AN EMPIRICAL EXAMINATION OF MULTINATIONAL CORPORATE CAPITAL STRUCTURE

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Abstract. This paper examines whether there are systematic differences in the traditional capital structure determinants between MNCs and DCs, and if there are additional, uniquely international factors that may help explain the capital structure choice of multinational corporations. The results suggest that specific international factors such as political risk and exchange rate risk are relevant to the multinational capital structure decision, that multinationals have higher agency costs than purely domestic firms, and that international diversification does not lower earnings volatility for multinational corporations.

Numerous textbook authors have suggested that multinational corporations (MNCs) should be able to support more debt in their capital structures than purely domestic corporations (DCs).[1] They point out that an MNC operates in several less than perfectly correlated economies and that this diversification should translate into lower earnings volatility, and hence a lower probability of bankruptcy. Thus, given the traditional paradigm of a trade-off between the tax shelter of debt and expected bankruptcy costs, MNCs should have lower expected bankruptcy costs and hence higher leverage ratios. However, the empirical evidence suggests that, in fact, MNCs have less debt in their capital structures than DCs [Lee 1986; Fatemi 1988; Lee and Kwok 1988]. Thus, either international diversification does not lead to a reduction in overall business risk, or there are other factors that need to be considered.

MNCs are exposed to additional economic forces, and have additional opportunities, that are less relevant for DCs. For example, MNCs may have greater exposure to international political risk, and they may be affected differently by exchange rate fluctuations. MNCs also face varying and at times uncertain tax systems. Furthermore, there could be systematic differences in the agency costs faced by MNCs and DCs. Most of the empirical literature on capital structure has either completely ignored international factors, or

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implicitly assumed that they can be adequately proxied by the standard business risk measures. However, if specific international factors are relevant in determining MNC capital structures, then models that ignore these factors are misspecified.

This paper examines whether there are systematic differences in the traditional capital structure determinants between MNCs and DCs, and if there are additional, uniquely international factors that may help explain the capital structure choice of multinational corporations. The results suggest that specific international factors such as political risk and exchange rate risk are relevant to the multinational capital structure decision, that multinationals have higher agency costs than purely domestic firms, and that international diversification does not lower earnings volatility for multinational corporations.

LITERATURE REVIEW

There has been relatively little empirical work dealing specifically with the capital structure of multinational corporations. Fatemi [1988] classified a sample of corporations as being either multinational or domestic using the foreign sales ratio. Controlling for size and industry effects, he then compared several different leverage measures between the two groups. Fatemi concluded that MNCs have lower target debt ratios than DCs, and that they use more short-term financing. He speculated that the differences are due to international market imperfections that MNCs are faced with or try to exploit.

The only work focusing on international differences in the determinants of capital structure is that of Lee [1986], which is summarized in Lee and Kwok [1988]. Lee used the foreign tax ratio to classify firms as MNCs or DCs and, after controlling for size and industry effects, also found that MNCs have lower target debt ratios than DCs. He then examined three primary capital structure determinants: bankruptcy costs (as proxied by volatility), agency costs (research and development, and advertising expenses/sales), and non-debt tax shields. After controlling for size and industry effects, he found that MNCs had greater agency costs and non-debt tax shields than DCs, but that, contrary to his hypothesis, there were no significant differences in volatility. Lee also found that non-debt tax shields and his agency cost proxy were positively related to the degree of international involvement (as proxied by the foreign tax ratio). However, he did not examine the actual relationship between his proposed capital structure determinants and leverage.

In summary, the empirical evidence so far suggests that MNCs have lower target debt levels than DCs, and that some of the traditional capital structure determinants seem to be related to the level of international involvement. However, there has been no work directly testing the impact of these determinants on the leverage of MNCs. In addition, there has been no work examining the effect on leverage of specific international factors such as

foreign exchange risk, political risk, diversification, and international agency costs. This paper extends the empirical literature in this direction.

MNC CAPITAL STRUCTURE DETERMINANTS

The vast majority of the empirical research on capital structure has ignored the possible impact of international factors.[2] While this may have been acceptable twenty years ago, international factors can no longer be ignored. Multinational corporations comprise a major portion of the total equity value in the U.S. and other industrialized nations, and these multinationals meet with a variety of constraints and opportunities that are unique to their international setting. This section discusses these international factors and their expected effect on the capital structure of the multinational firm.

Business Risk and Diversification

It is generally argued that there should be an inverse relationship between business risk and the optimal debt level. Firms with less business risk are supposedly able to assume more financial risk. Business risk (i.e., the cost of financial distress, expected bankruptcy cost, etc.) is often proxied by the volatility of net operating income, and most (but not all) of the previous empirical studies have found the expected negative relationship between volatility and leverage. It is also frequently argued that, due to their ability to diversify across less than perfectly correlated national economies, volatility should be less for MNCs than for DCs, and that MNCs should therefore be able to support more leverage. However, Lee [1986] and Fatemi [1988] have found that MNCs actually have lower leverage ratios than DCs.

