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Corporate Risk Management Costs and Benefits

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This paper establishes a framework within which the costs and the benefits of corporate risk management decisions can be analyzed. The most important conclusion is that risk management strategies should be pursued to enhance shareholder value. Although systematic hedging of all variation in the net cashflows may be in the best interest of the management, such behavior is inconsistent with maximizing firm and shareholder value. The extant empirical evidence cited is supportive of the notion that the strongest motive for risk management behavior is the avoidance of financial distress. However, there are offsetting costs to consider as well. The existence of these costs makes it imperative that shareholders understand the risk management process.

1. Introduction

Modern financial theory is based on three major paradigms: rational wealth maximization, the risk/return tradeoff, and the no-arbitrage principle. Risk management, both from a theoretical and applied perspective, can be best understood within the context of these paradigms and their extensions to each of the three major areas of finance: corporate finance, financial intermediation, and investments. This paper is designed to do this and, thus, to focus on the benefits and costs of corporate risk management. The various risks that a corporate manager must deal with are discussed within this structure.

Depending on the point of reference, risk can be defined in a number of ways. Focusing on the concept of wealth and value, it can be defined as the volatility of unexpected outcomes as it affects assets and liabilities (e.g., see Jorion, 1997, p. 6).

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Although it may be apparent that this volatility, (i.e., risk) should be managed, the perspective of the risk manager must be considered if the risk management process is to be understood. At least two different hypotheses have been advanced to explain why risk should be managed: shareholder value maximization and managerial risk aversion. The shareholder value maximization hypothesis predicts that a firm will engage in risk management policies if, and only if, they enhance the firm's value and thus its shareholders' value. This value enhancement can arise from one of three sources: (1) minimization of the costs of financial distress, (2) minimization of taxes, and (3) minimization of the possibility that the firm may be forced to forego positive NPV projects because it lacks the internally generated funds to do so (i.e., minimizing the probability of the occurrence of the under-investment problem).

Alternatively, the managerial risk aversion hypothesis is based on an agency argument. It holds that managers will seek to maximize their personal wealth, at times, at the expense of shareholders. Specifically, when the interests of shareholders are not perfectly aligned with those of the managers, the latter may pursue risk management strategies designed to insulate their own personal wealth from the effects of changes in interest rates, commodity prices, or foreign currency values. These steps may be taken without regard for the consequences of these decisions for shareholders' wealth.

Therefore, regardless of whether shareholder value maximization or managerial risk aversion is the driving force, engagement in risk management practices is to be observed. The extent and the intensity of these practices, however, will be dependent on the nature of the risk – return relationship. In this regard, theories governing the risk – return relationship predict that a reward is associated with the assumption of certain types of risks, but not others. Thus, in order to determine whether risk management activities lead to a reward (or benefit), one needs to identify the type of risk addressed.

2. Sources of risk

It can be said that, in general, firms face three sources of risk: business risk, strategic risk, and financial risk. Business risk is fundamental to the firm and is inherent in the firm's operations. This type of risk, sometimes identified as operating risk, can be technological, distributional, or informational. Firms will assume these risks to exploit a competitive advantage in technology, distribution, or information. More importantly, much of this risk can be controlled via management's internal operating decisions. Indeed, if the firm does not enjoy a competitive advantage that would allow it to control its operating risk, then it stands little chance of being rewarded for bearing this risk. As a result, firms unable to mitigate their operating risk on advantageous terms may ultimately fail. Montgomery Ward, the one-time retail giant, is an excellent example of this type of failure.

Strategic risk encompasses macro factors that affect the firm and, by extension, the value to its shareholders. These events can be economic or political and can be

domestic or international. The Japanese banking crisis and the Asian currency crisis would represent examples of international events. Increased regulation of the US securities markets and

changes in the US tax structure may be classified as examples of domestic economic events. Fundamental changes in government, such as the dissolution of the Soviet Union and shifts in the congressional majority, illustrate strategic political risks. A common feature of these risk factors is that they are long-lived and can, therefore, affect a firm's value for many years. Therefore, value consequences of strategic risk factors are long term, and are longer in duration than those attributable to business risk factors. Accordingly, prudence at the time of making the firm's long-term investment decisions will hold the key to the minimization of their adverse effects. When prudence is exercised and investments are carried out with appropriate safeguards built in, the firm's projects will yield long-term cash flows that are desirably stable. However, it should be emphasized that investments which exhibit strategic stability typically are also expensive to implement and difficult to cancel.

