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RISK MANAGEMENT, CAPITAL STRUCTURE, AND PERFORMANCE: A REAL OPTIONS PERSPECTIVE

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ABSTRACT

The use of derivative instruments has grown exponentially over the past decades reflecting significant advancements in the management of financial risks in global corporations. The development of enterprise risk management practices has further enhanced the ability to counter adverse effects from longer-term economic exposures. The related improvements in corporate risk management capabilities and the emergence of alternative risk-transfer opportunities should extend the utilization of existing capital resources and even reduce the need for capital reserves as a buffer against exogenous shocks from the business environment. These relationships are tested empirically on a sample of 1323 firms operating in different industries. The analyses indicate that effective risk management has a positive association with financial leverage and economic performance. However, the results also indicate that the performance effects of risk management are enhanced by lower financial leverage across industries except the financial sector where the inverse relationships are observed. The paper adopts real options logic to explain these findings and provides important insights to the handling of economic exposures with repercussions for the adoption of effective corporate risk management approaches.

I. INTRODUCTION

Surveys on the use of derivatives in global financial markets show exponential growth over the past decades with the total nominal contractual outstanding now exceeding US$ 270 trillion and confirm that large multinational corporations use derivatives actively to manage the basic risk exposures of their business activities (e.g., BIS, 1998, 2001, 2005; ISDA, 2003). The widespread use of derivatives and the emergence of new alternative risk-transfer instruments provide the basis for diversifying exposures among market participants through the exchange of residual risk obligations and thereby improve their risk management capabilities (e.g., Merton, 1995). One consequence of this development should be that corporations with effective risk management capabilities reduce the need for capital reserves as a financial buffer to shield against bankruptcy risk imposed by environmental uncertainty. It may further be argued that effective risk management reduces the cost of capital and thereby expands the availability of economically viable business opportunities and thus leads to superior performance. This paper presents a recent study analyzing these relationships based on a comprehensive dataset for the period 1996-2000 comprising 1323 firms operating in different industrial environments.

The study provides empirical support for the propositions that risk management is associated with higher financial leverage and economic performance after controlling for potential effects of corporate size, environmental dynamism, potential agency conflicts, and book to market ratios. However, the findings also indicate a positive interaction effect between risk management and lower financial leverage on economic performance, which may appear counter intuitive in view of the general propositions. Assuming real options logic helps explain why a certain capital reserve may be instrumental for the ability to create real options and exploit the upside economic potential of real option structures embedded in corporate resource endowments. This rationale is supported by analyses of the cross sectional industry sample where firm-specific option structures are assumed to have general relevance whereas the inverse relationships are found in the financial sector where engagement in traded financial derivatives predominate. These results have ramifications for the risk management approaches assumed by non-financial corporate enterprises.

The paper is structured as follows. First, there is a brief overview of basic financial market developments and their risk management implications. Then capital structure decisions as discussed in the finance and strategy literatures are considered in the context of risk management and transaction cost economics, agency theoretical, and real options perspectives underpin the development of central hypotheses. Following this, the paper describes an empirical study performed to test the hypotheses and the results of the study are presented. Finally, the paper offers a discussion of the findings and provides tentative conclusions.

II. DERIVATIVES AND RISK-TRANSFER

The explosive growth in derivative instruments is a major characteristic of developments in the global financial markets that provide new investment venues and allow market participants to hedge against fluctuations in foreign exchange rates, interest rates, commodity prices, credit exposures, etc. (e.g., Andersen, 1993; Rawls and Smithson, 1990). These instruments comprise exchange traded futures and options contracts and a wide range of over-the-counter products traded in international dealer markets. Around 70% of the outstanding in these instruments constitutes positions held between financial intermediaries while the remainder relates to positions with non-financial corporate enterprises (BIS, 2005). Hence, the liquidity in these financial instruments is relatively high and a substantial share of outstanding contracts relates to corporate risk management activities and this share has been increasing over the past decade. Many of the associated risk management techniques have been developed in the financial sector where institutions typically are exposed to the market risks associated with traded financial instruments and many of the techniques have been extended to deal with corporate business exposures (e.g., Miller, 1998; Saunders, 1997). The focus on risk management has intensified with the growing use of derivatives and the emergence of new risk-transfer solutions that reduce the cost of financial distress and thereby reduce the need for capital reserves (e.g., Colarossi, 2000; Froot, 1999).

