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Strategic Risk Management and Corporate Value Creation

Torben Juul Andersen
Copenhagen Business School
Kilevej 14A, 2.92
DK-2000 Frederiksberg
Denmark

Phone: +45 3815-2514
Email: ta.smg@cbs.dk

Oliviero Roggi
New York University
Leonard N. Stern School of Business
44, West Fourth Street, 10-88
New York, NY 11012-1126
U.S.A.

Phone: +1 212-998-0309
Email: oroggi@stern.nyu.edu

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ABSTRACT

Major corporate failures, periodic recessions, regional debt crises and volatile markets have intensified the focus on corporate risk management as the means to deal better with turbulent business conditions. Hence, the ability to respond effectively to the often dramatic environmental changes is considered an important source of competitive advantage. However, surprisingly little research has analyzed if the presumed advantages of effective risk management lead to superior performance or assessed important antecedents of effective risk management capabilities. Here we present a comprehensive study of risk management effectiveness and the relationship to corporate performance based on panel data for more than 3,400 firms accounting for over 33,500 annual observations during the turbulent period 1991-2010. Determining effective risk management as the ability to reduce earnings and cash flow volatility, we find that it has significant positive relationships to lagged performance measures after controlling for industry effects and company size. We also find that availability of slack resources and investment commitments affect the risk management capabilities and their relationship to performance.

KEY WORDS: Corporate risk management, Organizational slack, Strategic response capabilities

Strategic risk management has become a mantra in executive board rooms following the corporate scandals and financial crises of recent years. There is general awareness that the ability to deal effectively with major risk events is an important aspect of strategic management (e.g., Miller, 1998; Wang, Barney & Reuer, 2003). However, we are not sure whether the adopted risk management practices truly lead to the implied superior outcomes and, if so, what the essential drivers of effective risk handling are (e.g., Beasly, Pagach & Warr, 2008; Liebenberg & Hoyt, 2003; Pagach & Warr, 2011). In reality, there is limited evidence on the proposed benefits from effective risk management capabilities and it is unclear what the implications are for governance, management practice and strategy conduct in general (Power, 2009; Smithson & Simkins, 2005). So, while risk management has assumed a central executive focus little is known about the strategic effects and how potential effects may be derived.

The ability to adapt to changing conditions is considered beneficial for organizations and has a long tradition in social science (e.g., Levinthal & March, 1981; March, 1988). Strategic response capabilities allow firms to adjust to abrupt environmental changes and strategic renewal facilitates organizational adaptation (Agarwal & Helfat, 2009; Bettis & Hitt, 1995). The dynamic capabilities construct suggests that observant and innovative organizations respond better to changing conditions (Teece, Pisano & Shuen, 1997; Teece, 2007) where knowledge exploration identifies opportunities that can adapt the way the firm operates (Damodaran, 2008). That is, maintaining sufficient slack for investing in opportunities can enhance responsiveness and thus support effective risk management (Andersen, 2009). However, these rationales are fairly unexplored and represent a promising area for empirical studies. To this end, we investigate the performance outcomes of effective risk management

and its antecedents drawing on panel data from more than 3,400 firms with over 33,500 data points during the turbulent period 1991-2010.

In the following we first review literature streams related to strategic risk management and provide an overview of the few empirical studies conducted to date. Then we develop a model of risk management effectiveness linked to investment intensity and available slack and conduct a number of preliminary empirical tests. We find initial support for positive value creation effects from effective risk management capabilities and indications that these effects are associated with availability of slack resources and investment in opportunities. These findings are presented and implications for future research enhancements are discussed.

THEORY AND HYPOTHESES

Risk management and strategic responsiveness

One argument for risk management is that lower cash flow volatility reduces the likelihood of liquidity shortfalls so funds are more readily available for good investments (Froot, Sharfstein & Stein, 1993; Myers, 1977; Nocco & Stultz, 2006). The associated earnings stability reduces bankruptcy risk and provides access to external funding at more favorable rates (e.g., Minton & Schrand, 1999; Smithson & Simkin, 2005). Hence, effective risk management can help the firm "maintain access to the capital markets and other resources necessary to implement its strategy and business plans" (Nocco & Stultz, 2006). Lower cash flow volatility reduces the need for liquidity buffers and a lower level of cash reserves will release funds for alternative business investment with higher returns (Merton, 2005). That is, incremental value can accrue from the ability to finance more profitable projects and at lower funding cost. The lower bankruptcy risk can also reduce the transaction costs associated with the firm's

interactions with essential stakeholders that offer less than favorable business conditions in their dealings with vulnerable counterparts (e.g., Miller & Chen, 2003; Wang, Barney & Reuer, 2003).

This reasoning is consistent with the valuation principles where the value of the firm (VOF) is determined as the present value of future cash generation (C) minus bankruptcy costs as reflected in transaction and funding charges: VOF = PV[C – bankruptcy costs] (e.g., Stulz, 2003, p. 57). So, value from effective risk management can derive either from a reduction in the bankruptcy costs or through an increase in future cash flows from profitable projects or from both of these sources. In addition to this, we argue that there is an incremental value creating potential associated with the ability to develop innovative opportunities that can be implemented if and when abrupt changes in the competitive environment call for it. The availability of these optional responses improves the strategic maneuverability of the firm and the execution of the new business initiatives will enhance future cash flow generation that creates corporate value.