There are several possible explanations for this finding. One possibility is that, although international diversification can lower the volatility of earnings, firms operating multinationally are also exposed to exchange rate risk and political risk, and it may be difficult to adequately diversify these risks away. If, in diversifying internationally, the reduction in business risk due to reduced earnings volatility were more than offset by the additional exchange rate risk and political risk incurred, the net effect could be a lower optimal debt ratio for MNCs. Another possibility is that the risk-reducing benefits of international diversification are offset by systematic differences in agency costs between MNCs and DCs. As discussed later in this section, it is quite plausible that MNCs incur higher agency costs of debt financing than DCs. Finally, the lower observed MNC debt ratios could simply be due to the fact that the integration of the world economy precludes significant business risk reductions via international diversification.

Lee [1986], using COMPUSTAT data from 1964 to 1983, failed to find a difference in volatility between domestic and multinational corporations. However, it will be demonstrated in the next section that his volatility measure (which has also been used by Chaplinsky [1984], and Bradley, Jarrell and Kim

[1984]) suffers from potential size bias. Lee also attempted to test for an inverse relationship between diversification and earnings volatility. He regressed the foreign tax ratio on volatility and, after controlling for size and industry effects, found no significance. Lee concluded that the degree of international involvement does not reduce bankruptcy costs. However, the foreign tax ratio does not really measure diversification. A firm could have a high foreign tax ratio, but all of its foreign investment could be in a single risky country. One would not expect this firm's international involvement to lower its business risk.

Exchange Rate and Political Risk

Both MNCs and DCs are exposed to economic exchange risk: the risk that currency fluctuations will change the demand, supply, price, and cost characteristics of the firm. Previous empirical research has ignored this risk, or implicitly assumed that it can be adequately represented by the earnings volatility measure of general business risk. However, since FASB 52 mandated the use of the current rate method in 1981, translation gains/losses no longer pass through to the income statement. Furthermore, U.S. accounting standards allow some flexibility to smooth reported earnings. Hence, an economic exchange rate exposure measure based on reported earnings is seriously limited, and a measure based on stock prices or analysts' expectations would be more appropriate.

Within the universe of MNCs, the traditional argument would be that the more sensitive the firm is to exchange rate fluctuations, the greater the expected cost of bankruptcy and thus the lower the optimal debt level. However, an argument can also be made that MNCs with higher economic exchange rate exposure should have higher debt levels. The distinction here between transaction and economic exchange rate exposure is important. It is relatively easy for a firm to hedge its transaction exposure to exchange rate fluctuations. Economic exchange rate risk, on the other hand, is difficult to measure, and even more difficult to hedge. One tool an MNC does have to manage economic exposure is its financing policy. If an MNC has foreign currency denominated income from its foreign affiliates, it can hedge the exchange risk on this income by raising foreign currency-denominated capital. Since it is generally easier (and cheaper) for MNCs to issue debt than equity in foreign markets, they may increase their foreign debt in an effort to hedge their economic exchange rate exposure. Although this hedging should reduce exchange rate sensitivity, the hedge will not be perfect. Thus, there could be a positive relationship between the residual (unhedged) exchange rate sensitivity and the higher leverage resulting from MNCs' imperfect attempts to hedge this risk.

When comparing MNCs and DCs, at first it seems natural to assume that MNCs would have greater exposure to economic exchange rate risk than DCs. However, DCs with foreign competition in their local markets face a great deal

of economic exchange rate risk. If the U.S. dollar strengthens, foreign competitors will be able to reduce the U.S. dollar price of their products and still maintain profitability in their home currencies. And if the U.S. dollar weakens, and a DC purchases foreign inputs, the cost of these inputs will increase. MNCs face these same exposures, but they have several tools at their disposal to help manage this risk. For example, MNCs can shift production to low-cost areas, and they can utilize transfer pricing, multilateral netting and international debt sourcing to help mitigate their economic exchange rate exposure. MNCs may also have less economic exchange rate exposure due simply to diversification effects. Thus, it is quite plausible that, as a group, MNCs are less sensitive to exchange rate fluctuations than DCs.

In addition to exchange rate risk, MNCs are exposed to varying degrees of political risk. Previous studies of capital structure have either ignored political risk or implicitly assumed that it can be adequately proxied by earnings volatility. Historical time series measures of earnings volatility, however, cannot capture a firm's political risk exposure. A major political event such as a currency blockage or expropriation is rare, and the discrete nature of these events precludes the use of time-series approaches for measuring this type of risk.

When a major political event does occur, however, the impact on a corporation can be severe. The risk of major political events occurring abroad is very real. There is even an industry devoted to measuring and insuring this type of risk. Given the discrete nature of foreign direct investment, it is difficult for corporations to adequately diversify political risk. One of the few tools MNCs have to manage this risk is debt policy. Corporations can minimize the expected loss due to a major political event in a risky foreign country by financing mostly with local debt, or by borrowing from a syndicate of international banks. Hence, it can be argued that MNCs that operate in riskier countries should be expected to have higher debt ratios.

Agency Costs

Agency costs have been shown to significantly affect the optimal debt level, and there are a number of reasons why these costs may differ between MNCs and DCs. These include differences in monitoring costs, international capital and labor market imperfections, and differing asset structures.

MNCs face higher auditing costs, language differences, sovereignty uncertainties, and varying legal and accounting systems. In addition, their investors are confronted with wider informational gaps and higher costs of investigation. Hence, MNCs are likely to face significantly higher monitoring costs than DCs.

