

DOWNSIDE RISK IMPLICATIONS OF MULTINATIONALITY AND INTERNATIONAL JOINT VENTURES

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Investments in dispersed foreign subsidiaries and international joint ventures (IJVs) are often thought to enhance corporate flexibility and thereby reduce risk. We tested these predictions from real options theory and the international strategy literature using a set of recently developed downside risk measures. The evidence reveals that U.S. manufacturing firms with greater multinationality or investment in IJVs do not generally obtain lower levels of downside risk. Implications for theory and future empirical research are offered.

Corporate flexibility has recently been emphasized as a key concern for management research (e.g., Buckley & Casson, 1998; Hitt, 1998). This observation presents a challenge to both positive and normative theory given the divergent views on issues surrounding both the flexibility of firms and the specific benefits that firms might derive from flexibility. For instance, studies in population ecology (e.g., Hannan & Freeman, 1984), competitive strategy (e.g., Dierickx & Cool, 1989; Ghemawat, 1991), and behavioral theory (Cyert & March, 1963) point to internal complexity, path dependencies, and uncertainty avoidance, respectively, as factors limiting flexibility or its potential advantages. By contrast, proponents of real options theory submit that firms can proactively and flexibly manage uncertainties to their advantage (e.g., Bowman & Hurry, 1993; Hurry, Miller, & Bowman, 1992; Kogut, 1983, 1989; McGrath, 1997; Sanchez, 1993).

It was within this theoretical context that the current study examined the downside risk implications of two types of international investment thought to enhance corporate flexibility—multinationality, or the dispersion of foreign subsidiaries across different countries—and international joint ventures (IJVs). As we explain below, recent research has suggested that these investments confer real options that enable a firm to avoid downside outcomes by shifting value-chain activities across different host country environments, or by staging commitments (e.g., Kogut, 1989,

1991; Kogut & Chang, 1996). However, such investments can also increase organizational complexity and bring about nontrivial coordination costs, joint control challenges, imperfect claims on emerging opportunities, and so forth. Thus, the corporate risk effects of multinationality and IJVs are ultimately an empirical matter.

This study examines the risk implications of firms' investments in foreign subsidiaries and international joint ventures using a downside conceptualization of risk. Formally stated, downside risk is a probability-weighted function of below-target performance outcomes. In contrast to traditional, variance-based measures of risk that incorporate the entire distribution of firm performance, downside risk focuses solely on organizational outcomes below some target value. For instance, the probability of failing to meet a performance objective or expected loss are two among many formulations within the downside risk family.

Miller and Reuer (1996) provided several rationales for moving from variance-based measures of risk to downside conceptualizations based on their review of behavioral decision theory, finance studies, and management research on risk. First, downside risk explicitly incorporates the notion of reference levels, which behavioral decision theory identifies as a determinant of risk preferences (e.g., Kahneman & Tversky, 1979). Second, following discussions of downside risk in the early development of portfolio models in the finance literature, Harlow and Rao (1989) showed that a downside risk model of equity returns explains stock returns better than the capital asset pricing model (CAPM). Third, empirical research in the management field documents that decision makers tend to consider risk in terms of negative outcomes or hazards rather than as variance in outcomes,

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as reflected by standard risk measures (e.g., Baird & Thomas, 1990; March & Shapira, 1987). Finally, although empirical applications remain limited, Miller and Reuer (1996) noted that downside views of risk exist throughout the strategy literature (e.g., Aaker & Jacobson, 1987; Ansoff, 1965; Porter, 1985: 476). Ruefli, Collins, and LaCugna (1999) raised similar concerns about the concept validity of existing variance-based risk measures and the conclusions drawn from empirical studies using these measures.

For this study's purposes, a downside conceptualization of risk is also valuable given its compatibility with the basic tenets of real options theory, a theoretical perspective we used in developing the hypotheses relating international investments to organizational risk. Real options are discretionary investments that provide firms with the right, but not the obligation, to undertake some future action. Thus, real options are investments that provide flexibility by allowing firms to avoid downside outcomes and exploit emerging opportunities. McGrath argued that "the distinguishing characteristic of an options approach lies in firms making investments that confer the ability to select an outcome only if it is favorable" (1997: 975). In the international strategy context, real options theory suggests that dispersed foreign direct investment (FDI) provides a portfolio of options that enable a firm to avoid downside outcomes by shifting value-chain activities across country borders in response to changes in local demand, competitors' actions, foreign exchange rates, input prices, and other environmental contingencies (e.g., Allen & Pantzalis, 1996; Kogut, 1983, 1989).

