The Rodney L. White Center for Financial Research

Taking a View: Corporate Speculation Governance and Compensation

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30-04

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Corporate Speculation, Governance and Compensation

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Current draft: November 2004

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ABSTRACT

Taking a view:
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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 they view speculation as a profitable activity. Firms specialize in taking a view on either interest rates or exchange rates, and specialization in FX contracts is positively related to the extent of the firm's foreign operations. However, the data do not support other theories of "rational" speculation such as the Campbell and Kracaw (1999) model. We also examine the association between speculation and governance mechanisms including compensation-based incentives, bonding contracts, and internal controls. Compensation-related incentives of the CFO, but not the CEO, are associated with the likelihood that a firm actively takes derivatives positions based on a market view. Moreover, firms with governance structures that allow for greater managerial power and indicate fewer shareholder rights, in general, are more likely to take a view, but these firms also have more extensive and sophisticated internal controls and monitoring mechanisms specifically related to derivatives activities. 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, governance and compensation

I. Introduction

Derivative instruments can be used to hedge market risk exposures, where "hedging" generally implies that the position is taken with the intention of reducing risk. Derivatives also can be used to speculate on movements in the value of the underlying asset. "Speculating" generally implies that the derivative position is undertaken with the intention of making a profit and not 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 firms' use of derivatives for speculation or "selective hedging" beyond stories about derivatives disasters at particular firms such as Banc One, P&G, and Gibson Greetings.

A major impediment to research on the use of derivatives for speculation is that the concept of speculation (or selective hedging) is not well-defined. Some would 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 we lack a standard definition, reporting requirements in public documents such as financial statements are not sufficient to determine which firms "speculate" under the researcher's definition. 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. "Derivatives are financial weapons of mass destruction. The dangers are now latent--but they could be lethal." (Warren Buffet, Fortune, March 2, 2003).

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

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 "Frequently", "Sometimes", or "Never". We define firms that respond "Frequently" as speculators. One significant advantage of using the survey instrument rather than financial statement disclosures to identify speculative behavior is that the survey provides a standardized definition of speculation. Moreover, the survey question does not use the word "speculation," per se, which has a pejorative tone in the financial press; rather, the survey describes taking a view without an explicit or implicit judgment about whether it is good or bad.

Our analysis addresses three issues related to the use of derivatives for speculation. First, we provide evidence on why firms speculate. Second, we examine the relation between speculation and governance mechanisms including compensation, commitments to *ex post* monitoring, and internal controls. Our analysis of a firm's internal controls is unique; the survey provides information about monitoring mechanisms that are specifically related to derivatives activities and which is not publicly available. Finally, we evaluate the informativeness of a firm's financial reporting of its derivatives use. Our ability to perform this analysis is again a unique opportunity provided by the use of survey data. We can compare survey responses, which we assume are an accurate representation of the firm's activities, to the data that are publicly reported. Without confidential survey data that reveals the "true" nature of the underlying transaction, it would be impossible to evaluate the adequacy of the disclosures.

In the first part of the paper, we examine theories that predict cross-sectional variation in the extent to which speculation is a value-maximizing activity for firms and thus provide testable implications about firm characteristics associated with speculation. Our analysis indicates that

speculators view the activity as a value-enhancing project, which suggests that they have (or believe they have) a comparative information advantage or economies of scale with respect to the market. 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. There is no significant overlap between the firms that frequently speculate with currency derivatives and interest rate derivatives, suggesting that firms "specialize" in their trading activities. These findings are consistent with theories that firms speculate to profit on what they believe is superior information and with anecdotal evidence that banks speculate on interest rates for profit (see Stulz, 1996).

The results are not consistent with the "bet-the-ranch" theories of optimal speculation. Campbell and Kracaw (1999), for example, predict that firms with poor current financial resources (low quick ratios) and relatively costly external financing opportunities (high debt-to-equity ratios) are more likely to speculate when they face a convex investment opportunity set. The speculators, however, have lower debt ratios (not higher), even after controlling for size, and there is no evidence of a relation between speculation and investment opportunities, as measured by the firm's book-to-market ratio, or internal liquidity.

The second part of the paper examines the relation between governance mechanisms and speculation. We analyze two types of governance mechanisms that can mitigate agency conflicts. The mechanisms include those that 1) align incentives of the agent (manager) *ex ante* with those of the shareholders, and 2) bond the firm *ex ante* by committing to monitor the agent's behavior *ex post*.

A significant mechanism that aligns managerial and shareholder incentives is compensation contracts. Assuming speculation is an activity that increases the volatility of the

underlying firm value, it also increases the value of equity-based compensation. We find that the equity incentives of the CEO, as measured by the sensitivity (delta) of his exercisable and unexercisable options and shareholdings, and by the convexity of his exercisable and unexercisable options (vega), are *not* significant determinants of speculative activities. However, the CFO's stock price (return 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, and perhaps the views themselves, take place at the CFO level and not at the CEO level and that CFOs act on associated incentives. In addition, the fact that we do not find a relation for the CEO but do find one for the CFO is important. It suggests that a lack of statistical power does not explain the lack of results for the CEO. Moreover, 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 omitted correlated variables explain the CFO results.

Our examination of monitoring activities suggests that speculating firms monitor *ex post* the speculative activities of managers through specific internal controls over derivatives trading activities but not through more general bonding mechanisms. In fact, speculative behavior is *positively* associated with greater managerial power using the Gompers, Ishii, Metrick (GIM, 2003) governance index, which has been used as a measure of the strength of firms' corporate governance. 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, all of which allow

firms to delay hostile takeovers. Thus, speculating firms do not use the takeover market as an *ex post* monitoring mechanism of derivatives use to prevent speculation. In contrast, weaker monitoring in this general sense allows for greater speculation.

Firms in which managers have greater equity-based compensation-related incentives, in general, and have broad decision-making power, however, use internal controls to monitor more closely specific derivatives-related activities. For example, firms that frequently speculate report their activities to the Board of Directors more frequently and on a set schedule. They are more likely to value their portfolios using sophisticated methods or resources, and they value them more frequently. All of the frequent speculators have policies regarding counterparty risk and they generally deal with lower-risk counterparties than the non-speculators and the sometimes speculators.

While one could view this analysis narrowly as one about the governance of derivative instruments, it makes a more general statement about the role of governance mechanisms to control agency conflicts. In a complete contracting setting, firms choose mechanisms optimally to align incentives of principals and agents *ex ante* or create *ex post* costs of deviating from actions that maximize firm value. But in a world with imperfect contracting, the optimal contract may induce or at least allow managers to take actions that are not value-maximizing for the firm. For example, because the same derivative instrument can be used for hedging or for speculation, a firm that provides incentives for optimal hedging using derivatives without further monitoring and control automatically allows for the possibility that an employee might speculate. Moreover, because derivative instruments are often highly liquid and easily traded, unlike investments in tangible assets, it is difficult *ex post* to observe deviant behavior.