The existence of capital and labor market imperfections could also lead to higher agency costs for MNCs. Barnea, Haugen and Senbet [1985] identify

several mechanisms through which capital and labor markets can mitigate agency costs. Theoretically, these mechanisms could also work across international markets. In practice, however, significant international capital and labor market barriers exist which could limit the efficiency of these market mechanisms in reducing the agency costs faced by MNCs.

Finally, MNCs are likely to have higher proportions of intangible assets (greater uniqueness) than DCs. One of the primary motivations for direct foreign investment is to take advantage of firm-specific advantages and market imperfections in the pursuit of monopoly rents [Caves 1971, 1974, 1982]. Errunza and Senbet [1981] found a positive relationship between the degree of international involvement and monopoly rents, and Kim and Lyn [1986], using Tobin's q, find that MNCs have excess market values due to monopoly rents and investment opportunities. MNCs may also have a lower proportion of tangible assets due to their greater political risk exposure. Significant tangible assets in a host country can be tempting targets for expropriation. Intangible assets, on the other hand, may have little value to parties other than the firm, and are thus less likely to be expropriated. Both the Myers [1977] underinvestment hypothesis and the Scott [1977] secured debt hypothesis suggest an inverse relationship between uniqueness and leverage, which could help explain the lower observed MNC debt levels.

SAMPLE SELECTION AND DATA DESCRIPTION

Sample Selection

The primary data source for this study is the COMPUSTAT tapes compiled by Standard & Poor's. Companies that had complete data on the COMPUSTAT tapes for the years 1987 to 1991, and that were incorporated in the United States and traded on the New York Stock Exchange, were initially selected. The time period was limited to the years after 1986 because of the possible effect of the Tax Reform Act of 1986 on the tax incentives for MNCs. Regulated firms (SIC codes 4000–5000) and financial firms (SIC codes 6000–6999) were excluded.

Next, it was is necessary to classify the companies as either domestic or multinational corporations. Several classification criteria have been suggested in the literature, including the foreign sales ratio [Geyikdagi 1981; Errunza and Senbet 1984; Fatemi 1984, 1988; Kim and Lyn 1986; Michel and Shaked 1986; Shaked 1986], foreign tax ratio [Lee 1986; Lee and Kwok 1988] and the number of countries in which the firm operates [Stanley and Block 1983; Errunza and Senbet 1984; Kim and Lyn 1986; Michel and Shaked 1986; Shaked 1986]. The foreign sales ratio has been the most popular, but it has two primary disadvantages. First, it is only available for certain years and for a limited number of firms. Secondly, it does not differentiate between firms that simply sell abroad and firms that generate foreign source income. Information on the number of countries in which a firm operates is also limited. Thus, the

foreign tax ratio is used as the primary classification variable. This variable is available directly from the COMPUSTAT tapes, and allows the largest sample of multinational firms to be constructed.

Firms were classified as domestic corporations (DC) if the foreign tax ratio (*FTAXR*) was less than or equal to 1%. Following Lee [1986], two samples of multinational firms were constructed, one with *FTAXR* greater than or equal to 10% (MNC10) and the second with *FTAXR* greater than or equal to 25% (MNC25). The MNC25 sample is used in tests comparing DCs to MNCs in order to maximize the difference between the two samples. The MNC10 sample is used to generate a somewhat larger sample when analyzing the capital structure determinants for MNCs alone.

The initial sample sizes were 410 DCs, 378 MNC10s and 284 MNC25s. However, a preliminary review showed that the MNCs were much larger than the DCs. Thus, firms with less than $250 million in total assets were dropped from the samples. Table 1 provides a frequency distribution by size for the final DC and MNC25 samples.

Industry classification has been a significant capital structure factor in previous studies, and is controlled for here. Table 2 provides a distribution by industry classification for the DC and MNC25 samples.

Selection of Proxies

Selection and computation of the various factor proxies is discussed below. Unless noted otherwise, all values are computed as five-year averages from 1987 to 1991 using data from the COMPUSTAT tapes.

The following debt ratio is used as the primary capital structure measure:

$$LEVERAGE = LTD / (LTD + MVE),$$

where *LTD* is long-term debt and *MVE* is the market value of equity (number of common shares outstanding multiplied by the year-end closing price).

TABLE 1
DC and MNC25 Size Distributions

Avg Total Assets ($ millions)	DC	MNC25	Total	Percent
> 5,000	21	56	77	15.8
2,500 to 5,000	23	35	58	11.9
1,000 to 2,500	60	55	115	23.6
500 to 1,000	70	42	112	23.0
250 to 500	77	48	125	25.7
Total	251	236	487	100.0
Percent	51.5	48.5	100.0	

TABLE 2
DC and MNC25 Industry Classification

Industry Classification	DC	MNC25	Total	Percent
1 Food	16	17	33	6.8
2 Retail	56	8	64	13.1
3 Drugs	8	22	30	6.2
4 Durables	10	35	45	9.2
5 Construction	26	8	34	7.0
6 Business Equipment	16	64	80	16.4
7 Chemicals	11	18	29	6.0
8 Metals	18	13	31	6.4
9 Oil and Mining	26	19	45	9.2
10 Miscellaneous	64	32	96	19.7
Total	251	236	487	100.0
Percent	51.5	48.5	100.0	

