean score for "internal source". This correlation again suggests greater sophistication with respect to derivatives activities in general for the frequent speculators.

V. Reporting of speculative activities

Since the derivatives debacles of the late 1990s and the recent collapse of Enron, investors are paying more attention to financial statement transparency, especially with respect to the use of off-balance sheet items like derivatives. However, research on the adequacy of disclosures in general is limited, and we are not aware of any studies that specifically assess the adequacy of disclosures about the extent to which firms speculate with derivatives. Such studies require the researcher to *know* the firm's activities in order to assess whether the firm has adequately disclosed them. The survey provides a reliable measure of the firm's activities which allows for an assessment of disclosure adequacy.

SFAS No. 133, para. 44, specifies the disclosure requirements for derivatives:

> "An entity … shall disclose its objectives for holding or issuing (derivative) instruments, the context needed to understand those objectives, and its strategies for

> achieving those objectives. The description shall distinguish between derivative instruments (and nonderivative instruments) designated as … hedging instruments, and all other derivatives. The description also shall indicate the entity's risk management policy for each of those types of hedges, including a description of the items or transactions for which risks are hedged. For derivative instruments not designated as hedging instruments, the description shall indicate the purpose of the derivative activity. Qualitative disclosures about an entity's objectives and strategies for using derivative instruments may be more meaningful if such objectives and strategies are described in the context of an entity's overall risk management profile. If appropriate, an entity is encouraged, but not required, to provide such additional qualitative disclosures."

We review the financial footnotes in 10-K filings at fiscal-year 1997 for the survey firms that indicate in the survey that they frequently take a view on interest rates or currency movements. The purpose of the analysis is to assess whether the publicly available information in financial statements, which presumably meets the minimum disclosure requirements, is adequate to ascertain whether firms are engaging in speculative activities. It is obviously difficult to assess a construct like the "adequacy" of disclosure. As a benchmark for assessing the disclosures by the speculators (i.e., firms that frequently take a view), we also examine the financial statement disclosures for random samples of the firms that sometimes use derivatives for speculation and the firms that never speculate with derivatives.

The main conclusion from our reading of the disclosures is that the firms that admit to speculating in the anonymous survey do not adequately report these activities. Amazingly, six of the 13 firms explicitly state that they do *not* use derivatives for trading purposes.[14] Three of these six also state that the derivatives are not used for "speculative purposes." Five of the remaining seven firms that admit to speculating in the survey do not discuss trading or speculation in their

[14] SEC disclosure rules at the time of the survey (Regulation S-K, Item 305) required firms to segregate derivatives positions into trading and non-trading portfolios. The instructions indicate that holding or issuing a derivative instrument for "trading purposes" has the same meaning as in generally accepted accounting principles. GAAP applicable at the time defined trading purposes as "including dealing and other trading activities measured at fair value with gains and losses recognized in earnings" (SFAS No. 119). Thus, derivative instruments that did not qualify for hedge accounting treatment were considered trading securities.

disclosures. In fact, only one of the 13 firms discloses that it uses derivatives in minor amounts for trading purposes and one other admits that it enters into certain transactions to create exposures.[15] Thus, for the firms where we most expect to see a discussion of the use of derivatives for speculative purposes, the financial statements do not provide investors with information that corresponds with the firm's admitted activities. In most cases, the disclosures contradict the survey responses and even a sophisticated reader of the financial statements that understands the nuances of the disclosure requirements cannot get an accurate picture of the firm's activities.

We also examine the financial statements for a random sample of 25% of the survey respondents that indicated that they sometimes use derivatives to actively take positions. Two of the 26 firms disclose using derivatives for trading purposes. The remaining firms all disclose using derivatives for hedging purposes but do not use words such as "trading purposes", "speculative purposes", or "speculation." A comparison of these results to those for the frequent speculators indicates that there is basically zero correspondence between the degree of speculation indicated by the survey responses and the revelation of speculative behavior in the financial statements. The disclosures across the two groups are similar.