In contrast to strategic risk, financial risk arises from adverse changes over relatively shorter time horizons in interest rates, commodity prices, equity prices, and foreign currency values. Adverse changes in these factors translate into real losses in shareholder value. Of course, the extent of these losses depends on the form and the magnitude of the firm's net cash flow exposure to each of these factors. The operational question that arises is whether the firm should attempt to manage these types of short-term financial risk. The answer is not obvious, and depends on whether or not the firm enjoys an informational advantage over the shareholders in the capital markets.

3. Shareholder wealth maximization hypothesis

Consider a perfect and frictionless world as characterized by Modigliani and Miller. Such a world is populated by rational wealth maximizers who will decline the opportunity to engage in any activity leading to an erosion in their wealth. They are in possession of all available information and, thus, will generate security prices that will accurately reflect the systematic risk for each firm. Since each firm's systematic risk is accurately assessed, its cost of capital will be the minimum return required by the firm's shareholders for the assumption of its inherent systematic risk. (All risks unique to the firm can be eliminated via diversification and will not affect the cost of capital.) Further, the firm's value is determined by the present value of the expected future net cash flows.

Given this setting, risk management strategies can enhance shareholder value only if they lead to a lower cost of capital to the firm or if they reduce the expected costs associated with the exposure of the firm's net cash flow stream to the to-be-hedged risks. However, neither the firm nor its shareholders will be able to affect its cost of capital, given that it is set in an efficient capital market and that it is a function, only, of its systematic risk. Moreover, risk management strategies can lead to an increase in the value of the expected net cash flows of the firm only by reducing the costs associated with their unsystematic variations. However, in a world characterized by our assumptions, shareholders own fully diversified portfolios that

are, by construction, devoid of all unsystematic variations. Therefore, if the firm chooses to engage in a risk management strategy, a loss in shareholder value will ensue. More specifically, the implementation by the firm of a hedging strategy designed to eliminate the unsystematic risk will duplicate shareholders' previously achieved results at an additional set of transactions costs. This will reduce the firm's value and leave the shareholders worse off, compared to a no-hedging strategy. (Notice that the firm holds no advantage over the shareholders under these conditions).

Relaxing the Modigliani and Miller assumptions would result in an imperfect world populated by rational wealth maximizers, who must deal with transaction costs and asymmetric information. Within this setting, the implementation of risk management strategies would be a value-enhancing activity (so long as it is carried out by rational wealth maximizer agents). However, the resulting enhancement in value may accrue to the shareholders, managers, or both. Specifically, risk management strategies can benefit both parties when the manager's incentives are perfectly aligned with those of the shareholders (e.g., through optimal compensation schemes). Under such conditions, risk management strategies will not be implemented unless the expected benefits outweigh the costs. While the costs are fairly easy to identify (the direct-out-of-pocket costs of the hedge as well as the indirect costs associated with the planning and the administration of the hedge), the benefits are more difficult to explain. Principally, these benefits are derived from either a minimization of costs of financial distress, or from a minimization of taxes. It is our contention that the benefits to the shareholders are derived from the former (i.e., the minimization of costs of financial distress) rather than the latter. The tax hypothesis relies on a convex tax schedule that has a detrimental impact on the firm's ability to meet its financial obligations. Under the current US tax code, losses incurred by the firm can be carried back or forward. Therefore, ignoring the opportunity costs associated with the timing of tax payments (or refunds), the firm lacks incentive to expend resources on strategies aimed at smoothing of its tax burden. On the other hand, variations in a firm's net cash flows can, and do, increase the chances of financial distress and of bankruptcy. Therefore, they are capable of destroying shareholder value. As such, unless the firm takes an appropriate set of steps to preserve this value, shareholders will demand a higher return as compensation. It follows, then, that firms that implement risk management strategies (aimed at avoiding the adverse affects of financial distress on shareholder value) will be rewarded with a lower required rate of return.