To proxy business risk, several researchers, including Lee and Kwok [1988], Chaplinsky [1984], and Bradley, Jarrell and Kim [1984], have used the standard deviation of the first difference in EBIT scaled by the mean value of the firm's total assets (*VOL/TA*). However, dividing by total assets could introduce a size bias, since this approach could actually understate volatility for larger firms and overstate volatility for smaller firms. In addition, since size has been shown to impact capital structure and should therefore be controlled for in the regressions, this volatility measure could be contemporaneously correlated with the size proxy. Hence, to control for the potential bias and statistical problems with *VOL/TA*, and to examine the robustness of the results to the volatility measure utilized, the coefficient of variation of EBIT (denoted *VOLCV*) will also be computed. Both volatility measures are computed using nineteen years of annual data ending 1991. EBIT is used rather than net income because its volatility is less likely to be directly correlated with leverage.

The volatility of EBIT may not be the only source of business risk for MNCs. Hence, two other factors, the economic exposure to foreign exchange rate fluctuations and political risk, will also be analyzed. Madura [1983], Adler and Dumas [1984] and Madura [1995] argue that economic exchange risk exposure can be measured as a slope coefficient in a regression of company stock returns as a function of exchange rate returns. The foreign exchange rate sensitivity measure (*FXSEN*) used here is computed as the absolute value of the b_2 coefficient in the following regression:

$$r_i = b_0 + b_1 r_{ew} + b_2 r_{\$},$$

where r_i is the return on the stock of firm i, r_{ew} is the return on the CRSP equally weighted index, and $r_{\$}$ is the return on the U.S. \$/SDR exchange rate. The r_i and r_{ew} values are taken from the CRSP tapes, and the U.S. \$/SDR rates

are taken from the *International Financial Statistics* CD ROM database published by the International Monetary Fund. To minimize the possibility of a stochastic regressors problem, the model above is estimated for the sixty months ending December 1986.

The political risk measure is computed as:

$$PR = 1 - (\#\ of\ Low\ Risk\ Countries\ /\ NOC)\ ,$$

where *NOC* is the total number of countries in which the firm operates, and # *of Low Risk Countries* is the number of countries the firm operates in that are considered to be among the twenty safest in 1989 by *Euromoney*.[3,4] The countries in which the MNCs operate are taken from the *Directory of American Firms Operating Abroad*, twelfth edition, 1991.

A common measure of the Myers [1977] underinvestment agency cost used in the literature is uniqueness,[5] where uniqueness is defined as:

$$UNQ = (R\&D\ Exp. + Advertising\ Exp.)\ /\ Sales\ .$$

Monitoring costs can also be considered an agency cost, and it is natural to assume that the costs of monitoring a firm increase with the number of countries in which that firm operates (*NOC*). Hence, *NOC* will also be used as an agency cost proxy.

TESTS AND RESULTS

The analysis proceeds in three steps. First, the factors thought to influence capital structure are compared between samples of domestic and multinational firms. Next, the impact of international diversification on the earnings volatility of a sample of MNCs is examined. Finally, for the same sample of MNCs, leverage is modeled as a function of both traditional capital structure determinants and specific international factors.

MNC vs. DC Comparison of Capital Structure Determinants

Table 3 presents the means of the various factors for the DC and MNC25 samples. Two-tailed *t*-test and Mann-Whitney *U*-test statistics for equal means are also presented. Note that the sample sizes for the *FXSEN* variable are lower than for the other variables, since data for this variable were not available for all of the companies in the two samples. Consistent with the findings of Lee [1986] and Fatemi [1988], the mean leverage ratio for the multinational sample is significantly less than that for the domestic sample at the 1% level. As discussed above, this result is contrary to the notion that multinationals should be able to carry higher debt loads since they are able to diversify their business risk across national economies.

The comparison of means for the volatility measures is quite interesting. Looking at the *VOL/TA* measure, it would appear that MNCs are less volatile

TABLE 3
Two-Tailed *t*-Test and Mann-Whitney *U*-Test for Difference in Means

	Means			
Variable	DC	MNC25	*t*-Test	*U*-Test
LEVERAGE	0.3290	0.2725	2.8015***	2.7450***
VOL/TA	0.0623	0.0531	1.7387*	1.0203
VOLCV	24.4140	33.1573	0.8816	1.7219*
FXSEN	0.5594 (n = 134)	0.4377 (n = 181)	2.5609**	3.1119***
UNQ	0.0171	0.0524	8.1851***	8.4512***

Significance: *** = .01, ** = .05, * = .10.

than DCs, although the statistical significance of the difference is weak. This result is consistent with the findings of Lee [1986]. However, since the firms in the MNC25 sample are, on average, larger than the firms in the DC sample, and since the *VOL/TA* measure potentially understates volatility for large firms, this result should be viewed with caution. Using the coefficient of variation measure (*VOLCV*), one would reach the opposite conclusion, that MNCs are in fact more volatile than DCs. Again, the statistical significance of the difference is weak.

