

CEO Overconfidence and Corporate Derivative Hedging Decisions

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This study investigated the effects of management overconfidence on corporate decisions to hedge financial risk. More specifically, it encompassed an investigation of whether chief executive officer (CEO) level of confidence affects the firm's decision to hedge interest rate and foreign currency exchange risk exposures. The main purpose of the study was to test the hypotheses that over-confident managers undervalue risk, and consequently, would use less derivative hedging than lower-confident managers. The study utilized a logit regression model to estimate the relationship between CEO overconfidence and hedging decisions for a sample of the standards and poor's 500 (S&P 500) firms faced with interest rate and foreign currency exchange risk exposures. The preliminary empirical results illustrated a statistically significant positive relationship for interest rate derivative usages and the CEO overconfidence variable. The results also revealed that CEO overconfidence had a statistically insignificant positive relationship with the usage of derivatives to hedge foreign exchange risk. In addition, dividend yield and firm size were found to have significant effects on firms' decisions to use derivatives to hedge interest rate risk exposure.

Filed of Research: Behavioral Finance, Corporate Hedging, Derivative, CEO overconfidence.

1- Introduction

Empirical studies have examined derivative holdings to identify causes that lead corporations to hedge financial risk exposures. This paper contributes to the empirical literature in hedging decisions by investigating a new factor that has not been tested in prior studies. It examines the relationship between corporate hedging and CEO level of confidence. More specifically, it examines whether the CEO level of confidence (high vs. low) affects the firm's decision to hedge interest rate and foreign currency exchange risk exposures.

The main purpose of the study is to test the hypotheses that over-confident managers undervalue risk, and consequently, use derivative hedging less than lower-confident managers. The related literature indicates that overconfident managers are more likely to predict the occurrence of favorable future events more often than unfavorable events. Furthermore, overconfident managers believe their

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firm is less risky than it actually is, and consequently, is less likely to experience financial distress. Therefore, I expect overconfident CEOs to engage in a reduced usage of hedging derivatives for interest rate risk and foreign currency exchange risk exposures.

The paper proceeds as follows. Section 2 reviews the literature related to corporate hedging and corporate governance. Section 3 discusses the methodology utilized and details the main variables of the study. Section 4 presents information about the data used in the empirical tests. Section 5 presents the results of the study and Section 6 illustrates the conclusions and limitations of the study.

2- Literature Review

The unsettled debate in the literature about the real motives behind corporate hedging is the main motive of this paper. To accomplish this, the relationship between CEO confidence and hedging activity will be examined. The following discussion illustrates studies that have examined the motivations for hedging

Jorion (1991) revealed that exchange risk was not priced on the United States (US) stock market, concluding that the exchange rate risk was insignificant and US investors did not require a premium for bearing the risk. This result was challenged by Doukas, Hall and Lang (1999). Geczy, Minton and Schrand (1997) revealed that the currency derivative usage increases when the firms face greater growth opportunities and tighter financial constraints. They also found that firms with extensive foreign exchange rate exposure and economies of scale in hedging activities were more likely to use currency derivatives.

In a different direction, Perfect, Wiles, and Howton (2000) investigated the influence of managerial compensation and corporate hedging. Their results suggest that deferred compensation does little to motivate managers to hedge optimally, while options tend to encourage hedging. Lin and Smith (2003) examined the interaction between hedging, financing and investment decision, illustrating that hedging was positively related to leverage. Their results are consistent with the debt capacity argument.

In another study, Knope, Nam and Thornton (2002) found that hedging activity was positively related to the sensitivity of the manager's stock option portfolio. They also found a non-statistically significant result, that hedging activities were negatively related to the sensitivity of the manager's stock option portfolio to stock return volatility. Tufano (1996) found evidence that hedging increased with managerial shareholdings and decreased with managerial option ownership. Geczy et al. (1997) and Haushalter (1998) found no evidence that managerial risk aversion or shareholdings affected corporate hedging (.).

Haushalter (1998) and Gay and Nam (1999) used debt ratio to measure the expected costs of distress and found that a higher debt ratio led to greater hedging. They interpreted this relationship as evidence that greater expected financial distress costs cause greater hedging. In addition, the previous studies found that the likelihood of using derivatives increases with firm size. A positive size

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effect is consistent with the argument that firms do not hedge with derivatives, unless the benefits are larger than the fixed costs of establishing a hedging program.