Internal controls are a third type of governance mechanism that firms can use to monitor

specific managerial behavior *ex post* in this setting. Like bonding mechanisms such as debt covenants, a commitment to internal controls can provide incentives to managers to avoid value-decreasing actions. Unlike bonding mechanisms, however, internal controls can be tailored to monitor specific managerial actions. Thus, the limited contracting constraint which can result in a second-best optimal mechanism choice with respect to compensation and bonding contracts may be resolved via activity-specific internal controls. Our findings suggest that specific internal controls are used to complete the contracting process by overcoming the limitations of more general contract-based monitoring mechanisms and by providing incentives for desired behavior.

The third question we address is whether market participants could have discerned the activities of the frequent speculators from publicly available documents. The somewhat disturbing, although not surprising, result is that speculation is not transparent in financial statements or other public disclosures. Our review of 10-K filings suggests 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 via public disclosures. These findings 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 discusses the survey, including its definition of speculation, and describes the respondents. Section III summarizes theories of optimal speculation, makes predictions about expected associations between firm-specific characteristics and speculative activities, and discusses the results of multinomial logit regressions estimating the likelihood of taking a view. Section IV provides an analysis of the association between speculation and governance mechanisms, including compensation. Section

V provides a review of financial disclosures of derivatives activities by the survey respondents. Section VI concludes.

II. The survey and its definition of speculation

A. The survey

The data for this study are from a confidential survey on derivatives use 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 instrument was sent to 1,928 publicly-traded non-financial firms in October 1997 with a second mailing in March 1998.[2] There were 367 usable responses, which represents a 19.04% response rate. This response rate is of the order of magnitude or is greater than in other surveys of corporate financial officers like that by Graham and Harvey (2001) who obtain a 9% response rate and Trahan and Gitman (1995) who obtain a response rate of 12%.

The 1998 survey was the third survey of its type. As such, 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 firms may not have responded to the survey if they believed derivatives use is viewed as pejorative, creating a selection bias in the data. However, if such a selection bias exists, it biases against finding results because it reduces variation central to our analyses.

[2] The firms were 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. A complete copy of the survey instrument is in Appendix A.

Our sample consists of 342 of the 367 respondents. Eighteen firms are eliminated because the firms engaged in a merger sometime before the end of fiscal year 1997. Although the firm completed a survey, it is not clear whether the pre-merger or post-merger entity completed the survey. Seven additional respondents are excluded because share price data are not available.[3] The equity incentives for these firms are not clear. However, we include these firms in the analysis of monitoring of derivatives activities. The non-respondent sample has 1,049 firms after eliminating those with missing Compustat data.

[Insert Table I here]

Table I provides a summary of the sample survey respondents and non-respondents. Of the 342 sample respondents, 186 report using derivatives in response to the first survey question: "Does your firm use derivatives (forwards, futures, options, swaps)?" One-hundred sixty-two (158) of the 186 firms report using currency (interest rate) derivatives.

The majority of the respondents and non-respondents operate in the rubber, stone, metals and heavy machinery industries. There is a slight over-representation of respondents in the transportation and communications industries relative to the non-respondents and a slight under-representation of respondents in the wholesale durable and non-durable goods, retail and restaurants and for-profit services industries. However, overall the industry membership of the respondent sample is representative of the Compustat population. The response rates range from 12.5% in agriculture and forestry to 42.9% in financial services.

The respondents are significantly larger than the non-respondents. The average book value of total assets for the responding firms is $6,011 million compared to $2,494 million for

[3] Five firms are wholly-owned subsidiaries, one firm is not publicly traded, and one firm is a co-op.

non-responding firms. The average market value of the firm (SIZE), which is 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 $8,500 for the responding firms versus $4,235 for the non-responding firms.[4] The averages and medians are statistically different for all three size measures.

B. Speculation

The survey asked the following question separately for foreign currency derivatives and interest rate derivatives use:

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." Of the firms that use derivatives, 9.7% report that they frequently alter the timing (part a) and size (part b) of hedges, and 7.0% indicate that they frequently use derivatives to actively take positions on interest rate or currency movements (part c).

We define frequent (sometime) speculators as those respondents that frequently (sometimes) actively take positions based on a market view of either foreign exchange (FX) rates or interest rates (part c). We view actively taking positions, but not altering the timing or size of hedges, as an indication of speculation for two reasons. First, survey respondents could have viewed altering the timing or size of "hedges" as part of a dynamic hedging strategy while it is not likely that survey respondents would interpret actively take positions as part of a hedging

[4] Share price data for one firm traded on the OTC bulletin Board were obtained from Bloomberg for the closest date to the firm's fiscal year end, which was within one week. For a firm with three tracking stocks, SIZE is computed as the sum of the market values of the three separate tracking stocks and the book value of long-term debt, and the book value of preferred stock.

strategy. Second, consistency checks of the survey responses indicate that the firms that actively take positions are distinct from those that alter the timing or size of their hedge positions. Of the firms that frequently alter the timing of their hedges, 67% also frequently alter the size of their hedges, while only 39% (44%) of the firms that frequently alter the timing (size) of their hedges also frequently actively take positions. In addition, as discussed later in the paper, when we use "actively taking positions" as the definition of speculation, almost 92% of the frequent speculators evaluate the risk management function based on profits (either absolute, relative to a bench-mark or risk-adjusted), while only 53.8% of the firms defined as non-speculators and 59.7% of the firms defined as sometimes speculators use profit-based benchmarks. In contrast, if we were to define speculation as altering the timing (size) of hedges, 71% (79%) of the frequent speculators would be evaluated by profit-based metrics.

III. Theories of optimal speculation

In this section, we describe two primary classes of theories of optimal speculation that generate testable predictions about firm characteristics associated with speculation. The first theory, which we denote the convexity theory, provides predictions about the association between speculative activities, firm growth, firm size, and financial flexibility. The second theory, which we denote the profit-making theory, provides predictions about the association between speculative activities, a firm's other operating activities, firm size, and manager characteristics.[5]

[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 the lack of results as evidence that supports these explanations (setting aside power issues).

A. The convexity theory

Campbell and Kracaw (1999) and Adam, DasGupta, and Titman (2004) develop models in which speculation is optimal because profit functions are convex in investment in some regions. Following the terminology of the Campbell and Kracaw model, speculation is optimal when a firm has investment options, but concurrently has an initial endowment below a minimal efficient scale and faces costly external financing. Speculation represents a gamble that can generate enough internal financing to allow investment in the profitable opportunities. Thus, firms will speculate more if they have:

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 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) is below the industry median and equals zero otherwise. The industry median is computed by three-digit SIC using all firms on Compustat with data available to compute SIZE as of fiscal year-end 1997. The second metric is a continuous variable: the ratio of SIZE to the industry median size (I-SIZE). While the convexity theory does not predict a linear relation between

scale and speculation, the continuous variable allows for the fact that industry median is an imperfect proxy for efficient scale. We also create analogous dichotomous and continuous measures of scale using the ratio of fixed assets (PPE) to SIZE as a measure of firm size. Appendix B describes the computation of the variables used throughout the paper.