Management and international strategy researchers have also for some time viewed international joint ventures as flexible and attractive from a risk standpoint because they entail lower initial capital outlays than wholly owned investments and allow firms to focus on core capabilities, access partners' skills, and facilitate market entry, among other factors (e.g., Contractor & Lorange, 1988). More recently, scholars have suggested that joint ventures can reduce downside risk in particular since JVs have option-like characteristics, in that firms can limit initial outlays and increase commitments later, if a desirable opportunity materializes (Kogut, 1991). Although the attractiveness of IJVs has long been attributed to their presumed flexibility and risk benefits, we know of no study that empirically examines the organizational risk implications of IJV investments.

This study proceeds as follows: the second section develops hypotheses relating firms' multinationality and IJV investments to downside risk. The third section focuses on methodological issues, and

the empirical results are contained in a subsequent section. Evidence from a sample of 357 U.S. manufacturing firms reveals that corporations with greater multinationality or greater investments in IJVs do not obtain lower levels of downside risk. In fact, firms investing in more IJVs experience higher levels of income stream risk and bankruptcy risk. We conclude with a discussion of these findings and their implications for theory development as well as future empirical research.

THEORY AND HYPOTHESES

Much research has investigated the risk profiles of multinational corporations (MNCs) relative to their domestic counterparts'. For instance, several studies have shown that multinational involvement tends to stabilize firms' income streams (see Caves [1996] and Qian [1996] for recent reviews). Kim, Hwang, and Burgers (1993) reported that international diversification was associated with the twin benefits of lower risk and higher returns. They concluded that these findings were consistent with MNCs' greater competitive options and operational flexibility, conforming to the view that MNCs have more degrees of freedom than domestic firms (e.g., Dunning & Rugman, 1985). At the same time, evidence such as the lower financial leverage ratios selected by multinationals (e.g., Lee & Kwok, 1988) casts some doubt on the diversification benefits of international operation. Reeb, Kwok, and Baek (1998) reported that systematic risk increased with a firm's degree of internationalization. Mitchell, Shaver, and Yeung (1992) found that multinational firms had a lower risk of business failure, but this risk increased if firms expanded or contracted their international presence.

Real options theory represents a promising theoretical perspective with which to evaluate the relationship between international operations and organizational risk. In particular, real options theory suggests that multinationality reduces firms' downside risk. The real options embedded in firms' international or other strategic investments can take many forms, including options to defer investment, expand or contract production, abandon operations, switch use of inputs, and grow into expanding markets (Trigeorgis, 1997). As a result, investing in real options allows a firm to manage risk by proactively confronting uncertainty over time in a flexible fashion (Kogut, 1991) rather than by attempting to avoid uncertainty (e.g., Cyert & March, 1963). Real options theory therefore provides researchers with a tool for evaluating the trade-offs between commitment and flexibility under conditions of uncertainty.

The introduction of real options theory into the international strategy literature clarifies one of the potential advantages of multinational firms over domestic rivals. Specifically, the dispersion of FDI provides a firm with a portfolio of real options that enable it to avoid downside outcomes and take advantage of upside opportunities by shifting value-chain activities globally (Kogut, 1983, 1989). The option to shift these activities is valuable when there are changes in local demand, labor expenses, other input costs, competitors' actions, or foreign exchange rates, all of which may vary among the countries in which a firm has operations. Real options theory therefore points to operational flexibility as one of the key strengths of a multinational firm.

One specific example of multinational firms' potential flexibility advantages is provided by their responses and economic exposures to foreign exchange rate movements. Unlike purely domestic firms or exporters with domestic production, firms with operations in multiple countries can shift production in response to exchange rate movements to enhance profits (Kogut & Kulatilaka, 1994). Rangan (1998) provided evidence that exchange rate movements trigger global shifts in manufacturing and sourcing activities by multinational firms. For instance, multinational operation enabled Asea Brown Boveri (ABB) to shift production from Europe and North America to Asia in response to the late 1990s' currency crisis (Fleming, 1998). Unlike their multinational counterparts, domestic firms are not able to exploit this flexibility and therefore have to bear any adverse consequences of such contingencies. Miller and Reuer (1998) found that FDI reduced firms' economic exposures to foreign exchange rate movements.

Although multinational operation may provide options to shift value-chain activities that can have efficiency consequences, the exercise of options can also be motivated by demand-side or competitive considerations. For instance, rising local income levels and demand can encourage the staged expansion of a host country operation. Further, Caves (1996) discussed how firms imitate rivals' international expansions in an attempt to acquire competitive options. Viewing an MNC as a possessor of a portfolio of options (Kogut, 1989) that provide the firm with the potential to select outcomes only if they are favorable (e.g., McGrath, 1997) leads to the following hypothesis:

Hypothesis 1. A firm's multinationality will be inversely related to its downside risk.