With the increasing complexity of financial instruments it has become essential to integrate the assessment of different market risks, e.g., as expressed in the value-at risk concept (e.g., Saunders, 1997; Chorafas, 1998). In the context of corporate business risk, it is also important to consider longer-term economic and strategic exposures that exceed the often limited time horizon of traded derivatives that rarely exceeds 12-18 months (Andersen, 1993; Eiteman, Stonehill and Moffett, 1997). Hence, enterprise risk management considers market prices, environmental hazards, political, competitive, technology, and other types of risk that may affect economic performance (DeLoach, 2000; Lam, 2003). In other words, the risk management perspective is extended well beyond a focus on price risks in the global financial markets. Since business risk exposures often require responses that are unique to the individual corporation there is a limit to how far traded financial derivatives can accomplish this task. Financial derivatives exist for many traded assets but do not extend to firm specific strategic risk factors, such as, environmental contingencies in technology, sourcing, distribution, etc. To deal with these types of risk, a corporation may try to invest in the creation of real options that can enhance the firm's ability to respond to competitive risk exposures. A real option structure constitutes a right, but not an obligation, to carry out particular actions at some time in the future and may comprise corporate business projects as well as operational expansion, contraction, and switching opportunities (Andersen, 2000). Hence, strategic management can be seen as decision making performed around a portfolio of identified real option structures (Bowman and Hurry, 1993; Luehrman, 1998). A wider array of real option structures can provide flexibility to the corporation and increase the ability to respond to changing environmental conditions and thereby enhance the corporation's risk management capabilities.

It is argued that operational flexibilities in a multinational setting can allow the corporation to restructure activities in response to changes in global economic conditions by shifting activities between national entities controlled by the enterprise (e.g., Kogut, 1985; Rangan, 1998). The ability to switch business activities across international manufacturing plants can be conceived as a particular type of real options where the value of the implied flexibility can be determined on the basis of option pricing models (Kogut and Kulatilaka, 1994). The development of real option structures can also be conceived as an innovative process where diverse corporate resources are engaged to create new growth opportunities (Foss and Pedersen, 2002; Grant, 1996; Mang, 1998; Myers, 1977). The flexibility associated with such an organization should allow the corporation to mitigate adverse effects of longer term economic and competitive exposures, e.g., associated with changes in demand conditions and relative factor costs across national markets (Allen and Pantzalis, 1996; Kogut and Chang, 1996).

III. CAPITAL STRUCTURE AND RISK MANAGEMENT

In their seminal study, Modigliani and Miller (1958) argued that the value of the firm is independent of its capital structure under given conditions. One important condition was perfect capital markets, that is, no taxes, no transaction costs, and no bankruptcy costs. Another condition was information symmetry, i.e., investors and managers have equal information about the firm's investment potential. In a subsequent paper, Modigliani and Miller (1963) eased the conditions and showed that under capital market imperfection where interest expenses are tax deductable, firm value will increase with higher financial leverage. In this situation, the optimal capital structure is determined by a trade-off between increased bankruptcy risk from higher debt load and the tax advantage associated with debt. Hence, this trade-off perspective suggests a proportional relationship between financial leverage and economic performance. Myers and Majluf (1984) analyzed the effects of asymmetric information where internal managers know more about the firm's investment opportunities than external lenders and investors. In this situation, the capital structure may be determined in accordance with a pecking order approach whereby the firm prefers to use internal sources to fund good projects and only assume external debt when there is a need to fund additional less attractive projects. In this case the relationship between leverage and economic performance is more indeterminate. If there is a rich pool of good business opportunities and debt is available at reasonable cost, then increased leverage may be associated with higher performance. However, there is a risk of over investment into inferior ventures in which case we might see the inverse relationship.