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 and DE ratios are averaged over fiscal years 1995 to 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 for three groups of the 186 derivatives users: firms that never speculate (n = 103), sometimes speculate (n = 61), and frequently speculate (n = 13).[6] We exclude firms that do not use derivatives from the sample because we are examining theories of speculation and not theories of derivatives use. As a

[6] The group of 103 firms that never speculate includes firms that never speculate with both FX and interest rate derivatives, or never speculate with one type of instrument and did not answer the question for the other instrument. The 61 firms in the "sometimes" speculate group responded that they sometimes actively take positions in both FX and interest rate derivatives, or sometimes speculate with one type of instrument and did not answer the question for the other instrument or never speculated with the other. There are 13 firms that frequently actively take positions in either FX or interest rate derivatives. The remaining nine firms of the 186 that answered that they use derivatives did not answer survey questions 12c and 15bc about actively taking positions based on a market view of exchange rates and interest rates, respectively.

robustness check, we also repeat our analyses defining non-speculators to include firms that do not use derivatives and firms that use derivatives but never take a view.[7]

The frequent speculators have significantly higher average growth opportunities than firms that never or sometimes speculate based on the book-to-market ratio as a proxy for growth opportunities,[8] but they are not significantly different on the basis of their R&D expenditures. The frequent speculators have greater R&D expenditures than the firms that sometimes or never speculate but the differences are not statistically significant.

The patterns in the scale variables are opposite the predictions of the convexity theory, which predicts that firms below efficient scale are more likely to speculate. Firms that frequently speculate are less likely to be below efficient scale (SIZE-BELOW) than the sometimes speculators, which are significantly more likely to be below efficient scale than the firms that never speculate. The frequent speculators also are larger on an industry-relative basis (I-SIZE) than the firms that sometimes speculate, but smaller than the firms that never speculate, although the differences are not statistically significant.

The frequent speculators have significantly lower long-term debt ratios and better debt ratings (insignificant), which could indicate better long-term solvency. The convexity theory, however, predicts that the speculators would have a higher cost of accessing external debt capital, *ceteris paribus*. The groups of firms do not differ statistically on the basis of quick and interest coverage ratios.

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[7] 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, VI and VII. 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. In general, the results for the decision to use derivatives but not speculate mirror those in Geczy, Minton and Schrand (1997).

[8] 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.

Patterns in the separate proxies for good growth opportunities, a low efficient scale endowment, low liquidity, and high costs of external finance are ancillary because the convexity theory as articulated by Campbell and Kracaw (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. To more accurately examine the theory's predictions, we create interaction variables that combine our proxies for growth opportunities (BM), scale (I-SIZE), liquidity (QUICK), and the cost of external finance (COV or DE). The input variables are recoded so that the convexity theory would predict a positive association between the interaction variable and speculation. While 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 convexity theory, 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 convexity story.

B. Speculation as a profit-making activity

Stulz (1996) claims that specific cases of large derivative-related losses like Orange County, Baring Brothers, Proctor and Gamble, and Banc One suggest that managers speculate to make a profit. Stulz provides two theories of 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 changes in the underlying commodity price, FX rate or interest rate. Brown and Khokher (2001) also suggest that firms may invoke a view of market prices that are related to their core (industry-related) competencies.

However, their model allows two additional predictions that differentiate it from Stulz (1996): financial constraints and managerial autonomy are associated with selective hedging. We address the first prediction using the interest coverage ratio and debt to equity ratio as measures of financial constraint. We examine variables that are associated with managerial autonomy in Section IV.

The profit-making theory is usually described in the context of commodity derivatives or the use of interest rate derivatives by financial institutions. 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. Adam and Fernando (2004) and Brown , Crabb, and Haushaulter (2003) explore the implications of these theories for firms in the gold mining industry.

The profit-making explanation suggests that firms that have the greatest information advantage or whose managers believe they 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. The univariate comparisons in Table II indicate that the frequent speculators are significantly larger than the sometimes speculators, and larger (but not significantly) than the firms that never take a view.[9]

[9] 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.

One angle on the profit-making theory is that managers are overconfident in their belief that they have superior knowledge and ability. We examine whether managerial "hubris" – in the spirit of Tate and Malmendier (TM, 2004) – is associated with the likelihood of speculation. The TM measure for hubris is an indictor variable that equals one if a CEO holds an option on his company's stock until expiration (LONGHOLDER). TM argue that it is generally suboptimal for a CEO to hold an option to maturity unless the CEO is overconfident.

Table II reports that the speculator sample has a larger proportion of longholder CEOs than the non-speculators and the firms that sometimes speculate; however, the proportions are insignificantly different. Thus, managerial hubris is not significantly associated with the likelihood of speculation in our sample, although point estimates are in alignment with it. There are three important caveats to these (non) results. First, the longholder indicator variable is computed using data from 477 large firms during the period 1980 to 1994, so it does not match our sample period well. Second, we have the TM hubris measure for only four of the frequent speculators. Finally, LONGHOLDER is measured only for the CEO. As we demonstrate later, CFO incentives are more relevant for the decision to speculate.[10]

We recognize that these proxies for a firm's information advantage are weak at best. Another testable implication of the information advantage theory is that firms earn positive returns to their speculative activities. While tests of this prediction may seem more powerful because profits are objectively measurable, non-positive profits are not a rejection of the information advantage theory. The theory applies if managers *believe* they have superior

[10] In multivariate analyses that follow, managerial hubris does not emerge as a significant correlate of the probability of using derivatives to speculate. We do not report further on the results associated with this variable.

information even if they do not. Given the nature of the data available in this study, we cannot determine whether the speculation was profitable for the speculators.[11]

The second theory of speculation as a profit-making activity proposed by Stulz (1996) is that firms that have economies of scale with respect to derivatives transactions have more profitable arbitrage opportunities due to lower transaction costs.[12] This theory, like the information advantage theory, 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 convexity theory predicts that firms whose size is below minimum efficient scale are more likely to speculate, while the 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 convexity 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. Results of multivariate analysis

Table III reports results of multinomial logit (MNL) analysis of the convexity and profit-making theories. The dependent variable categories in the MNL estimations are that a firm

[11] Adam and Fernando (2004) and 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.