In conclusion, the hedging literature indicates that firms may hedge for several reasons: to benefit by hedging from the convex corporate tax function, to reduce the cost of financial distress, to avert managerial risk and to receive compensation. The study will control for these incentives and extend the literature base by examining the relationship between the insider trading of CEOs, which serves as a proxy for confidence level, and a corporations hedging decisions.

The literature on managerial over-confidence was pioneered by Roll (1986), who investigated the hubris hypothesis of takeover, explaining the role of biased managers in corporate takeovers. He documented that firms employing hubris management overvalue the takeover benefit and pay too much for their targets.

The recent literature has provided a more quantifiable way to measure managerial overconfidence. Malmendier and Tate (2002) provided two measures for overconfidence. First, they used the timing of a manager's stock option exercise as a proxy for overconfidence and argued that managers who hold their stock options until expiration can be classified as overconfident. Second, they measured overconfidence by managers net purchasing of the firm's stock. Managers who purchase more than they sell for an extended period of time (5 years in their study) were classified as overconfident. They found that these two measures were highly correlated. This study will employ the second measure of overconfidence, as the data for this measure were freely available.

Malmendier and Tate (2002) used the first Malmendier and Tate (2002) measure to document that overconfident CEOs were more eager to make acquisitions, especially when their firm had abundant internal resources. They concluded that overconfident CEOs were more likely to undertake value destroying acquisition than rational managers. Malmendier and Tate (2004) investigated the relationship between corporate investment decisions and overconfidence and found that corporate investment decisions were significantly more responsive to cash flow if the CEO displayed an overconfidence.

Hackbarth (2004) developed a model that examined the effect of managerial traits on the capital structure decision and the firm's value. The model illustrated that overconfident manager's chose a higher level of debt, issued debt more often and tended to time the capital structure decisions. He assumed that managers were rational in all aspects, except for how they perceived the firm's growth rate and riskiness. The author cited DeLong, Shleifer, Summer, and Waldmann (1991) , stating that they found that optimistic managers usually overestimated the growth rate of cash flows, while overconfident managers underestimated the riskiness of cash flows. They argued that overconfident managers believed that a firm was less risky than it actually was, and therefore, were less likely to experience financial distress.

In a similar direction, Fahlenbrach (2004) investigated the relationship between founder CEOs and stock market performance. He found that firms run by founder CEOs had a higher accounting performance and a higher firm valuation. Firms that

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were run by founder CEOs invested more in R&D, had higher capital expenditures, and made more focused mergers and acquisitions. However, he did not consider the relationship between founder CEOs and the overconfidence level, which might explain the study's results. Founder CEOs may be characterized with a higher or lower confidence level than other CEOs.

Following Knope, Nam, and Thornton (2002), this paper focuses on the CEOs of a company for two reasons. "First, using all officers and directors mixes the incentives of the agent with different motivations. Second, while it is almost certainly true that more officers than just the CEO of the firm are involved in the hedging decision, the CEO retain ultimate authority over such as important decision as the hedging activities of the firm"

In view of the literature, the hypothesis is that CEO overconfidence would have a significant affect on the firm's decision to hedge, as they undervalue the future riskiness of cash flow.

3- Methodology

Mamendier and Tate (2002) measured overconfidence as the CEOs habitual purchase of his/her company stock. They explained that a rational CEO should minimize their holdings of the company stock, to the extent that is possible to divest themselves from idiosyncratic risk. They argued that overconfidence was the reason why CEOs habitually increased their equity position by acquiring new shares, or accumulating new stock grants without selling any shares to compensate. They classified a CEO as an overconfident CEO if he/she was a net buyer in the first years of the sample. A net buyer was a CEO who bought stocks at least one more year than he/she sold stock during his/her first five sample years. In this study, I replicate Mamendier and Tate (2002) measurement of overconfidence.