In an analysis of capital structure decisions, Ward (1993) distinguished between business risk and financial risk. Business risk is associated with the adverse effects of environmental uncertainties on the earnings development of corporate business activities whereas financial risk relates to the trade-off between providers of external funds (lenders and investors) and the users of funds (managers and owners). Hence, corporations that operate in environments with a high level of business risk should reduce the financial risk by decreasing the leverage, i.e., employ a larger capital reserve as a financial buffer to cope with the uncertainties in the business environment. Conversely, higher leverage is better suited in the case of relatively stable business activities where the need for a financial buffer is correspondingly lower. This argues for an inverse relationship between business risk and financial leverage, a phenomenon that has been confirmed in empirical studies using different conceptualizations of business risk, such as, variance in sales growth (Thies and Klock, 1992) and volatility of demand (Chung, 1993). A high level of environmental uncertainty reflects firms operating in markets characterized by dynamic competition that must engage in innovative ventures and consider more risky actions to create superior performance and gain sustainable competitive advantage through the deployment of valuable, rare, unsubstitutable, inimitable, firm specific assets (Barney, 1991; D'Aveni, 1994). This in turn imposes a higher level of business risk on organizational activities, which argues for lower financial leverage. From a transaction cost economics perspective, transaction costs are lower when they are carried out on the basis of standardized assets with low specificity whereas transaction costs are higher in the case of firm specific assets. Therefore, the higher the asset specificity, the more economical internal hierarchical coordination should be compared to market clearance of transactions (Williamson, 1988, 1991). A higher equity base supports internal hierarchical control whereas a higher external debt load imposes more market discipline on organizational activities. Consequently, equity should be the preferred source of financing when asset specificity is high (Harris and Raviv, 1991; Balakrishnan and Fox, 1993; Simerli and Le, 2000).

There is a potential conflict between managers and owners in this analysis, i.e., managers may be more inclined to operate with lower leverage because it reduces their exposure to financial risk associated with debt finance at the expense of the owners that provide the equity (Kochar, 1996). This corresponds to the principal-agent problem where the agency costs relate to management's potential divergence of productive resources toward employment benefits that reduce returns to the shareholders (Jensen and Meckling, 1976). This discrepancy between manager and shareholder interests may have implications for the corporation's investment decisions. Management could obtain funding through issuance of new equity to gain flexibility in pursuit of their own objectives and engage in questionable investments some of which might represent negative net present values (Jensen, 1986; Stulz, 1990), i.e., it could lead to over investment. Imposing more debt on the corporation might resolve this problem. On the other hand, excessive financial leverage can create an under investment problem as debt service commitments reduce the discretion to engage in new projects and thereby discourage investment in positive business propositions (Myers, 1977). This illustrates another trade-off effect in the capital structure decisions between the concerns for management's over and under investment behaviors. From an agency theoretical perspective, debt can be used as a disciplinary tool to ensure that managers give preference to wealth creation for the equity holders (Jensen, 1986, 1989). In this set-up, lenders are prime governance constituents as debt payment obligations and restrictive covenants make it more difficult for indebted firms to engage in peripheral and poor business ventures. Conversely, it will also reduce the number of strategic options available to the firm and hence make it more difficult for management to maneuver in a dynamic market environment. In other words, debt can become too restrictive for firms operating in rapidly changing environments that require a high degree of strategic responsiveness. Together, these arguments imply that the appropriate financial strategy for firms operating in dynamic global markets is to reduce leverage to economize on transaction cost, engage in opportunistic business activities, and create flexibility that increases responsiveness. These improved risk management capabilities should enable the corporation to manage the business risk imposed by environmental uncertainty and thereby reduce the variability in corporate earnings. This reduces the under investment problem and provides a basic argument for financial hedging (Froot, Scharfstein and Stein, 1993, 1994).

