

Risk management and hedging



Risk Management And Hedging In Derivatives Market

Risk management can be undertaken in several different manners, which often depends on the structure and initiatives for the specific firm. One commonly used approach is to hedge in the derivatives market, which consists of futures, forwards, swaps, CFDs, warrants, convertibles and options. Derivatives are financial instruments whose value and performance depends on the value of underlying assets, for example equities, stock market indices, exchange rates, commodities etc.

The main argument for hedging is for companies to minimize risks that may arise from interest rates, exchange rates, and other market variables and volatilities. By engaging in derivatives companies manage their various risks by hedging a position, to be more certain what the outcome will be. For example, one can hedge a certain amount of currency at a future point in time, in order to know exactly how much that will be received/paid at the specific time – thereby avoiding the risk of losing value because of the exchange rate risk.

There are however also arguments against hedging in the derivatives market. Establishing hedging programs may be very costly, and if there are alternative and more cost efficient ways to reduce risks, such as operational and financial strategies, that could be preferable. Furthermore, sometimes hedging may lead to losses even though there is a gain on the underlying asset, which is a scenario that is difficult to explain to stakeholders. If losses appear too often, this could cause mistrust from the shareholders, and should then be avoided. One has to consider the overall trade-off between costs and savings when engaging in hedging to manage and reduce risks. It

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is therefore also necessary for management to undergo thorough risk assessments and to construct firm specific schedules, in order to identify the most significant risks and subsequently to establish risk preventing actions. Hedging is in addition mostly used by institutions that are extensively exposed to the various business and market risks, and who most of the time would benefit from undertaking such actions. However, derivatives may also be used by the private sector if necessary.

The article *Who Manages Risk? An Empirical Examination of Risk Management Practices in the Gold Mining Industry* by Peter Tufano examines a new database that details corporate risk management activity in the North American gold mining industry. The article claims that academics know remarkably little about corporate risk management practice, even though almost three fourths of corporations have adopted at least some financial engineering techniques to control their exposures to interest rates, foreign exchange rates, and commodity prices. There is little empirical support for the predictive power of theories that view risk management as a means to maximize shareholder value.

The article furthermore describes risk management practices and tests their conformance with existing theory by analyzing an industry that seems almost tailor-made for academic investigation: the North American gold mining industry. These firms share a common and clear exposure in that their output is a globally traded, volatile commodity. Firms can manage this exposure using a rich set of instruments, including forward and futures contracts, gold swaps, gold or bullion loans, rolling forward commitments called spot deferred contracts, and options. Perhaps most importantly, firms

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in the gold mining industry disclose their risk management activities in great detail.

The gold industry has embraced risk management: over 85 percent of the firms in the industry used at least some sort of gold price risk management in 1990-1993. Using industry-specific measures for firms' exposures, cost structures, and investment programs, Tufano tests whether cross-sectional differences in risk management activity can be explained by academic theory. For example, theory predicts more extensive risk management by firms more likely to face financial distress, which in this industry can be measured by operating costs and leverage. Other theories posit that corporate risk management activities might be linked to risk aversion of corporate managers, and the form in which they hold a stake in the firm. These theories would predict that firms whose managers hold greater equity stakes as a fraction of their private wealth would be more inclined to manage gold price risk, but those whose managers hold options might be less inclined to manage gold price risk. This article tests the predictive (as compared with the prescriptive) power of the various theories, i. e., whether they help describe the choices made by firms. He finds that gold mining firms' risk management decisions are consistent with some of the extant theory. Managerial risk aversion seems particularly relevant; the data bear out Smith and Stulz's (1985) prediction that firms whose managers own more stock options manage less gold price risk, and those whose managers have more wealth invested in common stock manage more gold price risk. These results seem robust under a variety of econometric specifications, and using a number of alternative proxy variables. In contrast, theories that

explain risk management as a means to reduce the costs of financial distress, to break the firm's dependence on external financing, or to reduce expected taxes are not supported strongly. He also finds that firm risk management levels appear to be higher for firms with smaller outside block holdings and lower cash balances, and whose senior financial managers have shorter job tenures.

“ Managing Foreign Exchange Risk with Derivatives” by Gregory W. Brown is a field study of HDG, a multinational manufacturing company of durable equipment with sales in more than 50 countries that actively encounters 24 different currency exchanges. Although multinational companies like HDG are always exposed to foreign exchange risk, this is one of very few studies that investigate the risk management operations for a non-financial corporation. Since multinational companies tend to be very complex, while using multiple strategies, a field study of this nature provides a deeper understanding of how the risk management process works. Dr. Brown attempts to answer to three main questions. First he wants to understand how the Forex risk management program is structured; second, why the firm focuses on management of exchange risk; finally what HDG uses within their hedging derivative portfolio in order to minimize their foreign exchange risk.