Financial statement disclosures by the non-speculators – a random sample of 25% of the survey respondents that indicated that they never use derivatives for speculation – more closely correspond to actual derivatives use indicated in the survey data. Nine of the 15 firms (60%) explicitly state in their derivatives footnote that they do *not* use derivatives for trading or speculative purposes. The high frequency of denials for this group is consistent with the "unraveling" story in the voluntary disclosure literature (Grossman, 1981 and Milgrom, 1981).[16] If

[15] These are not the actual words in the footnote, but they convey the spirit of the survey respondent's disclosure. We do not quote the exact words in order to preserve the anonymity of the respondent.

[16] These studies predict full disclosure, even by firms with unfavorable private information. The firm with the "best" private information has incentives to disclose it, but that leaves the firm with the second-best private information to be

managers believe that investors view speculative activities as "unfavorable", then firms that never speculate have incentives to report that they don't. Unfortunately, the statement is not credible given that an even greater percentage of the frequent speculators make similar denials.

VI. Conclusions

Survey responses provide a measure of whether firms use derivatives to actively take a view on either currency or interest rate derivatives. Data on this activity are not available through publicly available sources – in fact, the study documents that one *could not* infer speculative activities from financial statement disclosures. The analysis provides insights into the determinants of speculative activities, specifically with respect to a firm's financial flexibility, governance structure, and compensation incentives.

The main findings are that firms appear to specialize in taking a view on rates when they believe they have an information advantage to predict them and are evaluated or rewarded commensurately. Firms that take a view engage in more complex derivatives activities in general as evidenced by the nature of the internal control procedures that they have in place. Firm size, compensation-related incentives of the CFO, but not the CEO, and financial flexibility are significant determinants of the probability that firms take a view on markets and act accordingly. In addition, the corporate governance structures of firms that more frequently speculate allow for greater managerial power and weaker shareholder rights. Finally, an iimportant aspect of this study is that we are able to assess whether investors, using publicly-available data, could identify the firms that admit to speculation in a confidential survey. The answer is that they could not.

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pooled with the remaining firms. So, the second-best firm also discloses and so on, which results in full disclosure by all firms except the one with the most unfavorable information.

Table I
Summary Statistics on Derivatives Usage Survey

Summary statistics for the Wharton/Chase/CIBC Capital Markets Survey of Derivatives Usage by U.S. Non-Financial Firms for 1998.

	Respondents (N = 369)	Non-Respondents (N = 1,459)
Number that report using derivatives:		
FX forwards, futures, swaps, options, or other	148	NA
Interest rate forwards, futures, swaps, options, or other	152	NA
Industry:		
Agriculture and forestry	1	9
Mining, oil and gas exploration, and construction	28	75
Food, textiles, lumber, paper, and chemicals	83	282
Rubber, stone, metals, heavy machinery	116	479
Transportation and communications	65	191
Wholesale durable and non-durable goods, retail, and restaurants	43	211
Financial services	3	11
For-profit services	20	147
Healthcare and social services	10	48
Governmental and quasi-governmental services	-	6
Firm characteristics:		
Total assets	6250.77	4236.52
Sales	4896.22	2697.60
Log(SIZE)	8619.29	2664.40

Table II
Selected Characteristics of Speculators and Non-Speculators

Selected characteristics of survey respondents. All data are measured as of fiscal year-end 1997 except the governance indexes from Gompers, Ishii and Metrick (2002). The S v. NS column (F v. S) {F v. NS} reports the significance level of a t-test comparing the mean values for the sometimes speculators and the non-speculators (frequent v. sometimes speculators) {frequent v. non-speculators}. *, **, *** denotes significance at the 10%, 5%, and 1% level.