Table 3 also shows that the DCs are significantly more sensitive to exchange rates than MNCs. At first, this result may seem surprising. However, in the presence of ever increasing foreign competition, DC returns are going to be sensitive to exchange rate fluctuations. Consider, for example, a DC that operates entirely within the U.S. and has no foreign sales or supply purchases. If this firm faces foreign competition in the domestic market, and if the U.S. dollar strengthens, foreign competitors are able to lower the dollar price of their goods and still maintain profitability in their home currency. Unlike transaction exposure, this economic exchange rate exposure is difficult for DCs to manage. MNCs, on the other hand, are usually in a better position to manage this type of risk Hence, it is not entirely unexpected that MNCs are less sensitive to changes in the value of the dollar.

Table 4 presents the results of a three-way analysis of variance for the leverage measure and for the primary capital structure determinants. The MNC25 factor is 1 if the firm is in the MNC25 group and 0 if the firm is in the DC group. The size factor consists of the five size groupings listed in Table 1, and the *IC* factor consists of the 10 industry classifications listed in Table 2.[6]

The analysis for *LEVERAGE* indicates that it is significantly different between the DC and MNC25 samples even after controlling for size and industry class.

TABLE 4
Analysis of Variance

Dependent Variable	Model *F*-Statistic	Factors	Factor *F*-Statistic
LEVERAGE	2.83***	MNC25	7.19***
		Size	2.50**
		IC	2.58***
VOL/TA	6.35***	MNC25	0.13
		Size	13.79***
		IC	4.39***
VOLCV	3.01***	MNC25	0.67
		Size	0.88
		IC	3.94***
FXSEN	2.04***	MNC25	3.63*
		Size	2.19*
		IC	1.86**
UNQ	15.80***	MNC25	83.47***
		Size	3.82***
		IC	14.16***

Significance: *** = .01, ** = .05, * = .10.

This supports the notion that there may be factors unique to multinational firms that affect their optimal capital structures, and that the traditional capital structure models for domestic corporations may be inadequate.

The results for the volatility measures indicate that, after controlling for size and industry effects, multinationality has little impact. Given the limitations of volatility as a business risk measure for multinational firms, however, these results must be interpreted with caution. It is interesting to note that the size factor explains a significant proportion of the variance for the *VOL/TA* proxy, but is insignificant for the *VOLCV* proxy. The potential size bias discussed previously could produce this result. The analysis for *FXSEN* indicates that all three factors help explain its variance. Finally, after controlling for size and industry effects, multinationality still explains a significant amount of the variance in the *UNQ* measure.

In summary, after controlling for size and industry effects, MNCs appear to have lower target debt ratios than DCs. The findings do not support the hypothesis that, due to their ability to diversify across less than perfectly correlated national economies, MNCs have less volatility than DCs. The hypothesis that, due to their greater ability to manage and hedge economic exchange risk, MNCs are less sensitive to exchange rate fluctuations is supported. Finally, the empirical evidence supports the hypothesis that MNCs have higher levels of the uniqueness measure of agency costs.

Analysis of Diversification Benefits

In this section, the textbook hypothesis that international diversification lowers the volatility of earnings is analyzed. Lee [1986] tested this hypothesis by running the regressions to test the relationship:

$$VOL = f(FTAXR),$$

where *FTAXR* was a proxy for the degree of international involvement (size and industry effects were controlled). He found no significant coefficient for *FTAXR* and concluded that "the degree of foreign involvement has not contributed to reducing the bankruptcy risk of MNCs, contrary to the hypothesis." However, the hypothesis is that international *diversification* can reduce business risk, and not simply international involvement. Lee did not actually test the diversification hypothesis. In his test, a firm could have a high degree of international involvement, and yet all of its foreign investment could be in a single high-risk country. Such a firm would actually be expected to have more and not less business risk due to its international activities.

To test the hypothesis that international diversification reduces business risk, the following diversification proxy is proposed:

$$DIVERS = \ln (FTAXR * NOC).$$

This proxy is a positive function of both the foreign tax ratio (degree of international involvement) and the number of countries in which the firm has subsidiaries, and should be a much better indicator of diversification than simply *FTAXR*. The following relationships are estimated using regressions (with controls for size and industry effects):

$$VOL = f(FTAXR),$$

and

$$VOL = f(DIVERS).$$

These models are estimated for sample MNC10, which consists of U.S. multinational firms with foreign tax ratios (*FTAXR*) greater than or equal to 10% for which information for all of the proxies were available. This sample contains 210 MNCs. The models are also estimated with variables added to control for size and industry effects. The natural log of sales (L*SIZE*) is added to control for size effects and nine industry dummy variables are used to control for industry effects. Finally, both regression models were estimated with two different proxies for volatility: the standard deviation of the first differences in EBIT divided by average total assets (*VOL/TA*) and the coefficient of variation of the first differences in EBIT (*VOLCV*).