The resulting capacity to adapt the organization and pursue strategic renewal should enable the firm to modify the way things are done in response to major changes in the environment so it can maintain a reasonable fit with current customer needs and operational practices. Strategic reference point theory and considerations about strategic fit suggest that there is potential value associated with the firm's ability to better match the requirements imposed by the strategic context at any given time (Fiegenbaum, Hart & Schendel, 1996; Porter, 1996). If the firm is able to fulfill changing customer needs then total revenues should remain high and if the firm is able to implement state-of the-art operating practices then costs should remain low and as a consequence of both hence performance and ongoing value creation should be high.

However, many important risk factors are exogenous to the firm and imposed by socio-economic conditions in the macro-environment that are beyond managerial control. This may comprise

events that are identical under similar circumstances and allow prediction of probable outcomes as well as events that must be assessed without a valid basis for classification reflecting the well known distinction between risk and uncertainty (Knight, 1921: 224). It may also relate to factors that are impossible to foresee in advance sometimes referred to as 'unknown unknowns' (e.g., Loch et al., 2006). Strategic risk factors including competitor moves, technology shifts, changing industry paradigms, etc., are hard to quantify and difficult to predict because the underlying events are irregular and may arise from complex non-linear conditions (Bettis & Hitt, 1995). That is, strategic risks are typically in the unknown end of the risk scale. Furthermore, the related risk exposures arise from the unique structures and market positions assumed by the individual firms. Hence, the response capabilities required to deal effectively with the strategic risks must also be of a firm-specific nature (Helfat et al., 2007; Teece et al., 1997; Zollo & Winter, 2002). The ability to develop new business opportunities and execute them as responsive initiatives in view of environmental changes constitutes one such form of firm-specific response capability.

The ability to adapt to changing conditions has been referred to as "dynamic capabilities" formally described as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece, Pisano & Shuen, 1997). They are formed by distinct skills, processes and procedures embedded in the organizational structures in ways that enable the firm to sense change, seize opportunities and reconfigure in the face of change (Teece, 2007). Like "strategic responsiveness" this requires an ability to assess environmental change and mobilize firm resources around responsive actions taken to adapt the firm to new challenges in the environment (Andersen, Denrell & Bettis, 2007). These response capabilities are affected by the decision structure, information and communication systems, coordination mechanisms, incentives and corporate values applied in the organization (Teece, 2007). Hence, we conceive of *effective risk*

management (ERM) capabilities as the firm's ability to observe, react, and adapt to major risk events so the variation in corporate cash flows and earnings are reduced compared to industry peers.

H 1: *Firms that demonstrate effective risk management capabilities are associated with higher value creation potentials*

Slack resources and investment intensity

The conventional view on risk evolved from insurance and financial hedging perspectives where the aim is to obtain economic cover against excessive loss situations. However, variability in cash flows and returns implies that outcomes go both up and down over time and suggests that we must assume a broader view when we deal with strategic risk management to consider the potential for positive upside gains as well as negative downside losses (Andersen, 2012; Damodaran, 2008; Slywotzky, 2007). Nocco and Stultz (2006) discuss the enterprise risk management approach where top management prioritizes corporate risk-taking and decentralized decision makers evaluate local risk-return tradeoff. However, many important responsive initiatives can be taken at dispersed decision nodes where exogenous influences are observed first and where a certain excess of resources, or slack, may facilitate the underpinning innovative opportunity development.

Slack can be conceived as the means to smooth performance against environmental shocks thereby avoiding disruptive layoffs so value creating capital investments in promising business opportunities can be retained. However, we are particularly interested in the way slack resources may enhance responsive initiatives and corporate adaptability in the face of exogenous risk events and the literature implicitly speaks to this. For example, Thompson (1967) recognizes that slack can allow the firm to take advantage of opportunities afforded by the environment in which it operates. Bromiley (1991) argues that "firms with additional resources have more strategic options available than firms

without resources". The presence of slack resources arguably leads to a range of strategic options and alternative profit-yielding activities (Amit & Schumacker, 1993). Slack may facilitate product innovation and experimentation that enable endogenous corporate growth (Greve, 2003; Lawson, 2001; Penrose, 1959, 1995; Pitelis, 2007). Hence, there are arguments for positive relationships between slack and innovation (Nohria & Gulati, 1996), risk-taking (Singh, 1986), and adaptation (Kraatz & Zajac, 2001). That is, slack resources can provide funding for initiatives with strong subunit support that otherwise might fail in the formal approval procedures. These activities relate to process, technology and product improvements rather than problem-oriented innovations typically imposed through more formal managerial interventions (Cyert & March, 1963).