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

never, sometimes, or frequently takes a view. The model in Panel A tests the convexity theory; it includes as independent variables: the book-to-market ratio, a proxy for scale efficiency (I-SIZE), the quick ratio, the debt-to-equity ratio, and an interaction term that captures the combined effect of these forces. The convexity theory predicts that firms with low internal capital (low quick ratios) and high capital costs (high debt-equity ratios) are more likely to speculate.[13] 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.

[Insert Table III here.]

Overall, the results of the MNL regressions in Table III do not support the convexity theory of speculation. There is no relation between the likelihood of speculation and book-to-market ratios as a measure of investment opportunities, quick ratios as a measure of internal liquidity, I-SIZE, our proxy for the efficient scale of the firm, or the interaction variable (BM*I-SIZE*QUICK*DE). Moreover, the predictive ability of the model is weak. The model predicts 141 of the 147 observations to be non-speculators, including all of the frequent speculators and 46 of the 49 firms that sometimes take a view.

In addition, the signs of the coefficients on debt-to-equity ratios are opposite those predicted by the convexity theory. The non-speculators have higher debt-to-equity ratios (marginal probability is 0.7128, p-value = 0.0063), while debt-to-equity ratios are negatively associated with the probability of sometimes speculating (p-value of -0.0487) and of frequent

[13] Firms' quick ratios and D/E ratios are negatively correlated (-0.2982). We include both in the model, but they measure the same constraint to some extent.

speculation (p-value of -0.0178). Assuming a positive correlation between debt-to-equity ratios and the cost of external financing,[14] the convexity theory predicts that firms with higher debt-to-equity ratios have incentives to increase variance and speculate. We find the opposite. Stulz (1996) suggests one interpretation of a negative association between DE ratios and speculation. 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. If higher DE ratios are an indication of distress, then firms with higher DE ratios are less likely to speculate, *ceteris paribus*.

The model in Panel B adds log(SIZE). The addition of firm size has little impact on the other coefficients besides the intercept. The DE ratio remains the only variable with significant explanatory power, although the significance of the marginal probability for the frequent speculators drops (p-value of 0.1236). The frequent speculators and the firms that never speculate are significantly larger as measured by log(SIZE), than the firms that sometimes take a view. The model that includes log(SIZE) is better at predicting sometimes speculators than the model in Panel A. It predicts 16 of the 49 firms correctly. However, it also predicts that 12 of the 89 non-speculators will sometimes take a view.

The larger size of the speculators 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. 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

[14] We also measure financial constraint using the large sample KZ index in Cleary (1999). This index is based on the Kaplan and Zingales (1997) small sample approach to classifying firms as not financially constrained, partially constrained, and financially constrained. The KZ index variable is not significant in any regression when it is included and the reported results do not change.

to which the firms use both interest rate and FX derivatives to frequently take a view. If the information advantage 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.[15] 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 currencies 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 the argument that firms that have economies of scale associated with a derivatives trading operation in general can profit from arbitrage. 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.

Responses to two questions from the survey also suggest that a profit motive underlies speculative behavior. A summary of the responses is in Table IV. First, the derivatives activities of the speculators are most frequently evaluated based on profit relative to a benchmark. The non-speculators and the firms that sometimes speculate are more likely to evaluate their derivatives activities by reduced volatility relative to a benchmark. Second, the benchmarks the

frequent speculators use to evaluate their derivatives activities are different. Related to interest rate exposure, none of the frequent speculators (six firms) evaluate management of the debt portfolio based on the reduction in interest expense volatility, which is a hedging-related motive for using derivatives, compared to 15.9% and 10.2% of the non-speculators and sometimes speculators, respectively. The frequent speculators are more likely to evaluate management of the debt portfolio based on the impact on the cost of funds versus a benchmark. Related to FX exposure, all of the firms that frequently speculate with FX derivatives (nine firms) use a benchmark and 44.4% (22.2%) of them speculate based on spot rates (forward rates). By contrast, 34.8% (21.9%) of the firms that never (sometimes) speculate have no benchmark. The finding that the speculators' benchmark for FX derivatives 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.

[Insert Table IV here.]

IV. Speculation, compensation and governance mechanisms

We classify governance mechanisms over a firm's agents (managers) into two types following John and Kedia (2002). The first type of mechanism aligns the agent's incentives *ex ante* with those of the shareholders. Compensation contracts provide *ex ante* incentives; we analyze the association between compensation and speculation in Section A. The second type of mechanism is a credible pre-commitment to the firm's stakeholders for *ex post* monitoring. For

example, John and Kedia (2002) specifically consider debt contracts and exposure to takeover markets as such mechanisms. We analyze the firm's *ex post* monitoring of derivatives use through pre-commitment strategies in Section B and through internal controls in Section C.

A. Compensation

Assuming speculation is an activity that increases the volatility of underlying 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). Stock options also provide direct incentives to increase volatility. In addition, if speculation is a positive NPV activity, it increases the value of equity-based compensation directly.

There is an extensive empirical literature that examines the association between compensation and risk-taking, in general, or derivatives use, in particular. We broadly interpret the findings as mixed. There is little evidence of a link between compensation and hedging/derivatives use in cross-sectional studies across a broad sample of firms;[16] but there is some early evidence of an association in industry-specific studies.[17]

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)

[16] See, for example, Geczy, Minton, and Schrand (1997), among others. In the specific context of speculation, Brown, Crabb and Haushalter (2003) find no evidence that actively managed changes in the (gold market) hedge ratios of gold producers is connected to compensation proxies.

[17] See, for example, Tufano, 1996, and Schrand and Unal (1998). The proxies for compensation-related risk-taking in these studies simply measure some notion of share ownership and option ownership: the dollar value of shares owned by officers and directors as a group, the number of options held by this group, and managerial share ownership retained in an S&L conversion, and managerial option ownership.

and Brown and Khokher (2001) suggest, incentives for both CEO's and CFO's may be relevant factors for whether firms choose to speculate.

We use two variables to measure the risk-taking incentives provided by the manager's equity-based compensation. Following Core and Guay (1999), DELTA and VEGA capture the sensitivity of a manager's wealth, received through compensation, 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 a 1% change in firm stock return volatility. VEGA captures the manager's incentives to increase the risk of the firm directly. We obtain compensation data from Execucomp and supplemental hand collection from proxy statements. Details of the computation are in Appendix B.

[Insert Table V here.]

Table V reports descriptive statistics of the compensation variables. The average wealth DELTAs of the CEOs range from 457.85 for the firms that sometimes speculate to 710.93 for the firms that never speculate. The average wealth DELTAs of the CFOs are significantly lower. The average VEGAs of the CEO range from 90.06 for the firms that never speculate to 123.42 for the firms that frequently speculate. The VEGAs of the CFOs are again significantly lower.