The regression results are reported in Table 5. Panel A presents the results for the test of volatility as a function of the *FTAXR*. Using the *VOL/TA* measure proposed by Lee [1986], there is a weakly positive relationship between

TABLE 5
Analysis of Diversification Benefits
Dependent Variable: Volatility

Variable	Volatility as *VOL/TA* Coeff.	*t*-ratio	Volatility as *VOLCV* Coeff.	*t*-ratio	Volatility as *VOLCV* Coeff.	*t*-ratio
Panel A: Foreign Tax Ratio (*FTAXR*)						
FTAXR	.0088	1.48*	−13.906	−0.03	−35.787	−0.59
L*SIZE*	−.0053	−4.65***	8.310	1.18	6.030	0.98
ID1	−.0023	−0.54			−21.371	−1.28
ID2	−.0096	−2.35***			−18.470	−1.16
ID3	−.0047	−1.08			−17.654	−1.06
ID4	.0106	2.28**			70.492	1.29*
ID5	.0059	0.96			−5.452	−0.36
ID6	.0224	4.59***			22.606	1.01
ID7	−.0016	−0.35			−8.677	−0.47
ID8	.0108	1.73**			3.204	0.18
ID9	.0253	4.51***			88.083	1.04
Constant	.0692	7.62***	−19.804	34.35***	−12.472	−0.29
R-square	.3412		0.0072		0.0573	
Adj. *R*-square	.3046		0.0024		0.0050	
F-value	9.32***		0.08		2.05**	
Panel B: Diversification (*DIVERS*)						
DIVERS	−.0017	−1.52*	−4.160	−0.39	−0.762	−0.06
L*SIZE*	−.0047	−3.76***	9.666	1.05	6.467	0.85
ID1	−.0011	−0.26			−24.504	−1.59*
ID2	−.0126	−3.61***			−17.754	−0.72
ID3	−.0015	−0.32			−22.038	−1.23
ID4	.0118	2.64***			66.135	1.26
ID5	.0065	1.10			−8.613	−0.67
ID6	.0259	5.13***			14.541	0.89
ID7	.0018	0.36			−15.062	−0.89
ID8	.0127	2.13**			−2.670	−0.20
ID9	.0279	4.89***			78.016	1.10
Constant	.0693	7.00***	−31.527	−0.58	−26.339	−0.51
R-square	.3416		0.0079		0.0548	
Adj. *R*-square	.3050		−0.0016		0.0023	
F-value	9.34***		0.83		1.04	

Heteroskedastic-consistent *t*-ratios are reported.
Significance: *** = .01, ** = .05, * = .10.

volatility and the *FTAXR*, and a significantly negative relationship between volatility and size. Some of the industry dummy variables (*ID*) are also significant. However, when *VOLCV* is used as the volatility proxy, *FTAXR* and L*SIZE* become statistically insignificant. The results are consistent with the argument made above that, by dividing by total assets, a size bias is introduced into the *VOL/TA* measure, potentially causing contemporaneous correlation in the regression analysis.[7] The results using the *VOLCV* measure of volatility, which should be free from size bias, suggest that the *FTAXR* has no impact on volatility, and the results are qualitatively unchanged when the industry dummy variables are added.

In Panel B, the *FTAXR* term is replaced with the diversification proxy, *DIVERS* = ln(*FTAXR* * *NOC*), and similar results are obtained. With the *VOL/TA* volatility proxy, the *DIVERS* and *SIZE* terms are both negative and significant. However, with the *VOLCV* proxy, neither term is significantly different from zero. In addition, the *R*-square value is extremely low and the *F*-value indicates that the joint hypothesis that all of the coefficients are equal to zero cannot be rejected at even the 10% level of significance. Hence, after removing the size bias from the earnings volatility proxy, there is no support for the hypothesis that international diversification reduces business risk.

Analysis of MNC Capital Structure Determinants

In this section, the impact of the various capital structure determinants on the leverage of the multinational firm is examined. The first model estimated is:

$$LEVERAGE = f(VOLCV, UNQ, NOC, LSIZE),$$

where *VOLCV* is the coefficient of variation in EBIT, *UNQ* is the uniqueness measure of agency costs, *NOC* is the number of countries in which the firm has subsidiaries, and L*SIZE* is the natural log of sales revenue. The model is estimated for the MNC10 sample of 210 multinational firms described above, and nine industry dummy variables are included to control for industry effects.

TABLE 6
General Capital Structure with *FXSEN* and *PR*
Dependent Variable: *Leverage*

	Model A		Model B		Model C		Model D	
Variable	Coeff.	*t*-ratio	Coeff.	*t*-ratio	Coeff.	*t*-ratio	Coeff.	*t*-ratio
VOLCV	.0002	1.87**	.0002	1.71**	.0002	1.98**	.0002	1.73**
FXSEN					.0809	2.55***	.0908	2.83***
PR					.1717	2.89***	.1664	2.88***
UNQ	−.9900	−5.75***	−.9495	−4.54***	−.9708	−5.97***	−.8876	−4.48***
NOC	−.0028	−2.89***	−.0027	−2.66***	−.0042	−4.02***	−.0041	−3.96***
L*SIZE*	.0165	1.63*	.0131	1.17	.0189	1.98**	.0172	1.68**
ID1			−.0195	−0.31			−.0460	−0.89
ID2			.1160	0.93			.1145	1.48*
ID3			.0298	0.43			.0072	0.11
ID4			.0401	0.83			.0414	0.94
ID5			.0175	0.07			.0146	−0.23
ID6			−.0042	−0.09			−.0098	−0.24
ID7			.0189	0.40			.0170	0.40
ID8			.0384	0.54			.0300	0.46
ID9			.0429	0.05			.0302	0.73
Constant	.1958	2.61***	.2013	2.33***	.1022	1.45*	.1004	1.28
R-square	.1945		.2093		.2595		.2783	
Adj. *R*-square	.1788		.1569		.2376		.2225	
F-value	12.39***		3.99***		11.85***		4.99***	

Heteroskedastic-consistent *t*-ratios are reported.
Significance: *** = .01, ** = .05, * = .10.