The paper utilized a logit regression to estimate the likelihood that a firm used derivatives. The model was estimated with a dependent variable that was equal to one for derivative users and zero for nonusers. I will then estimate a model for interest rate derivatives and another for currency derivatives. Based on the related literature, the following variables will be the primary independent variables Investigated in this study (Geczy, Minton and Schrand 1997).

- CEO over-confidence: a binary variable that is equal to one if the CEO is classified as overconfident, and zero otherwise.
- The ratio of the book to market value of the firm: the book value of the common shareholder's equity as of the end of the year, less the outstanding preferred stock.
- The market value: the closing share price multiplied by the common shares outstanding at year-end.
- Interest rate coverage ratio: The ratio of pretax income for 2001 plus interest expenses to interest expense plus capitalized interest.
- Long term debt ratio: Ratio of the book value of the long-term debt at the end of the fiscal year to firm total asset (size)
- Dividend yield: Ratio of cash dividends per share to the closing price per share at the end of the year.

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- Quick ratio: Ratio of cash and short term investment as of the fiscal year end to the current liability at year end.
- Foreign sales ratio: foreign sales to total sales.
- Size: The natural logarithm of total assets.

4- Data

Information about each firm from the study S&P 500 sample fiscal year-end derivatives ownership was collected from 10-k forms filed electronically in the security exchange commission's(SEC) Electronic Data Gathering and Retrieval (EDGAR) database for the year 2001. Effective December 15, 1994, the SFAS 119 requires firms to report detailed information on the direction and purpose of national holdings. This study restricts its analysis to the hedging practices of non-financial firms, because financial firms include both users and providers of the risk management product. Restricting the sample to firms that face ex-ante financial price risks reduces the noise in the empirical tests, by focusing on the major cross-sectional differences that affect the incentives for hedging.

The source of the insider trading data was the Ownership Reporting System, Records of the Securities and Exchange Commission (SEC), obtained by the National Archives and Records Administration (<http://www.archives.gov>). The data set summarized all insider transactions in all publicly held firms that were reported to the SEC from July 1978 to December 2001. The data items included the date of each transaction, the classification of the insider, the name of the insider, the type of the transaction, and the number of shares transacted.

The names of the sample firms were collected from the S&P 500 list of non-financial companies. The sample firms were exposed to exchange and interest rate risks. Previous studies used the following as an indication of exchange risk exposure: the firm disclosed foreign assets in the Compustat Geographic Segment file or disclosed positive values of 1) foreign currency adjustment 2) exchange rate effect 3) foreign income taxes or 4) deferred foreign taxes in annual Compustat files (Graham and Regress, 1999). This paper classified firms with foreign sales ratios of over .01 as exposed to a currency exchange risk. The original sample included 165 companies, however, after excluding firms that did not have insider information, the firms that had its current CEO for less than 5 years and companies that had missing data, the final sample included 55 companies.

The following table presents the descriptive statistics. The sample firm had a high exposure of exchange risk, according to the foreign sale mean ratio (0.2 for currency derivatives users and 0.17 for non-users).

Table 1- Descriptive Statistics for the sample of firms that used currency derivatives

	OC	Size	BM	TAX Coverage	LD_ RATIO	DIV_YLD	Q_ RATIO	F_SALE _RATIO
Mean	0.278	8.897	0.417	44.340	0.210	1.504	1.258	20.358
Median	0.000	8.986	0.328	2.598	0.215	1.327	0.845	16.508
Maximum	1.000	11.417	1.678	1242.850	0.500	6.076	4.580	40.028
Minimum	0.000	6.833	0.065	-479.855	0.000	0.000	0.314	1.354
Std. Dev.	0.454	1.144	0.336	232.895	0.151	1.638	1.167	11.156
Probability	0.024	0.560	0.000	0.000	0.421	0.025	0.000	0.331
Observations	36.000	36.000	36.000	36.000	36.000	36.000	36.000	36.000

OC: CEO Overconfidence, a binary variable, BM: Book to market, Div_YLD: Dividend yield ratio, F-Sale_Ratio: Foreign sales ratio, LD_Ratio: Long term debt ratio, Size: Natural logarithm of total assets, PR_TAX_COV: pre tax interest coverage ratio, and Q_Ratio Quick ratio