In order to get a comprehensive understanding Dr. Brown investigated HDG over 14 quarters starting from 1995 and ending in 1998. The structure of HDG's foreign exchange group consisted of 11 employees who were not considered “ traders”, with an average experience of 4 years, whose focus was not only hedging foreign exchange risk. The program cost which

included salaries and overhead was approximately \$1.5M annually, and the overall transactional costs averaged around \$2.3M annually. HDG had an actual foreign exchange risk policy which focused to reduce transactional, translational, and overall economic exposures. In order to meet this policy the group actively engaged in spot and forward contracts, currency put option, and currency call options. Traditional economic theories usually illustrate hedging Forex risk for benefits such as reducing taxable income, protecting against potential costs of financial distress, and reducing overall volatility of wealth. HDG however, focused its risk management program on smoothing out earnings impacts, providing the company with competitive pricing, and enabling improved internal control management. In some ways it seemed that HDG was attempting to use Forex risk hedging in a speculative attempt to increase potential income and thereby increase overall firm value.

The procedure used in Forex risk hedging was quite simplistic. The department would not use live market feeds but rather sources such as Bloomberg to signify a “ hedge rate” from current market rates and overall cost of derivatives. This information would then be passed onto the tax department and after review would be developed into a hedging strategy to forecast future hedging activity. Brown’s statistical studies of HDG’s hedging activities concluded that the model’s R-squared value increased as the time horizon decreased. This indicated that the companies hedging activity was dramatically affected by its most recent hedging transactions. This may seem rather obvious but the strongest tests only indicated 55% in accuracy. In all Brown explains there is much more in the way of testing that needs to

beconducted in order to better evaluate which additional factors significantly influence the Forex risk management of multinational non-financial companies. This study should be the start of a new investigation in understanding currency risk perspectives.

In ‘ Risk Measurement and Hedging: With and Without Derivatives’, Petersen and Thiagarajan (2000) explore the reasons for two gold mining companies to use opposite approaches in managing their risk, namely American Barrick, which aggressively hedges its gold price risk with derivatives, and Homestake Mining, which uses no derivatives. By studying two firms from the same industry, which hardly has any variation in product quality, the fundamental differences that lead to the different approaches in risk management can be examined.

Homestake Mining is focused on developing its own properties and hence, spends more on exploration costs (capital and labour costs), which makes high gold prices profitable if they are not correlated with exploration costs. The greater need of investment capital Homestakes Mining has when gold prices are high makes reductions in the volatility of operating cash flow less valuable to it as a complete hedging would take cash flow away when gold prices are high, i. e. when Homestake Mining is in need of it.

The different opportunities companies possess of also explain some reasons for different risk management strategies. Homestake Mining has for example lower costs of adjusting the mining output than American Barrick as the former can (over a short period) alter the quality of the ore that is mined. This mining strategy creates costs that vary positively with the price of gold

and thus provides the firm with a natural hedge, which American Barrick does not possess of.

As managers will act differently according to the risk they are personally bearing, compensation strategies is of utmost importance when it comes to risk management. Both the American Barrick and Homestake Mining use options to link the managerial wealth to the shareholder wealth, however, American Barrick does so more intensively. Also, its compensation is equity-focused where the bonuses are linked to the stock values, whereas Homestake Minings's bonuses are linked to the profitability, which explains why the latter adjusts its costs as gold prices change. The earnings are quite volatile, however through this can be reduced by different choices of accounting techniques, which is the reason for Homestake Mining to changes them in opposite direction to gold prices, where American Barrick rarely alters its accounting choices at all.

From the above findings one may conclude that the choice of managing risks depends on various firms' specific characteristics; their firm structure, management contracts and incentives. Specifically, it is a matter of the trade-off between costs and savings/benefits. Establishing and maintaining derivatives program is often quite costly, and therefore the alternative of using other methods to hedge risks may be preferable.

In the article Hedging and Coordinated Risk Management: Evidence from Thrift Conversions, the writers argue that the firms risk management can be used to reallocate the firms total risk between different sources, rather than reduce it. So in this case hedging doesn't necessarily equal total risk

reduction as often stated, but rather a technique of risk-reallocation or as an essential part of a firm's profit-maximizing strategy. This becomes clearer if we separate risk into two types, based on the activities where the firms have their comparative information advantages, namely:

-Core business risk: Firms earn rents or economic profit for taking on activities bearing this risk.