The results are reported in Table 6. Model A is estimated without controlling for industry effects. The *VOLCV* variable is positive and significant at the 5% level, and the *UNQ* and *NOC* terms are negative and significant at the 1% level. The results do not change qualitatively when the industry effects are controlled for in Model B.

The sign of the volatility coefficients does not support the notion of an inverse relationship between business risk and leverage commonly discussed in the textbooks.[8]

Next, the regressions are repeated with the addition of the *FXSEN* and *PR* terms:

$$LEVERAGE = f(VOL, FXSEN, PR, UNQ, NOC, LSIZE),$$

and the results are reported in Table 6.[9] Model C reports the results without controlling for industry effects, whereas Model D includes the nine industry dummy variables. The *FXSEN* and *PR* variables enter both models with positive and highly significant coefficients, and the signs and significance of the other variables remain essentially unchanged. The results are again qualitatively similar with and without the industry dummy variables.

The sign of the *FXSEN* term does not support the hypothesis of a negative relationship between leverage and exchange rate sensitivity. However, this result is consistent with the notion that, since capital structure is one means by which MNCs can manage exchange risk, firms with higher *FXSEN* levels could have higher debt ratios. Firms can raise debt in local currencies in which they have expected foreign currency receipts, and thus reduce their net exchange risk exposures. However, since this hedging is not perfect, residual *FXSEN* will still be observed. Hence, the positive relationship between leverage and *FXSEN* could be evidence of MNCs' imperfect attempts to manage exchange risk.

The conclusion that MNCs use debt policy to manage exchange rate exposure is, however, tentative at best. A stronger test would be to measure separately the firm's return sensitivity to each of the currencies in which it has receipts, and compare these with the proportion of debt it issues in each currency. Unfortunately, however, the currency composition of debt for a large sample of MNCs was not available.

The sign of the political risk term (*PR*) is positive and significant at the .01 level in both regressions. This result supports the hypothesis that MNCs use debt policy as a tool to hedge political risk. The strong significance of the results is surprising given the rather coarse political risk indicator available. Knowledge of the proportion of direct foreign investment in each country would allow for a stronger political risk measure. Nevertheless, the high significance of the admittedly limited political risk proxy suggests that political risk is an important factor affecting MNC target debt levels.

The coefficients on the *UNQ* term in both regressions are negative and highly significant. This is consistent with the hypothesis that firms with a higher proportion of their value represented by real options (or intangible assets) have higher agency costs of debt, and thus lower optimal debt levels.

The coefficients on the *NOC* term are also negative and highly significant in both regressions. This result supports the hypothesis that there is a negative relationship between leverage and monitoring costs, and that monitoring costs for MNCs increase with the number of countries in which the firm operates.

CONCLUSION

Multinational corporations operate in an international environment, encountering economic forces and opportunities not faced by their purely domestic counterparts. It is therefore likely that these multinationals must consider additional factors in determining their target capital structures. However, the existing empirical evidence either ignores international factors completely or implicitly assumes that they are adequately proxied by the standard business risk measures. This study examined whether there are systematic differences between multinational and domestic firms in the traditional factors thought to determine capital structure, and whether there are additional international factors relevant to the multinational capital structure decision.

The results indicate that, contrary to common expectations, multinational corporations appear to have lower target debt ratios than purely domestic firms. Furthermore, international diversification does not appear to lower earnings volatility. Hence, the proposition that MNCs should be able to carry more debt in their capital structures because they are able to diversify across several less than perfectly correlated national economies is not supported.

The notion that target debt levels are determined by a trade-off between the tax advantages of debt and expected bankruptcy costs is also not supported for the sample of multinational corporations examined here. In fact, leverage is found to be positively related to volatility. It appears that for multinational corporations, the real trade-off is between the tax advantages and agency costs of debt. Leverage is found to be negatively related to two different agency cost proxies, and multinationals appear to have higher agency costs than purely domestic firms. The higher agency costs of debt financing could explain the fact that MNCs have lower target debt ratios.

The specific international factors of exchange rate risk and political risk have been ignored in previous empirical studies. However, leverage is found to be positively related to both of these factors for the sample of MNCs examined here. These findings are consistent with the use of capital structure as a tool to hedge political risk and economic exchange rate risk.

NOTES

1. See, for example, Abdullah [1987], Eiteman and Stonehill [1994], Madura [1995], and Shapiro [1992].

2. See Harris and Raviv [1991] for an excellent summary of the capital structure literature.

3. See Laurence Bromhead. 1989. Country risk – A slightly riskier place. *Euromoney*, September: 206–207. *Euromoney* publishes this ranking of country risk every year in September. In 1989, the twenty safest countries were considered to be Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, South Korea, Spain, Sweden, Switzerland and the United Kingdom.