	Non-Speculators (N=290)		Sometimes speculators (N=66)		S v. NS	Frequent speculators (N = 13)		F v. S	F v. NS
Variable	Mean	Std. Dev	Mean	Std. Dev		Mean	Std. Dev		
Selected Firm Characteristics									
Growth/Investment opportunities									
Average book-to-market ratio[1]	0.4449	1.1165	0.4495	0.4168		0.2903	0.1029	**	**
R&D expenses/sales	0.1060	0.3152	0.0369	0.0485	***	0.0873	0.1071		
Scale									
SIZE-BELOW	0.5477	0.4988	0.3600	0.4849	**	0.1000	0.3162		***
PPESIZE-BELOW	0.4891	0.5010	0.4400	0.5014		0.2500	0.4629		
I-SIZE	9.4072	70.0985	9.9042	26.7964		14.9925	17.0109		
I-PPESIZE	1.4343	2.2370	1.2633	0.9807		1.3342	0.7060		
Short and long-term liquidity									
Quick ratio	0.9762	3.5719	0.3073	0.5618	***	0.2251	0.3483		***
Interest coverage ratio	16.3158	66.9904	25.0904	138.0981		7.3623	5.9248		**
Long-term debt ratio	0.2448	0.2127	0.2458	0.1919		0.1828	0.1319		
S&P debt rating	8.0259	3.5764	7.9211	3.3722		7.0000	3.2193		
BM*I-SIZE*Quick*COV[1]	178.0783	1116.59	64.8784	355.6647	*	135.6887	215.7465		
BM*I-SIZE*Quick*DE[1]	331.2026	3385.52	19.2660	52.0565		135.6753	186.8120		
Firm size: SIZE (log $MM)	6.4613	2.3727	7.5055	1.9475	***	9.1365	1.5153	***	***
Compensation-related variables									
CEO CASHCOMP%	0.5390	0.2407	0.4913	0.2310		0.4020	0.2080		*
CFO CASHCOMP%	0.6065	0.2289	0.5335	0.2237		0.5395	0.2234		
CEO wealth DELTA	551.6568	1203.63	539.3615	657.6177		602.9781	504.2715		
CEO wealth VEGA	77.1681	97.5293	112.0204	109.1008	*	119.5086	129.2340		
CFO wealth DELTA	66.8331	111.8339	142.9903	127.5098	**	198.2849	155.1129		***
CFO wealth VEGA	16.6862	19.6624	33.7570	23.4071	***	25.0135	14.4776		
CEO age	60.3	6.3	59.4	4.8		60.5	7.8		
CEO tenure	2842.46	2695.43	2345.69	2293.57		2348.92	1721.68		
CEO with company	8134.88	4722.43	6540.95	5028.05		10661.80	4128.20	**	
Governance Summary Index	9.3400	2.8704	9.5833	2.9306		11.0000	2.4083		*
Gov. Index: DELAY component	2.0000	1.1701	2.2500	1.3289		2.9091	1.3751		**

[1]Excludes one non-speculator firm with an average BM = -0.001.

Table III
Multinomial Logit Regression Estimates of the Likelihood of Speculation

Multinomial logit regression estimates of the relation between the likelihood that a firm frequently, sometimes or never actively takes positions based on a view about currency or interest rates and predicted determinants of speculation. ΔProb. measures the marginal change in the probability of using derivatives resulting from a change in the independent variable. The marginal effects of the regressors on the probabilities are calculated as: $\Delta prob = \partial Y / \partial x_i = \Lambda(z'x)(1-\Lambda(z'x))z$, where Y = dichotomous dependent variable; x_i = ith independent variable; x = vector of independent variables; Λ = the logistic cumulative distribution function; and z = vector of coefficient estimates. $\partial Y / \partial x_i$ is calculated at the means of the regressors. t-statistics are for the logit coefficients. Variable definitions are in Appendix A.

Panel A: Uses BM*I-SIZE*QUICK*DE[1]

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	0.3495	0.000	-0.2977	0.0011	-0.0519	0.2535
BM*I-SIZE*QUICK*DE[1]	0.0000	0.4752	-0.0000	0.4893	-0.0000	0.7674
Book to Market (Ave)	0.0009	0.9769	0.0010	0.9754	-0.0019	0.7067
Log(SIZE)	-0.0314	0.0017	0.0266	0.0049	0.0048	0.2220
Quick Ratio	0.0438	0.1132	-0.0405	0.1351	-0.0033	0.5439
Debt/Equity (Ave)	0.0221	0.0646	-0.1848	0.0860	-0.0364	0.2450
Number of Observations	237		49		9	

Log Likelihood at convergence: -151.88
Pseudo R-Squared: 1131
P-value for Restricted Log Likelihood: Slopes = 0: 0.00003

Panel B: Uses BM*I-SIZE*QUICK*COV[1]

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	0.4584	0.0000	-0.3506	0.0000	-0.1078	0.0392
BM*I-SIZE*QUICK*COV[1]	0.0001	0.2699	-0.0001	0.3060	-0.0000	0.5151
Book to Market (Ave)	0.0089	0.7101	-0.0073	0.7564	-0.0016	0.6886
Log(SIZE)	-0.0349	0.0011	0.2609	0.0099	0.0088	0.0290
Quick Ratio	0.0612	0.2110	-0.0613	0.2091	0.1431	0.9860
Coverage Ratio	-0.0002	0.4985	0.0002	0.2669	-0.0000	0.7947
Number of Observations	210		45		9	

Log Likelihood at convergence: -143.86
Pseudo R-Squared: 0.0900
P-value for Restricted Log Likelihood: Slopes = 0: 0.0015

[1]Excludes one non-speculator firm with an average BM = -0.001.