The average DELTA for the Core and Guay (1999) sample of 5,352 CEO-year observations from 1992 to 1996 is 557.7 with a median of 117.4 and a standard deviation of 3,680.5.

The average wealth DELTA for the CFOs of frequent speculators (165.09) is statistically higher than that of the non-speculators. The CFO VEGAs are also higher, but the difference is not statistically significant. These patterns are consistent with the notion that the CFO's wealth is more sensitive to the outcomes of their decisions that affect stock price and stock return volatility. The differences between DELTA and VEGA for the CEOs of the three groups are not significant.

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 motivate desired behavior are relatively more important because the executive has less need to prove himself or establish a reputation (e.g., Gibbons and Murphy, 1992). The older executive benefits less from non-equity-based incentives such as reputation building.

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. Age and tenure have been used as proxies for both 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 they 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 V shows that the average CEO of frequent speculators has been at the firm longer than the CEOs of the non-speculators and firms that sometimes speculate. There are no distinct patterns in the ages or tenures of the CFOs across the groups. The longer tenure of the CEOs of the frequent speculators is inconsistent with our predictions; however, it is consistent with a positive correlation between firm-size and CEO tenure and a positive correlation between size and speculation.

The multinomial logit analysis of the association between speculation and the compensation variables is in Table VI. The model includes the DELTAs and VEGAs for the CEO and CFO as well as for the two variables that were consistently significant in the preliminary models in Table III (log(SIZE) and DE ratio).[18]

[Insert Table VI here.]

The incentives of the CFO are associated with a firm's choice to speculate. CFO wealth deltas have a positive marginal probability for frequent speculation (p-value of 7.2 percent) and a negative marginal probability for non-speculators (p-value of 10.2 percent). At the same time, CFO wealth vegas have a negative marginal probability for the frequent speculators and a positive marginal probability for the non-speculators, although the estimates are not significant.

[18] We recognize that some readers may raise variable-selection or data-mining objections. Data availability obviously constrains the latitude we have in specifying as full a model as we would like. To those who are 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 VI are not enough in number or character to dispel belief in the results.

This combination of results suggests that CFOs of speculating firms view speculation as a profit-enhancing activity. CFOs 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 value-enhancing. However, CFOs whose wealth is most sensitive to changes in firm volatility are *less* likely to actively take positions. This result is not consistent with the use of speculation merely to increase option value via increased volatility without a corresponding return; rather it suggests a strong distinction between the two kinds of incentives.

In the model presented in Table VI, the coefficients on the CEO deltas and CEO vegas have signs that are opposite those of the CFO. Further investigation of this result, however, indicates that it is related to correlations between the CEO and CFO compensation variables. The Pearson correlation between the deltas (vegas) of the CEO and CFO is 54.8% (84.3%).[19] We run separate MNL regressions that include log(SIZE), the DE ratio, and the two compensation variables (DELTA and VEGA) but only for one executive at a time (results untabulated). The results for the CFO are qualitatively similar. There is no significant association between CEO incentives and the likelihood of speculation.

The coefficients on log(SIZE) and the DE ratio remain the same as those presented in Table III, although the DE ratio is no longer a significant determinant of the likelihood of frequent speculation. The model has better predictive ability than the models in Table III. For example, the model predicts three of the 11 frequent speculators correctly and predicts that two of the 11 are sometimes speculators. The predictions for the non-speculators and the sometimes speculators are also better.

B. Pre-commitment strategies to monitoring

[19] The correlation between the CEO (CFO) delta and the CEO (CFO) vega is 41.0% (48.3%).

The second type of governance mechanism we consider is a bonding mechanism in which the firm commits to monitor managerial actions as a means of reducing agency costs. John and Kedia (2002) analyze debt covenants and takeover defenses as specific examples of such mechanisms; the more general economic construct is an *ex ante* commitment to *ex post* monitoring.

We use the Gompers, Ishii, and Metrick (GIM, 2003) Governance index as one proxy for this construct. GIM use data from the Investor Responsibility Research Center (IRRC) to construct their 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.[20] 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 85 of the 103 non-speculators, 47 of the 61 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

[20] GIM carefully adjust their measure for various opt-out or opt-in choices firms have relative to state laws dictating certain governance behaviors. We make the same adjustments.

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). 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.

Descriptive statistics of the GIM index and its DELAY component are in Table V. Frequent speculators, on average, have higher GIM indices (more control in the hands of management) and significantly higher DELAY indices than firms that never speculate. The DELAY component varies from 2.06 for non-speculators to 2.91 for frequent speculators, a difference that is statistically significant at the 5% level.

Table VII presents the results of the multinomial logit analysis of the governance variables. The model in Panel A adds the Gompers et al. (2003) corporate governance index to the two variables that were significant in Table III: log(SIZE) and the DE ratio. The results for log(SIZE) and the debt-to-equity ratio in general mimic those in Table III. The corporate governance index emerges as an important variable that explains the probability that sample firms frequently speculate. Its marginal probability for the frequent speculators is significantly positive (marginal probability of 0.1171, p-value of 6.6 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.

[Insert Table VII here.]

To better understand the source of the governance index influence, we decompose the governance index into its five subcomponents – DELAY, Protect, Vote, Direct Defense, and State Law – and separately examine their relative importance to explain the likelihood of never, sometimes, or frequently taking a view. Only DELAY significantly influences the likelihood of speculating versus not speculating. Panel B reports the results. The coefficient on the DELAY component is negative for the non-speculators, although the p-value is not significant (0.2259). The relation between DELAY and frequent speculation is positive and significant (p-value of 0.0466). Although GIM are unable to confirm empirically in a returns-based analysis that DELAY is the most relevant sub index, we verify it in the context of our tests.

The result that corporate governance is related to the frequency of speculation remains strong when we include in the model both the compensation variables and DELAY (see Panel C). The relationships between all of the explanatory variables and the likelihood of speculation are similar to those presented previously in terms of both magnitude and significance. The only exception is that the coefficient on log(SIZE) for the frequent speculators is negative. However, like the estimates when just the compensation variables are in the model (Table VI) and when just the DELAY variable is in the model (Panel B), it is not significantly different from zero.

Several of the results presented up to this point can be used to examine the predictions of Brown and Khokher (2001). A rather broad and somewhat indirect implication of their model is that firms may invoke a view of market prices that are correlated with their core (industry-related) competencies. Our analysis thus far generally supports a correlation between a firm's "expertise" and speculation. The Brown and Khokher model, however, also predicts a positive

association between speculation and financial constraint and managerial autonomy. The previously documented associations between leverage and speculation do not support this prediction. Moreover, the positive association between speculation and the GIM index, and in particular the DELAY component of it, is inconsistent with the prediction of Brown and Khokher (2001).