Hence, innovative risk taking behavior is more likely in the presence of organizational slack where resources can be released for experimentation without formalized controls and managerial scrutiny. That is, slack thrives under economic affluence and is associated with decentralized structures whereas poor performance may lead to tighter controls and more centralization (Bourgeois & Singh, 1983; Singh, 1986). Organizational search may often be induced by failure to reach targeted performance aspirations (March & Shapira, 1987, 1992) but it "is sometimes also stimulated, largely unintentionally, by organizational slack, and by illusions that organizational actors have about their abilities to overcome risks" (March, 1995). Experimentation with new ideas, technologies, and market offerings "thrives on serendipity, risk-taking, novelty, free association, madness, loose discipline and relaxed control" (March, 1995), all conditions that may derive from the availability of slack resources. Innovation is fostered by individuals in the organization as they generate, discuss, promote, and realize new ideas (Damanpour, 1991; Scott & Bruce, 1994; Van de Ven, 1986) and slack resources induce experimentation, risk taking, and proactive strategic choices (Judge et al., 1997; Greve, 2003; Keegan

& Turner, 2002). In short, slack should induce strategic responsiveness and there is some evidence that slack is associated with lower downside risk (Miller & Leiblein, 1996).

The key to dealing effectively with strategic risks that are hard to predict and foresee depends on the organization's ability to sense impending changes and seize ways to respond to them (Teece, 2007). Hence, a responsive organization is one where new suggestions about how things can be done differently are allowed to flourish. So, organizational adaptation is reflected in an ability to innovate and apply new ideas, devices, systems, policies, programs, processes, products, services, and markets in ways that make firm operations more compliant with current conditions (Damanpour, 1991; Nohria & Gulati, 1996; Scott & Bruce, 1994). Finding new ways of doing things can also be conceptualized as a type of experimentation where the organization explores the effects of different combinations of technical and organizational elements (Kogut & Kulatilaka, 2001). The innovations can relate to product development, use of new technologies, new market entry, etc., but may also include changes in organizational processes, administrative practices, management approaches, etc. (Bourgeois, 1981; Damanpour & Evan, 1984). These responsive behaviors can be seen to drive exploratory actions that make it possible for the firm to modify business activities and accommodate changes in customer needs, technologies, economic conditions, etc. Accordingly, the associated strategic responsiveness, or dynamic capabilities, are considered a fundamental source of competitive advantage (Bettis & Hitt, 1995; Teece et al., 1997). Hence, the extent to which investment and slack resources are made available to drive these business opportunities and innovative initiatives can be important moderators of effective risk management capabilities.

H 2: *The level of slack resources positively moderates the performance effect of the firm's effective risk management capabilities*

The availability of investment and slack resources can build up in various ways, e.g., as low financial leverage, strong cash flow generation, extraordinary dividends, high liquidity reserves, excess salaries, incremental service fees, room for budgeted expenses, perks and prerequisites. Hence, slack can comprise excess payments to organizational members above what is required to perform current activities and it may comprise excess payments from customers for individual services. It may reflect additional financial means from internal self-generation or through access to external capital markets. It can also manifest itself in physical things including extra people, additional cash, more time, excess capacity, etc. and thereby constitutes a mechanism that can absorb fluctuations in the business environment (Bromiley, 2005; Cyert & March, 1963; Singh, 1986).

Recoverable slack is made up by excessive payments for various factor inputs and excess operating capacity. This kind of slack can be recovered fairly easily through internal budget reallocations at the business unit level and constitutes a resource buffer that allows pursuit of development projects despite environmental disruptions (Cyert & March, 1963; Sharfman et al., 1988). While this kind of absorbed slack has discretionary limitations they do provide room for ongoing collaborative learning activities and can fund immediate initiatives with strong subunit support that otherwise might fail in formal approval procedures (Cyert & March, 1963; Wayne & Rubinstein, 1992; Keegan & Turner, 2002). Hence, these generic absorbed resources provide sufficient discretion to reallocate resources for local purposes to facilitate innovation, experimentation, responsive initiatives, and adaptive moves (Greve, 2003; Kraatz & Zajac, 2001; Lawson, 2001; Nohria & Gulati, 1996; Pitelis, 2007). As a consequence recoverable slack is likely to facilitate experimentation that generate innovation around alternative ways to conduct business that increases the organization's ability to adapt to changing environmental conditions despite formalized controls.

Available slack constitutes unabsorbed resources that are readily available from the firm's cash position comprising bank balances, marketable securities, short term receivables, etc. It is argued that this provides a higher level of managerial discretion and furnish financial means that otherwise might be hard to get approved (Cyert & March, 1963; Nohria & Gulati, 1996). However, these generic unabsorbed resources are monitored by the treasury function that require more formal approvals and leave less discretion to local entities (Voss et al., 2008). Nonetheless, this type of slack allows for relatively quick access to resources in support of development projects even though the release of financial means is expected to undergo some type of formal approval. Everything else equal, the availability of these additional resources should furnish more alternative business propositions and strategic options (Amit & Schumacker, 1993; Bromiley, 1991). This ability to generate more viable strategic alternatives should increase corporate maneuverability and thereby enhance the ability to adapt to strategic risk events caused by environmental changes.