4. The underinvestment problem

One of the consequences of financial distress is the underinvestment problem. Simply stated, faced with inadequate internally generated funds, when external funds are deemed too expensive (or impossible) to secure, the firm may decline investing in positive NPV projects. Froot, Scharfstein, and Stein (1993) take the position that this is the most important reason for a firm to actively engage in risk management strategies. Their analysis is based on three assumptions: (1) firms

create shareholder value by investing in positive NPV projects; (2) internally generated funds, i.e., net operating cash flows, are the most important source of capital; and (3) these flows can be adversely affected by changes in interest rates, commodity prices, and foreign exchange rates. It follows then that, if the sources of the internally generated funds are not protected, the firm may be forced to forego profitable growth opportunities and shareholder value will erode. However, if the firm pursues risk management policies that insure the existence of internally generated funds necessary to undertake positive NPV projects, both firm and shareholder value will be enhanced.

5. The managerial risk aversion hypothesis

Consider the imperfect world once again, and allow for the presence of market frictions of the type that lead to lower transactions and hedging costs for the firm (as compared to those for the individual shareholders). Further, assume divergence between the interests of management and the shareholders of the firm. Under such conditions, the managerial risk aversion hypothesis predicts that the managers will engage in full cover hedging. That is, they will attempt to eliminate deviations below, as well as those above, the mean of the probability distribution of the firm's net cash flows. This pattern of risk management may be further strengthened by managerial compensation schemes that encourage the achievement of static performance targets.

Therefore, the managerial risk aversion hypothesis holds that risk management strategies are implemented, principally, to enhance the position of the firm's management. This brings into focus the agency costs arising from the conflicts between management and shareholders. In analyzing this, consider that full cover hedging eliminates desirable (upper tail) outcomes as well as all the undesirable (lower tail) outcomes. As such, full cover hedging enhances neither the firm nor shareholder value. The benefits derived from it, if any, accrue only to the management. Indeed, in its extreme form, full cover hedging can be used to protect the management at the expense of shareholders. The premise is that hedging strategies can be used to perpetuate negative NPV projects in order to protect managerial perquisites. The specific strategy used to insulate management is cash flow hedging, i.e., structuring the operating cash flows such that the firm will be able to continue its investments without having to rely upon funding from external capital markets. This provides the benefit of avoiding expensive external capital, but at a cost—that of removing the discipline and the scrutiny imposed by the external capital markets on management.

In short, when management and shareholders are aligned (and cash flow hedging is used properly), sufficient funds will be available to pursue positive NPV projects. The adoption of these types of projects will, in turn, result in an increase in both firm value and shareholder value. Conversely, in the presence of extreme conflict between the management and shareholders (and the improper use of cash flow hedging), the management will be able to secure funding for projects that actually destroy shareholder value. It is important that these types of agency costs be evaluated as real costs of risk management (e.g., see Tufano, 1998).

6. Selective hedging

Relying on evidence from observed corporate behavior, Stultz (1999) questions the efficacy of the managerial risk aversion hypothesis and full cover hedging. He hypothesizes that a model of selective hedging may be a better predictor of corporate behavior. Accordingly, he argues that in a world characterized by asymmetric information and transaction costs, shareholder risk management will not be a perfect substitute for corporate risk management and that firms will be forced to bear business or operational risk. This risk becomes tolerable if the firm enjoys a competitive advantage over its rivals within the industry. This advantage (in information or expertise) may provide the firm superior access to the capital markets. This can be utilized by the management to determine if shareholder value can, indeed, be enhanced by routinely hedging all of the unsystematic variations in the firm's net cash flows associated with its financial exposures. Therefore, when the firm enjoys a favorable position in the credit markets, commodity markets, or the foreign exchange markets, it will engage in selective hedging strategies in order to avoid the lower tail outcomes, while attempting to capture the benefits of the upper tail outcomes. Accordingly, those types of exposure that position the firm to benefit from the upper tail outcomes will not be hedged. Evidence provided by Fatemi and Glaum (2000) is supportive of the predictions of the selective hedging hypothesis in a sample of German nonfinancial firms. Further, their evidence suggests that these firms, occasionally, pursue risk-seeking strategies. (This is consistent with the premise that selective hedging is motivated by comparative advantage.)