Furthermore, risk management is important because essential stakeholders can be unable to diversify investments that are geared to maintain specific business engagements, e.g., buyer and supplier relationships, business partnerships, employment contracts, etc. (Miller, 1998). In this context, the corporation needs capital reserves to maintain a financial cushion against adverse performance effects and thereby assure the key stakeholders about the reliability and soundness of the corporation as a going concern. The 'insurative' model that incorporates insurance contracts as well as equity funding as residual claims on the firm illustrates that capital structure decisions and risk management are two sides of the same coin (Shimpi, 1999). Financial derivatives, insurance contracts, risk-linked securities, contingent capital instruments, etc., all serve the same purpose of transferring risks that are beyond the corporation's discretionary control and thus constitute important sources of financial capital (Culp, 2002). The strategic risk management perspective further suggests that all risk factors exposing the corporation should be considered including competitor moves, technology use, sourcing networks, customer needs, demand conditions, etc. (Miller, 1998). These exposures often require flexibilities that are unique to the corporation and, therefore, may be facilitated through the identification of firm specific real options (Bowman and Hurry, 1993). Hence, effective risk management capabilities should be extended to include real options that identify valuable corporate claims on the future that depend on developments in underlying risk factors (Leiblein, 2003).

IV. HYPOTHESES DEVELOPMENT

Capital reserves can provide the financial buffer needed to absorb adverse performance effects imposed by operations in dynamic environments with high levels of business risk. The increased use of derivatives and alternative risk-transfer instruments allow corporations to reduce the variability in earnings caused by changes in economic conditions. The consideration of real option structures that enhance flexibilities and expand the choice of alternative actions improve the corporation's ability to manage adverse earnings developments (Andersen, 2000; Bowman and Hurry, 1993; Luehrman, 1998). To the extent active risk management can lower the level of business risk it allows management to increase the financial risk associated with a higher external debt load (Ward, 1993). Furthermore, corporations that are able to impose effective risk management practices that reduce the volatility of corporate earnings diminish the need to maintain capital reserves as a financial buffer. It also decreases the cost of insurance and alternative risk-transfer arrangements that reduce the need for capital reserves. Imposing effective risk management reduces the risk of bankruptcy and makes it possible to increase financial leverage (Miller and Modigliani, 1958, 1963). The reduced cost of capital deriving from lower bankruptcy risk makes debt financing of incremental business projects more favorable and thereby tends to increase leverage (Myers and Majluf, 1984). These rationales lead to the following hypothesis.

HYPOTHESIS 1: *Firms demonstrating relatively effective risk management capabilities will be associated with higher financial leverage compared to firms with relatively ineffective risk management capabilities*

Effective risk management reduces the volatility of corporate cash flows and hence reduces the costs associated with potential financial distress thereby reducing the average cost of capital. This improves both the debt capacity and the ability to attract alternative risk-transfer solutions and correspondingly reduces the need to maintain capital reserves as a financial cushion. With a general improvement in credit worthiness that may extend the pool of committed credit facilities should make funding readily available for favorable projects. An increase in the debt capacity allows the corporation to increase its financial leverage, which is associated with higher performance due to the tax advantage of debt (Miller and Modigliani, 1958, 1963). At the same time, the reduction in the cost of capital makes debt more attractive and provides incentives to engage in incremental business projects that contribute to corporate performance (Myers and Majluf, 1984). Hence, a related effect of improved risk management capabilities is to reduce the potential under investment problem caused by debt overhang (Myers, 1987, Froot, Scharfstein and Stein, 1993, 1994). To the extent the corporation uses the flexibilities embedded in real option structures to enhance responsiveness and improve the timing of alternative strategic actions it may enable the corporation to avoid downside losses and exploit the upside potential for economic gains. Hence, economic performance should improve. Real options differ from financial options in the way their values are tied to idiosyncratic conditions in the organization and the unique ways in which the corporation may exploit the underlying opportunities (McGrath, 1997). The presence of real option structures can support sustainable value creation since they are based on firm specific resources not readily available in the market (Barney, 1991). This argues for the following hypothesis.