Potential slack constitutes the ability to access external funding, such as, bank borrowing and securities issues, and thus comprises part of the generic unabsorbed resources in the firm that would need formal approval and more extensive preparations to be released (Bourgeois & Singh, 1993; Voss et al., 2008). These financing sources constitute the funding reservoir discussed in much of the finance literature as the means to support investment in profitable business development projects (e.g., Froot et al. 2003; Smithson & Simkins, 2005). We can interpret this as a way to execute the firm's strategic options that will require an initial investment layout to be set in motion (McGrath & Nerkar, 2001; O'Brien, 2003). Hence, the availability of additional capital resources from the market by maintaining relatively low financial leverage gives the firm more leeway to exercise strategic options, i.e., investment propositions, when environmental conditions suggest that it is advantageous to do so (Miller, 1998; Luehrman, 1998). Hence, the availability of potential slack makes it possible to execute

alternative business propositions once they have been developed and thereby enhance adaptability to changes in the environment.

Recoverable slack provides more discretion to reallocate resources for new innovative purposes by reshuffling internal budget allocations at the local business unit level (Cyert & March, 1963; Sharfman et al., 1988; Voss et al., 2008). Hence, it can provide room to take immediate initiatives in response to changing conditions, experiment, and learn from these activities (Wayne & Rubinstein, 1992; Keegan & Turner, 2002). Available slack is made up by cash and liquid assets that can fund more extensive or expansive business activities. However, access to these resources is typically monitored by the treasurer and thus requires formal approval to be deployed (Nohria & Gulati, 1996; Voss et al., 2008). Potential slack represents the firm's borrowing capacity in the bank and capital markets as the means to implement larger business propositions. However, access to this funding typically requires substantial legal documentation, sign-off by corporate executives and may even require formal board approval, i.e., the deployment of such resources is more time consuming and demanding (Bourgeois & Singh, 1993; Voss et al., 2008). In short, recoverable slack are resources more readily accessible for grass roots initiatives responding to current changes, whereas available and potential slack are the potential funding sources that can help expand these initiatives as they evolve into larger and more important organizational activities.

H 3: *Higher levels of recoverable, available and potential slack are positively related to the firm's effective risk management capabilities*

H 4: *Recoverable, available and potential slack have positive interactive effects on the firm's effective risk management capabilities*

Availability of slack can shield the firm's operating core from exogenous changes in the environment but may thereby create complacency and ignorance among organizational actors that eliminate or reduce responsive behaviors (Bansal, 2003; Thompson, 1976; Yasai-Ardekani, 1986). So, slack can reduce managerial risk-taking and cause poor responsiveness, operational inefficiencies and sub-optimization (Palmer & Wiseman, 1999; Singh, 1986). Hence, excessive slack may induce risk aversion that reduces exploratory initiatives (Mishina, Pollock & Porac, 2004). Furthermore, slack may represent wasteful use of resources where organizational agents assume fringe benefits as they act in their own self-interest (Jensen & Meckling, 1976; Williamson, 1964). In short, the potential risk management effects of slack seem to have limitations.

H 5: *The positive relationships between recoverable, available and potential slack resources and effective risk management capabilities are non-linear*

In the following, we outline an empirical study devised to test the proposed hypotheses and present the results from the associated analyses.

METHODOLOGY

Data and measures

The data for the study was extracted from Compustat over the twenty years from 1991 to 2010 including companies across all industries but excluding firms in the regulated financial sector (6000<SIC<6999) and diverse conglomerates (SIC>8800). The time period was chosen because it covers a decade (1991-2000) of economic growth and global expansion for which a number of empirical studies exist followed by a decade (2001-2010) of turbulence and two economic recessions. Given the implied volatility of the business environment, the twenty-year period 1991-2010 is

considered suitable for a study of potential risk management effects. We excluded firms with total sales below US$50 million, which is set as the limit for small-to-medium sized firms (SMEs). Hence, the accessible dataset comprised 3,436 companies with an average of 7 years panel data available on key variables. The proposed risk management relationships expressed in hypotheses 1 and 2 were analyzed in multiple regressions using annual performance (PER_t) as the dependent variable and effective risk management (ERM_{t-5}) over the preceding five-year period and its interaction terms with slack variables from the current year (ERM_{t-5}*$SLACK_t$) as independent variables. The regressions were controlled for industry performance in the current period ($PER_{industry,\ t}$) and included a number of other control variables ($CONTROL_t$) for the same year.

$$(1)\ PER_t = \alpha + \beta_1 ERM_{t-5} + \beta_2 PER_{industry,\ t} + \beta_3 ERM_{t-5}*SLACK_t + \beta_4 CONTROL_t$$

The potential antecedents to risk management as expressed in hypotheses 3, 4 and 5 were analyzed in multiple regressions using effective risk management (ERM_{t-5}) as the dependent variable and different measures of slack ($SLACK_{t-5}$), interaction terms between different types of slack ($SLACK\{X\}_{t-5}$*$SLACK\{Y\}$), and slack measures to the second power ($\{SLACK_{t-5}\}^2$) as independent variables. The regressions included other control variables ($CONTROL_{t-5}$) and all variables were calculated across the same five-year periods.

$$(2)\ ERM_{t-5} = \alpha + \beta_1 SLACK_{t-5} + \beta_2 SLACK\{X\}_{t-5}*SLACK\{Y\}_{t-5} + \beta_3 \{SLACK_{t-5}\}^2 + \beta_4 CONTROL_{t-5}$$

Performance was measured as return on assets (ROA) for the full year calculated as the annual net income divided by average assets over the period determined as the simple mean of assets at the

beginning of the year and at yearend. Tobin's q was included as an alternative performance measure and calculated as market value of equity divided by the book value of equity to indicate how the market values the company in relation to the replacement cost of the productive assets. The effective risk management (ERM) measure was determined as the coefficient of variation in corporate sales divided by the standard deviation in corporate performance outcomes both calculated over consecutive five-year periods. For this purpose corporate performance was defined as earnings and cash flow returns measured as return on assets (ROA) and cash flow return on invested capital (CFROI) respectively. ROA was determined as net profit divided by total assets and CFROI was determined as net cash flows for the year divided by total invested capital.