Table 2- Descriptive statistics for the sample of firms that were non-users of currency derivatives

	OC	Size	BM	TAX_ COV	LD_ RATIO	DIV_YLD	Q_ RATIO	F_SALE _RATIO
Mean	0.421	8.912	0.474	17.929	0.274	0.629	0.867	17.093
Median	0.000	8.849	0.356	5.726	0.251	0.342	0.772	15.746
Maximum	1.000	10.513	1.818	113.736	0.608	2.282	2.071	37.881
Minimum	0.000	7.324	0.014	-3.217	0.006	0.000	0.118	0.000
Std. Dev.	0.320	0.964	0.409	33.396	0.148	0.750	0.538	11.171
Probability	0.204	0.520	0.000	0.000	0.834	0.282	0.435	0.600
Observations	19.000	19.000	19.000	19.000	19.000	19.000	19.000	19.000

OC: CEO Overconfidence, a binary variable, BM: Book to market, Div_YLD: Dividend yield ratio, F-Sale_Ratio: Foreign sales ratio, LD_Ratio: Long term debt ratio, Size: Natural logarithm of total assets, PR_TAX_COV: pretax interest coverage ratio, and Q_Ratio Quick ratio

5- Empirical results

The results in Table 3 illustrate that overconfidence is not significant to the firm usage of currency derivatives. Moreover, the coefficient sign is positive, which is not consistent with the prediction of the hypotheses of this paper. One explanation for the positive sign on the overconfidence measure is that overconfidence loses its affect for foreign sales. In other words, when foreign sales are high, firms may hedge, irrespective of CEO overconfidence.

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Table 3: Logit estimation of the relationship between the likelihood of a firm's usage of currency derivatives and proxies for incentives to hedge.

Dependent Variable: FX derivatives
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 12/19/04 Time: 22:44
Sample: 1 55
Included observations: 55
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-4.305899	3.962828	-1.086573	0.2772
Overconfidence	0.027867	0.825801	0.033746	0.9731
Book to Market	-0.584704	1.115243	-0.524284	0.6001
Dividend Yield	0.919445	0.350572	2.622701	0.0087
Foreign Sales Ratio	0.036969	0.032883	1.124244	0.2609
Long term Debt Ratio	-2.856202	2.497129	-1.143795	0.2527
Size	0.370024	0.400067	0.924907	0.355
Pre Tax Coverage Ratio	0.00091	0.00319	0.285194	0.7755
Quick Ratio	0.869951	0.55397	1.570393	0.1163
Mean dependent var	0.654545	S.D. dependent var	0.4799	
S.E. of regression	0.444766	Akaike info criterion	1.3233	
Sum squared resid	9.099562	Schwarz criterion	1.6517	
Log likelihood	-27.3897	Hannan-Quinn criter.	1.4503	
Restr. log likelihood	-35.4523	Avg. log likelihood	-0.498	
LR statistic (8 df)	16.12521	McFadden R-squared	0.2274	
Probability(LR stat)	0.040623			
Obs with Dep=0	19	Total obs	55	
Obs with Dep=1	36			

Table 4 illustrates that the overconfidence sign changes to the predicted negative sign after the foreign sales ratio was excluded from the regression. This may indicate a strong effect of foreign sales on the decision to hedge, in a way that the overconfident CEO effect on hedging is weak when the foreign sales are large, as is the case in this sample. This unexpected result may also be due to the small sample size, because of the difficulty in collecting the data and the small variations in the dependent variables. This can be improved in two ways. First, by the inclusion of more firms in the sample. Second, by using the national value of derivatives as independent variables.

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Table 4: Logit estimation of the relationship between the likelihood of a firm's use of currency derivatives and proxies for incentives to hedge, excluding the foreign sales ratio.