HYPOTHESIS 2: *Firms demonstrating relatively effective risk management capabilities will be associated with higher economic performance compared to firms with relatively ineffective risk management capabilities*

Corporations that operate within a multinational organization can create operational flexibilities, e.g., by switching production from one national economic context to another thus increasing the responsiveness to changes in international demand and price conditions (Kogut and Kulatilaka, 1994). Hence, real option structures embedded in a diverse resource base can support corporate risk management capabilities. However, managing a diversified organization across different national settings can be costly and may impose incremental business risk (Christophe, 1996; Reeb, Kwok and Baek, 1998). The real option structures may also comprise growth options that represent new business opportunities to the corporation (Grant, 1996; McGrath and Nerkar, 2004; Myers, 1977) in which case the exploitation of the real options represent incremental economic gain. However, the development of growth options requires a certain level of financial slack as does the ability to exercise them under favorable market conditions. For organizations operating in the increasingly dynamic global markets there is a need to employ unique firm specific resources to create sustainable competitive advantage (Barney, 1991; D'Aveni, 1994; Thomas, 1996). Since dynamic environments arguably are associated with the deployment of corporate assets with high specificity, equity funding will tend to lower the firm's transaction costs in this situation (Chung, 1998; Santarelli, 1991). The higher the specificity of assets employed in the development of business opportunities, the more economical it becomes to coordinate organizational activities through internal hierarchy, which is supported by lower financial leverage (Williamson, 1988, 1991; Balakrishnan and Fox, 1993; Simerli and Le, 2000). To the extent real options are used as an element of the firm's risk management process there is a need to maintain some organizational slack to ensure that option structures are created and that funding is readily available for underlying projects if and when the options are exercised. Therefore, the corporation must have sufficient financial slack in the form of capital reserves to exploit the potential economic advantages associated with a real options portfolio (Miller, 1998; Luehrman, 1999; Leiblein, 2003). This reasoning leads to the following hypothesis.

HYPOTHESIS 3: *Firms demonstrating relatively effective risk management capabilities and lower financial leverage will achieve higher economic performance compared to firms with higher financial leverage*

Corporate risk management capabilities may derive from the active use of traded financial derivatives as well as the exploitation of real options developed around unique corporate assets and resources. However, there is a distinct difference between traded derivatives and real option structures as the cost of financial derivatives usually relates to the up front payment of an option premium whereas real options also require a subsequent investment at exercise (e.g., Andersen, 2000; Luehrman, 1998). Most financial futures and options used for risk management purposes are closed out to hedge underlying transactional cash flows thus eliminating additional cash payments at exercise. In contrast, the real options whether they constitute operational flexibilities or growth opportunities are firm specific and therefore cannot be closed out in the market but must be exercised by executing the underlying project investment, which in practice requires additional cash outlays. Since the risk management challenge in financial institutions primarily relates to exposures affected by changes in measurable market prices it is typically based on the active use of traded derivatives (Andersen, 1993; Sounders, 1997). Since the use of traded derivatives for risk management purposes imposes no subsequent cash flow requirements their effective utilization does not require financial slack associated with capital reserves. These arguments lead to the following hypothesis.

HYPOTHESIS 4: *Firms operating in the financial sector that demonstrate relatively effective risk management capabilities will achieve higher performance when financial leverage is relatively high*

The subsequent section describes an empirical study devised to test the hypotheses.

V. METHODOLOGY

The empirical study is based on a sample of large US firms including Fortune 500 companies, Stern-Stewart Performance Top 1000 companies, and 1000 largest companies in Compustat based on market capitalization. These sources produced a total of 1357 companies operating across four-digit SIC-code industries with financial information available from Compustat. Economic performance was measured as return on assets (ROA) and return on investment (ROI) averaged over the 5-year period 1996-2000. The use of reported economic results was deemed appropriate since market returns could be skewed in the inflated market of the late 1990s (Schleifer, 2000). Financial leverage was measured as debt divided by equity averaged over the 5-year period 1996-2000 to control for spurious effects (Simerly and Li, 2000). Environmental dynamism was measured as the standard error of the regression coefficient on total industry sales 1996-2000 against time divided by average industry sales (Dess and Beard, 1984; Keats and Hitt, 1988).