The variability in corporate sales over a given period will capture the direct influences of exogenous strategic risk factors, including things like economic shocks and abrupt competitor moves, whereas earnings and cash flow volatility reflects the firm's ability to dampen the impact of these events on performance outcomes during the same period. Hence, the ratio of variation in sales divided by the earnings volatility has been adopted as an indicator of risk management effectiveness (Andersen, 2008, 2009). Here, we used two measures for effective risk management (ERM), one based on the volatility in annual earnings development expressed as ROA and another based on cash flow volatility expressed as CFROI. This is broadly consistent with measures adopted in strategic management based on accounting returns, such as, standard deviation on ROE, ROA, ROI, etc. (e.g., Bromiley et al., 2001; Miller & Reuer, 1996) and the use of the standard deviation in cash flow returns in finance inspired studies (e.g., Miller & Chen, 2003; Minton & Schrand, 1999).

The risk management process implied by the ERM construct captures an organizational capacity to deal with all major risk events including environmental hazards, financial turmoil, operational disruptions, and strategic incidents like changes in competitive structure, technology shifts,

new regulations, etc. The variability in realized returns, e.g., ROA, indicates performance after the firm has responded to the exogenous risk events and thus indicates the extent to which cash and earnings flows have been stabilized through the influence of good risk management capabilities. Incidentally, the risk measure will also capture adverse effects caused by endogenous risk events within the firm, such as, operational disruptions, technological breakdowns, processing errors, human failures, administrative mistakes, fraud, etc. Since net profit, and thereby return on assets, is influenced by developments in total revenues and expenditures, the measure of the ERM variable indicates whether the firm has been able to adapt its current costs to changes in corporate sales.

The net profit is determined as total revenues minus total costs, i.e., Profit{P} = Revenues{R} – Cost{C}. So, the variance in net profits is affected by variations in the revenue generation and in the cost development. That is, the standard deviation in profitability is affected by the standard deviation in revenues, the standard deviation in costs, and their inverse co-variation between the two.[1] Hence, the more revenues and costs co-vary over time the lower will be the variation in profits and by extension the variation in return on assets. This means that a simple interpretation of the risk management process is the firm's ability to engage in cost effective responses to dramatic changes in sales where new initiatives can be taken quickly without incurring excessive incremental costs as market demand expands and find alternative ways in a costless manner when the market contracts. This reflects effective strategic response capabilities under conditions of unpredictable changes in the competitive environment where the adaptation of internal processes that modify use of resources to accommodate responsive initiatives is done in cost efficient ways (Bettis & Hitt, 1995).

[1] $\sigma_P = [(\omega_R\sigma_R)^2 + (\omega_C\sigma_C)^2 - 2(\rho_{R,C}\,\omega_R\,\omega_C\,\sigma_R\,\sigma_C)]^{1/2}$ where σ_P is the standard deviation in net profit (P), σ_R is the standard deviation in total revenues (R), σ_C is the standard deviation in total costs (C), $\rho_{R,C}$ is the correlation coefficient between revenues and costs, and ω_R and ω_C are the relative weights of revenues against costs. Ideally $\omega_R > \omega_C$ but they are often of almost equal size, which simplifies the equation to: $\sigma_P = [\sigma_R^2 + \sigma_C^2 - 2\rho_{R,C}\,\sigma_R\,\sigma_C)]^{1/2}$.

Effective risk management may be affected by a number of things including the ability to innovate and search for new business opportunities within the organization that can be driven by the availability of slack resources and internal cash generation. Recoverable slack is determined as total expenses devoted to operational activities measured as sales, general, and administrative expenses divided by total sales (Bourgeois & Singh, 1993; Miller & Leiblein, 1996; Reuer & Leiblein, 2000). This is often referred to as the firm's SGA ratio. Available slack indicates the organization's ability to meet short-term resource commitments and is measured by the current ratio equal to current assets divided by current liabilities (Bourgeois & Singh, 1993). We also refer to this as the firm's liquidity reserves. Potential slack is captured by the debt-to-equity ratio measured as total long-term debt divided by shareholders' equity consisting of paid-in capital and retained earnings. The debt-equity ratio has been adopted in a variety of studies as a measure of financial slack (Bromiley, 1991; Bourgeois & Singh, 1993). To be more exact, we use the equity-debt ratio here to measure the firm's capital reserves because it is a positive indicator of the ability to obtain new funding from the external debt and capital markets.