Table IV
Logit Regression Estimates of the Likelihood of Speculation

Logit regression estimates of the relation between the likelihood that a firm frequently, sometimes or never actively takes positions based on a view about currency or interest rates and measures of the firm's governance structure, size, and financial flexibility. ΔProb. measures the marginal change in the probability of using derivatives resulting from a change in the independent variable. The marginal effects of the regressors on the probabilities are calculated as: $\Delta prob = \partial Y / \partial x_i = \Lambda(z'x)(1-\Lambda(z'x))z$, where Y = dichotomous dependent variable; x_i = ith independent variable; x = vector of independent variables; Λ = the logistic cumulative distribution function; and z = vector of coefficient estimates. $\partial Y / \partial x_i$ is calculated at the means of the regressors. t-statistics are for the logit coefficients. Variable definitions are in Appendix A.

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	0.3228	0.1110	-0.1521	0.4348	-0.1708	0.0357
Corp. Governance Index	-0.0109	0.3353	0.0040	0.7152	0.0068	0.0360
Log(Size)	-0.0078	0.6829	-0.0007	0.9701	0.0085	0.0918
Quick ratio	0.0656	0.3154	-0.0660	0.3110	0.0004	0.9801
Debt/Equity (AVE)	0.2989	0.1184	-0.2030	0.2893	-0.0959	0.0991
Number of Observations	145		46		9	

Log Likelihood at convergence: -133.9
Pseudo R-Squared: 0.0580
P-value for Restricted Log Likelihood: Slopes = 0: 0.0357

Table V
Logit Regression Estimates of the Likelihood of Speculation

Logit regression estimates of the relation between the likelihood that a firm frequently, sometimes or never actively takes positions based on a view about currency or interest rates and measures of the firm's governance structure and executive compensation. ΔProb. measures the marginal change in the probability of using derivatives resulting from a change in the independent variable. The marginal effects of the regressors on the probabilities are calculated as: $\Delta prob = \partial Y / \partial x_i = \Lambda(z'x)(1-\Lambda(z'x))z$, where Y = dichotomous dependent variable; x_i = ith independent variable; x = vector of independent variables; Λ = the logistic cumulative distribution function; and z = vector of coefficient estimates. $\partial Y / \partial x_i$ is calculated at the means of the regressors. t-statistics are for the logit coefficients. Variables are defined in Appendix A.

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	0.4067	0.0133	-0.2291	0.1248	-0.1776	0.0665
DELAY Governance Index	-0.0640	0.1619	0.0278	0.5367	0.0363	0.0724
Debt/Equity (Ave)	0.4625	0.2195	-0.5240	0.1513	0.0615	0.6791
CFO Wealth Delta	-0.0004	0.5823	-0.0003	0.6425	0.0560	0.0350
CFO Wealth Vega	-0.0037	0.3519	0.0067	0.0668	-0.0030	0.1430
CEO Wealth Delta	0.0000	0.4185	-0.0000	0.8310	-0.0000	0.4388
CEO Wealth Vega	0.0001	0.9069	-0.0001	0.8430	0.0000	0.9211
Number of Observations	47		16		7	

Log Likelihood at convergence: -48.74
Pseudo R-Squared: 0.1605
P-value for Restricted Log Likelihood: Slopes = 0: 0.0099

Table VI
Monitoring of Derivatives Activities by Firms that Frequently, Sometimes, or Never Speculate

Summary statistics for the Wharton/Chase/CIBC Capital Markets Survey of Derivatives Usage by U.S. Non-Financial Firms for the year 1998 based on whether the firm frequently, sometimes, or never actively takes positions in currency derivatives based on its market view of exchange rates.