The international strategy literature has also long described IJVs as being attractive from a risk standpoint. Although the organizational risk implica-

tions of IJVs have not been a topic of empirical research, risk figures highly in many discussions of IJV formation motives (e.g., Contractor & Lorange, 1988). By engaging in joint ventures rather than acquisitions, for instance, firms can spread various risks over multiple capital providers in large-scale projects (e.g., Kogut & Singh, 1988). Firms might also use IJVs to overcome the liability of foreignness (e.g., Zaheer & Mosakowski, 1997) by tapping into a partner's local connections, market knowledge, and other supporting resources. A local partner can also buffer an MNC from a host government, a function that reduces possible hold-up risks (Teece, 1986). A firm can also use IJVs as springboards for further commitments and growth once it accumulates knowledge specific to a host country (e.g., Inkpen & Beamish, 1997).

Real options theory suggests that firms involved in IJVs can limit downside risk in particular. Specifically, a joint venture is thought to possess the same basic characteristics and nonlinear payoff function as a financial call option (Kogut, 1991). After a firm makes a small initial commitment to a market or technology through an IJV, it can expand that commitment if the market or technology proves to be favorable. However, the firm is under no compulsion to expand in the case of a negative turn of events and, rather than divest, it can adopt a wait-and-see approach if more favorable outcomes are possible in the future. Provided that the initial outlay is sunk and additional capital is not required, downside risk is "inconsequential" (Kogut, 1991: 24) since the option need not be exercised. The ability of individual IJVs to provide firms flexibility advantages also rests on the parents' ability to buy or sell equity to change their commitments over time. It also rests on the security of the firm's claim on future investments lest rivals preempt emerging opportunities (Folta & Leiblein, 1994). At the corporate level, the containment of downside outcomes and the exploitation of upside opportunities in individual IJVs leads to lower organizational downside risk (e.g., Bowman & Hurry, 1993) if firms follow an options-based approach in managing IJVs:

Hypothesis 2. A firm's investment in IJVs will be inversely related to its downside risk.

METHODS

Model Specification

The multivariate statistical models used in this research took the following basic form:

$$\begin{aligned} \text{Downside risk}_t = & \beta_0 + \beta_1 \text{multinationality}_{t-1} \\ & + \beta_2 \text{IJV investment}_{t-1} + \beta_3 \text{organizational slack}_t \\ & + \beta_4 \text{firm size}_t + \beta_5 \text{industry risk}_t + \varepsilon_t. \end{aligned} \quad (1)$$

The subscripts indicate the time lags we used for the theoretical variables to rule out problems from potential reverse causality in cross-sectional risk models (e.g., Bromiley, 1991). Two contiguous five-year periods during the years 1985–94 were used in calculating downside risk and its determinants. We chose the five-year periods to obtain sufficient time series data to construct the downside risk measure while also maintaining an assumption of strategy stability. Moreover, in the late 1980s the incidence of IJVs increased greatly (e.g., Anderson, 1990; Beamish & Delios, 1997).

Although our interest lay in developing a parsimonious model with which to assess the impact of multinationality and IJV investments on organizational risk, prior research has indicated the importance of including appropriate firm- and industry-level controls. We controlled for slack resources to account for an organization's ability to buffer against uncertainty (Thompson, 1967). Firm size was incorporated in the models to accommodate the greater project diversity of larger firms (Scherer & Ross, 1990); the financial, human, or other resources that can affect risk; potential rigidity or organizational inertia; and the relative importance of a firm's international investments. Finally, a control for industry risk addressed interindustry risk differences and nonobservable effects at the industry level.

Measures and Data

Downside risk. Downside risk is a probability-weighted function of below-target performance outcomes. In contrast to conventional, variance-based measures of risk that capture the entire distribution of firm performance, the family of downside risk measures emphasizes performance outcomes falling below a target level. In this research, we used multiple measures of downside risk. Following Miller and Leiblein (1996), we first specified downside risk as a function of a firm's annual return on assets (ROA) relative to a target level that changed over time. The mean ROA for a firm's two-digit Standard Industrial Classification (SIC) industry in the preceding year was the proxy for its target level. Downside risk was then measured as a second-order root lower partial moment:

$$\begin{aligned} \text{Downside risk, } ROA_j & \\ & = \sqrt{\frac{1}{5} \sum_{ROA_j < IROA_j} (IROA_j - ROA_j)^2}, \end{aligned} \quad (2)$$

where ROA_j is firm j 's ROA and $IROA_j$ is the average ROA for firm j 's industry in the preceding year. The squared difference term was summed over all years in the period 1990–94 in which firm j 's ROA fell short of its target level. For a sensitivity analysis, we also used breakeven (a target of 0) and a firm's own one-year lagged ROA as alternative targets. Accounting data for these three measures were obtained from COMPUSTAT.