7. Capital structure considerations

In the absence of a material probability of financial distress, the selective hedging hypothesis may provide us a good explanation for the observed corporate risk management practices of firms. Otherwise, minimizing the probability of distress may be the overriding motive. However, it is important to note that a side benefit of this minimization pertains to the firm's capital structure. Hedging activities that lead to the elimination of the unsystematic variation of the firm's net cash flows result in a stable stream of funds. Stable patterns of cash flows are, of course, the ideal means of servicing debt. The more predictable the pattern of cash flows, the lower the required return demanded by the bondholders and the larger the debt capacity of the firm. The combined effect is to permit the firm to increase the debt in its capital structure and to avoid expensive equity financing. In this manner, risk management activities of the firm become a substitute for equity financing. Stultz recognizes these benefits in the context of the interrelationships among capital structure, ownership structure, and risk management strategy. He stresses that risk management decision should not be made in isolation and without considering the firm's capital structure.

Consider first a firm with a capital structure consisting of a very small amount of debt and a large amount of equity. There is virtually no chance that this firm will experience a default and financial distress (i.e., a lower tail outcome). Since this firm will be able to fund its positive NPV projects from internally generated sources, it

has no need to hedge its cash flows. Accordingly, it would not be expected to engage in risk management activities. However, Stultz argues that it would be suboptimal for this firm not to engage in risk management. The firm can do better for its shareholders by capturing the capital structure benefits of risk management: acquiring more debt and controlling default and financial distress through hedging strategies.

Next, consider a second firm with a large proportion of debt in its capital structure and one that faces a moderate chance of default and, thus, experiencing financial distress. This firm's shareholders would demand that the firm engage in hedging and risk management activities in order to minimize its chances of experiencing a lower tail outcome. When it chooses to do so, the firm will end up protecting its financing flexibility needed to undertake positive NPV investments. Accordingly, risk management activities, motivated as such, will be rewarded by an enhancement in shareholder value.

Finally, consider a third firm: one that is too highly levered, subject to a high probability of default and, therefore, likely to suffer from a catastrophic lower tail event. This is tantamount to experiencing financial distress and an engagement in risk management activities will not lead to an easing of the stress. Therefore, one would not expect this firm to engage in any type of hedging. Indeed, with an eye on a probability (albeit small) of salvaging some kind of value, shareholders will encourage the management to undertake projects that are highly volatile. This speculative activity is the obverse of full cover hedging and it increases the chances of capturing a large payoff associated with an upper tail event. Of course, the problem with this strategy is that it jeopardizes the claims of the bondholders and the existing covenants may preclude the firm from implementing it.

8. The empirical evidence

A number of attempts have been made to determine whether firms pursue a shareholder value maximization strategy or a managerial risk aversion strategy. Smith (1995), Smithson (1998), and Stultz (1999) cite numerous surveys and empirical studies that examine corporate risk management behavior. In general, these studies focus on the reasons underlying the value maximization and pay little attention to the issue of agency conflicts. There are two problems with investigating the agency conflicts. First, the data are firm-specific and hard to obtain. Second, the absence of external funding does not necessarily imply suboptimal investment policies and agency conflicts. A strong argument can be made that the absence of external funding is the result of prior value-enhancing investment policies of the firm (funded by internally generated cash flows and pursued by managers who are aligned with the shareholders). It remains to be seen whether or not these ambiguities can be resolved and the relationship between agency conflicts and risk management strategies better understood.

In contrast to the managerial risk aversion hypothesis, the shareholder value maximization hypothesis has been the subject of numerous empirical studies. Much effort has been devoted to investigating the relationship between corporate risk management practices and the three sources of value: minimizing costs of

financial distress, avoiding the underinvestment problem, and minimizing taxes. Most of these, however, have dealt with the use of exchange traded derivatives as the tool of risk management. The evidence is supportive of the notion that corporate risk managers pursue strategies aimed at minimizing the costs of financial distress and avoiding the underinvestment problem. On the other hand, there is little evidence supportive of the notion that minimizing taxes is a motive for corporations to pursue risk management strategies.

Empirical studies of Bodnar, Hayt, and Marston (1996, 1998), Dolde (1995), Geczy, Minton, and Schrand (1997), Mian (1996), and Nance, Smith, and Smithson (1993) all examine the corporate use of derivatives and provide only mild support for the notion that corporate hedging is carried out to minimize the underinvestment problem. Since some of these findings can be attributed to poorly defined proxies for corporate investment activity and opportunity, one should not conclude that avoiding the underinvestment problem is not important to corporate managers. A more recent study by Gay and Nam (1998) utilizes better proxies for corporate investment opportunities and employs a more rigorous methodology for studying the relationship between financial derivatives and the underinvestment problem. Their results provide strong support for the hypothesis that corporate hedging activity is carried out to minimize the underinvestment problem. Specifically, Gay and Nam find that firms with enhanced investment opportunity sets increase their use of derivatives as their levels of internally generated cash decline. They also show that when internally generated cash flows are positively correlated with investment opportunities, firms use fewer derivatives.