	Frequency of Taking a View of Exchange Rates and/or Interest Rates		
	Frequently (N = 13)	Sometimes (N = 66)	Never (N =290)
Foreign currency or interest rate risk management activities are:			
Primarily centralized	100.0%	93.3%	83.8%
Primarily decentralized; centralized coordination	7.7	10.8	9.4
Primarily decentralized	-	0.0	3.4
Frequency of reporting derivatives activity to the BOD:			
Monthly	0	1.5%	3.2
Quarterly	33.3	16.7	20.4
Annually	33.3	12.1	23.7
As needed/no set schedule	22.2	62.1	43.0
Other	11.1	4.6	6.5
% of firms with a documented policy on derivatives use	100%	73.4%	85.6%
% that evaluate the risk management function by:			
Reduced volatility relative to a benchmark	11.1	38.7%	42.7%
Increased profit (reduced costs) relative to a benchmark	66.7	22.6	17.1
Absolute profit/loss	11.1	19.4	20.7
Risk adjusted performance (i.e., profits or savings adjusted for volatility)	11.1	19.4	19.5
Frequency of valuation of derivatives portfolio			
Daily	33.3	7.8%	12.2%
Weekly	0	6.3	12.2
Monthly	33.3	31.3	31.1
Quarterly	11.1	25.0	24.4
Annually	0	10.9	3.3
As needed/no set schedule	22.2	18.8	16.7
Who values the portfolio (ranked 1, 2, 3)			
Dealer that originated the transaction	1.71	1.65	1.84
Other dealer, consultant, or price vendor (e.g., Bloomberg)	1.88	2.15	1.99
Internal source	1.33	1.91	1.56

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Appendix A

Summary of explanatory variables and a detailed description of the method of calculation.

Variable Name	Variable Description
BM	Ratio of book to market value of the firm. Book value of common shareholders' equity is total assets less total liabilities less outstanding preferred stock (Compustat data items 6, 181, and 130, respectively). Market value is closing share price times common shares outstanding at year-end 1997 (Compustat data items 199 and 25, respectively). The ratio is the *average* over 1995-1997.
RD	Ratio of RD (Compustat data item 46) to sales (Compustat item 12) for 1997.
SIZE	Market value of the firm at fiscal year-end 1997. The sum of the market value of equity (Compustat data item 199 times Compustat data item 25), book value of long-term debt (Compustat data items 9 and 34), and book value of preferred stock (Compustat data item 130).
PPE	Ratio of property, plant, and equipment (Compustat data item 187) at fiscal year-end 1997 scaled by SIZE.
QUICK	Quick ratio. Ratio of cash and short-term investments as of fiscal year-end 1997 (Compustat data item 1) to current liabilities as of fiscal year-end 1997 (Compustat data items 34, 70, 71, and 72).
COV	Interest coverage ratio. Ratio of pretax income for 1997 (Compustat data item 170) plus interest expense for 1997 (Compustat data item 15) to interest expense plus capitalized interest (Compustat data item 239) for 1997.
DE	Debt-to-equity ratio. Ratio of book value of long-term debt as of the end of fiscal year 1997 (Compustat data items 34 plus 9) to SIZE. The ratio is the *average* over 1995-1997.
S&P	S&P Bond rating (Compustat data item 280), numbered consecutively from 1 (AAA) to 24 (D) for 1997. ratings on noninterest bearing debt are set to missing.

Compensation variables are created separately for the CEO and CFO. The individual identified as the CEO or CFO is the one that was the CEO or CFO for the majority of fiscal 1997.

CASHCOMP%	Salary and bonus in 1997 (Execucomp variable SALARY plus BONUS) as a percent of total compensation including options (Execucomp variable TDC1).

DELTA and VEGA

The CEO delta is the sum of the deltas for the exercisable and unexercisable options plus the delta of his shareholdings, which is defined as shares owned (Execucomp variable SHROWN) * 0.01 * end of fiscal year price (Execucomp variable PRCCF). The CEO vega is the sum of the vegas of the exercisable and unexercisable options. The vega of the shareholdings is assumed immaterial consistent with Coles, Daniel and Naveen (2003). We compute the delta and vega of the exercisable and unexercisable options separately. Estimates of the delta and convexity of a CEO's options are based on Black-Scholes (1973) formula for valuing European call options as modified to account for dividend payouts by Merton (1973) following the Core and Guay (1999) methodology.