These ROA-based downside risk variables implicitly reflect the interests of top managers and others concerned about income stream risk owing to their sunk investments in their firms. This focus was attractive for the present analysis since top managers will be involved in making decisions about firms' international strategies, and these measures also capture various stakeholders' interests. However, Miller and Reuer (1996) showed that alternative operational definitions of downside risk reflected the interests of different stakeholder groups. Thus, for comparison purposes, we also tested the effects of multinationality and IJV investment using a broader set of downside risk measures. First, we calculated the same three variables described above using return on equity (ROE) data to reflect bankruptcy risk and creditors' interests. These measures were called downside risk, ROE. Miller and Reuer's (1996) factor analysis of alternative risk measures showed that this measure loads on the same factor as Altman's Z , which is an indicator of bankruptcy risk. Second, we calculated a mean lower partial moment CAPM beta measure to consider shareholders' interests in firms' systematic risk, calling it downside risk, beta. A firm-specific market model was estimated over the 1990–94 period for all months in which the market return fell short of the U.S. Treasury Bill rate:

$$r_{jt} = \beta_{0j} + \beta_j r_{mt} + \varepsilon_{jt}, \text{ for all } t \text{ given } r_{mt} < i_t, \quad (3)$$

where r_{jt} is firm j 's return in month t , r_{mt} is the market portfolio return, i_t is the interest rate, and β_j is firm j 's downside risk, beta (e.g., Harlow & Rao, 1989). Stock returns data were acquired from the Center for Research in Securities Prices (CRSP) data files, and interest rate data were obtained from the International Financial Statistics database.

Explanatory variables. Following Caves and Mehra (1986) and Kogut and Singh (1988), we measured multinationality by counting the number of countries in which a firm had foreign subsidiaries.

We defined multinationality as the logarithm of 1 plus the number of countries in which a firm had foreign subsidiaries in order to remedy the significant positive skew that was evident for the pre-transformed count measure (e.g., Tabachnick & Fidell, 1996). Foreign subsidiary data were obtained from the 1990 edition of National Register Publishing's *Directory of International Affiliations*.

A firm's investment in IJVs was similarly measured as the log of 1 plus the number of equity joint ventures formed abroad or with a foreign partner during 1985–89. We did not include announcements of preliminary discussions or venture negotiations in these counts in an effort to ensure that our measure included only agreements that were actually consummated. Searches for IJV investments were carried out with the Lexis-Nexis database, which draws upon more than 2,300 sources. Despite the comprehensiveness of this database, the use of public announcements and the lack of reporting requirements may bias count measures in favor of more significant alliances. Recognizing this issue and seeking to avoid potential problems from pooling different types of alliances, our focus was on equity joint ventures.

Our control for organizational slack focused on a firm's recoverable slack resources (Bourgeois & Singh, 1983; Miller & Leiblein, 1996), a concept similar to Singh's (1986) notion of absorbed slack. We calculated three ratios for each firm: accounts receivable/sales; inventory/sales; and selling, general, and administrative expenses/sales. Each ratio was normalized by the industry average, summed, and averaged over the 1990–94 period. Firm size was measured as the log of a firm's average net sales. Finally, industry risk was the mean downside risk for all other firms in the firm's industry (that is, industry risk, ROA; industry risk, ROE; and industry risk, beta).

Sample

The base sample consisted of all U.S. manufacturing firms in the SIC range 3000–3999 that had data available from COMPUSTAT, CRSP, and the *Directory of International Affiliations*. Use of a manufacturing sample rather than one from a different sector or a broader range of industries was motivated by several considerations. First, the large sunk costs in assets and employees typically found in the manufacturing sector suggested that flexibility would be particularly valuable for these firms. Second, sampling firms in this SIC range reflected our desire to facilitate comparisons with prior studies in the risk, international strategy, and real options literatures. Finally, focusing on firms within

this SIC range mitigated data discrepancies arising from differences in accounting practices across single-digit SIC categories (Bromiley, 1991). After observations with missing accounting or subsidiary data necessary to construct our risk measures and independent variables had been deleted, the sample comprised 357 firms. There were sufficient data to calculate downside risk, beta, for 332 firms. Visual inspection of the dependent variables' distributions indicated two outliers in the upper tail of the downside risk, ROE, measure, which we addressed by deleting observations with values more than three standard deviations from the mean.