The Gay and Nam results clearly support the shareholder value maximization hypothesis. These results indicate that firms act in a manner consistent with the predictions of Froot, Scharfstein, and Stein: minimizing the underinvestment problem. The Gay and Nam results also shed some light on Stultz's selective hedging hypothesis. Recall that selective hedging is based on comparative advantage and seeks to only eliminate the lower tail outcomes. If firms have such an advantage, they should be able to exploit it to match their funding needs when undertaking positive NPV projects. This can be accomplished by establishing natural hedges where operating cash flows will be aligned with funding requirements. It follows then that resources will not be wasted by routinely hedging all net cash flow variations, thus eliminating the possibility of capturing benefits associated with the upper tail events. The inverse relationship between operating cash flows and derivative use, documented by Gay and Nam, is consistent with policies designed to capitalize on natural or operational hedges.

Finally, a study by Hentschel and Kothari (2001) examines the corporate use of derivatives from a regulatory perspective. The study was motivated by the lack of empirical evidence regarding the effects of derivatives on firms' risk characteristics. Anecdotal evidence cited in the popular press conveys the impression that corporate use of derivative instruments increases the riskiness of the firm, and poses a danger to shareholders. Hentschel and Kothari find that derivatives have no significant effect on the volatility of the firm's returns. Thus, they conclude that concern over widespread corporate speculation via derivative instruments is

unfounded, and that regulators should exercise restraint when it comes to corporate use of derivative instruments.

9. Summary and conclusions

In this paper, we have established a framework within which the costs and the benefits of corporate risk management decisions can be analyzed. The most important conclusion is that risk management strategies should be pursued to enhance shareholder value. Routinely hedging all variation in the net cashflows may be consistent with management's aversion to risk, but it is inconsistent with maximizing firm and shareholder value. Froot, Scharfstein, and Stein present theoretical arguments that are consistent with the value maximization hypothesis. They show that the most important reason for risk management is to protect net cashflows, which are internally generated and minimize the underinvestment problem. Gay and Nam provide convincing empirical evidence that supports Froot, Scharfstein, and Stein and strengthens the case for Stultz's theory of comparative advantage and selective hedging.

Stultz's theory predicts that managers can enhance shareholder value by exploiting an advantage in information or expertise when choosing which net cashflow exposures to hedge. Selectively hedging exposures minimizes the costs of financial distress and the probability of lower tail outcomes while preserving the gains associated with upper tail events. Further, following this strategy yields two important benefits. First, it provides the flexibility to pursue positive NPV growth opportunities with internally generated funds. Second, it affords the firm the opportunity to use risk management strategies aimed at minimizing the probability of financial distress and thus increasing its debt capacity.

Therefore, a clear conclusion can be drawn: risk management activities can lead to the enhancement of value for shareholders. However, there are offsetting costs to consider as well. The theoretical arguments presented by Froot, Scharfstein, and Stein, and by Stultz assume that the management's interests were aligned with those of the shareholders. Tufano questions the validity of this assumption. He presents arguments that illustrate how managers can use cashflow hedging tactics to insulate itself from the shareholders. These costs will continue to take a toll on shareholder value until the engendering agency conflicts are resolved. The existence of these costs makes it imperative that shareholders understand the risk management process.

Shareholders who act according to the predictions of either the theory of comparative advantage and selective hedging (as developed by Stultz) or the preservation of internally generated operating cashflows (as advocated by Froot, Scharfstein, and Stein) will reward managers for minimizing the probability of financial distress. Further, they will not penalize them for exploiting informational and operational advantages. On the other hand, informed shareholders will not be fooled by managers who pursue risk management strategies designed to enhance their personal wealth at shareholder expense.

The extant empirical evidence is supportive of the notion that the strongest motive for risk management behavior is the avoidance of financial distress.

Future research should focus on this motive within Stultz's comparative advantage framework. Particular attention should be paid to the agency costs of the risk management process as described by Tufano. Finally, this comparative advantage/agency cost framework should be applied to both US and non-US firms.

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