Option value = $[Se^{-dT}N(Z)-Xe^{-rT}N(Z-\sigma T^{(1/2)})]$,

where

$Z = [\ln(S/X)+T(r-d+\sigma^2/2)]/\sigma T^{(1/2)}$

N = cumulative probability function for the normal distribution

S = The close price of the company's stock at fiscal year end 1997 (Execucomp variable PRCCF)

X = exercise price of the option[17]

σ = The standard deviation stock return volatility calculated over 60 months as used in Execucomp's Black-Scholes valuation of options (Execucomp variable BS_VOLAT)

r = natural logarithm of the risk-free interest rate[18]

T = time to maturity of the option in years[19]

d = natural logarithm of expected dividend yield for fiscal year 1997 (Execucomp variable BS_YIELD), which is the company's average dividend yield over the past 3 years.

[17] Following Core and Guay, we compute the average exercise price in two steps. First, we divide the value the CEO would have realized at year end if he had exercised all of his vested and unvested (exercisable and unexercisable) options that had an exercise price below the market price (Execucomp variables INMONEX and INMONUN, respectively) by the number of vested and unvested options that the CEO held at yearend (Execucomp variables UEXNUMEX and UEXNUMUN, respectively). Second, we subtract the quotients from the end of fiscal year price (PRCCF).

[18] Interest rate yields are the natural log of treasury bond yields from CRSP as quoted at the firm's fiscal year end. If T = 1, r = the one-year bond yield; if T = 2 or 3, r = the two-year bond yield; if T = 4 or T = 5, r = the five-year bond yield; if 6 <= T <= 8, r = the seven-year bond yield; and if T = 9 or T = 10, r = the ten-year bond yield.

[19] We compute time to maturity in years from Execucomp data for each grant during 1997 assuming that the grant was made at the end of the firm's fiscal year. We take the average time to maturity of all grants during the year, equally weighted. We round to the nearest whole year. We use .7 of this maturity following Execucomp's convention. For exercisable options, we take the average time to maturity – three years. It is set = 1, if that time < 0. It is set = 6, if the data are missing. For unexercisable options, we take the average time to maturity – 1 year. It is set = 9 if the data are missing. It is set = 1 if < 0. The max is set at 10.

The option delta, which is the sensitivity with respect to a 1% change in stock price is defined as:

$[\delta(\text{option value})/\ \delta(\text{price})]*(\text{price}/100) = e^{-dT}N(Z)*(\text{price}/100)$

The option vega, which is the sensitivity with respect to a 1% change in stock return volatility is defined as:

$[\delta(\text{option value})/\ \delta(\text{volatility})]*0.01 = e^{-dT}N'(Z)ST^{(1/2)}*(0.01)$

where N' = normal density function

CEOAGE Age of CEO in years in 1997.

CEOTENURE Number of years that the CEO has been the CEO. The number of days from the date the CEO became CEO to December 31, 1997 divided by 365.

WITHCO Number of years that the CEO has been with the company. The number of days from the date the CEO joined the company (Execucomp variable JOINED_C) to December 31, 1997 divided by 365.

APPENDIX B: Survey Questionnaire
Wharton Survey of Financial Risk Management by U.S. Non-Financial Firms
1. Use of Derivatives

1a. Does your firm use derivatives (forwards, futures, options, swaps)?
(Please circle the appropriate response.)

a. Yes **b. No**

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*Please complete this section if you answered **NO** to question 1a.*
1b. Please indicate the three most important factors in your decision not to use derivatives.
(Please rank: 1- Most important; 2 – Second most important; 3 – Third most important.)

a. Insufficient exposure to financial or commodity prices
b. Exposures are more effectively manages by other means
c. Difficulty pricing and valuing derivatives
d. Disclosure requirements of the SEC or the FASB
e. Accounting treatment
f. Concerns about perceptions of derivative use by investors, regulators and the public
g. Costs of establishing and maintaining a derivatives program exceed the expected benefits
h. Other

1c. What percentage of your consolidated operating revenues are in foreign currency?
(Please circle the response that is closest.)

a. 0% b. 5% c. 10% d. 15% e. 20% f. 25% g. 30% h. 40% i. 50+%

1d. What percentage of your consolidated operating costs are in foreign currency?
(Please circle the response that is closest.)

a. 0% b. 5% c. 10% d. 15% e. 20% f. 25% g. 30% h. 40% i. 50+%

Thank you. Please return your survey in the postage paid envelope.