RESULTS

Table 1 presents descriptive statistics for the sample and a correlation matrix. The average firm had foreign subsidiaries in just under six countries and sales of \$3.3 billion. Approximately 28 percent of the firms had purely domestic operations, and the most internationally diversified firm operated in 44 countries. Firms' total assets averaged \$3.6 billion and ranged from \$15.2 million to \$173.6 billion. A majority of the firms, 62 percent, did not enter into IJVs between 1985 and 1989. Of the firms that did not have operations in foreign countries, only 20.4 percent of them entered into IJVs, whereas 43.1 percent of the firms with foreign subsidiaries invested in at least one IJV. This finding is also in accord with prior research suggesting IJVs are organizational forms that firms use selectively (e.g., Hennart, 1988). Moreover, firms' IJV formation levels were quite heterogeneous, ranging from 0 to 30 investments during 1985–89.

We examined the correlations among the ROA- and ROE-based downside risk measures using the alternative target-level specifications of lagged industry-average return, breakeven, and lagged own-firm return. The correlations between the three downside risk measures derived from ROA data were .87 or higher. Similarly, all correlations between the three downside risk measures based on ROE data were at least .96. Given the robustness of our risk measures to alternative target-level specifications, just three risk measures were retained for the analysis. These were the ROA- and ROE-based risk measures with a lagged industry-average return target and downside risk, beta.

The correlation matrix indicates that downside risk, ROA, is positively correlated with downside risk, ROE, but not with downside risk, beta. Downside risk, ROA, is negatively related to firm size ($p = .026$), and downside risk, ROE, is negatively related to organizational slack ($p = .011$). The only significant correlation between any of the down-

TABLE 1
Descriptive Statistics and Correlation Matrix^a

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. Downside risk, ROA	0.04	0.05									
2. Downside risk, ROE	0.14	0.28	.61***								
3. Downside risk, beta	1.43	1.31	-.09	-.07							
4. Multinationality	1.34	1.08	-.02	.03	-.03						
5. IJV investment	0.47	0.73	-.01	.13*	-.06	.43***					
6. Organizational slack	-0.02	1.68	.01	-.13*	.04	.03	-.10*				
7. Firm size	6.33	1.83	-.12*	.05	-.06	.63***	.66***	-.17***			
8. Industry risk, ROA	0.04	0.01	-.04	-.07	.06	.11*	-.04	.03	.02		
9. Industry risk, ROE	0.30	0.36	-.06	-.10 [†]	-.01	.13*	.01	-.01	.02	-.05	
10. Industry risk, beta	1.37	0.18	.08	-.01	-.12*	.04	-.05	.02	.01	.51***	-.06

^a $N = 332$ for cells corresponding to downside risk, beta; $N = 355$ for all other cells. Downside risk, ROA and downside risk, ROE were constructed using lagged industry-average return targets. Means, standard deviations, and correlations are reported for the log-transformed variables (multinationality, IJV investment, and firm size).

[†] $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

side risk measures and the theoretical variables is the positive relationship between downside risk, ROE and IJV investment ($p = .013$). Nevertheless, the significant correlations among the explanatory variables (for instance, multinationality, IJV investment, and firm size) indicated that multivariate analysis was needed to examine the partial effects of the theoretical variables on downside risk.

We investigated potential multicollinearity problems by examining variance inflation factors (VIFs), conditioning indexes, and variance decomposition proportions. The maximum VIF obtained for the six models (presented in Table 2) was 2.51, which is substantially below the rule-of-thumb cutoff of 10 for multiple regression models (Neter, Wasserman, & Kutner, 1985: 392). The maximum conditioning indexes for the full regression models with downside risk, ROA, downside risk, ROE, and downside risk, beta, as the dependent variables were 18.78, 14.23, and 23.61, respectively. These values are also below the accepted cutoff value of 30 (Belsley, Kuh, & Welsch, 1980: 112). Further, in each case the variance decomposition proportions for the largest conditioning indexes were associated with the intercept term and one of the control variables, indicating that the regression estimates for our theoretical variables were not adversely affected by the presence of multicollinearity. Heteroskedastic error terms might have resulted from the use of a regression estimate as a dependent variable in the downside risk, beta specifications (Hanushek, 1974), but inspection of studentized residuals provided no evidence of heteroskedasticity.