Effective risk management was conceived as the extent to which the corporation is able to cope with environmental uncertainties and stabilize the resulting earnings development (Culp, 2002; DeLoach, 2000). Hence, risk management was calculated as the standard deviation of corporate sales during 1996-2000 divided it by the standard deviation of economic performance during the same period to reach a direct indication of the corporation's ability to adapt activities to dampen the influence of environmental risk factors.

The hypotheses were tested in multiple regression analyses. One set of regressions used the economic performance measures, i.e., 5-year average ROA and 5-year average ROI, as dependent variables and measures of risk management and its interaction with financial leverage as independent variables. Another set of regressions used financial leverage as dependent variable and risk management as independent variable. This approach is comparable to previous strategic capital structure studies (e.g., Simerly and Li, 2000; O'Brien, 2003). The regressions considered a number of control variables. Financial leverage in itself may influence economic performance (Modigliani and Miller, 1958, 1963) and therefore was included as control variable. Organizational size may represent business diversification opportunities and organizational slack that could affect capital structure decisions (Aldrich and Auster, 1986; Aldrich, 1999), i.e., corporate size measured as the natural logarithm of total assets to correct for positive skew in the data was included in the regressions. Two variables were included to control for potential effects associated with agency and transaction cost issues (Kochar, 1998). Firm dummy 1 indicates corporations with average annual returns on capital between –2.5 and +2.5 percent and growth in capital reserves below 25 percent. Firm dummy 2 indicates corporations with return on capital below –2.5 percent and capital growth below 25 percent. The dummies were assigned a value of 1 for firms belonging to the specific subgroup while all other firms were given a value of 0 (Simerli and Li, 2000). Firms belonging to these subgroups have not been able to create returns in excess of the cost of capital during the period of study and, therefore, are likely to have agency or transaction cost problems that could affect their choice of capital structure. The market to book ratio reflects the potential issue price of new equity in the firm, which might influence capital structure decisions (Hovakimian, Opler and Titman, 2001) as well as it has been identified as a predictor of market returns (Fama and French, 1992, 1993) and hence could influence performance. The regression analyses were tested for possible outlier effects and multicollinearity. Data sets causing excessive prediction errors were excluded from the sample in a sequential manner to observe potential changes in regression coefficients. The final analysis excluded 34 observations where prediction errors exceeded three times the standard deviation. No multicollinearity problems were registered and VIF factors did not exceed 3.4, which is well below the level indicating potential multicollinearity problems (Kleinbaum, Kupper, Muller and Nizam, 1998; Lomax, 1992).

VI. RESULTS

Statistical data and correlation coefficients on the full sample are reported in Table 1 and the results from the subsequent regression analyses are shown in Table 2.

Table 1. Descriptive Statistics and Correlation Coefficients[a]

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1 Average 5-year ROA	4.254	5.687									
2 Average 5-year ROI	7.547	8.735	0.576**								
3 Average leverage	113.237	207.858	-0.144**	-0.098**							
4 Dynamism	0.007	0.021	-0.033	-0.038*	0.045*						
5 Firm Dummy 1	0.081	0.273	-0.015	-0.035+	0.031+	-0.004					
6 Firm Dummy 2	0.108	0.311	-0.110**	-0.128**	-0.111**	0.024	-0.107**				
7 Size (ln assets)	7.847	1.599	-0.020	0.095**	0.236**	-0.103**	0.005	-0.075**			
8 Market/Book	1.821	1.576	0.083**	0.061*	-0.151**	-0.092**	-0.037+	-0.038+	-0.405**		
9 Risk management	5.449	1.946	0.074**	0.170**	0.223**	-0.083**	-0.028	-0.142**	0.735**	-0.358**	
10 Risk mgt.*leverage	90.775	494.287	-0.098**	-0.051*	0.2869**	-0.059*	0.017	0.018	0.205**	-0.062*	0.196**