C. Internal controls as a monitoring mechanism for governance

Another type of ex post monitoring device is internal control mechanisms. As with bonding mechanisms, firms can commit ex ante to having internal controls, thereby reducing agency costs. The distinction between bonding mechanisms and internal controls is that internal controls can be designed to monitor specific actions, whereas limited contracting generally constrains the ability of contractual bonding mechanisms to monitor specific behaviors effectively. The importance of internal controls relative to more general bonding mechanisms is likely high for derivative instruments because they are often highly liquid and easily traded, unlike investments in tangible assets, and it is difficult to observe deviant behavior *ex post*.

The survey asks eight questions about internal controls that are related to derivatives use. Data on such controls are generally not available in public documents. Table VIII reports descriptive statistics of these variables.

[Insert Table VIII 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 (95%) for the firms that sometimes speculate and still lower (89%) 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 because decentralized approaches may be ineffective in complex firms. 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 report activities to the Board of Directors (BOD) more frequently. Over 80% of the frequent speculators report derivatives activities to the BOD on a set schedule (monthly, quarterly, or annually). Firms that only sometimes or never take positions report less frequently or have no set schedules. The more frequent reporting schedules of the speculators may again suggest that the speculators have more extensive and complicated activities in general that require such oversight.

Third, the frequent speculators deal with better counterparties on average. They never deal with counterparties rated BBB or lower, while between 1.9% and 3.6% of the sometimes speculators and between 8.8% and 14.6% of the firms that never speculate (depending on the instrument maturity) deal with BBB or lower counterparties. From an internal control perspective, the more important data are that between 11.3% and 14.3% of the firms that never or sometimes speculate have no set policy regarding counterparty risk. All of the frequent

speculators report that they have a policy.

Finally, the frequent speculators differ from the firms that never or sometimes speculate with respect to portfolio valuation. The speculators more frequently value their portfolios. Almost one-third of the frequent speculators value their portfolios daily compared to only 8.5% and 19% of the sometimes and never speculators. The frequent speculators also are more likely to use an internal source or outside dealers to value the portfolio rather than the dealer that originated the transaction, as evidenced by the significantly lower mean scores for these variables. Finally, the frequent speculators are significantly more likely to calculate value at risk measures for some or all of their derivative portfolios. These patterns again suggest greater sophistication with respect to derivatives activities in general for the frequent speculators.

D. Summary of the relation between governance mechanisms and speculation

In summary, the CFOs of the firms that speculate have compensation contracts that provide greater incentives to increase firm value but not necessarily firm risk. Frequent speculators also do *not* use contractual arrangements that bond them to stronger governance in general, at least as measured by the GIM index. But frequent speculators address the potential to abuse derivatives and take "excessive" risks through the implementation of specific controls related to derivatives use. This combination of correlations between speculation and the three types of governance mechanisms is consistent with a profit-making motivation for speculation. Firms that believe taking a view is value-enhancing want to encourage managers to engage in it, and do so through incentive alignment and bonding contracts, but internal monitoring mechanisms and controls are put in place to manage the potential abuse of the instruments.

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 speculators, we also examine the financial statement disclosures for a subset 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.[21] 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 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.[22] 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 activities. In most cases, the disclosures contradict the survey responses. The inconsistency is not necessarily evidence of fraudulent reporting; our definition of "speculation" is not equivalent to the GAAP definition. Nonetheless, the analysis suggests that 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

[21] 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.

[22] 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.

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).[23] If 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

[23] 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 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.

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 specialize in taking a view on rates when they believe they have an information advantage to predict them. Tests of other theories of rational speculation are not supported. The CFOs of firms that speculate have equity-based compensation incentives to do so and survey responses indicate that the speculators are rewarded based on profit benchmarks. They also have a weaker commitment to *ex post* monitoring but a stronger commitment to controlling derivatives use through internal controls such as more frequent and sophisticated valuations, more frequent reporting to the board, and better counterparties. All of these findings are consistent with the idea that some firms view speculation as value-increasing. Finally, an important 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.

An important question is whether these results generalize to other time periods, in particular because the survey occurred prior to the market downturn of the late 1990s and the transparency and governance crisis associated with Enron's bankruptcy that refocused investor attention on derivatives. One could assert that the costs associated with speculation have risen such that speculation overall has decreased, and the question of what motivates speculation is less relevant today. But, if it is not obvious from the financial statements whether a firm is speculating, then the costs really have not risen. While the reporting standards continue to evolve, it is not clear that the financial statements are required to be any more transparent today than they were in 1998 with respect to speculation as we have defined it. In fact, representatives from one of the frequent speculators from 1998 privately suggest that firms probably

"rationalize" their use differently today than they used to (anonymous firm, 2004).[24] However, this statement implies that firms may still speculate in response to the belief that speculation adds value when incentives exist to capitalize on market views.

[24] We are continuing to contact survey respondents in an effort to provide a more complete picture of the evolution of speculative activities, the basis for certain responses in the 1998 survey, and responses to additional questions that have come up during this analysis.

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 = 342)	**Non-Respondents (N = 1,049)**
Number that report using derivatives:		
FX forwards, futures, swaps, options, or other	162	NA
Interest rate forwards, futures, swaps, options, or other	158	NA
Industry:		
Agriculture and forestry	1	7
Mining, oil and gas exploration, and construction	27	51
Food, textiles, lumber, paper, and chemicals	80	233
Rubber, stone, metals, heavy machinery	111	376
Transportation and communications	55	113
Wholesale durable and non-durable goods, retail, and restaurants	40	147
Financial services	3	4
For-profit services	18	96
Healthcare and social services	7	18
Governmental and quasi-governmental services	-	4
Firm characteristics:		
Total assets ($ millions)		
Mean	6,011.02	2,493.69
Median	641.25	391.95
Std deviation	24,163.49	9,137.03
Sales ($ millions)		
Mean	4,752.02	2,569.87
Median	716.90	463.46
Std deviation	13,859.80	8,381.48
Firm Size ($ millions)		
Mean	8,500.03	4,235.17
Median	858.69	568.47
Std deviation	29,403.66	14,128.52

Table II
Selected Characteristics of Speculators and Non-Speculators

Selected characteristics of survey respondents. Appendix B describes the variables. 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 versus the non-speculators (frequent v. sometimes speculators) {frequent v. non-speculators}. *, **, *** denotes significance at the 10%, 5%, and 1% level.