We included a number of control variables in the regressions. The performance regressions included industry performance measured as average performance of peers within the firm's two-digit SIC code industry to control for systematic differences in industry performance. Organizational size reflects prior success and may provide the firm with additional leeway to cope with external shocks and periods of adverse conditions (Aldrich, 1999; Sharfman et al., 1988) and was measured as the natural logarithm of total sales to reduce effects of skewed data. Investment intensity reflects the level of capital expenditures assumed by the firm compared to the total assets and captures the firm's ongoing investment in business opportunities. Autonomous investments measure the free cash flows available to firm compared to total capital expenditures and thus reflects a certain leeway to make ongoing

investment in responsive initiatives (Opler, Pinkowitz, Stulz & Williamson, 1999; Minton & Schrand, 1999). Finally, all the measures of performance, effective risk management, organizational slack and control variables were standardized across two-digit SIC code firms to eliminate industry specific effects (McGrath & Nerkar, 2004; O'Brien, 2003).

Analysis

The hypotheses were tested in step-wise regressions incorporating standardized interaction terms where one set of regressions analyzed risk management effects against performance and another set of regressions analyzed the antecedents to effective risk management (Aiken & West, 1991; Kleinbaum et al., 1998). A number of robustness checks were carried out to test the sensitivity of results to alternatives variable measures, different data trimming techniques, sample splits, and potential endogeneity problems that might cause biased parameter estimates. Hence, we also applied two-stage least square (2SLS) regressions to determine ERM variables as predictors in the performance equations, which is considered appropriate when the independent variables may be correlated with the error terms of the dependent variable (Theil, 1971).

RESULTS

Descriptive statistics and correlation coefficients on key variables are reported in Table 1.

----- Please insert Table 1 about here -----

The initial results from the step-wise multiple regression analyses are presented in Table 2 below where the regression coefficients against return on assets and Tobin's q as dependent variables are reported for comparative purposes. It is apparent from these results that effective risk management

(ERM) has a significant positive relationship to the lagged performance measures of ROA after controlling for industry performance, company size, financial leverage and other influential factors. The same result prevails when Tobin's q is used as performance measure even though the sample size is somewhat smaller due to missing observations. These results are consistent with hypothesis 1. Further analyses were conducted to test the robustness of results with different data trimming techniques applied. Hence, we first excluded observations with performance below and above the mean value plus and minus three times the standard deviation and subsequently windsorized the data around three times the standard deviation. This did not alter the results.

We repeated the regressions using the alternative measure of ERM based on volatility of cash flow earnings (CFROI) but this did not change the findings. We conducted split-sample analysis based on data from the high growth decade 1991-2000 and the turbulent decade 2001-2010 with periodic recessions. Although there were some modifications in the regression coefficients the analytical results were not materially different from those reported in either of the two sub-periods. It should be noted that the number of observations is significantly reduced as more variables are included in the regressions due to lack of complete data coverage and this may call for more refined techniques to the analyses. Nonetheless, the general result remains robust in all the regressions.

----- Please insert Table 2 about here -----

The regression coefficients on the interaction terms between ERM and the different slack variables show mixed results. Hence, the interaction between ERM and sales, general and administrative costs (the SGA ratio) has a significant positive relationship to return on assets and the interaction between ERM and liquidity reserves (the current ratio) has a significant positive relationship to Tobin's q. While this is not a clear cut result, it seems to indicate that some recoverable

slack may support responsive initiatives and thereby enhance effective risk responses as well as some liquidity can help the execution of value creating business opportunities as part of the effective risk responses. The interaction between ERM and autonomous investment as an indicator of incremental leeway for responsive investment has significant positive relationships to both performance measures, which provides some support for hypothesis 2.

The results from the second regression analyzing potential antecedents to effective risk management (ERM) are shown in Table 3. It should be noted that the number of observations is vastly reduced in these analyses due to incomplete data and because we apply the analysis to datasets across consecutive five-year periods. The results show that resources available in the form of allocated sales, general and administrative expenses (the SGA ratio) have a negative first order relationship to effective risk management (ERM) and that only capital reserves (the equity-debt ratio) have a direct positive relationship to ERM as proposed by the conventional risk management literature (Moelbroek, 2002). This provides weak support for hypothesis 3.

----- Please insert Table 3 about here -----

The interaction terms between sales, general and administrative expenses (the SGA ratio) and capital reserves (the equity-debt ratio) has a significant positive relationship to ERM thus indicating that initial development of responsive initiatives can enhance risk management effectiveness if there is potential slack available to fund implementation. This reasoning is supported by a positive interaction effects between capital reserves and autonomous investment as an indicator of leeway to invest in business opportunities. These results lend some support for hypothesis 4.

Finally, we see that while the first order direct effect of sales, general and administrative costs (the SGA ratio) is negative, the second order effect is significantly positive as a potential indicator that

sufficient recoverable slack may drive innovation and responsive initiatives to enhance effective risk responses. However, the second order effect of liquidity reserves (the current ratio) is significant and negative, which indicates a diminishing risk effect from excessive cash positions. There is no significant second order effect of capital reserves (the equity-debt ratio) but only a significant positive direct first order relationship to effective risk management. While these results may hint the potential contours of non-linear relationships between slack and effective risk management, there is no clear support for hypothesis 5.