[a] N=1323, + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

Regressions on the full sample show that risk management has a significant positive association with average leverage (Table 2), which provides support for hypothesis 1. Risk management has significant positive relationships to both measures of economic performance, which provides support for hypothesis 2. Hence, firms with effective risk management capabilities seem to be associated with higher financial leverage and superior economic performance thus indicating that effective risk management increases the debt capacity and reduces the need for capital reserves as a financial buffer. However, the interaction term between risk management and average leverage has a significant negative relationship to both measures of economic performance, i.e., effective risk management capabilities combined with high financial leverage is generally associated with lower economic performance. This provides general support for hypothesis 3. The regression analysis was then performed on the industry sub-sample comprising institutions operating in the financial sector (SIC: 6000-6999). These regressions show a significant negative relationship between risk management and economic performance but no relationship between risk management and average leverage. The interaction term between risk management and average leverage indicates a significant positive relationship to economic performance, i.e., financial institutions seem to reap economic benefits when they adopt risk management practices and expand the credit multiplier through increased financial leverage. This provides support for hypothesis 4.

Table 2 Regression Analyses – Industry Sub-samples [Standardized Regression Coefficients]

	All Industries [a]					Financial Institutions [b]				
Dependent variable	**5-yr avg. ROA**		**5-yr avg. ROI**		**Leverage**	**5-yr avg. ROA**		**5-yr avg. ROI**		**Leverage**
Average leverage	-0.153**	-0.141**	-0.131**	-0.122**	-	-0.172**	-0.721**	-0.147*	-0.271*	-
Size (ln assets)	0.034	-0.094*	0.150**	0.054+	0.157**	-0.326**	-0.170+	0.125	0.033	0.260*
Dynamism	0.000	0.002	0.019	0.021	0.058*	-0.164+	-0.105	-0.196+	-0.176+	0.062
Firm Dummy 1	-0.020	-0.014	-0.041	-0.039	0.017	0.118**	0.065	-0.011	-0.037	0.069
Firm Dummy 2	-0.125**	-0.102**	-0.132**	-0.112**	-0.106**	-0.011	-0.090	-0.159*	-0.204**	-0.077
Market/Book	0.070*	0.090**	0.103**	0.112**	-0.020	0.354**	0.203*	0.062	0.053	-0.010
Performance	-	-	-	-	-0.145**	-	-	-	-	0.124+
Risk management	-	0.215**	-	0.174**	0.097**	-	-0.320**	-	-0.251*	-0.144
Risk mgt*leverage	-	-0.075**	-	-0.047+	-	-	0.720**	-	0.200	-
Multiple R^2	0.206	0.255	0.234	0.273	0.321	0.603	0.680	0.296	0.343	0.309
Adjusted R^2	0.038	0.059	0.053	0.068	0.097	0.341	0.437	0.055	0.076	0.089
F-significance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

[a] N=1323, [b] N=203 (SIC: 6000-6999); + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

VII. DISCUSSION

The results from the regression analyses support the hypotheses and thereby give credence to the underlying theoretical reasoning. Risk management is generally associated with higher financial leverage and superior economic performance. However, pursuing risk management practices while maintaining high financial leverage is associated with inferior performance outcomes and, therefore, provides an opportunity to reassess contemporary risk management practices in view of the global competitive environment. The increasing competition among firms operating across open global markets (e.g., Govingarajan and Gupta, 2001) has accentuated the emphasis on corporate risk management practices (e.g., Froot, Scharfstein and Stein, 1993; Miller, 1998; Rawls and Smithson, 1990) and the exponential increase in the use of derivative instruments is testament to this development. However, longer term economic exposures and competitive risk factors cannot be hedged through the use of financial derivatives alone (e.g., Andersen, 1993; Eiteman, Stonehill and Muffett, 1994), which is one reason for the emergence of new alternative risk-transfer instruments and the considerations of strategic flexibilities embedded in real option structures (e.g., Andersen, 2000; Bowman and Hurry, 1993; Culp, 2002; Kogut and Kulatilaka, 1994; Rangan, 1998). The increased use of derivatives and the recognition of real option structures embedded in operational flexibilities and business opportunities reflects attention to strategic risk management issues comprised within more comprehensive enterprise risk management perspectives (e.g., Lam, 2003; DeLoach, 2000). Hence, the proliferation of financial derivatives, insurance contracts, alternative risk-transfer instruments, and real option structures should enhance the corporation's ability to increase responsiveness when confronted with environmental uncertainty and thereby reduce variability in economic performance (Culp, 2002; Froot, Sharfstein and Stein, 1993, 1994; Miller, 1998).