	Non-Speculators (N=103)		Sometimes speculators (N=61)		S v. NS	Frequent speculators (N = 13)		F v. S	F v. NS
Variable	Mean	Std. Dev	Mean	Std. Dev		Mean	Std. Dev		
Growth/Investment opportunities									
Average book-to-market ratio[25]	0.4710	0.4018	0.4495	0.4168		0.2948	0.0993	**	***
R&D expenses/sales	0.0261	0.0474	0.0224	0.0417		0.0537	0.0930		
Scale									
SIZE-BELOW	0.1889	0.3936	0.3600	0.4849	**	0.1000	0.3162		
PPESIZE-BELOW	0.4483	0.5002	0.4400	0.5014		0.2500	0.4629		
I-SIZE	22.8696	113.7146	9.9042	26.7964		14.9925	17.0109		
I-PPESIZE	1.2804	0.9994	1.2633	0.9807		1.3342	0.7060		
Short and long-term liquidity									
Quick ratio	0.3034	0.7198	0.3218	0.5816		0.1843	0.1750		
Interest coverage ratio[26]	8.9341	24.6199	7.0795	10.8613		7.3623	5.9248		
Long-term debt ratio	0.2953	0.1863	0.2343	0.1657	**	0.1656	0.0720	**	***
S&P debt rating	7.4375	3.3747	7.9737	3.3731		7.0000	3.2193		
BM*I-SIZE*Quick*COV	363.82	1,638.62	43.59	127.40	*	122.14	207.87		
BM*I-SIZE*Quick*DE	897.44	5,527.34	45.98	77.13		122.13	181.26		
Firm size: SIZE (log $MM)	8.3666	1.7072	7.5055	1.9475	***	9.0271	1.4937	**	
Hubris: LONGHOLDER	0.065	0.250	0.167	0.389		0.250	0.500		

[25] Excludes a non-speculator with an average BM = -0.001. The interaction variables also exclude this observation.
[26] Excludes a sometimes speculator with an interest coverage ratio of 1,055.47. The next highest interest coverage ratio for the sometimes speculators is 51.92.

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. All firms use derivatives. 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. P-values are for the marginal probability estimates. Variable definitions are in Appendix B.

Panel A: Uses BM*I-SIZE*QUICK*DE

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	-0.0500	0.601	0.0488	0.598	0.0012	0.969
BM*I-SIZE*QUICK*DE[1]	0.0000	0.983	0.0000	0.965	-0.0000	0.854
Book to Market (Ave)	0.0559	0.617	-0.0094	0.932	-0.0465	0.268
I-SIZE	0.0008	0.617	-0.0009	0.603	0.0000	0.954
Quick Ratio (Ave)	0.0526	0.412	-0.0111	0.851	-0.0415	0.330
Debt/Equity (Ave)	0.7128	0.006	-0.5026	0.049	-0.2102	0.018
Number of Obs. (147)	89		49		9	

Panel B: Adds SIZE and uses BM*I-SIZE*QUICK*DE

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	-0.6019	0.028	0.7142	0.008	-0.1123	0.185
LSIZE	0.0638	0.025	-0.0769	0.006	0.0132	0.125
BM*I-SIZE*QUICK*DE	0.0000	0.531	-0.0000	0.564	-0.0000	0.802
Book to Market (Ave)	0.1299	0.228	-0.1206	0.249	-0.0093	0.831
I-SIZE	-0.0004	0.751	0.0009	0.508	-0.0004	0.221
Quick Ratio (Ave)	0.0589	0.342	-0.0399	0.507	-0.0189	0.434
Debt/Equity (Ave)	0.7182	0.005	-0.5852	0.019	-0.1330	0.124
Number of Obs. (147)	89		49		9	

Table IV
Evaluation of the Risk Management Function by Speculators and Non-Speculators

Summary of survey responses about the evaluation of the risk management function for firms that never, sometimes, or frequently actively take positions based on a view about currency or interest rates. 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 versus the non-speculators (frequent v. sometimes speculators) {frequent v. non-speculators}. *, **, *** denotes significance at the 10%, 5%, and 1% level.

	Non-Speculators (n = 103)	Sometimes speculators (n = 61)	S v. NS	Frequent speculators (n = 13)	F v. S	F v. NS
% that evaluate the risk management function by:						
Reduced volatility relative to a benchmark	46.2%	40.4%		8.3%	***	***
Increased profit relative to a benchmark	16.1	24.6		66.7	***	***
Absolute profit/loss	14.0	19.3		16.7		
Risk adjusted performance	23.7	15.8		8.3		
Benchmark for debt portfolio:[27, 28]	*n = 84*	*n = 50*		*n = 6*		
None	37.8%	38.8%		50.0%		
Volatility of interest expense	15.9	10.2		-	**	***
Cost of funds v. market index	25.6	28.6		16.7		
Cost of funds v. duration-matched portfolio	6.1	12.2		33.3		
Cost of funds v. portfolio with specified ratio of fixed to floating rate debt	23.2	26.5		33.3		
Other	8.5	4.1		16.7		
Benchmark for FX activities:[29]	*n = 92*	*n = 35*		*n = 9*		
None	34.8%	21.9%		-	***	***
Forward rates at beg. of period	23.6	40.6	*	44.4%		
Spot rates at beg. of period	18.0	15.6		22.2		
Baseline % hedged strategy	10.1	15.6		22.2		
Other	13.5	6.3		11.1		

[27] More than one can apply.
[28] Forty-six respondents did not answer question 15bc.
[29] Fifty respondents did not answer question 12c.

Table V
Governance Mechanism Proxies of Firms that Frequently, Sometimes, or Never Speculate

Descriptive statistics of the governance mechanism proxies of the survey respondents for firms that never, sometimes, and frequently actively take positions based on a view about currency or interest rates. Appendix B describes the variables. 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 versus the non-speculators (frequent v. sometimes speculators) {frequent v. non-speculators}. *, **, *** denotes significance at the 10%, 5%, and 1% level.

	Non-Speculators (N=103)		Sometimes speculators (N=61)		S v. NS	Frequent speculators (N = 13)		F v. S	F v. NS
Variable	Mean	Std. Dev	Mean	Std. Dev		Mean	Std. Dev		
Compensation variables:									
CEO wealth DELTA	710.93	1477.22	457.85	610.93		601.91	502.85		
CEO wealth VEGA	90.06	82.19	91.19	100.29		123.42	130.46		
CFO wealth DELTA	78.49	100.65	102.63	114.79		165.09	144.15		*
CFO wealth VEGA	20.67	18.13	25.78	23.43		31.29	25.58		
CEO age	57.10	6.41	57.14	5.47		59.25	3.79		
CEO tenure (years)	7.26	6.64	6.74	6.83		6.44	4.72		
CEO with company (years)	19.65	12.48	18.24	12.82		26.61	12.02	**	*
CFO age	50.00	7.29	49.03	7.33		51.77	6.06		
CFO tenure (years)	4.41	3.80	4.56	3.88		3.57	3.30		
CFO with company (years)	12.28	10.25	9.60	8.33		12.74	10.80		
Governance mechanisms:									
Governance Summary Index	9.60	2.81	9.60	2.96		11.00	2.41		
Gov. Index: DELAY component	2.06	1.17	2.21	1.32		2.91	1.38		**

Table VI
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. All firms use derivatives. 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. P-values are for the marginal probability estimates. Variable definitions are in Appendix B.