-Homogenous risk: Financial risk as interest rate changes, foreign currency exchange rates, or commodity prices. By contrast there is no compensation for bearing this kind of risk. (This doesn't necessarily apply if the firm has a comparative information advantage in the financial risk sector, then financial risk can then become core business risk.

If we now consider a risky asset, it may be viewed as a portfolio of multiple claims from the owners. These claims are bundled together which basically means that the firm must take on all the projects if it wants any of them. A subset of these projects may be "core business projects" which have a positive NPV for the firm, and the remaining subset may be projects bearing homogenous risk with $NPV = 0$ (the firm hasn't any disadvantage/advantage compared to others in assessing the unsystematic risk). The total variability of a portfolio's cash flow of course includes both risk types. An example of this could be a farmer expecting payment for breeding pigs. Then his superior equipment or animal feed preparation would be categorized as activities bearing core business risk, while the price of pork would be homogenous risk.

When increase in total risk is costly, risk composition becomes more important as the firm value becomes a concave function of the expected cash flows. Therefore if the risky asset was separable (which it is not), we would only seek to invest in positive NPV projects with core business risk. However this is not the case and therefore we can instead make a trade off by decreasing homogenous risk while gaining additional exposure to core business risk and still maintain the target level of total risk. This substitution is called “coordinated risk management” and can be attained by the use of derivatives.

They test for coordinated risk management in a sample of thrifts that convert from the mutual to stock form of ownership. These conversions have been used to recapitalize the thrift industry since 1982 where legal barriers were cleared. From '83 to '88, 571 conversions issuing stock totaling over \$10 billion were completed, compared to only 130 mutual-to-stock conversions between '75 and '82.

At the end of '82, stock saving and loans managed only 30% of the industry's assets, but by the end of '88, stock saving and loans controlled 74% of the industry's total assets, going from \$686 billion to \$1, 4 trillion.

These converting thrifts provided an interesting sample to test whether the use of hedging can be part of an overall strategy to increase total risk. They argued that converting thrifts will attempt to increase their overall level of firm risk following conversion due to changes that occur at the time of conversion. In other words, these institutions are a unique case relative to

empirical studies of risk management that focuses on firms with incentives to decrease total risk.

The reasons for converting institutions to increase total firm risk are likely because of these two major reasons:

1. A converting institution's ability to take risk increases at the time of conversion, even though the investment opportunities do not change. This is because conversion provides financial slack and access to capital markets. A conversion typically proceeds at least the book value of equity of the mutual thrift. Assuming that pre-conversion mutual equity meets regulatory capital requirements, doubling the capital ratio creates a larger borrowing capacity that can be used to double the asset size of the thrift. Increasing thrift size does not necessarily imply an increase of thrift risk. However, thrifts usually have incentives to grow by investing in riskier assets because of flat deposit insurance premiums that allow thrifts to shift risk to the government.

2. Converting institutions are predicted to increase the total firm risk following because of the change in their managers' incentives for risk taking. Before the conversion, managers receive a fixed salary. But upon conversion, shareholders are able to include stock and stock options in a manager's compensation contract, aligning the managers' interest with the shareholders. In this situation, the manager will typically be more willing to take risks in order to maximize firm value.

The Test

Schrand and Unal has used sample data from conversions completed between January 1, 1984 and December 31, 1988. They have also made

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some selecting in the sample excluding the supervisory mergers and merger-conversions. Also they further exclude smaller companies by having a minimum limit of \$100 million among the sample company's. As of the methodology Schrand and Unal have used a quantitative time-series study, where they have analyzed the changes in total risk, interest-rate risk and credit risk using an ordinary least squares method.

The model is a form of a least squares method where they have added the term $\text{Time}(t+k)$. The extra term is an indicator variable which is equal to one if quarter t is k quarters from the conversion quarters, and if not the term equals zero. As of the independent variables in the model, they can be seen as tests, indicating the differences between the risks of the average converting institution and the risks of the average institution in the control group.

However the model doesn't indicate whether the interest risk and credit risk are coordinated. Therefore Schrand and Unal have used another model to analyze if there is an association between the interest risk and the credit risk. The model which is a pooled time-series cross-sectional regression is computed as follows:

Here Schrand and Unal predict a positive slope between the interest risk (XSNET) and the credit risk (XSHIGH).

The Empirical Results

The study show that the converting institutions capital position increases with roughly 70 percent after the conversion. Also the study shows that the converting institutions significantly decrease their exposure to interest risk.

However the Credit risk increases when converting, because of taking more risk in their loan portfolios. Further the study indicates that the investment patterns are related to the actual conversion rather than the time-trend within the industry. Also they conclude that the increased use of derivatives is a strategic decision and not a mechanical phenomenon.

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