While effective use of real option structures to manage risk exposures in principle should reduce the need for capital reserves and thereby increase financial leverage, the empirical evidence indicates that the combination of effective risk management and high financial leverage is associated with lower economic performance. The theoretical rationale for this phenomenon seems to be that the corporation needs slack resources, e.g., in the form of capital reserves that provide a financial buffer against adverse economic performance outcomes, to ensure that real options are continuously developed and to make sure they can be executed when market circumstances warrant it. The ability to develop real options will usually require a certain amount of financial slack and the eventual exercise of real options implies that the corporation invests in the project that constitute the very growth option. Hence, the investment corresponds to the 'exercise price' in the options jargon (e.g., Dixit and Pindyck, 1994; Luehrman, 1998). To fully exploit the flexibilities embedded in different real option structures, the corporation must, therefore, maintain a certain level of financial slack that allows it to execute the underlying business opportunities whenever it is opportune to do so. This is in contrast to traded financial derivatives that are used to hedge risk and smooth cash flow developments. Here the premium is typically paid up front and there are no additional outlays at the time of exercise. The findings are interesting in view of other recent studies of corporate risk management processes. For example, Liebenberg and Hoyt (2003) found that firms with greater financial leverage are more likely to appoint a Chief Risk Officer, i.e., there seems to be a common association between corporate emphasis on risk management and higher financial leverage as also found in this study. Although we cannot for sure determine the causality, i.e., high financial leverage might actually induce management to increase it focus on risk management, it does raise concerns in the context of the current results. While the findings are consistent with the general thesis that improved risk management capabilities reduces the need for capital reserves and thus are associated with higher financial leverage, it seems like corporate management may be ignoring the potential benefits that can derive from consideration of real option structures and thereby miss the wider implications for positive strategic risk management effects.

Among the credit intermediating financial institutions the situation is different because here the positive performance effect materializes when effective risk management capabilities are used to increase financial gearing and expand the credit multiplier to increase the return on capital reserves. Since institutions operating in the financial sector primarily are exposed to financial market risks, they are prime users of traded derivatives for risk management purposes. However, financial derivatives are priced in accordance with fair assessments in accordance with transparent historical market prices as distinct from real options that are based on firm specific assets and resources. Conventional option pricing models determine a fair price in view of a given expected price volatility (Black and Scholes, 1973; Cox and Rubinstein, 1985). Hence, the only way to make excess returns from a portfolio of financial derivatives is to take positions and make bets against market expectations. However, this increases the variability in reported earnings, which is exactly what is observed among institutions in the financial sector.

Hence, the results from this study seem to confirm that corporate risk management has a significant influence on the economic performance of capital structure choices. The fact that effective risk management seems to matter in corporate capital structure decisions can be partially explained by real options logic. First of all, recognition of essential real option structures can increase flexibilities that allow the corporation to better deal with longer term economic exposures and increases strategic responsiveness. Secondly, there is a need for financial slack associated with larger capital reserves to support the ongoing development of real option structures and enable the corporation to exploit the underlying opportunities through quick investment decisions at opportune moments. In contrast, real options seem less important among financial institutions where major risk factors relate to the price volatility of financial assets and credit exposures that can be hedged through the markets for traded derivatives.

VIII. CONCLUSIONS

This study has analyzed a large cross sectional sample of firms operating in different industries and demonstrated that risk management has a positive relationship to economic performance and generally is associated with higher financial leverage. However, the evidence also indicates that optimal performance effects from effective risk management practices among large corporations require a certain financial buffer in the form of reasonable capital reserves. In short, to improve the economic performance effects from effective risk management, financial leverage should not be excessive. One reason presumably is that that it takes some financial slack to support the development of real options that can increase responsiveness to longer-term firm specific risk exposures and allow the corporation to exercise the real options when environmental conditions suggest it is opportune to do so.

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