DISCUSSION & CONCLUSION

The reported results based on analyses of a comprehensive updated dataset support the notion that an ability to dampen the impacts from exogenous risk events so the corporate cash flow and earnings volatility is reduced will be associated with higher performance outcomes. This study reports on effects related to a contemporary time period including the turbulent decade 2001-2010 that comprised two interim periods of economic recession and thus complements prior risk management studies. Based on a time-lagged effects analysis, the positive relationship between effective risk management (ERM) and the economic value creating potential of the firm is found to be robust against alternative performance and risk measures, different data trimming techniques and regression analytical approaches. More interestingly perhaps, the findings are also robust across two different economic sub-periods the high growth globalization decade 1991-2000 and the subsequent recession and crisis ridden decade 2001-2010. Hence, we find consistency with risk management results reported on prior time periods (e.g., Andersen, 2008, 2009; Smithson & Simkin, 2005).

Prior studies investigating the direct effects of adopting formal enterprise risk management approaches have so far been inconclusive (e.g., Beasley, Pagach & Warr, 2008). However, here we

report significant and robust relationships between effective risk management capabilities and economic returns in subsequent periods over a recent period of twenty years. That is, firms that responded effectively to exogenous risk events throughout this time period and thereby reduced the adverse downside effects were apparently able to extend their value creation potential. Yet, the analysis cannot say precisely what constituted the main drivers of the underlying strategic response capabilities. However, the study provides an initial search for important moderating influences from different forms of organizational slack on the effective risk management outcomes and reports on a preliminary investigation of related antecedents to effective risk management.

While this search is inconclusive at this stage, we find strong hints that some availability of slack resources provide the basis for innovation and responsive initiatives and that these can be important for the ability to create business opportunities that enhance corporate maneuverability. Furthermore, maintaining a certain level of self-generated cash flow and potential financial slack seem to provide leeway to execute business opportunities when changing environmental conditions call for these kinds of adaptive business responses. However, more detailed analysis is still required to uncover explicitly how this underlying dynamic operates.

These initial results seem to suggest that effective risk management capabilities relate to availability of sufficient resources to develop innovative opportunities that enable the firm to respond to changing conditions in the competitive environment. The findings uncover a potential tension between management control and corporate entrepreneurial perspectives where the availability of sufficient, although not excessive, slack resources is a prerequisite for effective risk management outcomes (Jensen, 1986, 1993). The incremental insights from this study suggest that these are not either or considerations. There is an urge for balanced solutions, which points to a need for more

refined analyses into the intriguing and important relationships between resource availability, corporate entrepreneurship, risk management, performance and corporate longevity.

It is argued that risk reduction allows the firm to reduce expensive equity capital needed to support operating risk exposures and where effective risk management is seen as a substitute for capital reserves (e.g., Nocco & Stulz, 2006). Hence, a major goal (and advantage) of risk management supposedly is that it can reduce waste and thereby save scarce capital resources and that this should be an important part of the job of a Corporate Risk Officer (CRO) and top management. Hence, a prior study found that the appointment of CROs is more likely in firms with high financial leverage and poor risk management outcomes (Liebenberg & Hoyt, 2003). Another study of CRO announcements found that a common antecedent includes volatile operating cash flows, high stock volatility, and CEOs with incentives based on stock options (Pagach & Warr, 2011). This may suggest that adoption of formal risk management practices often is driven by aggressive CEOs who (or possibly their boards) feel a need to contain potential excessive downside losses.

However, as this study suggests reducing capital buffers can have potential adverse risk management effects. That is, if potential slack is reduced to a very low level it may reduce the organization's ability to take autonomous initiatives and respond effectively to new risk events. The conventional risk management view is one-sided and inflexible with the aim to avoid downside risk and reduce resource waste. However, the key to enable effective responses to uncertain strategic risks is the availability of slack that induces learning from local responses and builds it into viable business opportunities in the changing business environment.

This means that firms need to take initial probing risks to create opportunities needed for strategic renewal and effective responses to unexpected and unpredictable competitive developments.

So effective risk management is the process where individual decision makers assume calculated risk within areas of expertise and deep business insights in order to develop effective responses to future challenges (e.g., Culp, 2001). Hence, risk management in practice is not really conceived to reduce all risks but rather to assume the necessary risks that enable opportunistic responses to emerge (e.g., Adams, 1995). Hence, some slack must be invested in innovative efforts to create new strategic options and the availability of financial slack makes it possible to execute these strategic options when the competitive conditions change.

In short, effective risk management does seem to have a significant positive relationship to organizational performance outcomes and corporate value creation and this result appears to be robust against alternative measures, data refinements, and time periods. Corporate risk management capabilities can be enhanced by availability of different types of slack resources in the form of recoverable, available and potential slack as well as self-generating financial means. Slack resources can provide leverage for responsive initiatives and engage in needed development activities that provide strategic choices under environmental uncertainty. However, the limited data availability in the updated datasets calls for more refined studies to uncover the details of the dynamic risk management process that lies underneath.