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	-0.6845	0.101	0.8393	0.035	-0.1548	0.361
Log(Size)	0.1057	0.060	-0.1158	0.031	0.0102	0.619
Debt/Equity (AVE)	0.8253	0.053	-0.5022	0.219	-0.3231	0.163
CEO Wealth Delta	0.0002	0.079	-0.0001	0.484	-0.0001	0.059
CEO Wealth Vega	-0.0031	0.055	0.0024	0.098	0.0007	0.229
CFO Wealth Delta	-0.0022	0.102	0.0013	0.252	0.0008	0.072
CFO Wealth Vega	0.0042	0.454	-0.0027	0.608	-0.0015	0.511
Number of Obs. (83)	44		28		11	

Table VII
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 FX 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. P-values are for the marginal probability estimates. Variable definitions are in Appendix B.

Panel A: Governance measured by the Gompers, Ishii Metrick (2003) overall index

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	-0.4259	0.152	0.6575	0.022	-0.2316	0.067
Log(Size)	0.0620	0.028	-0.0706	0.010	0.0086	0.403
Debt/Equity (AVE)	0.6415	0.016	-0.3848	0.133	-0.2567	0.020
Governance Index	-0.0057	0.700	-0.0060	0.675	0.0117	0.066
Number of Obs. (143)	85		47		11	

Panel B: Governance measured by the DELAY component of the GIM (2003) index

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	-0.4181	0.117	0.5643	0.028	-0.1463	0.165
Log(Size)	0.0654	0.022	-0.0700	0.011	0.0046	0.668
Debt/Equity (AVE)	0.6320	0.019	-0.3903	0.129	-0.2417	0.028
DELAY Index	-0.0417	0.226	0.0148	0.657	0.0269	0.047
Number of Obs. (143)	85		47		11	

Panel C: Governance and compensation proxies

	Non-speculators		Sometimes speculators		Frequent speculators	
	Δ Prob.	P-value	Δ Prob.	P-value.	Δ Prob.	P-value
Constant	-0.6282	0.197	0.7131	0.123	-0.0850	0.620
Log(Size)	0.1394	0.048	-0.1265	0.059	-0.0129	0.600
Debt/Equity (AVE)	0.7312	0.149	-0.4821	0.320	-0.2492	0.258
DELAY Index	-0.1138	0.079	0.0696	0.257	0.0442	0.113
CEO Wealth Delta	0.0002	0.049	-0.0001	0.375	-0.0001	0.096
CEO Wealth Vega	-0.0039	0.029	0.0031	0.055	0.0008	0.166
CFO Wealth Delta	-0.0020	0.093	0.0011	0.297	0.0009	0.049
CFO Wealth Vega	0.0043	0.460	-0.0024	0.654	-0.0018	0.359
Number of Obs. (73)	39		24		10	

Table VIII

Internal Monitoring and Control of Firms that Frequently, Sometimes, or Never Speculate

Descriptive statistics of the internal controls for firms that never, sometimes, and frequently actively take positions based on a view about FX or interest rates. 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 versus the non-speculators (frequent v. sometimes speculators) {frequent v. non-speculators}. *, **, *** denotes significance at the 10%, 5%, and 1% level.

Survey question		**Frequency of taking a view**					
		Never (n = 103)	Sometimes (n = 61)	S. v N.	Frequently (n = 13)	F. v. S.	F. v. N.
3	Risk management activities are:						
	Primarily centralized	89.3%	95.0%		100.0%	*	***
	Primarily decentralized; centralized Coordination	9.7	10.0		7.7		
	Primarily decentralized	2.9	-	*	-		*
17a	% with a documented policy	83.0%	74.6%		84.7%		
17b	Frequency of reporting to the BOD:						
	Monthly	4.0%	1.7%		7.7%		
	Quarterly	21.0	16.9		38.5	*	
	Annually	23.0	13.6		23.1		
	As needed/no set schedule	44.0	62.7	**	23.1	***	
	Other	8.0	5.1		7.7		
	Lowest counterparty rating						
18a	*Maturities 12 months or less:*						
	A	50.0%	51.8%		76.9%	*	*
	AA	19.8	19.6		15.4		
	AAA	3.1	10.7	*	7.7		
	BBB	10.4	3.6	*	-		***
	Less than BBB	4.2	-	**	-		**
	No set policy/Don't know	12.5	14.3		-	***	***
18b	*Maturities more than 12 months:*						
	A	36.3	45.3		46.2		
	AA	36.3	30.2		46.2		
	AAA	5.5	11.3		7.7		
	BBB	6.6	1.9		-		**
	Less than BBB	2.2	-		-		
	No set policy/Don't know	13.2	11.3		-	**	***
19	Frequency of derivatives portfolio valuation						
	Daily	19.0%	8.5%	*	30.8%		
	Weekly	11.0	6.8		7.7		
	Monthly	27.0	30.5		23.1		
	Quarterly	23.0	27.1		23.1		
	Annually	2.0	11.9	**	-	***	
	As needed/no set schedule	18.0	15.3		15.4		
20	Who values the portfolio (ranked 1, 2, 3)						
	Dealer that originated the transaction	1.83	1.64		1.90		
	Other dealer, consultant, or price vendor	1.96	2.16		1.67	*	
	Internal source	1.58	1.94	**	1.42	*	
6	Calculates "value at risk" for derivs. portfolio	40.78%	38.33%		69.23%	**	*

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APPENDIX A: 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.

Appendix B

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.[30]
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). The ratio is the *average* over 1995-1997.
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.

[30]For two firms, we use two-year averages over 1996 and 1997 to calculate BM, QUICK, and DE because 1995 data are 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.[31] The primary source of data is Execucomp. Missing items were supplemented with hand-collection of data from proxy statements and data from CRSP.

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.

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

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 company's close stock price at fiscal year end 1997 (Execucomp variable PRCCF)

X = exercise price of the option[32]

σ = The 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[33]

T = time to maturity of the option in years[34]

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.

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[31] When a firm has two different CEOs or CFOs during the year, we retain the one that had the longest duration. In one case, a new CFO started on July 1, 1997. We retained the CFO from the latter half of the year.

[32] 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 year end (Execucomp variables UEXNUMEX and UEXNUMUN, respectively). Second, we subtract the quotients from the end of fiscal year price (PRCCF).

[33] 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.

[34] 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

AGE Age of executive in years in 1997.

TENURE Number of years that the executive has been in his position as of December 31, 1997.[35]

WITHCO Number of years that the executive has been with the company (Execucomp variable JOINED_C) as of December 31, 1997.

[35] If we were only able to find the year that an executive started in his position or with the company, the start month and day were set to July 1.

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