Statistical Techniques

Ordinary least squares (OLS) regression models were used to estimate models involving downside risk, beta, as the dependent variable. The choice of estimation procedure for the other two downside risk measures was influenced by the fact that a significant proportion of the observations obtained a limit value of zero: for downside risk, ROA, and downside risk, ROE, these percentages were 19.4, and 23.4 percent, respectively. Since OLS regression techniques can provide inconsistent parameter estimates when applied to data that include a large proportion of limit observations (Greene, 1993: 962), we used censored Tobit regression models for downside risk, ROA, and downside risk, ROE. The Tobit models can be expressed as follows:

$$Y^* = X(\beta) + \varepsilon, \text{ where } Y = Y^* \text{ if } Y^* > 0, \text{ and } Y = 0 \text{ otherwise, (4)}$$

where Y^* is a latent variable that is observed only when the value of the dependent variable is positive, X is a vector of explanatory variables, β is a coefficient vector, and ε is an error term assumed to be normally distributed.

Tobit and OLS Regression Results

We estimated two regression models for each of the three measures of downside risk and report these results in Table 2. Models 1, 3, and 5 are baseline models in which the analysis is restricted

TABLE 2
Results of Tobit and OLS Regression Analyses^a

Variable	Downside Risk, ROA		Downside Risk, ROE		Downside Risk, Beta	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.075*** (0.02)	0.098*** (0.023)	0.099 (0.069)	0.228** (0.083)	2.941*** (0.615)	2.888*** (0.637)
Organizational slack	0.001 (0.002)	-0.001 (0.002)	-0.023* (0.011)	-0.025* (0.011)	0.027 (0.044)	0.027 (0.045)
Firm size	-0.003 [†] (0.002)	-0.009*** (0.003)	0.001 (0.010)	-0.029 [†] (0.016)	-0.039 (0.041)	-0.022 (0.063)
Industry risk, ROA	-0.392 (0.420)	-0.410 (0.421)				
Industry risk, ROE			-0.078 (0.052)	-0.082 (0.052)		
Industry risk, beta					-0.925* (0.404)	-0.951* (0.406)
Multinationality		0.006 (0.004)		0.014 (0.022)		0.020 (0.087)
IJV investment		0.013* (0.006)		0.094** (0.033)		-0.098 (0.133)
Log likelihood $L(\beta)$	330.07	333.65	-155.05	-150.89		
$-2[L(\beta_{\text{reduced}}) - L(\beta_{\text{full}})]$		7.16*		8.32*		
Model F					2.20 [†]	1.43
N	355	355	355	355	332	332

^a Models 1 through 4 were estimated using Tobit models, and models 5 and 6 were estimated using OLS models. Significance levels for models 1 through 4 were determined by Wald tests, and significance levels for models 5 and 6 were determined by t -tests.

[†] $p < .10$

* $p < .05$

** $p < .01$

*** $p < .001$

to the effects of the control variables. Models 2, 4, and 6 augment the baseline models by including the direct effects of the two theoretical variables. A comparison of the log-likelihood values for models 1 and 2 as well as for models 3 and 4 indicates multinationality and IJV investment are jointly significant in explaining interfirm differences in both downside risk, ROA ($p < .03$), and downside risk, ROE ($p < .02$). A hierarchical F -test comparing models 5 and 6 shows that the theoretical variables are not statistically significant predictors of downside risk, beta ($F = 0.29$).

Our findings for the control variables reveal that organizational slack is significantly related to downside risk, ROE ($p < .05$) and that firm size is most significantly related to downside risk, ROA ($p < .001$). In both cases, the control variables are negatively related to downside risk. Larger firms had lower levels of income stream risk, and firms with greater recoverable slack resources had lower levels of bankruptcy risk. Our controls for industry risk were not statistically significant in the downside risk, ROA, and downside risk, ROE, models.

Hypothesis 1 predicts that multinationality will be inversely related to organizational downside

risk. The regression coefficient for this variable was not statistically significant in any of the models. Thus, the empirical evidence suggests that the international dispersion of foreign subsidiaries does not have a negative impact on a firm's level of downside risk.

Based on predictions from real options theory and the IJV literature, Hypothesis 2 similarly posits an inverse relationship between a firm's investment in IJVs and its downside risk. However, in contrast to the negative hypothesized relationship, a statistically significant, positive effect was obtained in both the downside risk, ROA ($p = .034$), and downside risk, ROE ($p = .005$), models, indicating firms that actively invested in IJVs experienced higher, rather than lower, levels of income stream risk and bankruptcy risk. The overall insignificant results for model 6 precluded interpreting the individual variables' effects on firms' systematic risk.

Several robustness tests were separately performed for the full models. First, to further assess the effects of the correlation between multinationality and IJV investment, we also modeled their effects by entering these two variables individually

into the models. Second, given the relatively large number of firms that did not operate foreign subsidiaries or invest in IJVs, we estimated the effects of multinationality and IJV investment using two dummy variables instead of the two continuous measures. Third, we included a lagged measure of downside risk to account for other possible unspecified influences on organizational downside risk. For these three separate analyses, the results and interpretations were entirely consistent with those presented above. Finally, incorporation of squared terms for the theoretical variables provided no evidence of nonlinear effects, and inclusion of terms for interactions between firm size and multinationality as well as between firm size and IJV investment provided no evidence that the theoretical variables had size-moderated effects on downside risk.