4. A referee pointed out that this proxy cannot distinguish between different levels of political risk within a given country. This is an admitted weakness in the proxy for which subsidiary-level direct foreign investment data would be required to correct.

5. This proxy is also consistent with Scott's [1977] secured debt hypothesis.

6. The size and industry classifications are arbitrary. The industry classification scheme follows Fama and French [1986].

7. The correlation between *VOLITA* and L*SIZE* across the sample of MNC10 firms is −0.3439.

8. To test for the U-shaped relationship between leverage and volatility proposed by Kale et al. [1991], the regressions were also estimated with a squared volatility term. The square terms were negative and the signs of the other terms remained unchanged. Hence, using a sample of MNCs only, no support is found for the Kale et al. model.

9. One possible explanation for the lower observed MNC debt ratios is that, due to foreign tax credits, debt tax shields are less valuable. To test for this possibility, the regressions in Table 6 were repeated with a non-debt tax shield proxy. The results remained qualitatively unchanged; the non-debt tax shield proxy was insignificant in all models.

REFERENCES

Abdullah, Faud. 1987. *Financial management and the multinational firm*. Englewood Cliffs, N.J.: Prentice-Hall.

Adler, Michael & Bernard Dumas. 1984. Exposure to currency risk: Definition and measurement. *Financial Management*, 13: 41–50.

Barnea, Amir, Robert Haugen & Lemma Senbet. 1985. *Agency problems and financial contracting*. Englewood Cliffs, N.J.: Prentice-Hall.

Bradley, Michael, Gregg A. Jarrell & E. Han Kim. 1984. On the existence of an optimal capital structure: Theory and evidence. *Journal of Finance*, 39: 857–80.

Caves, Richard. 1971. International corporations: The industrial economics of foreign investment. *Economica*, 38: 1–27.

——. 1974. Causes of direct investment: Foreign firms shares in Canadian and U.K. manufacturing industries. *Review of Economics and Statistics*, 56: 270–93.

——. 1982. *Multinational enterprises and economic analysis*. New York: Cambridge University Press.

Chaplinsky, Susan. 1984. The economic determinants of leverage: Theory and evidence. Unpublished Ph.D. dissertation, University of Chicago.

Eiteman, David & Arthur Stonehill. 1994 (seventh edition). *Multinational business finance*. Reading, Mass.: Addison-Wesley.

Errunza, Vihang R. & Lemma W. Senbet. 1981. The effects of international operations on the market value of the firm: Theory and evidence. *Journal of Finance,* 36: 401–17.

——. 1984. International corporate diversification, market valuation, and size-adjusted evidence. *Journal of Finance,* 39: 727–45.

Fama, Eugene & Kenneth French. 1986. Common factors in the serial correlation of stock returns. CRSP Working Paper No. 200. Center for Research in Security Prices, University of Chicago.

Fatemi, Ali M. 1988. The effect of international diversification on corporate financing policy. *Journal of Business Research,* 16: 17–30.

——. 1984. Shareholder benefits from corporate international diversification. *Journal of Finance,* 39: 1325–44.

Geyikdagi, Yasar M. 1981. The cost of equity capital and risk of 28 U.S. multinational corporations vs. 28 U.S. domestic corporations: 1965–1978. *Management International Review,* 21: 89–94.

Harris, Milton & Artur Raviv. 1991. The theory of capital structure. *Journal of Finance,* 46: 297–355.

Kale, Jayant R., Thomas H. Noe & Gabriel G. Ramirez. 1991. The effect of business risk on corporate capital structure: Theory and evidence. *Journal of Finance,* 46: 1693–1715.

Kim, Wi Saeng & Esmeralda O. Lyn. 1986. Excess market value, the multinational corporation, and Tobin's q-ratio. *Journal of International Business Studies,* 17(1): 119–25.

Lee, Kwang Chul & Chuck C.Y. Kwok. 1988. Multinational corporations vs. domestic corporations: International environmental factors and determinants of capital structure. *Journal of International Business Studies,* 19(2): 195–217.

Lee, Kwang Chul. 1986. The capital structure of the multinational corporation: International factors and multinationality. Unpublished Ph.D. dissertation, University of South Carolina.

Madura, Jeff. 1983. Empirical measurement of exchange rate betas. *Journal of Portfolio Management,* 9: 43–46.

——. 1995 (fourth edition). *International financial management.* St. Paul, Minn.: West.

Michel, Allen & Israel Shaked. 1986. Multinational corporations vs. domestic corporations: Financial performance and characteristics. *Journal of International Business Studies,* 17(3): 89–100.

Myers, Stewart. 1977. Determinants of corporate borrowing. *Journal of Financial Economics,* 5: 146–75.

Scott, James. 1977. Bankruptcy, secured debt, and optimal capital structure. *Journal of Finance,* 32(1): 1–19.

Shaked, Israel. 1986. Are multinational corporations safer? *Journal of International Business Studies,* 17(1): 83–106.

Shapiro, Alan C. 1992 (fourth edition). *Multinational financial management.* Boston: Allyn and Bacon.

Stanley, Marjorie & Stanley Block. 1983. An empirical study of management and financial variables influencing capital budgeting decisions for multinational corporations in the 1980s. *Management International Review,* 23: 61–72.