2. Based upon the notional value of contracts, how does your firm's derivative usage compare to last year? (Please circle the appropriate response.)

   a. Usage has increased b. Usage has decreased c. Usage has remained constant

3. Which of the following statements best describes your organization's approach to the use of derivatives to manage each of the following forms of risk? (Please indicate with a check in each column.)

	Foreign Exchange	Interest Rate	Commodity	Equity
Exposure not managed with derivatives				
Risk management activities primarily centralized				
Risk management decisions primarily decentralized with centralized coordination				
Risk management activities primarily decentralized				

4a. Indicate your degree of concern about the following issues with respect to derivatives.
(Please indicate your degree of concern with each issue by checking the appropriate box in each column.)

	No Concern	**Low**	**Moderate**	**High**
a. Accounting treatment				
b. Credit Risk				
c. Market Risk				
d. Monitoring and evaluating hedge results				
e. Reaction by analysts or investors				
f. SEC disclosure requirements				
g. Secondary market liquidity				

4b. Indicate the three issues of greatest concern from the list in question 4a.
(Please enter the letter from Question 4a for your three most serious concerns.)

	a	b	c	d	e	f	g	h
Most serious								
Second most serious								
Third most serious								

5. What will be the most likely impact on your firm of the FASB's new rules on derivatives accounting? (Please circle all that apply.)

   a. No effect on derivatives use or risk management strategy
   b. A reduction in the use of derivatives
   c. An increase in the use of derivatives
   d. A change in the types of instruments used
   e. Alter the timing of hedging transactions
   f. A significant change in the firm's overall strategy or approach to risk management

6. Does your firm calculate “value-at-risk” for some or all of its derivatives portfolio?

   a. Yes b. No

II. Currency Exposure

7a. What percentage of your consolidated operating revenues are in foreign currency?
(Please circle the response that is closest.)
a. 0% b. 5% c. 10% d. 15% e. 20% f. 25% g. 30% h. 40% i. 50+%

7b. What percentage of your consolidated operating costs are in foreign currency?
(Please circle the response that is closest.)

8. Which benchmark does your firm use for evaluating foreign currency risk management over the budget/planning period? (Please circle the response that is appropriate.)

a. Our firm does not use a benchmark
b. Forward rates available at the beginning of the period
c. Spot rates available at the beginning of the period
d. Baseline percent hedged strategy (i.e. X% hedged)
e. Other benchmark

If your firm does not use currency derivatives, please skip ahead to Section III.

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9. How often does your firm transact in the currency derivatives markets to…
(Please circle the appropriate response for each exposure.)

	Not Applicable	Never	Sometimes	Frequently
Hedge foreign repatriations (dividends, royalties, investment payments)				
Hedge contractual commitments				
i. on-balance sheet transactions (accounts receivable/payable)				
ii. off-balance sheet transactions (unfilled or pending contracts)				
Hedge anticipated transactions one year or less				
Hedge anticipated transactions over one year				
Hedge economic/competitive exposure				
Hedge translation of foreign accounting statements				
Arbitrage borrowing rates across currencies(currency swaps in association with foreign currency borrowings)				

10. What percentage of the following categories of exposures do you typically hedge?
(Please indicate the appropriate percentage under each exposure category.)

Percentage of exposure typically hedged	**On-balance Sheet Transactions**	**Off-balance Sheet Transactions**	**Anticipated Transactions 1 yr or less**	**Anticipated Transactions Over 1 yr**	**Economic/ Competitive Exposure**	**Foreign Repatriations**	**Translation Of Foreign Accounts**
>25% 25%-50% 50%-75% 75%-100%							

11. For each of the following exposures, which best describes your typical hedging horizon?
(Please check the appropriate response for each column.)

