

Risk management in non-financial firms: Evidence from the U.S. market

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1 Preliminary Proposal

Numerous contributions in the literature developed theoretical explanations for corporate hedging.¹ Though, there are still not any widely accepted motives for risk management as a corporate function. In particular finding the determinants of a company hedging and measuring the impact of risk management policies on the firm value are crucial questions that are not fully answered.

In order to address these questions, this paper provides empirical evidence about risk management practises of *1,000* firms by telling first, which of the theoretical models for optimal hedging is verified in our dataset and second, which are the benefits that can be realized from reducing risk and the costs associated with risk reduction.

In the basic Modigliani and Miller (M&M) world, hedging does not alter firm value. Theoretical research on corporate risk management is founded on the relaxation of one or more of the M&M assumptions: several explanations for optimal hedging are provided that results from different type of capital market imperfections. Firms use derivatives first, to reduce the variation in cash flow or earnings that might otherwise preclude firms from investing in valuable growth opportunities and so to maintain the access to cheap capital, that is, internal funds (Froot, Scharfstein, and Stein (1993)). Second, to lower the expected costs of financial distress by reducing the variance of the firm's cash flows (Smith and Stulz, 1985). Third, to increase the expected values of tax benefits by reducing the value of government's implicit call option on the firm's assets (Smith and Stulz, 1985). Fourth, to decrease informational asymmetries (De Marzo and Duffie, 1991) or to disentangle business related profits and losses from profit and losses related to market exposures (De Marzo and Duffie, 1995). Finally,

¹Corporate hedging refers to the use of off-balance sheet instruments, such as forwards, futures, swaps and options, in order to reduce the volatility of firm value. Hedging through on-balance-sheet strategies, like for instance relocating abroad production facilities to hedge currency risk exposure, is taken as predetermined in this paper.

firms use derivatives as this is an incentive for managers because of their wealth invested in the firm or through stock options (May, 1995 and Tufano, 1996 for the gold industry).

Moreover as a general matter, it should be considered that costs associated with maintaining a risk management program in general and choosing a specific derivative instrument play a crucial role in the firm decision to use derivatives and in its choice among different derivatives strategies.

The lack of publicly available information on corporate hedging activity is the principal limit to the empirical research in this area. This information is limited to off-balance-sheet disclosures in financial statements footnotes.² Given this constraint, previous empirical work on hedging has relied primarily on survey-based data, such as Nance et al. (1993) or the Wharton School survey (1998). Our paper is related to few papers in the literature which provide evidence about derivatives use and risk management practises by employing periodical report disclosures rather than survey data. For instance Gezcy et al. (1997) examine the use of currency derivatives and find that firms with greater growth opportunities and tighter financial constraints are more likely to hedge. Mian (1996) finds no evidence that hedging is associated with growth options and his data do not provide any support for models of hedging based on financial distress costs.

The contribution of our paper to the extant literature is first, to provide a comprehensive empirical evidence on risk management practises, including also interest rate risk hedging. Second, we try to reconcile some conflicting evidence of previous studies by a careful examination of two sources of periodical disclosure for a large sample of 1,000 U.S. non-financial firms. Third, we extend previous empirical work including original explanatory variables in order to test theoretical models. Finally, we examine in greater detail the benefits realized from managing risk exposures.

We obtain data about the use of derivatives by reading the 10-K filings for fiscal year-end 1999 and by examining the annual financial statements available on the NAARS file on the LEXIS/NEXIS database for the year 1999. (*There is a publication "Corporate risk management handbook" of Risk Publications which probably contains other useful data about derivatives usage.*)

We just observe if a firm is using derivatives or not, while we do not consider the magnitude of these hedging activities because notional amounts are not available for every firm and especially because the figures are often very noisy.

In order to understand if observing derivatives' use is actually equivalent to observing risk management practises, we should make sure that our variables measure hedging rather than speculation. Hence, we employ proxy variables

²Only recently a new accounting standard for derivative instruments requires, roughly speaking, all derivatives to be recorded on the balance sheet at fair market value and marked to market each reporting period. FAS 133 (Statement of Financial Accounting Standard No. 133 "Accounting for Derivative Investments and Hedging Activities"), originally released in draft form in June 1996, became effective in June 2000 for financial statements ending ????.

The International Accounting Standards Board 39 ruling, making derivative reporting a global requirement, is taking effect June 30, 2001; it is expected that all countries will begin to move toward universal compliance.

such as some firm characteristics which are related just to speculation motives, as in Geczy et al. (1997). In particular a firm is rationally speculating if it has an informative advantage about the assets underlying the derivatives or if it has economy of scale in transaction costs for derivatives usage; this suggests that potential proxy variables are the variety of derivatives used or the size of the firm.

We will estimate logit regressions in order to relate the probability of hedging to the determinants of hedging. The explanatory variables will describe the investment opportunity set, liquid assets (for the trade off between liquid assets and hedging see Opler et al., 1999), the tax variables, the firm size, the firm's financial structure, the firm's liquidity situation and some variables related to the stock market, like analysts coverage and stock price performance. The main part of the data describing these explanatory variables will be obtained by COMPUSTAT database. The variable illustrating the choice among different types of derivatives will be used to proxy for the persuasiveness of the risk management activity and to distinguish between hedging and speculative derivative activity.

In Section 2, we review existing theories, identify economic incentives for a firm to hedge and summarize testable implications. We describe our data in Section 3 and in Section 4 we use a logistic regression to analyze the determinants of hedging activities. Section 5 presents conclusions along with a comparison of our findings with those from previous work.

2 References

- Bodnar, Hayt and Marston, 1998 Survey Wharton School
- DeMarzo Duffie, 1991 Journal of Economic Theory
- DeMarzo Duffie, 1995 Review of Financial Studies
- Froot, Scharfstein, and Stein, 1993 Journal of Finance
- Geczy, Minton, and Schrand, 1997 Journal of Finance
- May, 1995 Journal of Finance
- Mian, 1996 Journal of Financial and Quantitative Analysis
- Nance, Smith and Smithson, 1993 Journal of Finance
- Opler, Pinkowitz, Stulz, and Williamson, 1999, Journal of Financial Economics
- Smith and Stulz, 1985 Journal of Financial and Quantitative Analysis
- Tufano, 1996 Journal of Finance