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Table 1. Descriptive Statistics and Correlations

	Mean	S.D.	1	2	3	4	5	6	7	8
1 Return on assets	0.027	0.241	-	-	-	-	-	-	-	-
2 Tobin's q	1.821	2.078	0.426**	-	-	-	-	-	-	-
3 Effective risk management	4.153	7.816	0.178*	0.094	-	-	-	-	-	-
4 Organizational size	7.744	5.481	0.199*	0.239**	0.082	-	-	-	-	-
5 Capital reserves	0.350	0.476	0.020	0.085	0.080	0.038	-	-	-	-
6 Liquidity reserves	1.563	1.642	-0.036	0.139+	-0.088	0.007	0.024	-	-	-
7 Sales, general & adm.	0.046	0.437	0.067	0.086	0.044	0.008	0.333**	0.072	-	-
8 Investment intensity	0.096	0.544	0.008	0.162*	-0.052	0.006	0.006	-0.059	-0.050	-
9 Autonomous investment	0.567	0.859	0.112+	0.035	0.012	0.056	0.200**	0.285**	-0.056	-0.070

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$;

Table 2. Regression Analyses – Performance effects of Effective Risk Management [Regression Coefficients (t-values)]

Dependent variable:	**Return on assets**			**Tobin's q**		
Number of observations	32,313	6,067	6,067	21,095	4,658	4,658
Number of groups	3,378	897	897	2,625	737	737
Intercept	-.044***	.045*	.047*	.521***	3.955***	3.915***
	(-4.37)	(2.25)	(2.32)	(3.55)	(18.43)	(18.24)
Effective risk management (ERM)	.009***	.009***	.008***	.051***	.088***	.082***
	(16.39)	(6.01)	(5.36)	(7.02)	(6.33)	(5.73)
Industry performance	.923***	.984***	.981***	.875***	.896***	.892***
	(34.65)	(23.11)	(23.09)	(31.73)	(17.22)	(17.14)
Organizational size (ln[sales])	.007***	-.004	-.004	-.054*	-.328***	-.322***
	(4.78)	(-1.40)	(-1.36)	(-2.56)	(-10.56)	(-10.36)
Sales, general and adm. (SGA ratio)	-	-.065***	-.064***	-	-.344***	-.339***
		(-22.63)	(-22.25)		(-12.61)	(-12.33)
Liquidity reserves (Current ratio)	-	.014***	.013***	- .	.018	.019
		(6.87)	(6.54)		(1.02)	(1.11)
Capital reserves (Equity-debt ratio)	.035***	.033***	.032***	.139***	.106***	.116***
	(22.81)	(16.42)	(2.05)	(10.45)	(5.41)	(5.72)

Investment intensity (Cap. exp./assets)	-	-.001 (- .49)	.001 (.67)	-	.150*** (8.32)	.156*** (8.56)
Autonomous inv. (Cash flow/cap.exp.)	-	.006*** (3.33)	.010*** (4.45)	-	.095*** (5.39)	.106*** (4.93)
ERM*Sales, general & adm. costs	-	-	.006*** (4.08)	-	-	-.009 (- .61)
ERM*Liquidity reserves	-	-	-.003 (-1.05)	-	-	.035* (2.51)
ERM*Capital reserves	-	-	-.001 (- .67)	-	-	.012 (.76)
ERM*Autonomous investment	-	-	.006** (3.15)	-	-	.042** (2.49)
R-squared within	.154	.231	.235	.159	.146	.149
R-squared between	.167	.130	.135	.134	.012	.009
R-squared overall	.171	.130	.135	.139	.000	.000
F-significance	.000	.000	.000	.000	.000	.000

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3. Regression Analyses – Risk Management Antecedents [Regression Coefficients (t-values)]

Dependent variable:	**Effective Risk Management (ERM)**	
Number of observations	4,112	3,203
Number of groups	694	576
Intercept	-.641**	-1.858***
	(-2.52)	(-5.62)
Organizational size (ln[sales])	.008*	.025***
	(2.39)	(5.63)
Sales, general and adm. (SGA ratio)	-.443***	-.352***
	(-7.69)	(-4.71)
Liquidity reserves (Current ratio)	.020	.101
	(0.43)	(1.57)
Capital reserves (Equity-debt ratio)	.205***	.162***
	(5.01)	(3.22)
Investment intensity (Cap. exp./assets)	-	-.059
		(1.06)
Autonomous inv. (Cash flow/cap.exp.)	-	.216***
		(3.18)
SGA ratio* SGA ratio	.131***	.125***
	(4.54)	(3.73)
Liquidity reserves* Liquidity reserves	-.042**	-.058***
	(-2.90)	(-3.59)

Capital reserves* Capital reserves	.011 (0.60)	.001 (.03)
Liquidity reserves* SGA ratio	-	-.020 (- .35)
Capital reserves* Liquidity reserves	-	.006 (1.46)
SGA ratio* Capital reserves	-	.035* (2.51)
Investment intensity*Autonomous inv.	.0006 (1.50)	.019 (.38)
Capital reserves*Autonomous inv.	.064+ (1.64)	.121*** (2.74)
R-squared within	.032	.041
R-squared between	.044	.059
R-squared overall	.029	.034
F-significance	.000	.000

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$