Hedging Horizon	**Contractual Commitments**	**Anticipated Transactions**	**Economic/ Competitive Exposure**	**Foreign Repatriations**	**Translation of Foreign Accounts**
Hedge shorter than the maturity of the exposure					
Hedge the maturity of the exposure					
Hedge longer than the maturity of the exposure					
Hedge to the end of the current period (budget period or fiscal year)					

12. How often does your market view of exchange rates cause you to…
(Please check the appropriate response for each column.)

	Never	Sometimes	Frequently
a. Alter the timing of hedges			
b. Alter the size of hedges			
c. Actively take positions in currency derivatives			

13. What percent of your total foreign currency derivatives (by face value of contacts) have the following original maturities: (Please enter the approximate percentage of currency hedging for each maturity.)

90 days or less
91 to 180 days
181 days to one year
One year to three years
Beyond three years

III. Interest Rate Exposure

14. Which Statement(s) best describes the benchmark your firm uses for evaluating the management of the debt portfolio? (Circle all that apply.)

    a. Our firm does not uses benchmark for the debt portfolio
    b. The volatility of interest expense relative to a specified portfolio
    c. Realized cost of funds relative to a market index (e.g. Libor)
    d. Realized cost of funds relative to a portfolio with a specified duration
    e. Realized cost of funds relative to a portfolio with a specified ratio of fixed to floating rate debt
    f. Other benchmark (please describe)

If your firm does not use interest rate derivatives, please skip ahead to Section IV.

15a. How often does your firm transact in the interest rate derivatives market to…
(Please check the appropriate column for each row. Choose 'Not Applicable' if a reason is not relevant to your firm.)

	Not Applicable	Never	Sometimes	Frequently
a. Swap from fixed rate to floating rate debt				
b. Swap from floating rate to fixed rate debt				
c. Fix in advance the rate (spread) on new debt				
d. Reduce costs or lock-in rates based upon a market view				

15b. How often does your market view of interest rates cause you to…
(Please check the appropriate response.)

	Never	Sometimes	Frequently
a. Alter the timing of hedges			
b. Alter the size of hedges			
c. Actively take positions in interest rate derivatives			

IV. Option Contracts

16a. Please indicate which of the following types of option contracts your firm has used in the past months for the indicated exposures.
(Please check marks in the appropriate columns for each type of option, leave blank if options are not used.)

	Types of Exposure			
	FX	**IR**	**CM**	**ANY**
a. Standard European-style options				
b. Standard American-style options				
c. Average rate (price) options				
d. Basket options (options on two or more prices)				
e. Barrier options (knock-in/knock-out)				
f. Contingent premium (options with deferred or conditional premiums)				
g. Option combinations (i.e. collars, straddles, etc.)				
h. Other				

16b. If your firm does not use options, can you tell us why not?

_____

V. Control and Reporting Procedures

17a. Does your firm have a documented policy with respect to the use of derivatives?
(Please circle the appropriate response.)

a. Yes b. No

17b. How frequently is derivatives activity reported to the Board of Directors?
(Please circle the appropriate response.)

a. Monthly b. Quarterly c. Annually d. As needed/No set schedule e. Other

18. What is the lowest rate counterparty with which you will enter a derivatives transaction?
(Please check the appropriate rating for each maturity.)

	AAA	**AA**	**A**	**BBB**	**Less than BBB**	**No Set Policy/ Don't Know**
a. Maturities 12 months or less						
b. Maturities more than 12 months						

19. How frequently do you value your derivatives portfolio?
(Please circle the appropriate answer.)

a. Daily
b. Weekly
c. Monthly
d. Quarterly
e. Annually
f. As needed/No set schedule

20. Rank your degree of reliance on each of the following for valuing your derivative positions.
Please rank items; 1 – Most important; 3 – Least important; Use an "X" if a method is not used at all.)

	Rank 1	**Rank 2**	**Rank 3**
a. Dealer that originated the transaction			
b. Another dealer, consultant, or price vendor (e.g. Bloomberg)			
c. Internal source (e.g. software, spreadsheet, etc.)			

21. How do you evaluate the risk management function?
(Please circle the statement that best matches your practice.)

a. Reduced volatility relative to a benchmark
b. Increased profit (reduced costs) relative to a benchmark
c. Absolute profit/loss
d. Risk adjusted performance (profits or savings adjusted for volatility)

Thank you for completing the survey.
Please mail it today in the enclosed postage-paid envelope.