DISCUSSION

The main finding of this study is that U.S. manufacturing firms' investments in dispersed FDI and international joint ventures do not have a general, negative impact on organizational downside risk, as predicted by real options theory and international strategy research. Corporate multinationality is not significantly related to downside risk, and firms that are more active in engaging in IJVs obtain higher, rather than lower, levels of downside risk. These results are striking in light of prior research in the international literature on the diversification benefits of multinationality and recent evidence that higher-performing (Harbison & Pekar, 1998) and higher-prestige (Stuart, 1998) firms are more active in forming alliances. The evidence we present can be explained by the observation that not all investments undertaken in uncertain contexts provide significant options, nor do firms necessarily manage real options properly. The results thus reveal a gap between the promise of risk reduction that theory holds out and the reality of firms' apparently limited capabilities for managing international investments as options.

Multinationality and Organizational Downside Risk

The difference between international investments' potential and actual benefits in terms of improved flexibility and reduced risk has previously been acknowledged by authors noting the challenges that firms face in successfully implementing an options-based approach. For instance, owing to their size and complexity, global firms may fail to perceive the real options embedded in

their international investments and may also lack appropriate management systems for exercising flexibility (e.g., Kogut, 1985). Further, the costs of holding real options may be substantial if an MNC must commit additional capital over time or incur ongoing costs—for instance, if the firm carries excess capacity to facilitate shifts in value-chain activities across borders. Rangan (1998) also pointed to the lack of compatibility across MNCs' operations and the residual effects of administrative heritage as additional factors that may restrict firms' abilities to shift value-chain activities in response to changing environmental conditions.

Other considerations might explain why firms with more dispersed international operations do not obtain lower levels of downside risk. Implicit in the formulation of the multinationality hypothesis is the notion that flexibility benefits outweigh any incremental costs and risks stemming from greater organizational complexity. In fact, prior research has suggested that it is difficult for firms to coordinate foreign subsidiary operations (Roth, Schweiger, & Morrison, 1991) and that international diversification can increase transaction costs and information-processing loads (e.g., Jones & Hill, 1988). If managers' monitoring capabilities are taxed or organizational inertia is present, it is less likely that a firm will be able to avoid downside outcomes and exploit emerging opportunities as environmental conditions change. Related factors that might impede global shifts in value-chain activities and nullify the potential flexibility and downside risk benefits of dispersed FDI include parochialism, giving rise to subgoal pursuit, and weak internal systems that fail to provide timely information to decision makers (Rangan, 1998).

Joint Ventures and Organizational Downside Risk

Although a large body of research has similarly identified many features of IJVs that make them attractive from a risk standpoint, we know of no empirical study that directly tests the organizational risk implications of international joint ventures. Our finding that IJV investment has a positive influence on downside risk raises the question of whether this result would also hold for domestic joint ventures, which may not involve some of the managerial challenges that arise from operating in a foreign country or allying with a foreign partner. To address this issue, we re-estimated the models by incorporating an analogous measure for domestic JVs. The results revealed that firms' investments in domestic joint ventures were positively related to downside risk, ROA ($p = .015$), and downside risk,

ROE ($p = .008$). This analysis indicates that the significant risks attending collaborations are not confined to cross-border ventures. Neither international nor domestic JV investment has a negative impact on organizational downside risk.

The poor performance and low survival rate of many IJVs also raise the issue of whether many IJVs are simply high-risk projects and the issue of whether they are truly being managed using an options-based approach. Studies show that parent firms' satisfaction levels with IJVs are quite low and may be declining overall (e.g., Beamish & Delios, 1997; Kogut, 1988), and empirical research has shown that IJVs are unstable organizational forms that are very difficult to manage (e.g., Barkema, Bell, & Pennings, 1996; Li, 1995; Park & Ungson, 1997). Singh and Mitchell's (1997) findings demonstrate how a business's fate can become linked with a partner's future: a firm's dissolution risk increases when partners either form new relationships or shut down.