Dependent Variable: FX derivatives
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 12/20/04 Time: 18:52
Sample: 1 55
Included observations: 55
Convergence achieved after 5 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-2.757354	3.63583	-0.75838	0.4482
Overconfidence	-0.083368	0.793516	-0.10506	0.9163
Book to Market	-0.70663	1.026019	-0.68871	0.491
Dividend Yield	0.925609	0.355325	2.604967	0.0092
Long term Debt Ratio	-3.080209	2.437913	-1.26346	0.2064
Size	0.29623	0.38188	0.775716	0.4379
Pre Tax Coverage Ratio	0.000257	0.002906	0.088283	0.9297
Quick Ratio	0.867386	0.578407	1.499614	0.1337
Mean dependent var	0.654545	S.D. dependent var		0.479899
S.E. of regression	0.445544	Akaike info criterion		1.310849
Sum squared resid	9.329952	Schwarz criterion		1.602824
Log likelihood	-28.04834	Hannan-Quinn criter.		1.423758
Restr. log likelihood	-35.4523	Avg. log likelihood		-0.50997
LR statistic (7 df)	14.80793	McFadden R-squared		0.208843
Probability(LR stat)	0.038542			
Obs with Dep=0	19	Total obs		55
Obs with Dep=1	36			

Table 5 illustrates the results of the logit regression for the likelihood of using interest rate derivatives. The results reveal a weak significant support of overconfidence, but with a positive sign. Even though the results are still not significant for many of the variables, the results have improved likelihood of using currency derivative. The reason for this improvement is that there was more variation in the dependent variable of the interest rate derivatives usage, than that of the currency derivatives. This may indicate that the increase in the sample and the variations in the dependent variable may improve the results.

Table 5:

Logit estimation of the relationship between the likelihood of a firm's use of interest rate derivatives and proxies for incentives to hedge.

Dependent Variable: Interest rate derivative usage
 Method: ML - Binary Logit (Quadratic hill climbing)
 Date: 12/19/04 Time: 22:42
 Sample: 1 55
 Included observations: 55
 Convergence achieved after 5 iterations
 Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-7.952229	3.942085	-2.01727	0.0437
Overconfidence	1.463044	0.829238	1.764322	0.0777
Book to Market	-1.677763	1.070214	-1.56769	0.117
Dividend Yield	0.579833	0.289175	2.005129	0.0449
Foreign Sales Ratio	0.021338	0.031419	0.67914	0.497
Long term Debt Ratio	2.204324	2.379707	0.9263	0.3543
Size	0.738173	0.386025	1.91224	0.0558
Pre Tax Coverage Ratio	-0.000688	0.002474	-0.27797	0.781
Quick Ratio	0.215879	0.419481	0.514633	0.6068
Mean dependent var	0.527273	S.D. dependent var		0.503857
S.E. of regression	0.466986	Akaike info criterion		1.381273
Sum squared resid	10.03148	Schwarz criterion		1.709746
Log likelihood	-28.98501	Hannan-Quinn criter.		1.508296
Restr. log likelihood	-38.04124	Avg. log likelihood		-0.527
LR statistic (8 df)	18.11245	McFadden R-squared		0.238063
Probability(LR stat)	0.020399			
Obs with Dep=0	26	Total obs		55
Obs with Dep=1	29			

The results have improved for interest rate derivative decision. The overconfidence measure was found to be weakly significant. However, the coefficient was positive, which is contrary to the expectation of the paper. Dividend yield and size had a significant affect on the decision to use interest rate derivatives.

6- Conclusions and limitations

The empirical results of this study illustrate a statistically significant positive relationship for interest rate derivative usage and CEO overconfidence. This reveals that CEO overconfidence has a statistically insignificant positive relationship to the usage of derivatives to hedge foreign exchange risk. The results illustrate that dividend yield and firm size had significant effects on a firms' decisions to use

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derivatives to hedge interest rate risk exposure. The results also indicate that the ratio of foreign sales may have an impact on the CEO overconfidence relationship to interest rate and currency derivatives usage, in that the CEO is involved in hedging decisions as long as foreign sales do not offset the CEOs influence in hedging decisions.

As this was preliminary study, it has some limitations that can be improved upon in future studies. The main limitation is the small sample size that resulted because of the difficulty in collecting the data. The criteria used in selecting the sample can also be improved. I used foreign sales as the main criterion for collecting the sample. I recommend that future studies use more criteria to select the sample to select firms that have less exposure than in my sample. Some firms used derivatives for speculation reasons and may have been included in the samples of hedgers. This problem can be solved by analyzing a larger sample of firms.

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