Just as a number of contingencies might explain why multinationality is insignificantly related to downside risk in general, many related factors potentially explain why IJVs often do not deliver downside risk benefits to parent firms. First, viewing joint ventures as options that reduce downside risk rests on the assumption that parent firms do not experience large recurring costs or make additional capital infusions while managing ventures over time. If carrying costs or postformation investment outlays are significant in maintaining the collaboration, downside possibilities can be non-trivial. Second, viewing JVs as options also implies that a firm has a secure claim on a venture's upside opportunities while deferring irreversible investment (McDonald & Siegel, 1986). This can be the case if a firm has an explicit call option on a venture, but in other instances it is plausible that hold-up will occur upon JV termination or that the gains from expansion will be reflected in the buy-out price. Finally, other IJV work has identified many other contingencies, like parent firms' organizational structures (Franko, 1971) and IJV control mechanisms (Killing, 1983), that can shape firms' abilities to manage joint ventures over time.

Limitations and Future Research Directions

The present study's results and limitations have several implications for future international strategy research. First, our finding that investments in multinationality and joint ventures do not have a negative effect on downside risk provides a cautionary note against making general claims regarding flexibility enhancement or risk reduction based

upon the investments per se. At best, such investments can provide firms with the potential to obtain these benefits, but we found no evidence that firms making such investments were able to actually achieve lower levels of downside risk in general. Given the evidence we present, there is value in questioning theoretical predictions or assumptions regarding organizational flexibility and risk in different contexts. Research is needed to sort out the degree to which international investments truly confer specific options to global organizations from the firms' abilities to properly manage the options they possess.

Second, although the focus of our study was on the overall effects of multinationality and international joint venture investments on organizational downside risk, future research might investigate specific contingencies affecting a firm's ability to enhance flexibility and reduce risk through international operation. Although there did not appear to be any general relationship between multinationality and downside risk for our sample of U.S. manufacturing firms, and organizational downside risk was actually higher for firms investing in IJVs, flexibility enhancement and risk reduction from international operations may occur in more limited, well-defined settings. We have noted various factors that might have moderated the general relationships between international investments and organizational downside risk that we observed (management systems, value-chain configurations and operations compatibility, organizational structure, alliance design, and so forth). Beyond these potential macrolevel impediments to achieving flexibility, successful implementation of an options-based approach may also hinge upon individual managers' abilities to perform specific tasks, such as monitoring environmental developments, communicating internationally, and transferring resources to satisfy global rather than unit objectives. Thus, there also appears to be value in applying real options theory with other perspectives operating at the individual level.

Third, several opportunities exist to build upon the study's focus and methods. Our analyses using secondary data to measure IJV investment and characterize a firm's international presence could be refined by using primary data. Use of survey methods would also permit elaborating our models to incorporate possible moderating effects or investment antecedents using a structural modeling approach. Gathering finer-grained data would also allow researchers to explicitly investigate real option theory's assumptions and boundary conditions as this perspective is applied to multinational firms and joint ventures. Future research could examine

the generalizability of our findings by replicating the present study in different contexts, but it could also build upon our work by studying operational flexibility and environmental cues directly (e.g., Hurry et al., 1992; Kogut & Chang, 1996), drawing comparisons with other investments that provide options to organizations (e.g., Bowman & Hurry, 1993; McGrath, 1997) and investigating specific types of risks to which firms are exposed or to which they respond through their investment decisions. Das and Teng (1998), for example, classified alliance risks into performance and relational categories and suggested how parent firms might anticipate such risks in the provision of different types of resources and in alliance design. The application of an alliance typology to classify alternative structures and collaborative motives would be valuable in studying how different types of risk affect and are affected by different types of inter-firm collaboration. Research extending our study in directions such as these could advance the literature on alliances and international strategy.

Finally, the downside risk measures implemented in this study can be applied to a wide range of other empirical research settings. Downside conceptualizations of risk are particularly attractive in empirical studies applying real options theory because of the contention that options offer firms the potential to avoid unfavorable outcomes and seize upon favorable outcomes in a selective fashion (McGrath, 1997). As an empirical matter, the finding that multinationality is not significantly related to organizational downside risk contrasts with previous studies' suggestions that international involvement offers diversification benefits in the form of profit stabilization (e.g., Qian, 1996). Given these differences and the theoretical motivations for employing downside conceptualizations of risk (Miller & Reuer, 1996), incorporation of downside risk measures into other areas of organizational research may prove fruitful.

The study's findings indicate the opportunities that exist for management scholars to study how or if firms can close the gap between the potential and actual flexibility and risk benefits of international investments in multinationality and joint ventures. Future research can address the influence of supporting strategies and implementation approaches, specific contexts in which risk reduction and flexibility enhancement is great or improbable, and the positive and normative boundaries of real options theory. As corporate flexibility becomes a more central concern of management and international strategy research (e.g., Buckley & Casson, 1998; Hitt, 1998), these research directions will likely take on greater importance.

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